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IIPE MANUFACTURING NEWS

Editor-in-chief
Dr. K. Gopalakrishnan

Monthly Newsletter of the Indian Institution of Production Engineers

Vol. 05 Issue: 01 Annual Subscription: Rs. 60 December 2018

IIPE Welcomes

Mr. Aniruddh Kumar Director, Rail & Metro, BEML Ltd

Vice Chairman, IIPE, Dr. L.V. Muralikrishna Reddy (Left) and GC Member, Dr. Enti Rangareddy (Right) presenting IIPE Life Fellow Membership Certificate to Mr. Aniruddh Kumar (Centre)

From the Pages of History...

National Chairman/ Period	End of Financial Year As on	Audited Statement Bank Balance in Rs.	National Secretary
IIPE Estd. 30.04.1977 @ New Delhi	1977-1993	No Records	No Records Available
Mr. W.S. Venkateswaran (1993-2001) (Shifted NHQ to Bangalore in 1997)	31.03.2000	1,47,095/-	Mr. S. Rajagopalan, Vice Chairman
	31.03.2001	**42,720/-**	
Mr. V. K. Iyer (2001-2003)	31.03.2002	75,292/-	Mr. S. Rajagopalan
	31.03.2003	1,22,833/-	
Mr. O. P. Khanna (2003-2005)	31.03.2004	1,98,313/-	Mr. R. Chandrasekar
	31.03.2005	2,21,555/-	
Mr. M. S. Zahed (2005-07)	31.03.2006	1,80,924/-	
	31.03.2007	1,46,838/-	
Mr. A. K. Saxena (2007-09)	31.03.2008	1,93,147/-	Dr. U. Chandrasekar
	31.03.2009	2,39,023/-	
Padmashri. Prof. R. M. Vasagam (2010-Till Date)	31.03.2010	2,74,953/-	Dr. K. Gopalakrishnan Audited Statement of Accounts Available at IIPE-NHQ as presented in GCM/AGM
	31.03.2011	3,34,508/-	
	31.03.2012	3,82,934/-	
	31.03.2013	3,65,257/-	
	31.03.2014	1,65,460/-	
	31.03.2015	**4,95,644/-**	
	31.03.2016	3,34,252/-	
	FD A/c	**6,00,000/-**	
	31.03.2017	2,93,339/-	
	FD A/c	**6,00,000/-**	
	31.03.2018	1,01,321/-	
	FD A/c	**6,00,000/-**	

CHAIRMAN'S MESSAGE

I am glad that the IIPE news letter is launched in online mode from now onwards and will have wider reach among the IIPE fraternity carrying information on major developments in manufacturing field at national and international arena. With India trying to regain its due share in manufacturing field this is a timely step. India is opening up its aerospace, automotive marine and rail transport sector foreign investment with technology transfer will make Indian products to become world class. Simultaneously research and innovation by Indian institutions will enable original products to compete in international market in near future.

India has to modernise its plants, work force and go ahead with state of the art tools and techniques by completely adopting digital manufacturing route. IIPE can play effective role in ushering in Industry 4.0 revolution in India. A focused effort has to be mounted by academic institutions, research laboratories and Industry is called for in a synergistic manner. Policy frame work has to transform announcements to achievements.

It is hoped that the online newsletter will become an effective means for timely communications tool in the hands of stakeholders. Let us all make it a grand success!

Prof. R. M. Vasagam
Padma Shri Awardee
National Chairman, IIPE

Industry 4.0

Factories of the Future

Global manufacturing competitiveness is based on advanced technologies that are integrating the physical and digital systems through the emerging paradigm of cyber-physical systems. This technology stack commonly referred to as "Industry 4.0" is the convergence of advanced hardware and software, sensors, connected systems-also referred to as Internet of Things (IoT), predictive analytics, smart materials and automated factories resulting in significant benefit to society through smart processes and products that network suppliers, manufacturers, and customers. Advances in information technology including enhanced computational power, connected networks and data volume along with progress in the semiconductor industry resulting in low power devices are being leveraged to build wide-area networks, and create the "connected enterprise" of the future.

The intrinsic ability of Industry 4.0 to act as an economic game changer through enhanced manufacturing flexibility was postulated by Germany, and slowly gained acceptance across the manufacturing world. The core technologies of Industry 4.0 were referred to by geography-specific nomenclature including "Advanced Manufacturing Partnership 2.0" in the USA; "Revitalization and Robots Strategy" in Japan; "Industries du future" in France; "Intelligent Factories Culture" in Italy; "Made in China 2025", amongst others.

Process of strengthening the Manufacturing Industry, and enhancement of the competitiveness of Indian Manufacturing Industry are gaining momentum. Some mission-mode initiatives being pursued by the Government of India in tandem with flagship programmes "Make in India", Digital India, and "Green Corridor", amongst others. While the New Industrial Revolution may not have reached its complete potential, India's march towards global manufacturing excellence and supremacy has started garnering considerable attention across the world.

Manufacturing has emerged as one of the high-growth sectors with the potential to significantly transform the Indian economy. Industry analyst reports predict that India is likely to become the fifth largest manufacturing nation in the world by the year 2020. India has set an ambitious target to increase its manufacturing output to 25 percent of GDP by 2025 from the current 16 percent. With this expansion, the Indian manufacturing industry has the potential to touch USD one trillion in revenues while creating 90 million jobs, thereby becoming the global 'Manufacturing Hub.'

Industry 4.0 with a focus on "Smart Manufacturing" is the only viable solution to accelerate business growth and enhance productivity. Globally, the Automotive Industry has been a pioneer in implementing "Industry 4.0" movement. In India,

India's "Growth Drivers including "Make-In-India", "Green Corridors", "Digital India" and "Smart Cities" articulate the Government's intention to increase investments and innovation, grow skills, protect IPR, and build world-class manufacturing infrastructure and pave the way for accelerating growth by creating alignment with Industry 4.0. The "Digital India" initiative of the Government of India will enhance the focus on IoT as a solution platform for contemporary challenges.

the automotive industry has been an early adopter of "Industry 4.0" by adopting contemporary technologies including the Internet of Things. India is currently assessed to be leading the IoT penetration with market share being expected to climb to 20 percent in the next five years.

India is positioned to leverage the significant advantages of a generous supply of skilled workforce, cost-viable manufacturing, and resilient engineering educational system completing the ecosystem for seamless adoption of "Industry 4.0". The recently adopted Goods and Service Tax enhances the competitiveness of the Indian manufacturing sector by streamlining the ease of doing business while passing on cost benefits to small manufacturers.

India is all set to adopt "Industry 4.0", an industrial revolution surpassing the previous three while contributing to establishing new standards for Global Manufacturing Competitiveness.

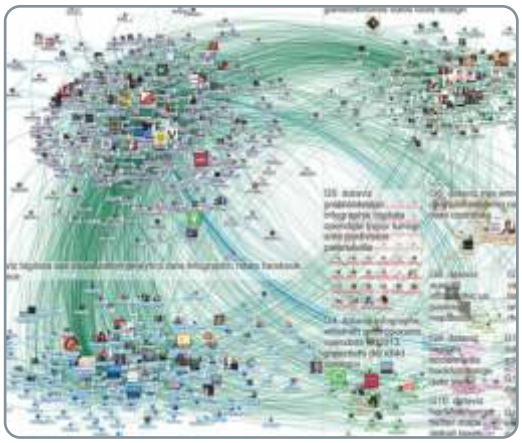
TEN Technology Pillars of Industry 4.0

Digital technologies are being used in the manufacturing sector for quick some time, but with Industry 4.0, it will transform production outlook. Industry 4.0 drive has the power to usher in higher efficiency, and completely revolutionize the classical production relationships between people and machine; and between suppliers, producers, and customers.

The ten technologies that form the foundation for Industry 4.0 have been in use for a while in silos; it is only now that they are being brought into play in a cogent, integrated manner to optimize production flow, and articulate tangible benefits.

The Industrial Internet of Things

Industry 4.0 implies that more devices, including unfinished products, will feature embedded computing and intelligence. This will allow devices in the field to communicate with one another, exchange information, and possibly direct each other; and communicate with centralized controllers. IIoT will decentralize analytics and decision-making, while facilitating real-time responses. Industry analysts are projecting that by 2025, more than 100 billion of IoT connected devices would have been installed and functional.



Augmented Reality

Augmented-reality based systems are finding service in new areas including send repair instructions over mobile devices, and selecting parts in a warehouse. It is expected that augmented reality will empower the workforce of tomorrow with real-time information to improve decision making and work processes.

System Integration

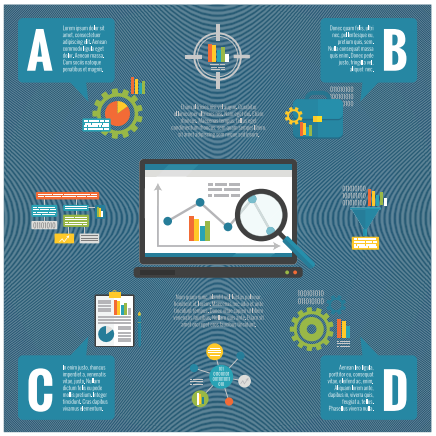
The adoption of Industry 4.0 technology stack will facilitate seamless integration across organizations, departments, functions, and capabilities to help the enterprise emerge as more cohesive, data-integrated network enabling automated value chains. The data-driven collaboration platform manages the complete task of exchanging product and production data across multiple stakeholders and functional owners.

Autonomous Robots

The basic tenet of Industry 4.0 is autonomous production methods that are becoming a reality across many industries including manufacturing. The autonomous robots can complete tasks with minimal human input. Raw material and work-in-progress material can be transported across the factory floor by autonomous mobile robots (AMRs), avoiding obstacles, coordinating with fleet-mates, and identifying where pickups and drop-offs can be made in real-time. It is expected that the deployment of autonomous robots will be high in Automotive, MedTech, Energy, Electronics, and Transportation sectors, with about 1.8 million robots being in operation worldwide.

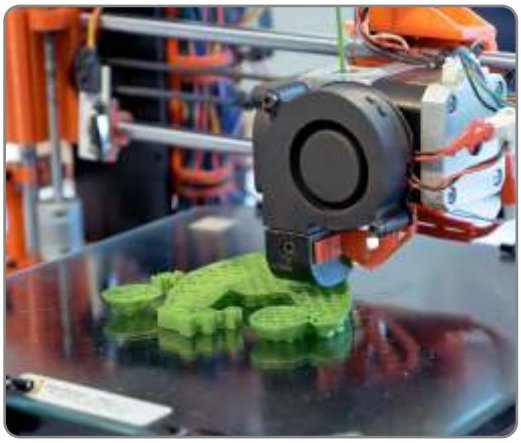
Big Data and Analytics

The advent of Industry 4.0 has made Big Data a key component in the context of enabling technology to furnish actionable insights. The IIoT ecosystem enables machines to gain data intelligence from the environment using sensors and related systems. Big Data and Analytics makes it feasible for data to be utilized by Manufacturing Execution Systems (MES), resulting in the realization of the concept “smart factory”.



Simulation

Simulation has emerged as a powerful tool for optimization of plant operations by creating a virtual model of the physical plant including machines, humans, materials, and processes, and utilizing real-time data. This virtual model facilitates the operators to optimize the machine settings and test for the next product before initiating the physical changeover. This helps increase quality and slash machine setup time.



Additive Manufacturing

3D printing technologies are becoming pervasive, and are being used to produce small batches of customized products faster with increased flexibility, enhanced precision, minimal prototype construction, fewer dies, and lower post-processing effort. Additive manufacturing and 3D printing have the potential to turn data into components and products at an incredible speed.

Cloud Platform

Industry 4.0 and IIoT rely on powerful information technology systems to securely process industrial device data to automate and optimize business processes, creating a more efficient supply chain and facilitating predictive maintenance. The Cloud platform can be scaled resulting in flexible service provisioning, providing predictable performance in the context of varying magnitude of interconnected devices.

Artificial Intelligence

Artificial Intelligence (AI) is a methodology teaching machines and computers to make decisions. AI includes a suite of technologies including Machine Learning algorithms, Natural Language Processing, automated reasoning, and knowledge representation. Robotic applications apply the experiential knowledge of a human expert to account for every possible situation that may arise in a manufacturing operation. Using Deep Learning tools, it is possible to make robots adaptive and biological in nature, enhancing the mimicking of humans.

With enhanced connectivity and use of standard communications protocols becoming pervasive through the adoption of Industry 4.0, it is essential to ensure a framework for reliable, secure communication with robust identity and access management of machines and users.

Cyber Security

Industry 4.0 presents tremendous opportunities for innovative producers, system suppliers, nations, and geographical entities. To have a successful adoption of Industry 4.0, it is imperative for the country to build capacity through well-conceptualized skill development programmes.

Future Factories

Manufacturing has always been a sector that creates more jobs and helps produce goods for domestic consumption, and if feasible, for export.

The advent of technology has transformed manufacturing from being narrowly focused on production and converting raw material into physical products, to include revenue generation across the wider, encompassing value chain.

Future factories will be based on emerging technologies that are interdisciplinary in nature. Rapid progress in technology, increasing levels of automation, and globalization are transforming the basic operating model of manufacturers including planning, construction, operation and integration of factory networks.

Factories of the future will be more digital, virtual and resource-efficient. It will be an environment that is more connected, both in terms of information availability and flow, with machines speaking to, directing, and collaborating with each other.

Computer-aided design and simulation slash the time and cost of bringing new products and goods to market. Advanced robotics makes automation more flexible and cost-effective. Material properties can be significantly altered by addition of nanoparticles to extend product usage. Contemporary production processes including 3D printing make things by building layer upon layer of plastic and metals, and is being used by designers to make prototypes and finished products.

Tangible value is being created through the adoption of the “Future factories” paradigm. Industry analysts report that

The dream of “Factories of the Future” is in the direction of high-value manufacturing technologies which will be clean, high performance, user centric, environmently friendly and socially sustainable.

global manufacturers have reported increased efficiency and reduced costs by as much as 30% across the entire value chain, powered by improvements in overall operating efficiency, lower inventory levels, reduced energy and water costs, and significant reduction in incidents involving safety.

To effectively adopt the Industry 4.0 technology stack, it is essential to building a extensive repertoire of skills that span both the online and offline worlds. Future engineers will need to build specialized system skills for productivity enhancement including increasing efficiency, reducing waste; production-line skills including monitoring, coordination, quality control, knowledge of raw materials, production processes and techniques; soft skills including analytical thinking, problem-solving, and working with digital interfaces, amongst others.

Every organization is a potential digital enterprise, and the rapid and effective absorption of "digital" skills will determine how the MSME sector that accounts for 38% of the national GDP and employing more than eleven crore people will adopt Industry 4.0 to enhance productivity and efficiency.

Early adopters including leading multinational technology corporations such as Siemens, Mitsubishi, and General Electric possess a broad portfolio of production and automation solutions, and these are being utilized by numerous organizations to supplement or upgrade their infrastructure to be reckoned as "intelligent production systems".

Corporations including IBM, SAP and Cisco are expanding beyond ICT sector to penetrate the market for intelligent production.

Some of the Indian organizations that have adopted Industry 4.0 include Mahindra & Mahindra and the TATA Motors' unit in Pune where robots are building car body frames. "Smart Factory" where machines speak with each other is being set up in Bengaluru at the Indian Institute of Science's Centre for Product Design and Manufacturing with seed funding from The Boeing Company.

The "FACTORIES OF THE FUTURE" will be a plant crowded with Robots making Robots and intelligent systems. Industrial collaborative smart Robots are key drivers for the "GLOBAL NEXT GENERATION FACTORIES".

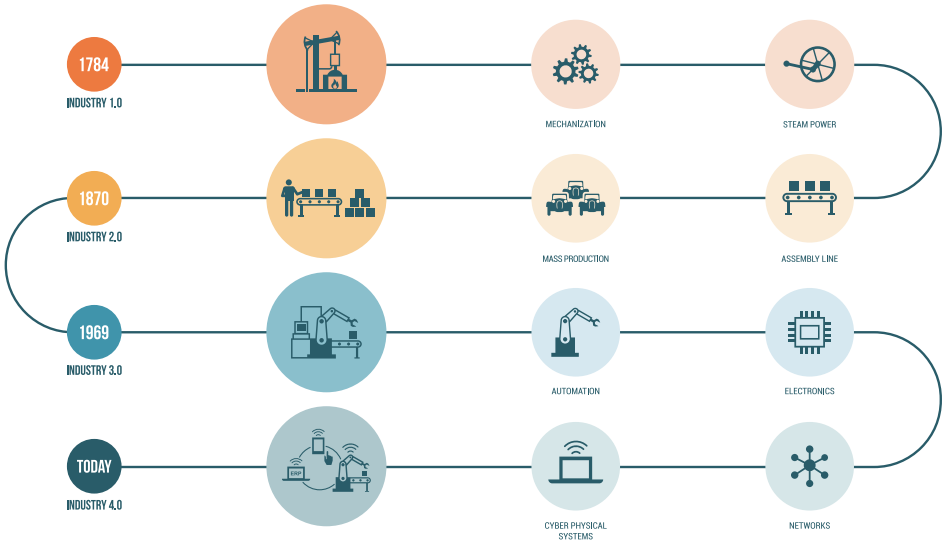
Impact of Industry 4.0

In its pursuit to strengthening the manufacturing ecosystem in the country, the Government's "Make in India" initiative is spearheading broader adoption of the Industry 4.0 technology stack, which in turn is driving the proliferation of IoT in the country. India's flagship programme, "Make in India" initiative has opened new vistas for the manufacturing industry, and has highlighted that emphasis on quality, commitment to localization of manufacturing processes, and synergy between the manufacturers and the Government would result in expanding the economy.

India's manufacturing sector has the potential and is on track to achieve a target of USD one trillion by about 2028. Manufacturing in India is all set to emerge out of the shadows of the service sector and is likely to grow to about 25% of the country's GDP and create about
90 million jobs by 2025.

The evolution of the Indian manufacturing industry is likely to have a very significant impact on planet Earth through its innate alignment with a "green" and clean environment. "Greening" of manufacturing through reduction in pollution, elimination of waste, and decrease in the consumption of natural resources would result in significant decrease in carbon emissions. Carbon dioxide emissions are getting slashed through the increased use of renewable sources like solar and wind power, with manufacturers taking on various initiatives to create "sustainable" and "smart factories".

Watch out!



Industry 4.0 will change our organizations; transforming our economy; reinventing the society; changing our lives.

Using machines, sensors and software, tomorrow's factories will be connected to enhance productivity and efficiency. While the manufacturing companies will benefit by the adoption of Industry 4.0, it is essential to assess the benefits accruing to the individual citizens.

The networked industry will enable the "configured" one-of-a-kind customized production of products, ushering in an era of centres of mass production making batches of one. Contemporary manufacturing methods and processes will enable optimal utilization of resources. In the future factory, the machines will organize themselves to a great extent assembling themselves into delivery chains, with orders transforming into production information, and output information flowing into the manufacturing process creating products.

Technological transformation results in creation of new job opportunities, strengthening the knowledge expansion in the workforce through developing competencies in process know-how, IT, and wirless and networking technologies. The expansion of contemporary state-of-the-art factories, and the creation of skilled workforce helps in preserving the competitiveness of the country through value creation. This is very critical for the country's economic growth through self-reliance.

IIPE Student Chapter Inaugurated at

KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION (DEEMED TO BE UNIVERSITY)

IIPE Student Chapter of Kalasalingam University, Krishnankoil has been inaugurated on 1st October 2018 at Admin Block Seminar Hall, Kalasalingam University by National Secretary of IIPE, **Dr. K. Gopalakrishnan** in befitting manner. During the inaugural function, **Prof. S. Kavitha** has welcomed the gathering followed by the opening remarks by **Dr. N. Rajini,** HoD, Mechanical Dept. Vice Chancellor of Kalasalingam University, **Dr. S. Saravanasankar** has delivered the Presidential Address. Over view of IIPE Student Chapter and Seminar has been presented by **Prof. P Jothiraj** followed by the introduction of Chief Guest by **Prof. S. Vignesh.** The Chief Guest, **Dr. K. Gopalakrishnan** was honoured by the VC, **Dr. S Saravansankar** and **Dr. J. T Winowlin Jappes,** Dean, School of Automotive and Mechanical Engineering (SAME). **Dr. K. Gopalakrishnan** has highlighted the need for IIPE Student Chapter and potential benefits of having vibrant professional societies' activities at any engineering educational institutions (EEIs) to bridge the gap between theory and practice during his inaugural address. Also he stressed that, such activities ensure the beyond curriculum learning and also bridge the knowledge gap with reference to the contemporary development and advancement of science and technology in particular in the backdrop of Industry 4.0! Office bearers of IIPE Student Chapter has been elected and announced. The meeting ended with Vote of thanks delivered by Prof. Anish Nair. All the faculty members of SAME and students have participated enthusiastically and made elaborate arrangements.

Vice Chancellor of Kalasalingam University,
Dr S. Saravanasankar delivering the Presidential Address

Office bearers of IIPE Student Chapter at Kalasalingam University




Office bearers of IIPE Student Chapter at Kalasalingam University

President
Mr. Esakki Raja G

Vice- President
Mr. Subramanian RM
Mr. Wilkins Marshal S

Secretary
Mr. Vikasvarma G

Treasurer
Mr. Sashi Krishnan J

Executive Committee: (Representatives)
- Mr.SanthoshN (Coordinator)
- Mr.Vinay Kumar A
- Mr.Saravana Kumar R
- Mr.Surya V
- Mr.Saronithan PM
- Mr.VenkataSaiCharanD

IIPE Faculty Coordinator: **Mrs. S. Kavitha**
IIPE Advisor: **Dr. N. Rajini**, HoD/Mech
IIPE Mentor: **Dr. J T Winowlin Jappes,** Dean, SAME

Historical Activity of IIPE Student Chapter at Kalasalingam University

IIPE Student Chapter has started to spearheading the "Students' Satellite Programme of Kalasalingam University". As a first ever technical activity coordinated by IIPE Student Chapter Office Bearers at Board Room of Department of Mechanical Engineering; "Sensitisation Workshop on Pico, Nano and Micro Satellite (PNM Sat)" has been conducted. Dr. K. Gopalakrishnan, National Secretary, IIPE and Convener of Indo-Israel 75 Students' Satellite Consortium has delineated the need and impact of small CubSats as an interdisciplinary initiative at EEIs in the emerging contemporary space scenario. He also highlighted, "Nanosatellites and CubeSats have matured from pure educational projects to in-orbit demonstrators. Turn-key CubeSat and nanosat/picosat missions are possible with the help of Innovative Solutions from Consortium of Space Scientists, MSMEs in Space Programmes under the initiative of Indian Technology Congress association. ISISpace engineers were responsible for the integration of 101 CubeSats onto the PSLV launch vehicle of ISRO, a true world record has been created with a launch of 104 Satellites (3 more by ISRO)!. Among these 101 satellites, there are 3 satellites where ISISpace, Netherlands played a major role in the design, development and implementation of the spacecraft. They are able to deliver small satellites ready for launch in 6 to 18 months. They also have ample experience with working with a broad range of standardized CubeSat and nanosat parts from various vendors and if needed, customized solutions will be implemented. Customers for satellite missions include government agencies, research institutes, universities and commercial companies". The entire team of Kalasalingam University has resolved to go ahead with their own "Students' Satellite Programme" and IIPE Student Chapter had its own professional mark among professional societies at University in a big way in its maiden attempt!


IIPE Chapter Inaugurated at **SNS COLLEGE OF ENGINEERING**

Dignitaries on Dias


Lighting of the Lamp


Dr. P. G. Rajamohan Addressing the Gathering


Mr. P. R. Vijayakumar Addressing the Gathering


Students Interacting with Mr.P.R.Vijayakumar, Plant Head, Steer Engineering Private Limited

The Department of Mechanical Engineering Inaugurated the Indian Institution of Production Engineers Student Chapter, Mechanical Engineering Association & SAE INDIA-SNSCE Collegiate Club. **Dr. P. G. Rajamohan,** Senior Manager, HR & Admin, Steer Engineering Private Limited, Coimbatore & **Mr. P. R. Vijayakumar,** Plant Head, Steer Engineering Private Limited, Coimbatore were the Chief Guest and Guest of Honour for the function held at SNS College of Engineering, Coimbatore on 19-07-2018.

Dr. N. Suresh Kumar, Principal, SNSCE Presided over the function & **Dr. R. Sudhakaran,** Vice Principal & HoD/Mechanical welcomed the gathering. Chief Guest **Dr. P. G. Rajamohan** addrssed the gathering about **"How students should prepare themselves for Industrial Needs?"**

Guest of Honour **Mr. P. R. Vijayakumar** elobrated on **"Evolution of Industry 1.0 to 4.0".** They also answered to the questions posted by student participants.


Office Bearers of Mechanical Engineering Association, IIPE & SAE


Guests Interacting in Principal Chamber

Printing and Published by:

Indian Institute of Production Engineers
National Head Quarters:
#117, 3rd Main, 3rd Cross, BEML Layout,
Basaveswara Nagar, Bengaluru - 560079

To: