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# INDUSTRIAL AUTOMATION

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Dear Subscriber,

Keeping up to the promise of delivering high quality content consisting of industry updates, industry experts speaking on topics of their expertise, We are glad to announce the Special Edition of the magazine which will be released in the month of **November 2021**.

If you wish to participate in the edition please let us know by writing to us by on below mentioned email address **beni@industrialautomationindia.in**

Regards,

Team Industrial Automation



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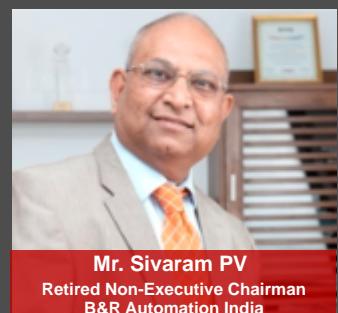
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# INDUSTRIAL AUTOMATION

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## From The Editor

**C**omplacency breeds carelessness and invites trouble. After going through a harsh lockdown that witnessed much disruption of civic life and the economy, just as things had started to improve, cases of Covid-19 are surging again in a few States. The fact that there are reports of new strains making appearance among these cases is a cause for concern. As the government has systematically gone ahead with the opening of business activities with progressive relaxation in lockdown conditions, it is the duty of the citizens not to drop guard and observe the basic precautions of wearing a proper mask and following the hygiene protocol. People at large could do well staying away from crowds - public gatherings or private functions - the ideal hotspots for contracting the virus. With more and more groups of citizens now becoming eligible for the vaccine, a little more of patience and precautions is the need of the hour.

The Cover Story this month examines the relevance of Fluid Power in face of the growing clout and convenience of electrical actuation finding favour where traditionally hydraulics and pneumatics were the first choice. We have an eminent panel of experts debating the issue and the consensus is Fluid Power is not only very much relevant today, but is also in step with the recent trends in automation in the IIoT era.

In recent weeks, newspaper headlines were abuzz and the social media was celebrating the success of Manya Singh, the daughter of a rickshaw driver, who beat circumstances and the odds to emerge a Runner-Up in the Miss India pageant. Prior to that, there were similar stories of women from mofussil towns and subaltern classes emerging successful in various competitive exams and professional courses, often outshining their male peers. The Indian woman has long come out of the home and hearth, both in urban and rural settings, to become a breadwinner for the family. But today, she is no longer satisfied with routine the desk bound job and is storming what was traditionally considered the male bastion - the world of engineering and the rough and tumble of field work. SAIL - a Maharatna PSU - is headed by a woman. Across the corporate world, several women are today in senior executive positions, waiting in the wings for entry to the centre stage. Many are also taking to entrepreneurship.

This edition of Industrial Automation celebrates the success of women in the technology arena, talking about their experience on the eve of the International Women's Day celebrated universally on March 8. What is remarkable about the stories that come through these interactions is the confidence, grit and determination shown by women in accepting challenges and breaking barriers.

A handwritten signature in black ink that reads 'Arokiaswamy'.

Dr. M Arokiaswamy  
Editor & Publisher

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## SIC Marking establishes itself as the preferred supplier



After a dynamic year in 2019, both in terms of acquiring new customers and enriching its product range, SIC Marking Group is continuing its momentum and multiplying its successes with key accounts in the automotive, medical, aeronautics and mechanical engineering sectors.

"Thanks to a centralised sales team at headquarters, key accounts can rely on a single point of contact for the worldwide management of their marking machine requirements" says Eric Brechenmacher, Sales and Marketing Director of SIC Marking Group. This personalised support is essential to the success of the French group and is reinforced by a worldwide presence, the result of a network of 10 subsidiaries and 45 distributors. In constant evolution, notably with the recent acquisition of a subsidiary in South Korea in 2018, SIC Marking's network enables it to provide local service and maintenance, at the best cost and with the greatest reactivity wherever customers have factories. In fact, Éric Brechenmacher confirms, "All the network members have trained technicians and a local stock of spare parts that enable them to intervene extremely quickly without costly travel by head office staff".

As the world leader in industrial traceability, SIC Marking Group has 3 competence centres in Europe, America and Asia, enabling it to offer specific marking solutions, developed and studied locally for customer needs. In addition to this, a wide range of standard products has been developed throughout its 30 years of experience. Indeed, no less than 3 new products are launched every year in addition to the numerous evolutions of existing products.

## New Rockwell Automation safety devices enhance safety and productivity



The new Allen-Bradley SafeZone 3 laser scanner with CIP Safety over EtherNet/IP and Allen-Bradley GuardShield 450L light curtain with CIP Safety over EtherNet/IP plug-in give users access to critical data needed for a comprehensive picture of machine or production line status. Ultimately, these devices create smart machines that provide meaningful information so users can monitor machine health, increase uptime, improve flexibility and enhance safety, while lowering total cost of ownership.

These smart devices provide diagnostic information that can deliver valuable insights, such as where safety-related failures are occurring or if workers are following standard operating procedures. Users can put these insights to work to improve the productivity and sustainability of their production equipment.

"For many manufacturers, this new way to understand safety not only helps keep people and processes safe, but also significantly expands productivity," said Lee Lane, vice president and general manager, Sensing, Safety & Industrial Components Business, Rockwell Automation. "Traditional safety devices provide little or no data. Smart safety devices provide better visibility into operations and help users understand process states, environmental conditions, and other factors that affect safety and productivity."

## Danfoss drives solutions for metros in Chennai and Kolkata



Danfoss Industries Pvt Ltd, a pioneer and industry leader in energy-efficient technologies, strives to transform the sustainable outlook for metros in India, in association with metro rail corporations across the country.

In its latest partnership with the Kolkata Metro Rail Corporation (KMRC) and Chennai Metro Rail Ltd, (CMRL) the company is offering cutting edge Drives solutions of varying capacities, to enhance safety, comfort, energy efficiency, sustainability, and reliability of metro networks. Danfoss designs are unique, as they not only ensure safety and protection of the equipment but also help Metros meet their sustainability goals by reducing their overall carbon emissions and energy footprint. At both the KMRC and CMRL projects, the installation of Danfoss Variable Frequency Drives has contributed to 15%-25% energy savings across various applications.

"In a rapidly urbanising world, concerns of energy efficiency and carbon emissions have become paramount. In this regard, making urban mobility sustainable and climate-friendly is a critical element in paving the way for sustainable urbanisation in India. Danfoss' domain expertise in Heating, Ventilation and Air Conditioning solutions (HVAC) for metro applications comes from years of experience having worked closely with metro projects both in the domestic and global markets such as Dubai, China, USA, Singapore, etc., making Danfoss an ideal solutions provider,"

## Dassault Systèmes showcases digitalisation solutions at Aero India 2021



With the theme of showcasing 'Digitalisation to realise a thriving Aerospace, Defense and Space ecosystem', Dassault Systèmes at the 13th edition of Aero India 2021, showcased technology solutions to Improve Supply Chain Collaboration, to Design for Flexible Manufacturing, to Manage Complex Systems and Accelerate Program Integration and to Deliver High Performance Operations.

Experts from Dassault Systèmes discuss with interested visitors how to bridge the gap between the virtual and real world to accelerate concept to operations by 50% through industry solution experiences based on the 3DEXPERIENCE platform.

Across the Aerospace & Defense industry, rising customer expectations for lower costs, higher standards and increased capabilities along with growing program complexity continually make it more challenging to compete. As systems become more complex to design, build and deliver, OEMs and suppliers need to accelerate innovation, drive efficiencies and move to the factory of the future to allow for greater agility on production rates.

"The Aerospace & Defense sector in India is at an inflection point, given the large scale modernisation and indigenisation programs being undertaken by the Government. Companies in this sector have to cater to stakeholder expectations of lower costs, higher standards and increase capabilities along with growing program complexity.

## Rohde & Schwarz introduces the R&S SMM100A



Rohde & Schwarz has introduced the R&S SMM100A, the only vector signal generator with mmWave testing capabilities in its class. The instrument meets the rigorous expectations for generating digital signals for the most

advanced wireless communication devices entering production, as well as for developing future products and technologies.

Manufacturers of state-of-the-art 5G devices wishing to test the whole frequency range possible, expect to do so with a single signal generator for both 5G NR FR1 and FR2 frequencies. The new R&S SMM100A vector signal generator meets this need, displaying excellent RF characteristics across the entire frequency range from 100 MHz to 44 GHz. It covers all the bands used by any wireless standards, including LTE and 5G NR, as well as the latest WLAN standards Wi-Fi 6 and Wi-Fi 6E (up to 7.125 GHz). Wireless personal area networks such as Bluetooth® are covered, too. The instrument's maximum RF modulation bandwidth of 1 GHz meets requirements to generate the broadband signals used by devices making full use of the most demanding wireless standard specifications, including IEEE 802.15.4z Ultra-Wideband (HRP-UWB).

## B&R heralds new era of multidimensional manufacturing



With ACOPOS 6D, B&R heralds a new era of manufacturing. Magnetic levitating shuttles move individual products freely through the machine. Gone are the days when conventional transport systems imposed rigidly defined timing on the production process. ACOPOS 6D is ideal for small-batch production with frequent changeover between products of different designs and dimensions.

ACOPOS 6D is based on the principle of magnetic levitation: Shuttles with integrated permanent magnets float over the surface of electromagnetic motor segments. The modular motor segments are 240 x 240 millimetres in size and can be arranged freely in any shape. A variety of shuttle sizes carry payloads of 0.6 to 14 kilograms and reach speeds of up to 2 metres per second. They can move freely in two-dimensional space, rotate and tilt along three axes and offer precise control over the height of levitation. Altogether, that gives them six degrees of motion control freedom.

Space savings: ACOPOS 6D offers up to four times the shuttle density of other systems on the market through the unique ability to control four shuttles on the same motor segment simultaneously. The shuttles can also be used as axes in processing stations. An ACOPOS 6D shuttle carrying a workpiece could follow a CNC path, for example, allowing the processing tool to be mounted rigidly.

## Arctoris launches expanded robotic platform Ulysses



Arctoris Ltd, an Oxford-based technology company operating a fully automated drug discovery platform, celebrated its 5th anniversary on the 4th of February. Over the past five years, Arctoris has grown from a technology startup to a globally operating company delivering integrated drug discovery projects with partners on three continents from its headquarters in Oxford and its Asia-Pacific hub in Singapore. On the occasion of its 5th anniversary, Arctoris unveiled its new and expanded, next-generation robotic platform, Ulysses.

Arctoris was founded in 2016 by Martin-Immanuel Bittner MD DPhil (CEO) and Tom Fleming MChem (COO), as the world's first fully automated drug discovery platform. Through end-to-end automation, the company's unique technology platform rapidly delivers reliable, reproducible, and fully auditable datasets enabling better decision-making early in the drug discovery process. Looking back at the past five years, the company's CEO Dr Martin-Immanuel Bittner said "The drug discovery ecosystem is evolving rapidly, and the key to success is having access to the right data at the right time, to progress the right projects towards the clinic. Arctoris plays an important role in enabling true data-driven drug discovery globally, by generating the data that powers decisions in biotech and pharma companies on three continents."

Tom Fleming, COO of Arctoris, added "Drug discovery is undergoing a rapid digital metamorphosis, and Ulysses plays a central catalytic role in that transformation. This success is the result of our amazing team's dedication and hard work over these past five years, combined with guidance from experienced and insightful advisors and board members."

## OLA to deploy ABB robotics at its mega-factory



Ola has announced that it has selected ABB as one of its key partners for robotics and automation solutions for its mega-factory in India that will roll out the much-anticipated Ola electric scooter. Ola's scooter mega-factory, billed to be the world's largest scooter factory, is expected to be ready and operational in the coming months.

Ola will utilise ABB's automation solutions in its factory's key manufacturing process lines, including its painting and welding lines, while the ABB robots will be deployed extensively for the battery and motor assembly lines. These include ABB's "IRB 5500" paint and "IRB 2600" Integrated Dressing robots in its painting and welding lines, and "IRB 6700" robots for assembly and material handling in the battery and motor assembly areas.

ABB robots will be digitally integrated into Ola's AI-enabled mega-factory, to optimise robot performance, productivity and product quality. The use of ABB's robots and automation solutions will ensure remote digital connectivity and monitoring of the robots that will ride on Ola's proprietary AI engine and tech stack. Ola is building its mega-factory on Industry 4.0 principles and to be powered by its own proprietary AI Engine and tech stack that will be deeply integrated into all its systems, continuously self-learning and optimising every aspect of the manufacturing process.

## Linxon commissions Nepal's first 400 kV GIS substation



Linxon has successfully commissioned the first 400 kV Gas Insulated Substation (GIS) at Dhalkebar, Nepal on behalf of the Nepal Electricity Authority (NEA). The operation of the Dhalkebar substation is an important milestone for Nepal's hydropower sector and is the first 400 kV substation to enter operation in the country.

The substation was energised to full capacity, allowing the 400 kV Muzaffarpur (India) - Dhalkebar (Nepal) line to come into operation on November 11, 2020. During an inauguration ceremony on February 1, 2021, NEA has presented a certificate of commendation to Linxon India Private Ltd for the successful completion. The certificate was given by Shri K P Sharma Oli, Hon'ble Prime Minister of Nepal.

Completion of this project will facilitate the transmission up to 1,000 megawatts of electricity through Nepal's first ever high-voltage cross-border transmission line. The substation, being the major hub for power exchange between Nepal and India, will ease the process of importing power and help meet the increasing demand for electricity in Nepal whilst also facilitating the export of electricity to India when Nepal's capacity generated is surplus to demand. The operation of the 400 kV Dhalkebar substation will further ease the reliable transmission of electricity within Nepal, along the country's east-west axis.

## KBL launches app for e-Warranty Registration for their Pumps



Kirloskar Brothers Limited (KBL), the leading pump manufacturing company in India, has always believed in staying ahead of the tech curve. KBLOne4All mobile app remains one such tech innovation that enables e-warranty registration of pump at the click of a button. KBL, India's first and largest pump engineering company, which started manufacturing centrifugal pumps way back in 1926, is trusted worldwide for its innovative, high quality, and energy-efficient pumping solutions.

Over the years, KBL has undertaken numerous steps using various latest technologies towards improving its manufacturing processes, product quality and customer service experience and delivery. Continuing with its efforts in the same direction, the company introduced the KBLOne4All app, which has been developed with an aim to ensure the best customer service experience and enhance engagement with dealers, retailers and customers.

KBLOne4All app, which is available on Google Play Store and Apple store, facilitates hassle-free and paperless warranty registration of KBL products at the click of a button. Registration of warranty is crucial for verifying product authenticity and fast servicing, among others. The e-warranty assures the customer of KBL's prompt after-sales service support, duly backed by the company's extensive service network of 650+ authorised service centres.

The registration process is quite simple and user-friendly. All that the user needs to do is to simply download the KBLOne4All app on their Android device or iPhone and follow the five easy steps to complete the registration, which hardly takes a few minutes.

## AVEVA charts course for digital future for ships and shipbuilding



AVEVA, a global leader in engineering and industrial software, is at the helm of developing and deploying cutting edge software solutions to execute and operate more effective projects and provide the marine industry with finely tuned features to connect the business-critical processes of engineering, design, planning, construction and operations. These positive developments come at a time when the Covid-19 pandemic has sent shockwaves across the sector and is having a knock-on effect in terms of the economic stability of the industry.

"The marine industry is a pivotal part of global economic trade, with a staggering 90% of international trade being seaborne," said Panel Chairperson, David Thomson, Solutions Strategy Manager, for Marine, AVEVA. "As the industry adapts to changes in both the economic landscape and environmental regulations, at AVEVA we have developed tools to optimise project execution, shipyard operations, and vessel performance through digitalisation across the marine lifecycle. These tools have been proven in other industries, and we are now adapting and mapping them to the Marine sector."

Marine industry leaders shared their experiences around embracing technology to enhance the industry during the recent AVEVA World Digital (AWD) conference. The sector shares the challenge of attracting talent from younger generations with other heavy industries.

## Michell Bearings' unique capability a success for Nuclear Station Blackout



Failure of the on-site power generators concurrent with the loss of offsite power ultimately results in a station blackout condition as there is no on-site electricity available to power the high pressure oil injection system. In order to meet testing requirements, the bearing must be able to run down to a stop, under full load, and restart without any subsequent intervention. As part of the contract to supply six thrust and guide bearings, a custom made test rig was constructed at the Michell Bearings site in order to satisfy the test conditions.

The test rig was designed to closely replicate real world bearing operating conditions such as the possibility of a station blackout, where the bearings are required to shut down safely without the aid of electrical power to drive the reactor coolant pumps. The bearings were designed, manufactured and tested at the Michell Bearings manufacturing site based in Newcastle upon Tyne, UK. This latest success comes after Michell Bearings developed and successfully station blackout tested a set of thrust internals with a leading European reactor coolant pump manufacturer in 2018. Founded in Newcastle upon Tyne in 1920, this year Michell Bearings celebrates 100 years of manufacturing products including horizontal bearings, vertical bearings and tilting pad bearings for the industrial, commercial marine and naval markets.



**COVER STORY**

# Fluid Power @ IIOT

## Fluid Power @ IIoT

*Experts debate the relevance of Fluid Power in general, and automation industry in particular, in the IIoT era.*

The potential of Fluid Power has been exploited by mankind from times immemorial.

Blaise Pascal's discovery of the principles of the physics of fluid during the 17th century paved the way for systematic exploitation of fluid power, and the harnessing continues till date, in various applications. There was a time, not too long ago, when the extent a plant's automation was measured by the compressed air consumed. But with several technological advances, electrical actuation has gained considerable ground over fluid power in many applications in automation. So what exactly is the situation on the ground?

"Fluid power systems started becoming a major driving force in the industry in the early 20th century. Rapid growth occurred post World War II, when the need was felt to



**'Many people were expecting electrical drives to take over completely'**

**Shashank Gune**, CEO, Techtonic Engineering.

increase the productive efficiency of various industrial processes. Further technological advancements took place in the last 3 decades which continue even today," says



Shashank Gune, CEO, Techtonic Engineering, and an industry veteran in pneumatics, with more than 25 years of rich experience in the fluid power domain. According to him, the integration of electronics has spearheaded much of this growth into components and systems, moving from analog to digital electronics to network and wireless communication. These advancements in fluid power technology have made it more energy efficient, compact, sleek, user friendly and cost effective. "Many people were expecting electrical drives to take over completely from fluid power. However, this has not happened in practice, thanks to these technological advancements. In fact, the global market trends predict a decent growth at 5.3% CAGR for pneumatic actuators and 3.6% CAGR for hydraulic actuators over the next 3 years," he explains.

"Fundamentally, fluid power

actuation can always be backed up by electrical actuation in cases wherever fail-safe mode is more prominent. Otherwise, actuation achieved by fluid power is always a first choice of machine/equipment manufacturers as the existing system mechanism can be leveraged and even maintenance, reliability and availability can be much assured," says Tansen Chaudhari, Chief Operating Officer, Fluid Controls Pvt Ltd, a leading provider of instrumentation products and services.

"Not at all," says Chandrashekhar S Joshi, R&D Head and Embedded Systems Specialist, when asked if electrical automation is taking over the role of fluid power. "Whereas electrical actuation is being used increasingly, fluid power continues to play an important role as it is the one finally driving the device," he adds. Joshi has extensive experience of working in the field of process control and industrial automation.

"Well, it depends. There is no easy answer. It all depends on the system design and evaluation of performance, cost of the components, system costs, and performance. Precision, speed and safety are the primary considerations," explains



**'Fluid power actuation is the first choice of machine manufacturers'**

**Tansen Chaudhari**, Chief Operating Officer, Fluid Controls Pvt Ltd.

Sureshbabu Chigurupalli, Unit Head - Plant Operations at Balasore Alloys Limited, taking a more nuanced view. According to him, a fluid-powered actuator's functionality has an advantage over the electric actuator in its capacity to provide a simple fail to safe position function. The diaphragm and cylinder of a fluid-power actuator opposed by spring can move the valve to an open or closed position on the loss of fluid power. "For a process shutdown, the fluid-power actuator is the traditional choice. In contrast to fluid power actuators, electric actuators provide precise control and positioning. Low operation cost helps versatile machines to flexible processes. They are most economical when deployed on a moderate scale. In an era of digitalisation, electrical actuators' application focuses more on intelligent devices, Smart processes. Fluid power actuators are significant in sturdy applications," elaborates Sureshbabu.

K A Venkataraman, General Manager, Plant Operations, is of the opinion that though all types of automation is operated and

controlled electrically, the real work is still done by fluid power actuation, which means pneumatic or hydraulic actuators. "Electrical systems have still not replaced the final output or working element of an automation system. Pneumatic actuation/actuator is economically cheaper and reliable to handle low to moderate workloads and hydro-pneumatic or complete hydraulic actuators are cheaper to handle moderate to heavy workloads. Hence still electrical actuation has not taken over the others, at least in India and Asian countries," says Venkataraman, who is a seasoned Pneumatic Expert with product development and techno-commercial competencies. He has developed over a hundred types of valves, actuators, FRLs, etc., and 1000+ variants/models from those types.

"Fluid power will continue to play an important role in automation for decades to come. The application determines whether hydraulic or pneumatic or electrical actuator or combination of these is the right choice. For example, electrical actuators are more suited for low load, low noise medical applications like dental chairs whereas hydraulic actuators are preferred in heavy-duty work like large construction machinery, marine propulsion and cargo handling, military weapons and transportation systems," says Shrikant Bairagi, Managing Director, Argo-Hytos Pvt Ltd. A veteran of over 30 years, Shrikant has served on various industry bodies such as the Confederation of Indian Industries and Fluid Power Society of India, etc.

What are the advantages fluid power still offers vis-à-vis electromechanical drives?

"There are a vast number of applications where pneumatics and hydraulics are preferred over electric drives," says Shashank Gune. "Hydraulic technology is particularly used in heavy-duty applications, where brute force is required whilst pneumatic technology is chosen for

lightweight, high-speed and comparatively low-cost applications. Generally speaking fluid power can offer better force-to-weight ratio than electrical drives. In almost all industrial sectors, today's fluid power components offer specific benefits to ensure efficient operation and lower cost of ownership."

Tansen Chaudhari, points out the safety aspect. "Definitely, fluid power is safer in hazardous environments. Also, fluid power automation, if one compares weight over high horsepower, is more beneficial. High torque at low speeds can be easily achieved by fluid power. In fact, force or torque can be held constant for a long time. Indeed, long distance pressurised fluid power transmissions through complicated systems is quite possible with a minimal pressure loss. Reversing motion in fluid power is possible instantaneously. In fluid power transmission, elimination of complicated mechanical trains of gears, etc., is possible," he elaborates.

"For heavy-duty applications,



**'Hydraulics systems will continue to play important role in future too'**

**Chandrashekhar S Joshi**, R&D Head and Embedded Systems Specialist.

hydraulic drives offer many advantages like high power density (i.e., power-to-weight ratio), proven safety and security and mobility, etc. For quick and light work, electromechanical drives offer superior speed, power savings, precision, and leakage free operation," says Shrikant Bairagi, emphasising the prominent advantages.

What about the use of fluid power in the automotive sector, especially the heavy vehicles, which have accounted for much interest in hydraulics? Will the upsurge of electrical vehicles sound a death knell for hydraulics? "Large vehicles obviously need higher power and



**'Hybrid systems are becoming more common'**

**Sureshbabu Chigurupalli,**  
Unit Head - Plant Operations at  
Balasore Alloys Limited.

need to run for very long distances for critical and regular supplies distribution. Hydraulic systems will continue to be an option while working along with electrification as Hybrid vehicles for these ones. Whereas electric vehicles will offer most reliability, running range and charging stations availability is going to be a challenge. The cost of an EV is not going to come down in next 5-7 years unless disruptive inventions are done immediately. Hence hydraulic systems will continue to play an important role in future too," opines Chandrashekhar S Joshi.

Market research valued the electric truck market at USD 19.80 billion in 2020 and expected to register a CAGR of 14-15% during the forecast period (2021-2026). "Global demand for a cleaner environment and low-emission zones drive fleets to replace diesel trucks with EV options. India is among the fastest-growing economies and the third largest emitting country in the world. Petrol and diesel trucks are highly polluting. Stricter emission and fuel efficiency norms to deal with alarming pollution levels in most cities, vehicles with diesel engines may become a relic of the past by as early as the next decade. The advantage of electrical actuators is

that they are simple and low cost compared to the hydraulic system, which needs many more components. With increasing emphasis on reduced weight, electric actuators offer integrated designs where traditionally hydraulics or pneumatics have ruled the roost. Weak spots in the application, such as hoses and pumps, are eliminated by installing electric actuators. Easy installations, flexibility and energy efficiency, and compact design reduce trucks' overall weight, improving trucks' fuel efficiency. It will be difficult to conclude at this moment that electrical actuators can replace hydraulics in totality, as efficiency is the prime factor. Design of pump capacities, battery uptime, sturdy applications where more improvements expected, says Sureshbabu Chigurupalli, taking a holistic view.

But there are other, practical considerations. "Normally electronic or electric actuation cannot handle moderate to heavy workloads. For example, though a garbage handling truck can be an electrically operated vehicle itself in the near future, the tipper which can handle a huge weight of the garbage in the behind portion of the vehicle cannot be actuated electrically. It will continue as hydraulic actuation only for at least one to two decades from now. Even attaining the notable population of passenger EVs on roads that can replace the existing petrol/diesel-operated vehicles will take one decade," says K A Venkataraman.

Along with rest of the industry, even fluid power devices have benefitted from the advances emerging technologies have brought in. So what are the new trends that hold promise for hydraulics and pneumatics in the digital era? "There have been rapid advancements in fluid power technology over the past two decades on account of many factors, viz., Safety Standards & Compliance, Manufacturing Efficiency, Operational Efficiency and the Concept of Industry 4.0 and Industrial Internet of Things (IIoT). As a result, manufacturers of fluid

power equipment have worked on all of these factors to make their equipment in tune with these requirements, using advancements in the material technology and manufacturing - metal cutting technology, including 3D printing, and integration with electronics to make them smart and sleek," says Shashank Gune.

Tansen Chaudhari, concurs with these observations. "Industry 4.0 focuses on making the machines working smoothly and seemingly fine by communicating with other machines and giving signals to humans. The same data can be leveraged and analysed globally using IoT. Undoubtedly this would reduce the efforts spent on gathering, filtering and improving the efficiencies across the industry. Added to it Big-data analysis could be clubbed in the same revolution. The PLC can be used to increase the system level performance of hydraulics and pneumatics systems. With these combinations of systems with hydraulics and pneumatics systems, the products would pass on the health/performance data using



**'Almost all process industries are operated by fluid power automation systems'**

**K A Venkataraman,** General Manager,  
Plant Operations.

the IoT which can predict the system reliability, safety, and maintenance," he points out.

"New trends are more focusing on Miniaturisation, compact and straightforward designs. For instance, hydraulic pumps with electric drives are extremely precise and highly efficient, valves with embedded intelligence provide unprecedented accuracy and performance, and hydraulic hoses

predict when they will fail. Hybrid systems that mix hydraulics and electronics are becoming more common. More research and innovations are happening on high performance, compact envelope, and customisation, says Sureshbabu Chigurupalli.



**'ECU-controlled hydraulics systems are working with IIoT seamlessly'**

**Shrikant Bairagi**, Managing Director, Argo-Hytos Pvt Ltd.

Process industry is a major user of fluid power. How relevant is fluid power today in process industries? "Highly relevant," says Shrikant Bairagi, "as most of the main and sub-systems use hydraulics extensively. For example, turbine control systems, paper mill hydraulic systems, conveyor systems, apron feeders, wagon tipplers, side arm chargers, stacker reclaimers, etc.

Chandrashekhar S Joshi feels hydraulic systems find a niche place probably used jointly along with electrical power in process industries due to two distinct reasons: 1. Space and power density, and 2. Safety requirements like ATEX ones.

"Almost all the process industries are operated by fluid power automation systems only. For example, in oil & gas, mining, chemicals and power/energy sectors, they are transmitting operating or processing materials or operating fluids through different types of huge size hydraulic valves, say butterfly, globe, and knife-gate valves, which are operated either by pneumatic actuators only to provide and control the automation mechanism," says K A Venkataraman.

Are hydraulic and pneumatic devices

compatible and in step with digital technologies and integrate with IIoT seamlessly? "Indeed, hydraulic and pneumatic devices have been in place for a long time, and seamless integration with IoT, AI and other digital technologies has already begun. For any business segment, return-on-investment for this combination would be greatly achieved," says Tansen Chaudhari. "Aviation, Oil & Gas, Nuclear Power, Health-care, entertainment, logistics, etc., are few among many industries where blessings of the combined technologies have already begun with full throttle. Low aim would be a crime here in extracting the benefits!"

"With the emergence of the IIoT and Industry 4.0 started the extensive use of sensors throughout automation systems, including pneumatic and hydraulic components. Sensors have become smaller, more lightweight, and easier to use in various fluid power components, allowing measurement of temperatures, pressures, flow rates, cycle times, and valve response rates and so on. Even the simplest devices can provide crucial information at some point," observes Shashank Gune. "With all these developments and newer applications of fluid power in almost all the industry segments, we can safely say that fluid power systems are here to stay at least for a decade, if not more," he sums up.

"Nowadays hydraulic systems are controlled by electrical systems, which include various sensors too. The controllers as well as intelligent sensors can easily be compatible and integrated for IIoT environments. It is not a big deal at all," points out Chandrashekhar S Joshi.

"Predictive diagnostics software is a key player in IIoT-integration. Smart sensors and intelligence built-in diagnostic capabilities help monitor temperature, voltage, current, and even cycle counts. The massive amount of data these sensors produce creates an equally tremendous opportunity to transform how one operates and maintains industrial equipment. Predictive and

preventive maintenance programs are essential to efficiently manage equipment life cycles and maximise the overall equipment effectiveness (OEE) and increase return on investment," explains Sureshbabu Chigurupalli. "Using data from IIoT sensors, technicians can predict accurate information on deteriorating components and take corrective steps such as modulating stroke speed to enhance life. The value of any IIoT solution is directly proportional to its interoperability," he elaborates.

"Actually, this implementation/integration of hydro/pneumatic devices with IIoT has been started already in bigger industries already and now step down to MSME sector also wherever applicable/possible. In every automation, either hydraulic or pneumatic actuator is operated through electrical/solenoid valves only along with PLC/timer logic circuits. So for better control or sequencing of solenoid valves thus actuators are possible by communication systems used in IIoT devices," concurs K A Venkataraman.

"Yes. ECU and telematics-controlled hydraulics systems are already working with IIoT seamlessly," agrees Shrikant Bairagi. "Real-time machine status information, through remote monitoring and data expertise allowing for smart, just in time, Predictive Maintenance. Argo-Hytos has developed ground-breaking solutions for the online monitoring of fluids. These intelligent measurement systems use smart algorithms to monitor the aging of lubricants and the wear of hydraulic components. Argo-Hytos measurement systems detect problems at an early stage before they cause further damage or downtime," he concludes.

(Note: The responses of various experts featured in this story are their personal views and not necessarily of the companies or organisations they represent. The full interviews are hosted online at <https://www.industrialautomationindia.in/interviews>)

## Designing With Intention to Reduce Costs

Systems that stay up and running and can be monitored and automated reduce maintenance costs and downtime.



**HS5L Miniature Locking. HW 22mm Heavy Duty. YW Series.**



keeping costs down is critical when competition is everywhere. In a global economy, machine builders not only compete with local companies, they contend with operations all over the world

Innovating and differentiating, maintaining product quality, going to market, and improving operational efficiency are everyday challenges. Reducing costs is one more way to compete. Cost reductions don't always have to come from sweeping changes to the labour force or supply chain. Cost efficiencies can be built into machine design or process steps that make a huge difference. We're constantly challenging ourselves to make components that are smaller or can perform multiple tasks. We know there are economies and efficiencies in products that are durable and require less effort to install. Systems that stay up and running and can be monitored and automated reduce maintenance costs and downtime. More efficient components such as LED lighting cost less to use, and automation software reduces design costs by giving you your own set of configuration tools.

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**RN Series. FC6A MicroSmart. SA1E Miniature.**

## Safety That Pays

### Installation solutions using the Safety Fieldbox and the SD-Bus from Schmersal.

**F**or many companies, maximising cost-effectiveness is still one of the most important objectives. The increasing digitalisation and networking of the production environment offers significant potential for higher productivity, for example by collecting and evaluating large volumes of data to optimise manufacturing processes. The Schmersal Group supports this objective with a wide range of efficient systems for functional safety that are individually adaptable, fail-safe in operation and also reduce wiring. Some examples are installation solutions using the new Safety Fieldbox and the SD bus from Schmersal.

Cost-effectiveness is also an important aspect of functional machine safety. For this reason, Schmersal focuses on developing system solutions that guarantee safety with a reasonable effort, for example that are not over-dimensioned, and which contribute to productivity increases wherever possible.

Very often safety switchgear that perform various functions, such as safety sensors and safety interlocks, must be fitted, installed and integrated into the safety circuit of not only complex machines and systems. Schmersal has developed the Safety Installation Systems for these cases where the user wishes to have access to information from the safety circuit for activities such as fault diagnosis: The passive distribution module (PDM) and the passive field box (PDF) enable mixed series connection of up to four purely electronic safety switching devices.



The SD bus system not only enables additional diagnostic functions, it also makes it possible for the machine builder to reduce the number of safety inputs on their system.

With these installation systems the machine manufacturer or electrician does not connect the machine's safety switchgear to the safety controller or the associated safety relay module, but to a separate wiring module that can be installed in the control cabinet or in the field. There, the signals are bundled together and forwarded to the evaluation unit or to the safety control unit. The safety switchgear is permanently connected in series for a safety function by the wiring modules. This considerably reduces the wiring work - and the user continues to use their existing safety evaluation unit.

#### Simple plug & play solution

The new Safety Fieldbox with Profinet/Profisafe fieldbus interface from Schmersal offers more flexibility. An eight-pin M12 connector enables the connection of all common types of safety switchgear: electromechanical safety switchgear, electromechanical and electronic safety interlocks with single or dual-channel control, safety sensors, optoelectronic protective devices and also control panels. This does not only apply to the Schmersal Group

safety switchgear range: Safety switchgear produced by other manufacturers can also be connected simply by using an adaptor.

As a simple plug & play solution the Safety Fieldbox enables a fast and fail-safe installation and, used together with the fieldbus system, cost-effective system cabling. The M12 power connector allows cables with a larger cross-section to be used. This reduces the voltage drop, and machines extending over a larger area can also be safeguarded. The Safety Fieldbox consequently covers typical safety concepts that are usually used for larger facilities: For example, two or three safety relays or safety interlocks can be used for monitoring the position of a single or double-leaf safety guard and an inspection hatch, a safety light curtain for safeguarding the area of an loading station and an operating panel with emergency stop button can be connected to the superordinate safety control system via the Safety Fieldbox.

An integrated digital input on each eight-pole device slot of the Safety Fieldbox enables the evaluation of the diagnostic signals from all connected safety switching devices and a wide



**Simple plug & play solution: the new Safety Fieldbox from Schmersal.**

range of operating data, helping to improve process transparency. This information can be used to detect irregularities and enable prompt intervention if service is considered necessary.

#### **Cost-saving, lean wiring**

Economic safety solutions are also possible using the SD bus (SD = serial diagnosis) from Schmersal. Safety interlocks and sensors can be easily wired in series via Y-adapters and standard M12 cables (Plug & Play) or a conventional connection on the terminal strip in the control cabinet. The non-safety related diagnostic signals are transmitted via the SD interface. The locking and unlocking of safety interlocks also takes place over the SD bus. This saves control system inputs and outputs. All common fieldbus protocols such as PROFINET, PROFIBUS, EtherNet IP, EtherCAT, ModbusTCP, etc. are available as communication interfaces to the control system.

All of the Protect PSC1 series safety controllers have an SD bus master in the version with an integrated fieldbus gateway. Up to 31 sensors with extended diagnostic functions can be connected directly to the compact controller PSC1 and evaluated via the integrated SD bus gateway. In addition to the standard diagnostic function "Safety device actuated or not actuated", these safety sensors can transmit further information such as

"Actuator near limit", the temperature in the sensor, error messages such as cross-circuit, over temperature, internal device error, communication error, status output Y1/Y2, etc. This solution also enables safety switching devices to be replaced before the end of their service life. Consequently, the SD bus is an important component of systems for condition monitoring and predictive maintenance, especially for more complex machines.

The use of the SD bus is particularly beneficial when machines are equipped with many safety guards or access hatches, for example filling machines, where the safety guards provide access to the workstations (feeding, filling, closing, labelling etc.). With the series connection of sensors and safety interlocks using SD bus, then practically only one cable harness is routed through the entire machine and the system can be used for up to approximately 31 safety switching devices. This enables very streamlined wiring and helps reduce costs. Wiring the sensors in series does not reduce the performance level (suitable for applications up to PL e). Different safety functions that communicate via the SD bus can also be formed into groups.

The BDF 200 control panel from Schmersal now also has an SD interface. Efficient safety solutions can be created by combining the control panel with the AZM201 door interlock, for example for large production areas

where robots are operating, as can be found with extensive guarding around robot workstations with many access doors. Wiring in series allows such work areas to be safeguarded with minimal wiring effort.

#### **Safety interlock with two safety functions**

The AZM201D version offers two independent safety functions in one device. Safety function 1: Door closed, but not locked. Safety function 2: Door closed and locked. Two safety outputs are available for each safety function. Safety function 1 is typically used when operating robots in setup mode. Under these conditions it must be ensured that the operating personnel are cannot be inadvertently locked into the robotic system enclosure. However, the facility must be safely shut down if other unauthorised persons enter the enclosure. The dual function eliminates the need for an additional safety sensor for use when operating in setup mode.

#### **Schmersal System Configurator**

To simplify the best safety solution for the application in question Schmersal has developed a new web-based design tool for various installation systems - SD Interface, IO Parallel Wiring and Safety Fieldbox. The Schmersal System Configurator calculates the supply voltage to each device according to the wire length and cross-section and evaluates it according to a traffic light system. If for example the supply voltage comes below a minimum value of 20.4 V, the display will switch from green to yellow and, if lower than 19.5 V, to red. In this case it is advisable to select an alternative installation solution, such as a passive field box instead of a series connection with Y-distributors. The best configurations can be stored. Parts lists can also be created, meaning that the user is just a click away from the best and most efficient safety solution available.

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# INDUSTRIAL AUTOMATION

## Presents

# Celebrating women in Indian industry

## INTERNATIONAL WOMENS DAY



# Women of Substance

**Industrial Automation** celebrates women achievers in the Indian industry on the occasion of **International Women's Day**.

The United Nations designated 1975 as the International Women's Year and since that year, March 8 has been celebrated as International Women's Day (IWD). The theme for IWD 2021 is, "Women in Leadership: Achieving an equal future in a Covid-19 world". The theme celebrates the tremendous efforts by women and girls around the world in shaping a more equal future and recovery from the Covid-19 pandemic. It is also aligned with the priority theme of the 65th session of the Commission on the Status of Women, "Women's full and effective participation and decision-making in public life, as well as the elimination of violence, for achieving gender equality and the empowerment of all women and girls", and the flagship Generation Equality campaign, which calls for women's right to decision-making in all areas of life, equal pay, equal sharing of unpaid care and domestic work, an end all forms of violence against women and girls, and health-care services that respond to their needs.

India has a mixed record when it

comes to women's empowerment. Women in India now participate fully in areas such as education, sports, politics, media, art and culture, service sectors, science and technology, etc. The armed forces now recruit women in combat duties. But at the same time the country ranks 112 in the World Economic Forum's Global Gender Gap Index 2020, a report that benchmarks 153 countries on their progress towards gender parity in four dimensions: Economic Participation and Opportunity, Educational Attainment, Health and Survival and Political Empowerment. To that extent, it has a long way to cover in closing the gap.

2021 began on a positive note for women technocrats as Soma Mondal assumed charge as Chairman of Steel Authority of India Limited (SAIL) on January 1, one of the largest steel-making companies in India and one of the Maharatna companies among the country's Central Public Sector Enterprises. Just a month

earlier, Navaratna PSU Bharat Heavy Electricals Ltd (BHEL) appointed Ms Renuka Gera as Director - Industrial Systems & Products on Tuesday, December 1, 2020. Prior to that, Vartika Shukla assumed charge as Director (Technical) of Engineers India Limited (EIL), another Navratna PSU under the administrative control of the Ministry of Petroleum & Natural Gas (MoPNG), on August 1st, 2020.

Industrial Automation began the initiative of celebrating the IWD in 2018, highlighting the role of women in the engineering industry. Since then, the magazine has featured over 30 women achievers, celebrating their success in what was, and still remains a largely male dominated industry, and where traditionally women are underrepresented. This Special Feature is dedicated to the aspiring women engineers of the country, with the hope that it will inspire them to greater heights in their professional careers.



(L-R) Soma Mondal, Renuka Gera and Vartika Shukla.

## I seized opportunities as they presented themselves to me

**Sophie Moochhala, Managing Director, Fluid Controls Private Limited.**

**An interesting career path beginning with advertising followed by different roles in a global beverages company before joining the family enterprise. Design or destiny?**

Definitely destiny! I did not chart out a career plan at an early age and work methodically towards achieving set goals. Instead, I seized opportunities as they presented themselves to me and, with each career move, I looked not at a 'goal' but at personal growth and satisfaction. As a result, my career path has definitely been unconventional.

**How was the journey from working for a company to managing one of your own?**

The transition was very challenging at first and the working environments of each are very different, as are the deliverables. In this transition I was helped by two things. Firstly, the training and grounding given to me during my work experience with a global company where I was exposed to world-class management principles. Secondly, the support and training imparted to me by my father, Dr Moochhala, in the early years of my transition. This enabled me to build a strong foundation for Fluid Controls and put in place systems, processes and strategies to transform Fluid Controls from a small family business to becoming a leading provider of instrumentation solutions for oil/gas, power, nuclear and railways.

**Coming from a non-engineering background, how did you make the transition successfully steering a technology company?**

'Success' is a multi-faceted word! Professionally, for me, success is to build a brand which is trusted by customers and which delights customers. At an organisational level, it is to build a team which is





Sophie with family.

motivated, innovative and performs to high expectations. In this context, my having or not having an engineering background did not really matter as I was robustly supported by a team, which has stellar engineering credentials.

#### **Do women as entrepreneurs have to face different or additional challenges?**

Definitely. As a career professional and an entrepreneur, I have experienced some barriers faced by women. I think one of the biggest barriers women do face is that of 'credibility', especially if they are in roles that are perceptually seen as 'non-traditional'. As a woman Sales Manager and General Manager and as a woman leading an engineering technology company - all non-traditional roles - I had to work hard to establish my credentials.

#### **A woman is also a homemaker. How do you maintain the balance between the two?**

It's a balancing act for sure! I have a family who is supportive of the time I need to devote to running Fluid Controls and that has enabled me to manage the workplace and the home space.

#### **Are workplaces today more sensitive to gender issues than a generation earlier? What is your approach to gender issues in the company?**

Yes, workplaces are generally more sensitive to gender issues today than a generation ago, driven in large part by more women beginning to work outside the home and achieving more financial independence. At Fluid Controls, we believe in equal opportunities. Our approach is performance-based, so attributes such as age, gender, background, etc., do not influence any of our employee-related decisions.

#### **How did the Covid pandemic affect your working routine and what are the learnings?**

The Covid pandemic had a huge impact on our working routine - as we moved to work from home. Realising that the pandemic may last

## **Indomitable. Focused. Result Oriented.**

for a long time, we took a decision to compensate our team as before and, over and above that, equip them to work from home. Once our plant became operational in May 2020, we provided them with a safe working environment. There are many key learnings from the pandemic, too many to enumerate here! One learning was that efficient remote working is very much possible as our team stepped up and delivered even in very challenging circumstances. The second learning was that the business model we follow is inherently flexible when it comes to customer interface. For example, our overseas business has thrived this year despite limited face-to-face contact with customers. Another learning is that investing in technology is essential. Because we have been investing in ERP, software and server technology over the years, the transition to remote working was smoothly accomplished.

#### **What would be your message to those seeking career guidance?**

Being an entrepreneur is an exciting, challenging, very fulfilling career choice. To have control of your own destiny and to be able to see the fruits of your labour is incredibly satisfying. Innovation, integrity and reliability are crucial to entrepreneurs starting out on new business ventures. Reliability - and I use the term in a broad sense - is the ability to work hard, stick it out in tough times, be strategic and have a long-term vision for success. Starting a business is not easy and perseverance is very important. Innovation ensures that the foundation of any enterprise is rock-solid and gives it the ability to continuously stay ahead and seek new opportunities and growth. Integrity - to the principles of the organisation, to customers and to the team - ensures that the culture of the organisation is enduring.



Celebrating Women's Day 2020.



Fluid Control Team at IREE 2019.

**It is said if you educate a man you educate an individual, but if you educate a woman you educate a family, generation (nation). Your views?**

The literacy rate for women in India is significantly increasing. According to the 2011 Census of India, the literacy rate for women is 65.46%, which is a significant increase from 54.16% in 2001. Women today work in all fields and lead companies across industries. To answer your question, I believe that women's education is important since, within the context of a family, an educated woman is an empowered woman. And, as women tend to be primary caregivers, they do exert more influence during the formative years of the next generation.

**Would you like to share information about your other achievements?**

- " Graduated Summa Cum Laude as an undergraduate
- " First woman General Manager at Coca-Cola India
- " Grew Fluid Controls revenue exponentially in the past five years whilst increasing profitability

- " Built Fluid Controls as a recognised brand within and outside India through coordinated marketing, branding and customer outreach activities
- " CII Industrial Innovation Award for Medium Scale Manufacturing Organisation
- " CII recognition as one of the Top 25 Innovative Companies of the Year at the Indian R&D Ecosystem Conclave 2019
- " Woman of the Year Award at Rail Analysis Innovation and Excellence Summit 2020
- " Woman Achiever Award 2020 by ISA Maharashtra Section at PPA Meet 2020
- " India SME Excellence Award for Woman Entrepreneur of the Year 2020 in Manufacturing Sector
- " Urban Infra Solutions for Top 10 Corporates of the Year
- " Recognition in Excellence in Technical Innovation by ISA Maharashtra Section at PPA Meet 2020
- " Rail Business Leader of the Year [Female] Award at Rail Infra & Mobility Business Digital Awards 2020
- " Recognised as Women Entrepreneur of the Year 2020 by Business Connect.

**What are the three words that best capture the essential you?**

Indomitable. Focused. Result Oriented.



Woman of the Year Award, Rail Analysis Innovation and Excellence Summit 2020.

## Sophie's Choice: From Beverages to Fluid Control



Sophie Moothala studied in the USA for seven years and has an MBA from Jamnalal Bajaj Institute. She has over 25 years of rich experience in managing corporate and entrepreneurial business including strategic planning, operational finance, new project management, team management and integrated marketing activities.

Sophie started her career at McCann-Erickson in advertising and joined Coca-Cola India in 1995. During her tenure at Coca-Cola India, she worked in Brand Management and then moved into operations, where she was the General Sales Manager for Gujarat. In 2001, she was appointed as General Manager for the Company bottling operations in Goa where she managed a profit centre operation and manufacturing plant. During her experience in Coca-Cola, she breached many barriers as she was the first woman field sales manager and the first woman General Manager in India. In these roles, Sophie managed large teams' operations and sales teams, successfully driving revenue growth for the Company.

In 2003, Sophie joined Fluid Controls Private Limited, a small family business established by her father. During her tenure with Fluid Controls, Sophie has built on the foundations established by her father. Today, Fluid Controls is a leading provider of instrumentation solutions for oil/gas, power, nuclear and railways.

## Do not become the victim of the story; try to be the heroine

**Sreelatha Nair, Freelance Consultant in the field of Industrial Automation.**



### What prompted you to pursue a career in engineering?

From a young age, I really enjoyed studying science as well as mathematics. I had not really thought of engineering as a career choice till the time when I was about to complete my high school. I scored full marks in Maths and Physics in 12th standard. Algebra, Geometry and Physics became my strengths and I even started teaching some of my classmates. Incidentally, I got my nickname as 'Teacher' in CET Trivandrum during my 4th semester of engineering.

Those days, there were not too many women who would have picked the engineering field, but I was determined to pursue my passion and my father supported my dream.

### Having obtained the qualification, what was the experience in getting a job?

The job market, back in early 1980s in

Kerala was mainly comprising government jobs and only few reputed private companies offered jobs to fresh engineering graduates. Among the government options, ISRO (Indian Space Research Organisation) was considered as one of the most sought-after organisations. India's success in space research, which was termed by most as unexpected in that decade was a proud moment for the entire country and I felt equally proud getting an opportunity to join the prestigious organisation in Inertial Systems and Instrumentation Division.

After marriage I had to shift to Delhi and joined Desein Pvt Ltd, a leading engineering consultancy firm in India. Thermal Power Plant Engineering being an interesting field for me, I continued mostly in the same field till the end of my career.

### Is a career in engineering more demanding vis-à-vis other options?

It would be hard and perhaps a bit unfair to

compare engineering with other fields in terms of how demanding it can be, as every field may have its own unique challenges, but I can be sure of one thing - that if you love what you do, then the challenges can be managed. From a design engineer, midway through my career, I progressed to become a senior project engineer, which meant my scope of work extended beyond the office and into the customer site with a significant time devoted to client facing and troubleshooting scenarios. I quite enjoyed these stints and while work was physically exhausting on some days, emotionally I was always content with the learning and successes.

### Often projects demand stay away from home. How is that experience?

Staying away from home for a short duration is quite common in the engineering field. I enjoyed such experiences. Since my family was very supportive, I felt comfortable and could

carry out outstation duties peacefully. Normally wife travelling is not acceptable in most of the Indian families; in my case such a restriction was not there. Further, security of lady staff was a priority for the management of my work places. I am a lucky person, to never have had bad behaviour from my male colleagues. Most of the time, I was a single lady travelling with male colleagues.

#### Have you ever missed a career opportunity or promotion due to gender?

I was very particular about my inclusion in the organisation structure, and demand for positions and promotions in more or less a timely manner. More or less I was considered properly and never felt the gender disparity. During my service period of 35 years, I worked with different firms and mostly I felt a female friendly corporate culture. Low representation of women is not there in engineering firms generally. Again it depends on job titles and industry types. Insider relationships and personal networks might have resulted in gender pay gaps and timely promotions which are generally observed.

#### Are workplaces today more sensitive to gender issues than a generation earlier?

Yes definitely, but there is still a lot of ground to be covered. I was generally fortunate and privileged throughout my career to be amongst a group of colleagues and seniors who valued my talent and abilities regardless of my gender. Working women are now the norm more than the exception it used to be a few decades ago. While gender diversity has increased creativity in organisations, it has also changed the way we speak up in organisations and demand change. I think casual stereotypes related to gender that were common earlier are now not being tolerated and both men and women are aware of their rights and duties.

#### Is there a glass ceiling when it comes to leadership roles in engineering?

It may seem like the case, but it could also be the result of the sheer low number of women in core engineering fields that almost always men are selected as the top leaders in the field. Women who succeeded are hardworking. Women who reached the top are not with special skills, special talent, but only hard work. If you are serious about fulfilling your wishes, sharpen the potential for career, then do not give up. All the challenges are to be faced with determination.

There is no point in acting as a bystander in your career; then the control of things will go to others hands. Then blaming others is not the solution.

#### What has been the experience with seniors at works and the management?

As a beginner, I got lots of support and proper guidance from my seniors. As I gained experience, seniors mostly gave trust and flexibility to me as a subordinate. I could work mostly on my agenda and freedom to prioritise the project requirement; mostly it matches with superiors also.

## Logical. Consistent. Collaborative.

#### How did the Covid pandemic affect your working routine and what are the learnings?

I am retired from my regular job (April 2019) and working as a freelance consultant. So, I was working mostly from home; video calls were also supportive. Freedom to work around my personal commitments is a new experience. I could improve my health conditions also. Little bit of concentration on my hobbies like singing, I could brush up. Also improved my cooking skills.

#### What would be your message to those seeking career guidance?

Do not become the victim of the story; try to be the heroine of the story. It is a woman's responsibility to get the right kind of career to choose after engineering course. From my own experience, the engineering field is an exciting field for male and female candidates. And gender barriers can be avoided with the individual's determination.

#### What are the three words that best capture the essential you?

Logical. Consistent. Collaborative.

*Sreelatha Nair graduated as Electrical Engineer from the College of Engineering - Trivandrum, batch of 1983. She started her career from VSSC, Trivandrum, Kerala (1984) as a Trainee Engineer and retired from Desein Pvt Ltd, New Delhi (2019). Sreelatha has thirty-six (36) years of experience in the field of Control and Instrumentation in design, detailed engineering of various control and instrumentation packages for the thermal power plants, gas based combined cycle projects, oil and gas sector. She has worked on multiple projects in geographies ranging from Indian subcontinent to the Middle East.*



# If you enjoy your work, you are capable of handling any challenge

**Swati Jain, Senior Manager – Program Management, Technology R&D & Women in STEM Leader for India, Emerson India.**



## What prompted you to pursue a career in engineering?

My uncle used to study for Engineering when I was in school. So, I know what engineering was since childhood. I always enjoyed practical learning over theoretical sessions and used to enjoy solving complex math problems. So, I have had that inclination towards STEM since beginning. I still remember when I got selected for engineering, my father said with pride that she will be the first engineer in our family.

## Having obtained the qualification, what was the experience in getting a job?

I have been lucky in getting a job. I was among the first five in college who got the job offer from the first company who visited our Campus.

## Is a career in engineering more demanding vis-à-vis other options?

Every job in today's situation is very much demanding. It doesn't matter who you are: an engineer, doctor, teacher, entrepreneur, or others. Today's world is very competitive. If you are not true to your work, then there are many others waiting in the queue who are ready to

take up the job. So, everyone needs to keep enhancing their skills and be passionate about their jobs. I believe, if you enjoy your work, you are capable of handling any challenge.

## Often projects demand stay away from home. How is that experience?

After office, I have meetings with stakeholders almost daily in the evening. Now, everyone in the family has adjusted to this schedule. It is easy to take meetings from home rather than staying late in office because then you also have to deal with late evening traffic. So, it's my choice and I came up with a good plan. I spend time with my family before the meetings start, then my children complete their homework, or play indoor games. Most of the time, we have dinner together. So, I focus on spending quality time with family. I feel this system has made my children more independent and mature.

## Have you ever missed a career opportunity or promotion due to gender?

I never felt so. We always follow a robust recruitment and performance management process to ensure the opportunity or promotion is given to the right candidate.

## Are workplaces today more sensitive to gender issues than a generation earlier?

Yes, and it is a good indicator. Diversity & Inclusion, Women in STEM (WiSTEM), encouraging more women to contribute in IP & Innovation and many such initiatives are an integral part of our organisation. We are encouraging interested women to take up customer facing roles, working on upskilling them so that they can be ready whenever the opportunity comes. I feel privileged to be a part of the Emerson family.

**those seeking career guidance?**

Don't wait for people to come and ask what you want to become. Openly communicate your goals with your manager and arrive at a development plan to achieve the same. Be innovative and never hesitate in sharing your ideas. Participate in organisation-level initiatives to gain confidence and know more about your organisation.

**What are the three words that best capture the essential you?**

Determined. Optimistic. Innovative.

*Swati Jain, Senior Manager - Program Management, Technology R&D & Women in STEM Leader for India, Emerson India. Swati's current role includes collaboration with external stakeholders and ensuring projects meet business objectives, keeping risks under control while managing and executing projects. As the India Region Leader for Women Engineers Club STEM, her role is to inspire, guide and lead by example for tomorrow's leaders while managing activities to take the STEM experience and excitement to the next level.*

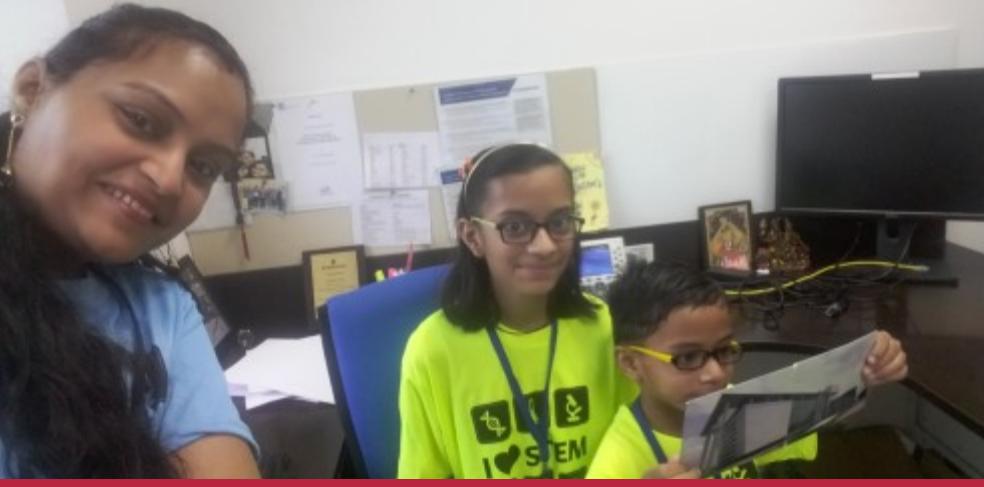
**Determined.  
Optimistic.  
Innovative.**

to the new schedule. In our minds, we have our new calendar.

The learning? Nothing is permanent, so we need to be happy and satisfied in every situation. If we accept the change early, our mind starts providing solutions. But if we don't accept the change, then we remain confused and tired.

The flexibility was a blessing in disguise. It allowed every woman to do more multitasking than ever. I personally enjoyed my time at home even during the pandemic.

**What would be your message to**



### **Is there a glass ceiling when it comes to leadership roles in engineering?**

Time is changing now. It will take some more time to completely break this glass ceiling. As I mentioned above, organisations have started putting more focus in increasing their diversity numbers at leadership level. This is driven from top to bottom and hence it has more acceptance. All employees including women are given technical and soft skill training, stretch assignments, coaching so that they gain the skills and are ready to apply for future opportunities. If we see equal opportunities and training being offered, then very soon we will have a good diversity in leadership roles as well.

### **What has been the experience with seniors at works and the management?**

I have worked for almost 19 years, so I would say it's a mixed experience. People used to take time to accept women in leadership roles. But nowadays, there is a culture shift in society and organisations are putting more focus on Diversity & Inclusion, so things are moving in the right direction.

I feel if you are skilled, no mind-set can stop you from achieving what you aspire to become, and you definitely get people around you who understand and support you in the journey. I am blessed to have seniors and managers who have acted as coach for me and trust my work and decisions as a leader.

### **How did the Covid pandemic affect your working routine and what are the learnings?**

# { Gender does not matter, only hard work and dedication does

**Swati Tiwari, Managing Director, Arcturus Business Solutions Pvt Ltd.**



## What prompted you to pursue a career in engineering?

My father was a Power plant engineer. I used to visit power plants very frequently with him, hence my keenness towards Engineering was there from childhood. Initially my focus was more towards sports as I used to play at the State and National level in table tennis at school, but opted to do Engineering in Electronics when it was time to think of getting a career.

## Having obtained the qualification, what was the experience in getting a job?

After getting the Engineering degree in 1990, there was a struggle for nearly a year to get the right job. In between, I worked with a couple of engineering design firms without salary just to gain some insights about practical engineering. My first job was at BSES Ltd (now Reliance Infrastructure), Mumbai as an Instrumentation Engineer for the Dahanu Thermal Power Project, which was at the construction stage. I was the first women engineer hired by BSES Ltd.

## Is a career in engineering more demanding vis-à-vis other options?

Career in engineering is very exciting and a great learning. It is demanding because there is lot to learn and do. There are lots of possibilities for innovation and varied fields for growth.

Other options may also have their own challenges and difficulties, but engineering is work plus fun together!

## Often projects demand stay away from home. How is that experience?

Being in engineering field, the outstation domestic and international tours were very frequent including extended stays. Women are known to be multi-tasking by nature and we learn to balance home and work front very efficiently.

## Have you ever missed a career opportunity or promotion due to gender?

Never. I always worked with full dedication and gave my best to the company. I was never ever judged by my employer on the basis of gender.

## Are workplaces today more sensitive to gender issues than a generation earlier?

Now the workplaces are more gender sensitive compared to



earlier and most of the companies also have policies in place for gender parity.

#### **Is there a glass ceiling when it comes to leadership roles in engineering?**

In leadership roles in engineering firms, you may feel the glass ceiling based on the employer's attitude. Now companies have started appreciating the multi-tasking and decision making skills and dedication of women employees. We find more women working in the software sector compared to the manufacturing, power and energy sector. However I am very hopeful that women will soon be in senior leadership positions even in core sector engineering firms.

#### **What has been the experience with seniors at work and the management?**

I have in general received very good opportunities and support from seniors and the management.

#### **How did the Covid pandemic affect your working routine and what are the learnings?**

Covid has affected the business but not the morale of employees. In fact the employees worked with more dedication to create new products for the market.

What would be your message to those seeking career guidance? Gender doesn't matter, only hard work and dedication matters for success.

#### **Would you like to share information about your other achievements?**

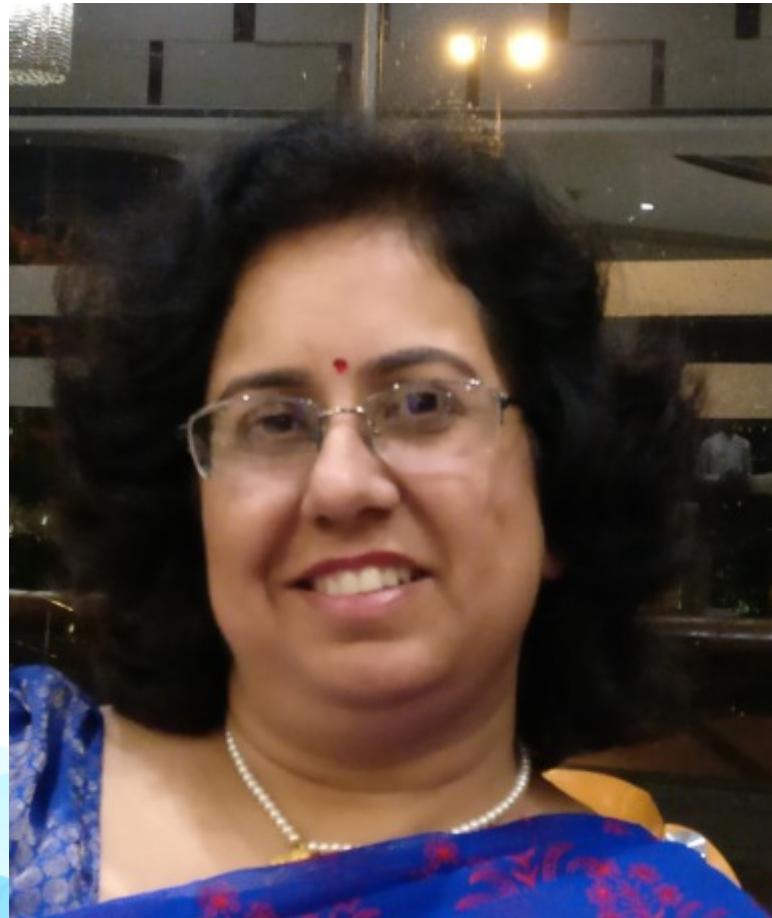
I have worked for 25 years with Power Sector companies in different leadership roles. At the peak of my career, I left my job and set up a startup firm in Artificial Intelligence and computer vision based Analytical Solutions. Now we offer different innovative solutions to the leading Manufacturing, Energy and Infrastructure companies in India.

#### **What are the three words that best capture the essential you? Hard Worker, Dedicated and Learner.**

*Swati Tiwari is an Electronics Engineer with Masters in International Business. She has rich corporate experience of 25 years in Power Generation, Transmission and Distribution verticals. Swati has worked for corporates like Sterlite Power, Lanco Infratech, Emerson and Reliance Infrastructure in different leadership roles.*

*After a prolonged stint in the corporate world, Swati founded Arcturus Business Solutions, a company working on artificial intelligence and deep learning solutions. They work on providing real time monitoring and analytics on images and videos for the workmen safety and industrial asset's security in companies working in Energy, Infrastructure and Manufacturing sectors where the critical areas are required to be monitored 24x7.*

**Hard Worker.  
Dedicated. Learner.**



## Nothing grows out of comfort and } easy mechanisms }

**Titli Chatterjee, Senior Lead, Smart Manufacturing Practice, Information Services Group.**



**You have taken the unconventional career path to technology. What prompted the transition?**

I always believed in progressive and continuous learning. While I was pursuing my MBA in HR, the basic purpose was to carry out research work addressing the human interventions in innovation. Though I had secured places from Oxford University and University of Glasgow with a Commonwealth Scholarship, it was left undone. Perhaps, that is when my journey in research started. My inclination towards technology and the curious mind to the man-machine interactions lead me to develop my forte at the factory floor. The most interesting part of my career/job is the upheaval task of disruptive changes and learning something new at the work front.

**Having obtained the qualification, what was the experience in getting a job?**

Though my goal of researching remained constant, my passion and zeal to take a step-forward drove the transition to consulting and understanding the shop floor or manufacturing complexities. As MBA

wouldn't have sufficed to learn the other technical implications, it was reading and constant endeavour of keeping myself updated that helped.

**Is a career in engineering more demanding vis-à-vis other options?**

I believe anything should be driven by passion. Irrespective of what one chooses to pursue as a degree/course it is the diligence and love for the job that creates upliftment. Be it any field that one chooses, at the end of the day it is the eagerness to succeed and creating one's own niche that makes a difference. However, to be on the radar I would still mention being updated on technology, the demand gap and upgrade on the possible digital skills that would rightly fit in the current scenario.

**Often projects demand stay away from home. How is that experience?**

I have been on-the-go and changing cities for more than a decade now, primarily for the betterment of my career at the job front and move out of my comfort zone, since nothing grows out of comfort and easy mechanisms. Due to this, staying away from my daughter and juggling roles as a single parent was one of the major challenges that I faced sometimes at the receiving end and all other times happier to balance it out with the help of the family. Perhaps, this is how we all end-up building a great ecosystem which comes to the rescue when needed!

**Have you ever missed a career opportunity or promotion due to gender?**

Though not particularly on gender biases but missed a lot of opportunities due to different concerns at the corporate level. However, being an optimist, a missed opportunity has always made space for something better. On the other hand, as a spectator I have often realised that extra mile taken by women soaring high. Those shards of glass indeed exist and shattering the glass ceiling will be a lot of emotional, time and moral investments. Of course, let's not forget to keep a tab on the family as well mentioned by IA, 'if you educate a woman, you are educating a family'.

## **Are workplaces today more sensitive to gender issues than a generation earlier?**

Post the 'Beijing Declaration and Platform for Action', support for gender equality is strong around the globe. While the people around have been welcoming the idea of gender equality, it is still a thing to ponder on if men generally have more opportunity than women. However, amidst these discussions few of the things should be prioritised at this juncture. Teaching the women their worth, raising voice whatsoever to amplify feminism in the workplace, exercising your political rights, committing to a cause and respecting the choice are what should be part of the norms.

## **What has been the experience with seniors at works and the management?**

Working with seniors has helped me to realise that it's always worth to be part of a living and learning environment. It has been rewarding at times when I have interacted and worked under notable mentors who helped me shape my graph and figure out the best practices at work. It's rewarding to bring back something from the past that triggers creativity, refurbishing the existing ideas and work on the drawbacks.

## **How did the Covid pandemic affect your working routine and what are the learnings?**

The unparalleled event of the pandemic pushed all of us to move from conventions. Despite disturbed routines and trying to adapt to the new normal of working style, managing schedules is becoming easier with time. Figuring out from the lessons of my own resilience in the past and working effectively, being able to capture a few things that are joyful to stay home seemed to be a productive step. Balancing out work and family twice or thrice a week as per the priorities looks realistic, maintaining the rhythm altogether.

## **What would be your message to those seeking career guidance?**

Bringing out unique flow of ideas can indeed be a driving force to innovation and overall development of the youth. If networking is not still in the agenda, it should be unless you have reached that helm of your career. Finding a good mentor aligned to your career path and understanding his/her journey and the timeline is something that I have personally mapped with that has helped me to understand my career status and bring in focus. Instead of solely focusing on the personal expectations or outcomes of a job, planning to develop yourself by impacting the next employer is another of the practices in-line. Above all is continuously upgrading yourself, learning and increasing knowledge that would help to go that extra mile.

## **Would you like to share information about your other achievements?**

I have contributed towards various global official and personal research papers, publications, content shared by global industry influencers. Invited as a delegate for the Management Department launch of Anglia Ruskin University, Cambridge, and acceptance of academic paper as poster for International conference at Beijing,

China organised by International Association for Chinese Management Research (IACMR). I am a professional blogger on contemporary issues and woman empowerment with around 2.5 lakh reader base.

## **What are the three words that best capture the essential you?**

Result-oriented, determined and positive minded.

*Titli Chatterjee is part of the Smart Manufacturing Practice working as a Senior Lead at Information Services Group (ISG) primarily focusing on the EMEA region and the Americas. Having experience in research and consulting for more than 11 years now, her focus has been in the areas of manufacturing and Industry 4.0. In her current role she has been closely working with industry leaders, ISG internal stakeholders, ISG partners and manufacturing clients to highlight the technological implications on addressing the manufacturing gap and building a Smart Manufacturing ecosystem leveraging the ISG solutions and practices.*

**Result-oriented. Determined.  
Positive-minded.**



# { Every successful woman is backed by the most supportive family }

**Jaya Chanchalani, Project Manager –Industrial & Utility Business Unit, Nexcharge-Exide Leclanche Energy Pvt Ltd.**

## **What prompted you to pursue a career in engineering?**

I hail from a small town of Rajasthan and belong to a traditional business family. Because I always wanted to do something different and during childhood was indulged in things like opening a remote control, playing with toy cars, etc., I had identified early on with my inclination towards the engineering field.

## **Having obtained the qualification, what was the experience in getting a job?**

I would not say I had to face difficulties in finding a job in the core engineering field; however, I must admit the pay scale on which I was hired for my first job was relatively much lower than what my peers were getting in the IT field. At times, financial benefits were tempting but because I had a passion to work in the core field, I continued moving on in a focused way.

## **Is a career in engineering more demanding vis-à-vis other options?**

Well, according to me, it's very difficult to compare which career path is demanding. Every person has their own motivation and career path. Since practical execution in engineering is much different than theory, it takes time to connect the dots between the two. Also, we live in a dynamic world in which technology is changing faster than we have ever thought, hence it takes lots of effort to keep ourselves abreast of the latest advancements.

## **Often projects demand stay away from home. How is that experience?**

As it is said, every successful independent woman is backed by the most supportive family, so this has been the case with me. Though at times parents raise their eyebrows if the project sites are at a remote location largely because of the associated safety concerns; however, fortunately, they have supported me to follow my passion with full zest.

## **Have you ever missed a career opportunity or promotion due to gender?**

Unfortunately, yes, there are still some companies in our country which consider gender as selection criteria. They still have the notion that a woman cannot justify field jobs; also there is a cultural barrier in

some countries, which are not open towards accommodating a women colleague with the same dignity.

## **Are workplaces today more sensitive to gender issues than a generation earlier?**

With many policies and initiatives from the government and companies' side to safeguard women working in corporate, today it appears that workplaces are very much sensitive to gender issues. After maternity leave policies and sexual harassment policies, companies are extending one more step with bringing policies like period leaves (Zomato). These are positive developments.

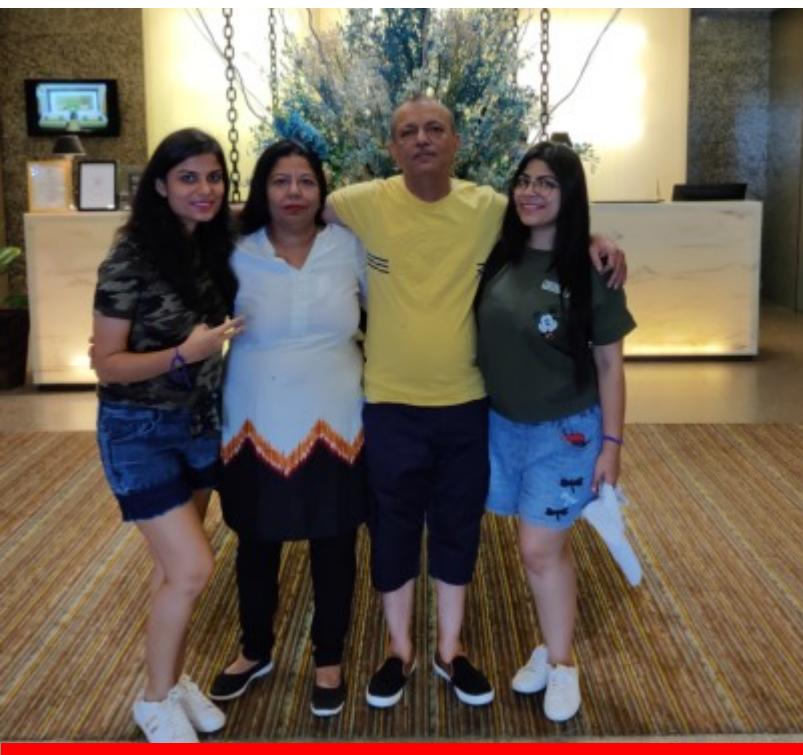
## **Is there a glass ceiling when it comes to leadership roles in engineering?**

I personally do not believe there should be a glass ceiling when it comes to moving up the ladder to a leadership role. However, with family expectations on raising the children and managing the household chaos, a woman faces a lot more challenges than her male counterparts. Additionally, even organisations have this perceived notion that women will not be able to justify the leadership role because of family responsibilities.

## **What has been the experience with seniors at works and the management?**

Though I have been fortunate enough to get





the workplace, there have been times I have been underestimated because of my gender. Maybe because of the external factors like acceptance of clients for a female point of communication or assumptions that it is difficult for women to keep on traveling. Largely, a female executive is considered to be settled at one place and will not prefer traveling/re-locating. Too often this paradigm leads to less support from seniors to provide progressing opportunities.

## Passionate. Persistent. Learner.

### How did the Covid pandemic affect your working routine and what are the learnings?

The Covid pandemic was obviously a testing time both mentally and physically. Managing all by yourself without any domestic help, with no compromise on workload was a big challenge. On top of it, since I was working for a government client, I had to attend daily office after a short while in the middle of pandemic stress. Managing breakfast to lunch for everyone with all safety measures before, during, and after office hours was extremely stressful. But I think, overcoming it has made us a better manager of my task and that has been great learning both personally and professionally.

### What would be your message to those seeking career guidance?

I would like to advise that one should identify their key strengths, focus on developing skills around them, persistently follow their passion and stick to it even if the path is full of hurdles. In a few of the cases you end up having a slow start than your peers but small

baby steps in the right direction are much better than doing something which doesn't link you with your destiny. Also, I would suggest each one of you be candid about issues faced - bring-up, discuss and resolve. Don't hold things for long as it will bring lots of stress and unhappiness in your life.

### Would you like to share information about your other achievements?

Secured Gold Medal (1st position) in a class of 60 students (55 male and 5 female) - PGDM in Infrastructure Management, Adani Institute of Infrastructure.

Coined a term, 'Infra-neurship', which captures the essence of the need of entrepreneurship still in building infrastructure.

Co-Presenter and Co-Author of a Research Paper on 'Emerging Cryptocurrencies: Energy, Environmental and Ecological Challenges Ahead' at an International Conference on Contemporary Challenges and Futuristic Approach for Creating Substantial Society at Pandit DeenDayal Petroleum University (PDPU), Gandhinagar (15-16 February 2017).

Mentor - My mother for motivating me to grab opportunities coming on my way and not getting affected by societal pressures.

Role Models - Dr Ritu Karidhal Srivastava and Indira Nooyi.

### What are the three words that best capture the essential you?

Passionate. Persistent. Learner.

*Jaya Chanchalani is a technocrat and an Infrastructure Manager who has a passion for developing and making the world a greener place to live. She believes in doing every responsibility with full zest and commitment, because of which she could manage to pave the path from Design Engineer to Vertical Head in a short span of her professional career. After acquiring substantial experience in Designing, Planning, Import Clearance and Execution of a Project in Electrical, Automation and Control industries she decided to move out of her comfort zone and eye bigger opportunities. Since she always wanted to drive sustainability using advancements in technology with her Project Management Skills, Masters in Infrastructure Management acted as a catalyst which helped her to link dots for a career path in the making of greener and cleaner cities.*



# Learning has to be a continuous process; adaptation, a way of life

**Litty Josekutty, GM (E&T), Incharge Infocom, ONGC – Tripura Asset.**



## What prompted you to pursue a career in engineering?

I belong to a middle class family and the goal of my parents, who worked for a PSU, was to make me and my sister independent and do well in life. In the 80s, the definition of doing well for highly educated amongst the service class people was to groom their children to be doctors or engineers. The comment from many in the family and friends 'girls should not go for engineering, it's a man's job' actually provoked and stimulated me to pursue this career.

## Having obtained the qualification, what was the experience in getting a job?

Not easy. My parents wanted me to join the Public Sector, if possible in the same location. During the last semester of engineering, I had cleared the entrance exam to ONGC, so that gave a hope in hand. However, the interview call was yet to come

through and after graduation, I had to wait for some time. In the meantime, I appeared for many other PSU exams. Eventually the call came through for an interview and I joined ONGC in 1991.

## Is a career in engineering more demanding vis-à-vis other options?

Every career is demanding. My mother, being a nurse, had to do gruelling night shifts. This prompted her to ensure that my sister and I do not take up a career similar to hers. However, time has taught her and me that every career is demanding. It depends mainly on how involved and diligent one is on the job, what one's career goals are and how agile and adaptable one is. With new technologies emerging daily, being relevant in the present business scenario is very challenging. But it is the responsibility of engineers to adapt and give their best in their field.

## Often projects demand stay away from home. How is that experience?

Initial days of staying away from home were a nightmare - cooking and stuffing the fridge with food for as many days as possible, checking frequently if everything is fine at the home front, monitoring and giving instructions to kids, etc. And most of all, the guilt that I was somehow letting down everybody. However, over a period of time, I realised that it is OK to not do everything - I don't need to be a Supermom or a Superwoman! The world will not fall apart if I don't make everyone comfortable. My family too realised that everyone has to pitch in for things to move smoothly. This made my family more independent and more supportive. Now, I get some 'me' time and many-a-times, situations take care of a lot of things.

## Have you ever missed a career opportunity or promotion due to gender?

So far, no. I have had very supportive bosses and senior officers. I tried to do the best in my career so far. But while climbing the career path, we can see the gender bias and the inclination towards favouring your own. It is subtle and unspoken - but it is very much there.

## Are workplaces today more sensitive to gender issues than a

## **generation earlier?**

Definitely, yes. With the Sexual Harassment Act in place our company follows a zero tolerance policy. Sensitisation programs are held for all employees. Checks and balances are in place with formation of Internal Complaints Committees (ICC). My company has circulated detailed guidelines and strict punishments are provisioned under CDA rules.

## **Is there a glass ceiling when it comes to leadership roles in engineering?**

Theoretically, everyone professes that there is no glass ceiling. However, the traits of patriarchal society still need to get weaned off from the mind-sets of both men and women. The ladies who could climb the ladder to the Board Rooms claim they never saw a glass ceiling. But the structure of the society is such that there are more expectations from the women folks both in handling the home front as well as office. So with additional responsibility on women, glass ceilings will always exist. Often we see women do not empathise with other women. Women also need to change their thought process and learn to bring up our kids with equality, irrespective of gender. We can find the gender bias in the new generation too.

ONGC has established many rules and policies to support women employees. Its implementation in the right spirit should also be ensured.

## **What has been the experience with seniors at works and the management?**

For me the seniors at work have been very supportive. I get all help required for doing full justice to the responsibilities bestowed upon me. I try to give a similar supportive work environment to my juniors and my team.

## **How did the Covid pandemic affect your working routine and what are the learnings?**

I am currently posted in Agartala and my family stays in Noida. So Covid time was no different for me from the regular work routine, except for more precautions, health-wise, to be taken. Our office was working without any break even during the lockdowns, as ONGC falls under essential services. Moreover, Agartala was declared a green zone with very few Covid-positive cases.

My family in Noida was in complete lockdown without domestic help. I had to provide 'online' coaching through video calls for cooking and other activities. While most people had 'family time' during the lockdown, being away from my loved ones at home and unable to physically interact with them, I missed my family sorely. This was a huge emotional drain. But like all things, I learned to take it in my stride and eventually, that stage too passed. This whole different experience taught me that human beings can endure any amount of tragedies and take things in their stride by adapting and being agile. My son, who never boiled water before, tried his hands on cooking, did baking, frying, cleaning, etc., and found that his food was tastier than that of our regular cook! It was tough for our old parents, though, without anyone visiting them. Working from home during quarantine, minimum contact with your colleagues and subordinates took its toll on work efficiency. However, we worked our way around these problems and started performing better as a team. The biggest

takeaway from this whole experience is that learning has to be a continuous process, and adaptation has to be a way of life.

## **What would be your message to those seeking career guidance?**

Explore your core interests, strengths, and values to guide your work journey. Nurture your network to support your career development. Maintain your value in the workplace by keeping your skills fresh. Become an agile learner.

## **Would you like to share information about your other achievements?**

I was a team member for implementing e-tendering in ONGC. I was instrumental in starting the online complaint handling system in Central Vigilance Commission (CVC) during my deputation. Understanding the importance of coaching and mentoring, I try to inculcate this in all my subordinates.

**Cheerful. Dependable. Dedicated.**

## **What are the three words that best capture the essential you?**

Cheerful. Dependable. Dedicated.

*Litty Josekutty did her BE (Electronics and Communication) from Raipur University and PGDHRM from Narsee Monjee Institute of Management Studies. Litty joined ONGC in the year 1991 as Assistant Electronic Engg (Electronics) and continues with the same organisation, having worked at offices in various locations - Mumbai, Hazira (near Surat) and Delhi Corporate office. She also worked in the Central Vigilance Commission on deputation for 3-1/2 years, in the IT section. Litty is currently posted in Agartala (Tripura) since May 2017, and though due for posting, continues to be there thanks to the Covid pandemic, living away from family. Otherwise she is based in Noida where her husband works for NTPC. They have two sons.*



# Covid has given us an opportunity to work in innovative styles

Reetu Khanna, General Manager-Instrumentation at EIL.

## **What prompted you to pursue a career in engineering?**

Candidly speaking, I wanted to pursue medicine but God had alternate plans. My parents pursued me to break the stereotyped studies women were supposed to go in for and emboldened me to tread a different path. This along with academic excellence paved the way for engineering, where fewer women ventured into at that time. Their confidence gave me the courage to move ahead. But once I stepped into it, I enjoyed every step of it. I worked harder at each rung of the ladder and today I am positioned at a point, which gives me immense satisfaction.



## **Having obtained the qualification, what was the experience in getting a job?**

Getting a job required clearing through various technical, analytical and logical reasoning written tests, participating in group discussions and the final personal interview. It was not easy sailing. Although with due preparation, I could make it to various companies like SAIL, Apollo Tyres and Engineers India Limited (EIL). EIL was the final destination.

## **Is a career in engineering more demanding vis-à-vis other options?**

All jobs require time and dedication. Once you learn to enjoy your work, all career demands can be easily accomplished.

## **Often projects demand stay away from home. How is that experience?**

Going on tours - domestic and overseas - is crucial towards work equality. Sharing equal responsibilities gives you equal power. I had the golden opportunity to go on numerous tours abroad on various projects ranging from refineries to petrochemicals, engaging in discussions with various licensors, at vendor's works and contractor offices for review of documents. It is a huge learning exposure, since, instead of compartmentalising oneself, reviews are done along with specialists of all disciplines in a design review, and gives one a holistic view of the entire Project and, in turn overall work satisfaction. The experience gained has enriched my knowledge, helped establish rapport with colleagues and enhanced my personality. The site tours have enabled me to understand the real at-site problems faced and to provide solutions, where required. It also provides clarity for execution of the future Projects. All of it has enabled me to take decisions and the ability to lead.

## **Have you ever missed a career opportunity or promotion due to gender?**

Gender bias has never been a concern in EIL. The organisation provides a very safe and cordial working environment. The office work culture has groomed me into what I am today. It has provided me ample opportunities to grow, empowered me with knowledge and to promote new ideas. Promotions have been purely based on merit.



#### Are workplaces today more sensitive to gender issues than a generation earlier?

True. Workplaces these days thrive to support women in the professional role. They are now treated as equals. In fact, Women are 'More than Equals', since they put in extra efforts, both at home and at the workplace. And this little extra effort gives them extra mileage in terms of achieving targets, gaining recognition and work pleasure.

#### Is there a glass ceiling when it comes to leadership roles in engineering?

There is no room for glass ceiling in matters of engineering and technical excellence. A woman leads by setting an example. Providing guidance to co-members, regular reviews and critical checks pave the way for accomplishing a leadership role with full cooperation from all counters.

#### What has been the experience with seniors at works and the management?

Both the seniors and the management have been very supportive in all the endeavours. They are always available for help in technical matters and in providing the required manpower to enable one to accomplish tasks. We have an open communication system, wherein we can walk into the office of seniors or management to seek help and guidance.

#### How did the Covid pandemic affect your working routine and what are the learnings?

The Covid pandemic drastically changed the style of working and the routine. As such, it made multi-tasking more inevitable, switching the roles of homemaker and professional leader, from one place and at the same time with the constraints of space.

Covid has given us an opportunity to work in innovative styles. Active use of webinars and virtual meets entails wider presence which presents opportunity for more ideas from more people. Covid has reinforced the fact that time is never certain and life is short. It is imperative that we share the tacit knowledge that we have acquired over a period of years with the next generation tech millennials. As a result, we have initiated a series of audio podcasts titled 'Engineering in Action' within our team, wherein each team member gives a

podcast. One podcast is issued every week on the team work group. Each member has the freedom to express one's ideas, feedback or insights gained in the topic of interest or area of work. Being quarantined due to Covid made me realise the importance of every individual in my daily life. Every person matters.

#### What would be your message to those seeking career guidance?

Once you start your career, it may not interest you in the beginning or you may be confused whether it is the right choice. But once you have stepped into one, immerse yourself into its realms. Extensive reading, a desire to learn, perseverance and gratitude towards learning gurus, will keep you moving forward. Asking questions and frequent interactions with peers, seniors, vendors and clients help to maximise your learning.

#### What are the three words that best capture the essential you?

Persevering. Adaptive. Honest.

*Reetu Khanna joined EIL, a premier Engineering design consultancy, primarily in the field of Oil and Gas in the year 1993 as a Management Trainee, and worked as Instrumentation Engineer for about 26 years in various Refinery, Petrochemical and Fertiliser Projects with clients of national importance like IOCL, GAIL, BCPL and RFCL. Reetu has designed and engineered field Instrumentation and Distributed Control Systems (DCS) for mega projects like Panipat Refinery Expansion project, Panipat Naphtha Cracker Complex and Assam Petrochemical Complex, and is presently associated with Integrated Refinery and Petrochemical Complex in Rajasthan.*

**Persevering.  
Adaptive. Honest.**



# Women must do twice as well as men to be thought half as good

**Resmi Nair, Senior Deputy General Manager, BHEL.**

**If is said if you educate a man you educate an individual, but if you educate a woman you educate a family, generation (nation). Your views?**

Absolutely true. An educated woman will not only ensure the education of her children and future generation but her financial and social empowerment will benefit her immediate family and in turn the society. More educated, empowered women will bring in a more feminine, balanced, gentler approach to address the political, economic situations the world faces now. Even Charles Darwin had pronounced that women have greater tenderness and less selfishness and later it has been proven by various researches. The world will benefit in the education and upliftment of women.

**What prompted you to pursue a career in engineering?**

During the early Nineties when I made this career choice, engineering and medicine were the most common career choices for the academically inclined students in the country. Since I had a great liking for mathematics, this seemed to be the right choice to my young mind. The technology leap that we saw during the Nineties encouraged me further to stay in the field. In hindsight, I still feel engineering is definitely the right choice for an individual with critical thinking, problem solving and analytical capabilities.

**Having obtained the qualification, what was the experience in getting a job?**

Since I had passed out from NIT Calicut, I was fortunate to get a campus placement in an MNC. It was not difficult to get job offers then, considering sufficient opportunities in the country due to liberalisation of the economy.

**Is a career in engineering more demanding vis-à-vis other options?**

Engineering is a demanding career but there are many careers, which are equally or more demanding such as lawyers, doctors, nurses, entrepreneurs, journalists, etc. It really depends on how much an individual puts into

the job.

**Often projects demand stay away from home. How is that experience?**

This is definitely more difficult for a woman with family responsibilities especially young children or old dependant parents. Ironically, the Covid pandemic proved to be the proverbial silver lining, bringing in remote working. What Covid brought in is the increased reliance on video conferencing, work-at-home.

In these days when even remote commissioning of projects is very much possible, the demand to travel unnecessarily will come down. This change is definitely going to benefit women greatly and will bring about a level playing field for future generations of women workers - the actual output and performance of a person will become evident.





#### **Have you ever missed a career opportunity or promotion due to gender?**

No. But I do believe the quote, 'Whatever women do, they must do twice as well as men to be thought half as good', is very true

#### **Are workplaces today more sensitive to gender issues than a generation earlier?**

Very much so. There is a lot of awareness these days on gender equality. The Indian government also is doing its part to spread awareness and ensure more women enter the workplace as it will only benefit our economy. You don't hear casual sexist remarks being thrown around so frequently now-a-days.

#### **Is there a glass ceiling when it comes to leadership roles in engineering?**

These days it really depends only on the Company's culture and within a few more years all such barriers are likely to be broken in India. There are a number of tech companies headed by women globally. Today, a core sector organisation such as SAIL is headed by a woman. To progress the women's cause, it is very essential that women who reach these top positions are self-made women of high calibre. Only then can they inspire like-minded women to aspire for top jobs.

#### **What has been the experience with seniors at works and the management?**

This depends on the person. Majority of my seniors have been supporting, approachable and work-oriented, but I did come across a few difficult people. I have been able to handle those situations; such experiences help you to learn and make you even stronger. One should be prepared to expect different kinds of people in any workplace.

#### **How did the Covid pandemic affect your working routine and what are the learnings?**

The pandemic brought in big changes in the way we work. Remote

working, social distancing and safety concerns pushed us to optimise the way we work. We learned to effectively harness technology to connect with customers, teams, sites and business partners. These learning can be surely used to bring in large-scale, far reaching changes in the way we conduct our business, manage time and resources.

#### **What would be your message to those seeking career guidance?**

Introspect, figure out what you really like doing best, and plan a career around that. Don't worry if you have to change your career mid-way - it is the journey that counts and not the destination. Keep your curiosity and love for learning alive always. Remember it is not the days in your life, but the life in your days that counts.

#### **What are the three words that best capture the essential you?**

Effective. Self-Driven. Empathetic.

*Resmi Nair, a B.Tech in Electronics and Communication from NIT - Calicut, is an Engineer with over 25 years of experience in Engineering, Project Management and Quality Assurance functions. She has successfully completed many industrial automation and engineering projects in the power, steel, water and oil sectors. Resmi is married, and has one daughter.*

**Effective. Self-Driven.  
Empathetic.**



# Honesty ensures your success under every/all circumstances

Ritu Agarwal, Dy GM – Instrumentation, Projects & Development India Limited.

Photo by  
Ritu Agarwal

## What prompted you to pursue a career in engineering?

My father is an engineering graduate and since childhood always saw his dedication and passion for work. As they say 'Like Father Like Daughter'! Since childhood, I wanted to be just like my father. My parents always motivated me to join Medicine which I was getting post 12th but not comfortable with ailments and blood, decided to forego Medicine undergraduate seat and opted for Engineering, which was nothing new for me.

## Having obtained the qualification, what was the experience in getting a job?

25 years back in tier-2 towns like Vadodara, there were only few employers and those were also hesitant to hire a female engineering graduate in the organisation. Female employees were limited in single digit percentage of the total work force at that time, but M/s Linde Engineering (a German MNC) had selected me and provided me a global opportunity for a career.

## Is a career in engineering more demanding vis-à-vis other options?

I personally believe that a career irrespective of stream, is always demanding if anyone wants to excel and has passion towards the work, be it engineering or any other profession.

## Often projects demand stay away from home. How is that experience?

It provides ample opportunity for on-the-ground learning. I have got immense opportunities to stay abroad for work related projects. Also attended meetings in India, different sites, FAT, etc. All this teaches us practical knowledge and offers a broad perspective, broad outlook, exposure to different cultures, languages, food, people, etc., giving us varied acceptability of different aspects in life.

## Have you ever missed a career opportunity or promotion due to gender?

I am lucky to have never missed any opportunity or promotion but may be because I always took all responsibilities like any other colleague at the organisation.



## Are workplaces today more sensitive to gender issues than a generation earlier?

Certainly true. Last decade in particular has shown tremendous change and also recognised women as partners in overall development, rather as support only.

## Is there a glass ceiling when it comes to leadership roles in engineering?



I believe that there is no glass ceiling for women in engineering leadership roles.

#### **What has been the experience with seniors at works and the management?**

Always found my seniors and management supportive, courteous, flexible and cooperative.

#### **How did the Covid pandemic affect your working routine and what are the learnings?**

Covid pandemic has impacted the routine a lot due to work from home and no time (24x7). In terms of learnings, it has proved that 'Nothing is Impossible', but you should have the intent and efforts to achieve.

#### **What would be your message to those seeking career guidance?**

Always be focussed, keep a positive outlook and take small steps at one time.

#### **It is said if you educate a man you educate an individual, but if you educate a woman you educate a family, generation (nation). Your views?**

Absolutely true. An educated woman nurtures her child accordingly with new beliefs and contributes towards betterment of the society. The child develops according to these ideologies and grows to a responsible citizen which carries on further generation to generation.

#### **Would you like to share information about your other achievements?**

In the first half of my two-decade plus career, I was mentored by Mrs Isabel Mendez, an engineering graduate from Latin America, the Electrical & Instrument Lead for Liquefied Natural Gas in Norway, Hammerfest project in Linde Engineering, Germany. Isabel coached that hard work and honesty ensures your success under every/all circumstances.

In the next half of my career I was mentored by Mr Sanjay K Tripathi (General Manager Instrumentation, Planning & MR), PDIL, who taught me things like 'never say no', 'don't take at heart', and 'swim with tide rather than running away'.

#### **What are the three words that best capture the essential you?**

Honest. Responsible. Dedicated.

*Ritu Agarwal is currently DGM (Instrumentation) in M/s Projects & Development India Limited (PDIL), a Central Public Sector undertaking. She is an Engineering Graduate (Electronics & Instrumentation) of 1995 batch from Maharaja Sayaji Rao University, Vadodara and started her career with M/s Linde Engineering (a German MNC) and served them for 12 plus years in India and Germany, before moving to PDIL where she is serving since April 2009. Her father is B. Tech Chemical Engineering, 1969 from HBTI Kanpur and was involved in most of the Indian Fertiliser plants executed till today. Ritu is married to Pradeep Agarwal and has a 7-year old daughter.*

**Honest. Responsible.  
Dedicated.**



# Organisations have become more sensitive and caring to gender issues

**Surbhi Jerath, Dy Manager – Projects, Endress+Hauser Group.**

## What prompted you to pursue a career in engineering?

I would say engineering is in my blood. My close family worked in PSUs, power plants and offshore rigs. Since childhood, I have been listening to their exciting stories, which eventually made me connect and built up my inclination towards engineering.

## Having obtained the qualification, what was the experience in getting a job?

I started off my career as proposal engineer after my graduation, catering to flow computers and metering skid business solutions for close to 4 years. I then joined M/s Endress+Hauser as a project engineer in the project

execution department. While looking for the work opportunity there was always something which kept me motivated and I believe that's what is required to keep you going ahead.



Is a career in engineering more demanding vis-à-vis other options?

Engineering is definitely a

demanding profession. It entails taking care of the business requirements of timely executing the projects. You are always on toes to provide seamless service to the customers within the stipulated time by maintaining the overall customer satisfaction factor. Also, we have to keep on updating ourselves in view of new developments happening around. In my opinion, other professions like medical science and legal services are equally demanding.

## Often projects demand stay away from home. How is that experience?

“ Advise the younger generation to be loyal to your organisation

My family always says, I have wings. True that my work does require me to travel as it is an integral part of the job and keeps me on my feet. Visiting new client facilities, different regional offices, and factories teaches a lot, e.g., getting to know how other departments work, strategies implemented for betterment of processes. Sometimes, travel is required to speed up the process cycle of the execution. Stepping out and managing things on your own with clients comes in as a handy experience, as each customer and visit is different and is to be handled differently.

## Have you ever missed a career opportunity or promotion due to gender?

I have quite a time heard of women being denied opportunities due to gender. However, I have a different take on this, in the sense that I never found my peers in workplace gender biased. And companies I have worked for in Automation, management have always been non discriminatory. Everyone gets an equal chance and opportunity while working here.

## Are workplaces today more sensitive to gender issues than a generation earlier?

Indian society has been a patriarchal society since ages. However, over the years women are now educated and independent. Organisations also have become much more sensitive and caring to gender issues, especially for women employees. M/s Endress+Hauser has special programs for women and I appreciate that a lot. Mandatory introduction of policies like prevention of sexual harassment (POSH) ensures a safer working environment for women in corporate structures. Also, several other new changes done in the recent years like providing extended maternity leave, adoption leave, etc., have proven very helpful for working women. These changes have also encouraged more women to work in the corporate sector by giving them a friendly eco-system.

#### **Is there a glass ceiling when it comes to leadership roles in engineering?**

From the processes and policies perspective there is no limitation for women in leadership roles in engineering. However, due to a lower number of women employees in engineering as compared to men, we find fewer women in leadership roles. This male-female ratio can be equalised by inducting more women in engineering roles.

#### **What has been the experience with seniors at works and the management?**

It has been my privilege to work at M/s Endress+Hauser. My peers have guided, advised, extended their full support and even held me responsible when called for. Top management of various departments are approachable for any kind of concern or challenges we come across during the project cycles. With such environment and collaboration, we are able to cater to project timelines and budgets.

#### **How did the Covid pandemic affect your working routine and what are the learnings?**

The Covid pandemic has taught everyone a lot of lessons. The initial phase was tough, as all production facilities were shut for a few days, and it was a challenge to apprise customers on their project delivery schedules, readiness and dispatch plan when there was no certainty. It made us learn that we need to remain in constant touch with the customers and keep them updated regarding the project activities. Risk mitigation plans were brought into force to understand the bottlenecks and work upon it. Going that extra mile with the customers helped us regain the momentum with them on their projects.

#### **What would be your message to those seeking career guidance?**

I would suggest students pursuing their graduation courses take internships during their semester leaves in different kinds of industrial roles to develop an inclination in industry for a particular

**Insightful. Methodical.  
Collaborative.**

domain.

Usually after graduation it is observed that fresh graduates take the decision of joining the company based on the package that is offered by the hiring company. My message to fresh graduates is to conduct a thorough study of companies, roles and the kind of experiences they are offering and then take the decision of joining the companies. This way they will be able to work at a place which will match their field of interest and experiences. They will have better job satisfaction and will be able to deliver excellent performance in their job profile.

I also would like to advise the younger generation to be loyal to your organisation if they really have to gain from the industry, as quickly





switching organisations without having in-depth knowledge would not help. It is important to spend time in an organisation in order to completely learn and understand the processes and culture, knowing different teams and colleagues as these factors are very much required to become an expert professional in the respective industry.

**It is said if you educate a man you educate an individual, but if you educate a woman you educate a family, generation (nation). Your views?**

I find this proverb very relevant to today's need that should be inculcated in individuals. An educated woman understands the importance of education in life and takes all the efforts to educate her children which results in getting the subsequent generation educated. Women can bring about a change not only in her

community but society at large. Being incredible multi-taskers and with their networking abilities they tend to be more empathetic. Women can make a positive impact on the socio-economic atmosphere in the society. I am glad that the Government of India is taking steps towards this important matter through the 'Beti Bachao, Beti Padhao' campaign.

**Would you like to share information about your other achievements?**

**“ Women can bring about a change not only in her community but society at large**

My father has always asked me to be unstoppable during every phase of my life. He has been instrumental in nurturing our minds and developing the potential in us to bring out the best. Though I did not have any mentor in particular in the professional phase, I got to learn many protocols, etiquettes, working style and people management to be adopted and inculcated for the betterment from all my superiors who have guided me and shaped my professional being as it is today.

**What are the three words that best capture the essential you?**

Insightful. Methodical. Collaborative.

*Surbhi Jerath is an engineering professional with graduation in Instrumentation & Controls having 11+ years of experience in the Automation Industry of which 7+ years of experience in project execution with Endress+Hauser, catering to sectors like Oil & Gas, Life Sciences, Water, Waste-Water, Pharma, Power and Energy. Her current responsibilities include Engineering, Project Management & Project Execution. In her spare time Surbhi likes to go on long walks, play table tennis and try out new adventure sports. Recently she has been trying her hand on painting flower pots and canvases.*

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## At NTPC there is a healthy relationship between seniors and juniors

Rashmi Mathur, DGM (O&M/C&I), NTPC VindhyaChal.

### What prompted you to pursue a career in engineering?

I was always a meritorious student throughout my academics and completed my schooling from a convent school. Being an older kid, I had very little guidance as to what can be good career options for me. Getting into engineering was primarily driven as a guidance from my older cousin and I selected electronics and communication as my major subject. After completing my engineering, I always wanted to pursue a career in the core stream and as luck would have it, I joined NTPC. My parents supported me in whatever I decided or did, and I owe them every bit of what I am today.

**“ The best career or job is the one in which someone is using the skills they enjoy**

### Having obtained the qualification, what was the experience in getting a job?

Back in 2003 when I completed my B.Tech, unlike today, I had very little knowledge on whether I should opt for further studies or go for a job. Campus placements were not so common those days and hence I decided to apply for public sector jobs. I was fortunate enough to get recruited by NTPC. Today I feel blessed to be working in a Maharatna Company and it gives me a feeling of self-satisfaction of contributing my little bit to the development of the nation/nation building.

### Is a career in engineering more demanding vis-à-vis other options?

After completing almost 15+ years into my career I have seen a lot of role changes for me and different challenges in each role. Based on my experience every job is equally demanding, only challenges differ.

When we talk about working in a power plant then it has its own challenges like round the clock availability, long working hours, late night unit startups, emergency handling, etc. On the other hand,



working in the engineering division has its own challenges like working under stringent timelines to meet the project milestones. Working at engineering also involves travel, at times at a very short notice. Travelling at short notice is challenging for a woman as they



have added family responsibilities. In my case I am fortunate enough to have a very supportive husband and family.

#### **Often projects demand stay away from home. How is that experience?**

Traveling gives you learning opportunities but at the same time have their own challenges. I have travelled to various places within India and abroad. I remember one such occasion where I had to go for a Factory Acceptance Test at Siemens, Germany for one of our projects. On the same dates my husband had to travel to Dubai for one of his project implementations, at this time my family took care of my kids and because of their support we were able to manage the situation.

With the support of my family including my husband, mother in-law and my parents, I am able to perform my duties and manage my home efficiently. What I have seen from my experience, kids of working women become independent quite early.

#### **Have you ever missed a career opportunity or promotion due to gender?**

I would be lying if I say No, although the gap due to gender difference has reduced over the past years but it still exists mainly because of the mind-set of people.

I have personally observed and felt that organisations are nowadays more considerate and have detailed laid out procedures and policies for the welfare of female employees, e.g., provision of maternity leave, child care leave, etc., but many times female employees have been denied promotion or given lower ratings on account of their being on maternity leave.

#### **Are workplaces today more sensitive to gender issues than a generation earlier?**

Definitely yes. There are several measures taken by organisations

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today to ensure they provide a safe and gender equal workplace to all the employees. Organisations are taking steps towards making workplaces more conducive to women. Workplaces are more open to conversation on workplace harassment than they have been in the past. From an infrastructure point of view, there are still many things lacking that make women uncomfortable at the workplace. I believe the industry should consider the basic sanitation needs for both male/female associates at work.

#### **Is there a glass ceiling when it comes to leadership roles in engineering?**

I don't agree with the fact that there is a glass ceiling at leadership roles in engineering, but at the same time I do agree that women need to put in twice the effort as compared to men to achieve the equivalent position in any organisation.

At NTPC we have the classic example of Madam Arundhati Bhattacharya, who was the first lady to reach the position of Executive Director (ED). Many female executives have reached the level of General Manager (GM) and have been head of projects (HOP) as well. NTPC is an organisation where capable and competent individuals grow up the ladder.

#### **What has been the experience with seniors at works and the management?**

**Success can be achieved only through dedication, commitment and hard work.**

At NTPC there is a healthy relationship between seniors and juniors. I have experienced the same when I was a junior and always try to create the same for my juniors. I am fortunate to have been blessed with very supportive and guiding seniors. I have learnt many things, not only technical and related to job profile but also time management, work life balance, etc., from them. We have a healthy and secured working atmosphere in our office which makes it the most conducive workplace in the industry.

#### **How did the Covid pandemic affect your working routine and what are the learnings?**

I was posted in NTPC Engineering Office at Noida during the Covid-19 pandemic. The 'Work from Home' concept was adopted for the first time in NTPC. We all were provided with secured

connectivity and access to engineering servers from our homes. All meetings and discussions, whether internal or with vendors, were done on Microsoft Teams.

In my understanding, productivity increased with extended time of working and flexibility of working. We could access our remote server even during late night and finish our work. Even testing at the manufacturer's workplace was done remotely. It was entirely a new way of working which no one had ever thought about.

The Covid pandemic has given everyone a new angle of thinking and looking at things. NTPC adapted well to the situation.



**What would be your message to those seeking career guidance?**

In today's world where people have numerous options to choose as their career, I would suggest that the best career or job is the one in which someone is using the skills they enjoy. Job should be used as an opportunity to learn something new.

Whatever one chooses as a career option they should follow it with full dedication and always keep in mind that there is no shortcut to success. Success can be achieved only through dedication, commitment and hard work.

**What are the three words that best capture the essential you?**

Be The Best!

Rashmi Mathur, presently working as Deputy General Manager at NTPC Limited, is a graduate in Electronics and Communication engineering from Rajasthan University. She joined NTPC as an Executive Trainee (ET) in 2004. With 16 years spent in Maintenance of Thermal and Gas Projects, Rashmi has a rich and extensive experience in engineering of various Greenfield projects and Renovation & Modernisation (R&M) of old projects. She is a Certified Profibus Engineer (for both Profibus PA Protocol & DP Protocol) from Procentec PICC and received Certification for SIL (Safety Integrity Level) 1, Functional Safety Engineer in accordance with IEC 61508:2010/ IEC 61511:2016, from TUV SUD South Asia. On the personal front, Rashmi is married for 14 years and blessed with two sons and a caring husband.

## The First Woman Engineer in India

**Engineer, Champion of STEM, Mother, an Inspiration to All Women**



Ayyalasomayajula Lalitha was born on August 27, 1919 in Chennai (then Madras). She had a middle class upbringing in a Telugu speaking family (Chennai is predominantly a Tamil speaking city). She had four older and two younger siblings. Child marriages were the norm in India in the first quarter of 1900's, and Lalitha was married in 1934, when she was fifteen. Her studies continued even after marriage, but came to a stop after receiving the Secondary School Leaving Certificate (SSLC or Class X).

Lalitha entered CEG in 1940 as a student of the four year electrical engineering program. Campus life as a lone woman must have been challenging. Thinking back to my days in the campus in the 1960's, which was much more progressive, I can see how she might have felt about having to study by herself. None of the camaraderie that the male students would have had in studying together, working on projects, having lunch together etc.. However, being the daughter of a professor would have compensated in some ways. The addition of two more women to CEG in 1940 was quite welcome. Both Leelamma George and Teresa joined CEG to study civil engineering in 1940. All three of them would graduate in 1943, the first batch of women to do so from CEG. Lalitha's Honors degree in Electrical Engineering was awarded in February of 1944.

# A job shouldn't be only a source of income

**Lakshmi Lalita Mohan**, Head and Representative – Germany, CII.

**What was the inspiration to study and pursue a career in Law?**

I chose to study law as it is a fascinating and broad subject. Studying law enabled me to better understand human behaviour, the industry and our society. The saying 'knowledge is power' definitely applies to the subject of law; it helped me to develop demonstrable critical thinking and decision making skills for my work. With a law degree, you can be successful in any related field or profession like politics, management, journalism, international relations, as long as you can combine intellectual strength and a practical approach to every situation.

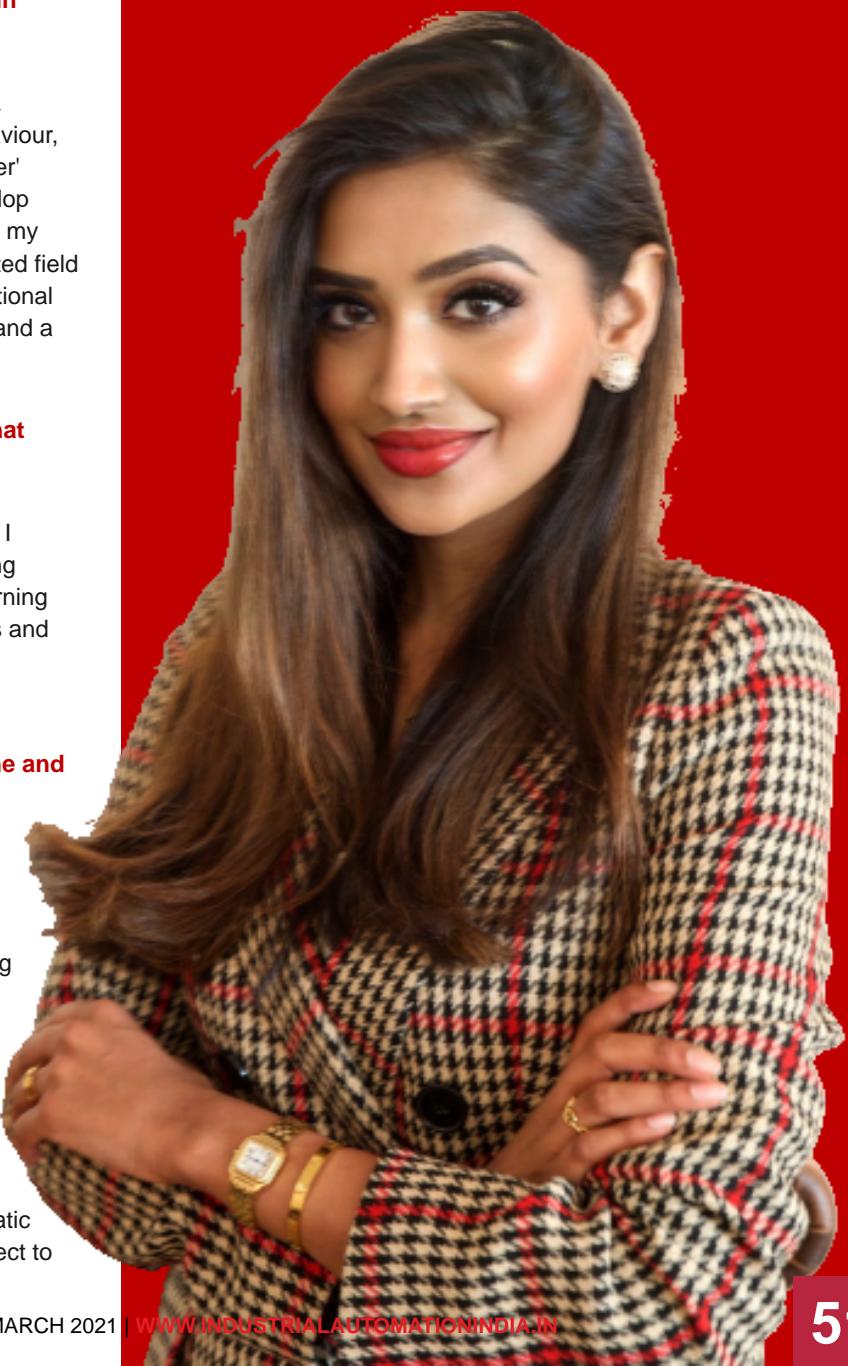
**Often projects demand stay away from home. How is that experience?**

At its core, work travel for me means enriching my own life: I always aim to expand my horizons by discovering something beyond my day to day life from which I can learn. I love learning new languages, meeting people from different backgrounds and cultures. For me a project away from home is a personal enrichment and truly exciting.

**How did the Covid pandemic affect your working routine and what are the learnings?**

Despite breakneck medical advancements, the pandemic has shown how vulnerable human beings are. This virus does not differentiate between humans and continues to shake the entire world with country after country announcing lockdowns and closing borders to prevent its transmission. More than 2,000 years ago, the ancient Indian wisdom embraced a worldview that gave equal value to all living creatures. This essential vision of ancient India revered nature and accentuated the need for the amicable co-existence of all living creatures. It's time to live after these ancient principles now more than ever. Perhaps the most obvious impact of Covid-19 on the labour force is the dramatic increase in employees working remotely. I am able to connect to

**Loyal.  
Empathetic.  
Optimistic.**





the whole world virtually, meetings, events, conferences are all happening virtually now. Other than offering flexibility, remote working can play a big role in resolving some modern-day ills. I truly believe that it can bring down the planet's collective carbon footprints. Further, in megacities with heavy traffic congestion and pollution, it can help clean up the air and the roads. While I do look forward to travel and personal interactions, I realise that a lot of our work can be done virtually too.

#### **What would be your message to those seeking career guidance?**

A job shouldn't be only a source of income. The career you choose for yourself should make you feel good emotionally which will give you motivation to meet your goals, and when you do then the sense of accomplishment is outstanding. Being content, you will radiate that success wherever you do. It is very important to follow your dreams and do the work you were born to do. As Confucius said, 'choose a job you love and you will never have to work a day in your life.'

#### **It is said if you educate a man you educate an individual, but if you educate a woman you educate a family, generation (nation). Your views?**

Indian culture and heritage has always represented the feminine as the most powerful energy of life. This is to show that singularly, the masculine aspect is in vain unless it is invigorated by the feminine aspect. Educating women is definitely a magic multiplier in the development equation. It is very important to invest in women and girls because the benefits flow not only to them but everyone around them, their families, children, the entire community and the next generations.

#### **Would you like to share information about your other achievements?**

I was born in India and at the age of 7 years, my father was posted to

UNIDO in Zürich, Switzerland, where I started school. Thereafter, we moved to Germany where I completed my 'Abitur'. I pursued German Law in Germany. I feel extremely fortunate that I could imbibe the best of both worlds - India and Europe. As they say, learning never stops, so, to keep in touch with passion which is law, I am currently doing my part-time Masters in Law (LL.M) in Corporate Security and Compliance along with my work.

I am a Member of the India Business Forum Executive Committee an initiative by the Consulate General of India in Frankfurt, and since September 2018, Ambassador of the Indo-German GINSEP program - a joint initiative by the Federal Ministry for Economic Affairs and Energy, Government of Germany and Deutsche Startups Association. Throughout my life, I have had several role models. There are many individuals that I looked up to for many different qualities that they represent such as Mahatma Gandhi, Dhirubhai Ambani, Ratan Tata, Gayatri Devi and Audrey Hepburn. My mother who has always been so loving and giving, and my father who is my living inspiration.

My father who always told me that we all come with a unique purpose when we are born. He has been my map and compass that guides me to that sought after destination of being able to fulfil my true potential. It is a life-long journey. Working for the Confederation of Indian Industry, I have found the work I love and also love the work I do.

#### **What are the three words that best capture the essential you?**

Loyal. Empathetic. Optimistic.

*Lakshmi Lalita Mohan works as Head of Confederation of Indian Industry (CII) in Germany and Europe. She is engaged in building strategic partnerships and maintaining relationships with all stakeholders, for CII on behalf of Indian industry in Germany and EU. This includes relationships with counterpart organisations and associations within Germany and across the EU. In her work with the CII, Lakshmi is engaged in promotion of industrial cooperation and bilateral relations - trade, foreign direct investments, joint ventures and technical collaborations between India and Germany. Primarily, promoting India as a destination for trade and investments.*



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## Do not be afraid to apply or take a challenging job

**Raedah Saman**, Future Offer Marketing for LV/MV Industrial Drives.

### **What prompted you to pursue a career in engineering?**

My immigration from Jordan to the United States as a teenager played a major role as my mom wanted us to have the best education, best career and best overall experience and she was the one always encouraging me to study, at the same time I have always loved math and science and I thought the best combination was Engineering. After I graduated as an Electrical Engineer I chose to go into Technical Sales & Marketing where I combined both the business and the engineering skills, which was the perfect combination for me as I enjoyed both Business and continue to work with Engineers.

### **Having obtained the qualification, what was the experience in getting a job?**

Actually it was relatively easy for me as I got the job offer 2 months prior to graduating through job interviews at WPI campus, where I got my engineering degree. One of the students I knew got a job as technical sales during my 3rd year which intrigued my interest to pursue such a role and mostly focused on applying for such roles and was successful to get my first job at Allen-Bradley once I graduated.

### **Is a career in engineering more demanding vis-à-vis other options?**

I currently work in an international company and I work with people who are in other fields, like marketing, engineering, sales, supply chain, purchasing and others and I believe that each of these roles are as demanding. The difference is how each person views their contribution to the project and apply to ensure a successful project and even though the demand is the same or similar, the success of any project or product is the combination of all the fields put together to achieve the success. Imagine a company created the best product but no one marketed it properly or sold it or we don't have the right supply chain to get it to the customer.

### **Often projects demand stay away from home. How is that experience?**

Throughout my career, I had to travel to many different countries and my husband has been very supportive.

### **Have you ever missed a career opportunity or promotion due to gender?**



Actually I have been working for more than 20 years and I have never missed an opportunity due to my gender. In my current company I have had many excellent opportunities to have growing responsibilities and the company even moved me and my family to a different country where I was based in the USA and moved me to France, it has been 8 years now, and I continue to grow in my responsibilities within my company.

### **Are workplaces today more sensitive to gender issues than a generation earlier?**

I believe companies are becoming more aware that there are additional needs for women like more flexible schedules and many are creating different programs to adhere to these needs.

### **Is there a glass ceiling when it comes to leadership roles in engineering?**

No, there is no ceiling. I have seen many become CTOs and they



serve in the executive board of the company.

**What has been the experience with seniors at works and the management?**

No direct experience to comment.

**How did the Covid pandemic affect your working routine and what are the learnings?**

I have been mostly working from home with no travel, which is a bit different than what I have been used to. Lessons learned, to continue to collaborate, set up regular scheduled meetings with your team members and peers to ensure strong collaboration in the team and less silos.

**It is said if you educate a man you educate an individual, but if you educate a woman you educate a family, generation (nation). Your views?**

You educate a nation by educating a woman who is in turn educating her children who in turn educate others, I believe this is changing as now more and more men are the caregivers at home and they are the ones educating the children who in turn educate others. It is everyone's responsibility to make a difference in the home and both men and women are educating the nations. Personally, the proverb that holds true for me is, do unto others as you would have them do unto you.

**What would be your message to those seeking career guidance?**

Have a vision and put the goals in place to achieve this vision, you may have some setbacks but don't worry keep going toward this vision. Be courageous and don't be afraid to apply or take a challenging job that you don't have 100% of the requirements. You may take a fall on some topics but get up quickly and learn why you fell and keep going and finally always be around the people who will always be your cheerleaders and are there to help you when you need help.

**Vision. Courage.  
Teamwork.**

**What are the three words that best capture the essential you?**

Vision. Courage. Teamwork.

*Raedah Saman, Future Offer Marketing for LV/MV Industrial Drives based in France. In her role, Raedah defines the strategy of LV/MV Drives of around Euro 1 Bn business and builds and executes a five years roadmap according to the strategy. In parallel she drives Countries to launch and deploy key offers to achieve strong growth. Prior to this position she was the Global Field Services Business Development Director for the Middle East & Africa zone where she developed and deployed business plans to drive services P&L of 150m€ with double digit growth in revenue.*

# Education makes women more aware of opportunities

**Dr Jeyalakshmi Nair, Principal, Vivekanand Education Society's Institute of Technology**

## What prompted you to pursue a career in engineering?

I was born and brought up in Thiruvananthapuram, near the Thumba Rocket Launching Station, where every Wednesday we could see rockets launched by the Vikram Sarabhai Space Centre (VSSC). As a small child I was fascinated by the technology behind controlling some device remotely. When the fleet of buses of VSSC moved past our lane, I used to see the occupants of the bus as some extraordinary scientists who can send rockets to 'Chanda Mama's space'. This interest created a spark in me to try for an engineering stream.

## Having obtained the qualification, what was the experience in getting a job?

I opted for a Control Systems course for Post-Graduation, which can enhance my scope for realising my dream for getting a job in VSSC. During my PG days I developed a liking for the teaching profession. So, when I shifted to Mumbai after my PG, I looked for teaching opportunities and fortunately landed up in my present organisation.

## Is a career in engineering more demanding vis-à-vis other options?

I think, all jobs at the junior level are not demanding, but as you grow and rise in your career, all jobs will be demanding.

## Often projects demand stay away from home. How is that experience?

Being an academician, stay away from home demands are less. However, late night lecture preparations are a regular feature. The satisfaction of a teacher after a successful lecture motivates a teacher to do a thorough preparation before every lecture, even if the topic is not new.

## Have you ever missed a career opportunity or promotion due to gender?

Never. I never faced any such problem in my career.



## Are workplaces today more sensitive to gender issues than a generation earlier?

Yes, workplaces are more sensitive now. Sometimes, misuse of the facilities also happens.

Is there a glass ceiling when it comes to leadership roles in engineering?

I do not think so.



**Would you like to share information about your other achievements?**

I am fortunate to be part of an organisation which values my contribution so that I am able to continue my teaching along with administrative duties. I completed my Ph.D in my early career phase itself, from IIT-Bombay. During the course of my career I got the opportunity to work with BARC and get a funded Research Project from the Department of Atomic Energy with full academic and administrative responsibilities. Today it is a matter of great pride that many of my students are leading their organisations and doing very well in their life.

My role models are all mothers, who handle all the responsibilities of a family very efficiently as the CEO of their family.

**What are the three words that best capture the essential you?**

**Simple. Honest.  
Trustworthy.**

**What has been the experience with seniors at works and the management?**

Favourable. Personally I have received full support from senior management.

**How did the Covid pandemic affect your working routine and what are the learnings?**

During the initial period of lockdown, fear and uncertainty loomed just as everybody. Soon we started online teaching and got occupied with learning online teaching tools and this was totally a big learning experience. All opportunities to learn in diverse fields also helped me to grow personally.

**What would be your message to those seeking career guidance?**

As students, one should have self-esteem and never look for external validation. One should compete and compare with only one's self.

Once in a job, qualities of dedication, sincerity and integrity will take one to heights in their career.

The corona pandemic taught us that learnability and agility will be the defining characteristic of the employees in future.

**It is said if you educate a man you educate an individual, but if you educate a woman you educate a family, generation (nation). Your views?**

True. Education makes women more aware of opportunities and they get more empowered with their incredible networking and multitasking abilities. This can make a positive impact on the growth of her family and the socio-economic atmosphere in the society.

Simple. Honest. Trustworthy.

*Dr Jeyalakshmi Nair, a post graduate in Control Systems, did her PhD from IIT-Bombay (1995) with major research topics Systems & Control Engg, Robust Control of Singularly Perturbed System. An approved Principal of Mumbai University, she has also been a Member, Adhoc Board of Studies in Electrical Engineering and also an Expert Member on panel of Staff Selection Committee for Lecturers/Assistant Professors/Professors of Engineering Colleges on behalf of Directorate of Technical Education. Having published/presented research papers in several international*



AICTE CII Platinum Category Institute Certificate was handed over by Dr. Sudakshina Lahiri, University of Warwick along with Mr. Vijay Thadani Chairman, CII National Committee on Higher Education & Vice Chairman & Managing Director - NIIT Ltd. , & Prof. Anil D. Sahasrabudhe, Chairman, AICTE during Knowledgeexpo 2017, Delhi on 2<sup>nd</sup> February 2017.

## { The joys and challenges of entrepreneurship are all rolled into one }

**Amrita Chowdhury, Co-Founder & Director, Gaia.**

### **What prompted you to pursue a career in engineering?**

Today, as a business leader in the technology space, I can see a few key drivers that led me on my path from engineering to innovation to business. Growing up, I was interested in the sciences. While I come from a family of doctors, I was not comfortable with blood and tissue - so the next best thing was to consider engineering. With that goal in mind, I joined IIT Kanpur as an undergrad.

After getting my engineering degrees from IIT Kanpur and UC Berkeley, I got the opportunity to work with Applied Materials in California. The Semiconductor industry was going through a massive inflection at the global scale at that time. I worked in innovation for the first few years, and indeed it was an enriching experience.

However, I wanted to further broaden my impact and that led me to pursue an MBA from Carnegie Mellon, work in management consulting in the US and Australia, and eventually shift to business.

### **Having obtained the qualification, what was the experience in getting a job?**

My first job was in California working on product development and innovation at Applied Materials. As mentioned earlier, the Semiconductor industry was going through massive change, innovation, and growth at that time. While I had wanted to work in tech marketing, I was assigned a product development project. It was incredibly tough and open-ended. There are no established rules in breakthrough innovation. I recall a year of experimentation - trying many new ideas and collaborating with various colleagues. I worked with a few teams for a while. Then the teams were moved to other projects and I worked alone. Nothing worked. There was immense pressure. Eventually, the product 'worked' - it led to 7 US patents. The first-ever Intel Pentium II and Pentium IV in the world used this technology, and it eventually was used in fabs around the world for a decade, generating perhaps tens of billions of dollars in associated business.

### **I learned some critical lessons in this phase which have stayed with me for life:**

- i. First, it takes a lot of perseverance and positivity to keep trying and trying and I don't expect things to be easy.
- ii. Second, one of my mentors of the time told me that real impact





happens from chasing new ideas not doing improvement projects from 99.9% to 99.99% and that has been my mantra.

iii. Third, there is no substitute for hard work. I worked typically sixteen plus hour days, and when the product moved from the lab to 'burn in' for repeatability testing for production, I was the youngest person but the team leader.

iv. Fourth, we need to be able to effectively communicate about our work and protect it - something I learned from the numerous conference talks, journal papers, and legal patent paperwork that I had to do.

v. Fifth, we need to enjoy what we do. Much like Silicon Valley companies of today, Applied Materials was a 'work hard, play hard' atmosphere. I rose to the challenge, but also enjoyed making friends, learning about their cultures, and more.

#### **What inspired your transition from a working woman to an entrepreneur?**

After working in strategy consulting in US and Australia and leading businesses in India for several years, I moved into entrepreneurship. At the time, I had been working on the governance and marketing aspects of government missions. My co-founders were looking at the technology aspect. It was a meeting of minds and I joined hands with them. Gaia provides technology and e-governance solutions for complex, multi-location, and multi-stakeholder operations.

#### **How was the journey from working for a company to managing one of your own?**

The joys and challenges of entrepreneurship are all rolled into one. It needs immense commitment, perseverance, and positivity to continue day in and day out in the face of challenges. In some ways, my journey of leading businesses had prepared me for the functional part of running a business. But the attitude that's needed is something that I have developed over time and continue to develop each and every day.

#### **Do women as entrepreneurs have to face different or additional challenges?**

The common challenge of entrepreneurship - for both men and women - is survival and agility. We need to continuously adapt and evolve - our products, our markets, and our approach - to grow and to succeed. That said, as a woman entrepreneur, we try to prove ourselves constantly. Hence, we end up working harder and take the effort to be totally thorough in everything we do.

#### **A woman is also a home maker. How do you maintain the balance between the two?**

Life is about balancing the imbalance. I believe that progression happens through imbalance, and consequently, there have been phases in my life when one thing or another has taken precedence. It's important to keep the momentum but also to forgive oneself. We can achieve a lot by serially multi-tasking and focusing on different goals - both professional and personal.

That said, my children have always taken top priority. While I have juggled and balanced like every working mother, and I may not have been there for every interaction or homework, I have been there for helping them navigate every important milestone and curve and decision. Today, I am filled with pride to see them developing as mature, thoughtful, and achievement oriented youngsters.

#### **Are workplaces today more sensitive to gender issues than a generation earlier? What is your approach to gender issues in the company?**

There is a lot more awareness about gender issues today. However, the numbers still do not reflect adequate change at the systemic level. While more women graduate and join the workforce, there is still a lot of churn and dropout. The fraction of women in senior leadership is still low. Despite several marquee women leaders in technology companies, the overall rates are low.

Gaia has two women in the co-founding team. So we are very aware and sensitive towards gender and family issues for both female and male team members. But we work as a meritocracy and focus on work and deliverables, equal opportunity and equal encouragement. We offer significant flexibility to people to achieve their home, personal, and professional goals.

#### **How did the Covid pandemic affect your working routine and what are the learnings?**

We have been largely working from home since the pandemic started. Though some parts of our business requires on-ground instrumentation and client interface and these teams have been working from office or client sites throughout - even during peak lockdown.

The pandemic has required new forms of communication and collaboration, project management and delivery of work.

#### **What would be your message to those seeking career guidance?**

There is a lot of opportunity today - both working in a company or as an entrepreneur. We need to ensure that we 'check in' with the right skills and right attitude. Constantly learning and growing is critical. At the same time, we need to be fully engaged with our work, our team, and our clients. In the end, it is about being thorough and solving problems to create delight for our clients.

#### **Would you like to share any other information or thoughts?**

I am always thinking of new ideas, new solutions, new ways of solving complex problems, new ways of communicating.

I like to take charge and act on my ideas. I prefer to act fast, fail



quickly, iterate, and restart till I get things to work.

I am not fazed by challenges - and increasingly so as an entrepreneur. I persevere. I remain smiling and composed. I keep trying to motivate my teams.

We need mentors and role models in life. But we may not find a 'formal mentor' if we seek one. I believe in learning from people by observing them. If we are diligent and excited about what we do, many people will come ahead to help us and be informal mentors. It is a circle of positive influence.

What are the three words that best capture the essential you?

Dreamer. Doer. Dauntless.

## Dreamer. Doer. Dauntless.

Amrita Chowdhury is Co-Founder of Gaia, where she leads the Business & Marketing functions. Gaia provides solutions for Smart Sites and Smart Cities, blending IOT, ICT, AI/ML, and analytics to provide insights. Gaia has worked with cities and enterprises on digital transformation via new age technologies and digital workflow automation to impact business processes and operations. Amrita is a business strategist, engineer and innovator. She brings a unique understanding of business growth, technology, digital spaces and brands. Previously, Amrita served as President & CEO of DY Works (Future Group); Country Head South Asia for Harlequin; and Associate Director, Education for Harvard Business School for South Asia. Amrita provided Board assessments and strategy consulting with AT Kearney in USA and Oppeus in Australia for clients in the mining, tech, automotive, professional services, and government sectors. She started her journey in innovation and product development with Applied Materials in California.

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# The pandemic taught us how to prepare oneself to fight with uncertainty

**Madhumita Ghosh, Solution & Service Lead – Cognitive & AI-Process Transformation-Digital-RPA-Advance Analytics at IBM.**

## What prompted you to pursue a career in engineering?

No, not engineering. Post my 10th, I developed an interest in Statistics and as I moved, I fell in love with the subject, more so with Applied Statistics so to say. I always tried to take a different path than the conventional and during our studentship when others took engineering-MBA paths, I happened to choose Post Graduation in Statistics and Operation Research path. Since then, I have been enjoying a versatile professional journey, starting with an international funding agency and NGO, moving through an advertising-consumer research firm, pharma consulting to airlines revenue processing to BPM domain, and then entrepreneurship; and now with tech giant IBM. Followed the mantra of 'Learning & Re-skilling' as the only constant.

## Having obtained the qualification, what was the experience in getting a job?

I left my birthplace, the steel city Jamshedpur, after my post-graduation and reached Mumbai to look for a job opportunity. Yes, there was an initial struggle, days were not easy, yet I enjoyed my career journey till date with adaptable experience in various functional areas and industries.

Is a career in engineering more demanding vis-à-vis other options? Here is my two cents...in any profession, it is up to you how you will align with the industry - be it engineering or any other profession. Your application knowledge and aligning it with industry requirements matters.

## Often projects demand stay away from home. How is that experience?

Women are better multi-taskers and can do better coordination I believe. So you can be at home, and being away from home too with a day to day connects and support system. Yes, more than 2 weeks at a stretch is a bit troublesome.

## Have you ever missed a career opportunity or promotion due to gender?

Not really. I have received support and guidance always and gender has never appeared as a barrier in my path; on the contrary I never



tried to take advantage of being female.

## Are workplaces today more sensitive to gender issues than a generation earlier?

Yes I feel so; moreover organisations are more sensitive and making it a necessity for 'inclusion'.

## Is there a glass ceiling when it comes to leadership roles in engineering?

I can't comment on engineering, but you see women are everywhere, and in every field their contribution, courage and capability is proven.

## What has been the experience with seniors at works and the management?

I am fortunate to receive support as always. I can get along with anyone with ease and flexibility hence not receiving any push back till now.

## How did the Covid pandemic affect your working routine and what are the learnings?

Facetime is lost, coped up with the situation. Work from home is not



a new phenomenon in our kind of work, however continuously for a year is a bit frustrating. I have always believed in upskilling and reskilling myself as per industry needs and invested my time in training towards emerging technologies. Yes, pandemic taught us how to prepare oneself to fight with uncertainty.

#### **What would be your message to those seeking career guidance?**

Try to learn a holistic approach in problem solving. I mean think non-linear. In whatever functional area or domain you are, try to bring some innovation at work by focusing on 'Enhanced experience', 'Operational excellency' and 'Business benefit'.

#### **It is said if you educate a man you educate an individual, but if you educate a woman you educate a family, generation (nation). Your views?**

A woman always looks with a holistic approach and sees through a lens of care and support. Women are the basis for the development and nurturing of the individual, the family and the community, which is half of the society that educates the other half, viz., the mother, the wife, the teacher and the sister, so it is necessary to take care of it and pay attention to its future. And a woman is assigned a place where this is reflected in all areas of life. Educating a girl child is tantamount to educating the whole family. Girls should be treated at par with their male counterparts.

#### **Would you like to share information about your other achievements?**

I have grown up in Tata's ethos. Born and brought up at Jamshedpur, upbringing was never like a typical girl child in Bihar. My parents, especially dad, who believed more in his daughter than the society, laid the runway for me to fly. A self-made and a true family person perhaps put all his energy and aspiration in his daughter, taught all possible ways various practical aspects of life. I lost him two years back yet feel his presence and guidance always. Certain key beliefs and values which he roped in me and I try to follow the same, viz:

- i. Fly high but stay connected with root
- ii. Never quit
- iii. Networking to gain different perspective
- iv. Remain dutiful at any circumstances, and
- v. Say what you do and do what you say.

I have always tried to do or did something new without following the conventional track.

Few accolades which gave me satisfaction are:

- Recognised and awarded as 'Analytics Excellence 2015' at NASSCOM BIG Data Summit,
- 'Best Analytics and Insight Leader of the year' at Kamikaze B2B Media in 2017 and
- 'Green Mentor award 2018, at Global Green School Conference - New York in 2018.

#### **What are the three words that best capture the essential you?**

Confident. Resilient. Integrity. I have always tried to be away from 'Comfort Zone', accepted challenges and always tried learning on the move.

## **Confident. Resilient. Integrity.**

*Madhumita Ghosh, SME and Thought Leader, has been working in the area of Cognitive & Digital Transformation with core expertise of Data Science for last 22+ years. As a seasoned professional, she poses broad based experiences, and brings rigorous approach to fact driven solution in modern data landscape, AI, ML, NLP, IoT, RPA and other digital transformational initiatives. Being industry agnostic in her varied experience in leadership role, she supported organisations in developing or enhancing business process solutions for raising revenue, cost and asset optimisation, as well as customer experience enhancement as catalyst between business and technology.*

*Her current assignment is with IBM India Pvt Ltd, in the capacity of 'Business Transformation Lead - Cognitive & Digital' in consulting arm of GBS. Prior to that she was Sr VP & Global Head of Analytics in Concentrix (erstwhile Aditya Birla Minacs), and previously worked with MNCs like Aegis Ltd (an ESSAR Enterprise), Accelya Kale Solution Ltd, IMS Health, Mullen LOWE Lintas, and Catholic Relief Services - USCC, to mention a few.*



# **Create your own path rather than going with the crowd**

**Samiksha Bhokare, Final Year Student, D Y Patil College of Engineering.**

**What inspired you to pursue a career in engineering - was Instrumentation your first preference?**

I was good in Mathematics and Physics in my Higher Secondary Education along with my inherent problem-solving aptitude, which made me land up in Engineering. Choosing a branch was utterly my choice. Attending workshops and seminars on Robotics and visiting various industries like the food industry, textile industry, chemical factories and seeing their process lines and automation in childhood fascinated me to take Instrumentation and Control for BE. Although many suggested I opt for Computer/IT due to the belief that there is a great scope in the IT industry for women, I was firm with my decision and chose my own path with the support of my parents.

**How did you find the atmosphere and the facilities at the college - the faculty, practicals, etc?**

The atmosphere and the facilities at the college are virtuous, also the contact with Alumni and industry experts is good. It also conducts various programs and expert talks at the institute level and department level, which enables students to stay in touch with industry people and be updated on various tech trends. The institution has various technical and non-technical clubs, where students get a chance to showcase their skills, be part of such clubs, and also lead the club along with the faculty coordinator. The college also organises various industry visits where students get exposure to the industry environment and standards.

**You have recently participated in and secured the first place in the openAutomation Challenge organised by B&R Automation. What was the experience like? Can you briefly explain the project you did at B&R and the experience at the Challenge?**

I learned of this competition in the core instrumentation field from my college mentor Prof Vipin Vibhute. On the basis of project ideas submitted, teams were short-listed by B&R Automation, which was followed by excellent training sessions on Automation Studio Software including programming in Ladder and Structured Text language. Many projects were built during the training in order to increase understanding of concepts, logical thinking, and hands-on experience. Along with programming language, they also provided training on communication protocols like OPC UA and building HMI screens. By combining all three technologies each team had to build their project within the span of seven days.



My project for openAutomation Challenge was Monitoring and Controlling multiple SCARA robots using HMI. The basic idea behind the SCARA robot was to pick an object from one moving platform and place it on another platform. I developed my project on Automation Studio along with VNC Viewer, UA expert, and Python 3.8 as



supporting software. In total there were 3 robots wherein the operator is able to control and monitor the position and coordinates of the robot, having three degrees of freedom to each robot (base, arm and clamp). Out of three, two robot coordinates were predefined and the operator is able to start/stop and monitor the positions of the robot, whereas, in the third robot, the operator was able to enter the coordinates or angle of rotation depending upon the requirement as well as monitor the work of the robot. The complete programming of all three robots was done on Automation Studio. Also, created several HMI screens and linked them in sequence so that it jumps accordingly. And for communication purposes and remote control of the robots, I used UA expert for the OPC UA communication protocol.

Due to some reasons, I was a single-member team, because of that, there were few challenges faced by me which made me juggle through managing presentation work as well as finishing the project work within the span of 7 days along with my college submissions and external exams. But, 'where there is a will, there is a way'. With a lot of determination and hard work, I overcame the obstacles and was able to finish all the work within the given deadline. The training given by Mr Tanmay Sharma from B&R Industrial Automation helped me a lot for the competition as well as for my final year major project and also for the placements. My mentor Mr Ranjith Kumar from B&R Industrial Automation kept me motivated and helped throughout the execution of the project. On the final day of the presentation, I was confident enough as I worked on the project right from the scratch and was under skilful guidance. The project presentation went well in front of the panel and I was waiting for the result in anticipation and was hoping for the best. I was not sure about winning but definitely, somewhere inside me, I was like "I have given my 100% and now let the best win".

I had heard a lot about Hackathons and Open Challenge competitions in the IT sector for students but it was great to be a part of such an inspirational training and competition in the core field. The complete openAutomation Challenge was conducted online and it was nice to see such huge participation and excellent competition from the students of various colleges.

**Did the syllabus at the college prepare you for the training you had at B&R?**

Definitely, studying at the college has helped me during training and competition to some extent, but due to the syllabus gap between university and industry, I faced several problems in understanding the technologies, although the university is implementing changes in the syllabus from the 2020 batch and bringing more practical-oriented pattern in the curriculum, which will make students industry-ready.

**Are there any gender issues faced at the college - what is the ratio of girls and boys in engineering today?**

The ratio of girls to boys in engineering colleges today is around 2.5. I was part of the Robotics Club in college, wherein we participated in many competitions and projects and represented the college. But due to safety issues girls were not allowed to stay back in the college workshop and work late at night whereas boys kept working on the project for long. Apart from that as such I never faced any kind of gender issue on college premises.

**How did the Covid pandemic affect your routine at the college?**

Covid pandemic has not only affected our college routine but also our lifestyle in a drastic way. Being a part of college and club I was engaged in some activities throughout the day, but due to the pandemic, everything ceased. But on the contrary, I completed various courses in different fields and learned new things that I always wanted to, like playing guitar and baking, which helped me sail through this quarantine in a smoother way. But the environment for learning was definitely affected.

## Discipline. Dedication. Determination.

**It is said if you educate a man you educate an individual, but if you educate a woman you educate a family, generation (nation). Your views?**

Though equality is widely practiced in today's world, there are many socio-political issues under the cover of feminism and anti-feminism. When we talk about equality, people often confuse it with equality in every aspect of living. As Priyanka Chopra once observed during an interview, 'When we say we want equality it does not mean we want to gain muscles and beat up someone'. According to her, its cerebral equality which is something women expect from society. This also makes us understand psychologically how a woman has more power to educate others. Also, 'Woman is a good manager' is a very controversial topic, but contemplating on this fact that in reality, women are capable of managing work and personal life way better than men can, emotionally or mentally. Not only in India but in many parts of the world, women are a major part of the education sector, who are responsible for nurturing a child. It's not only the duty of a mother to bring up a child but a child acquires most of the manners by seeing his/her mother. So educating a woman will educate a family, a generation, and a nation.

and will also make her more brave and confident.

#### What would be your message to those seeking career guidance?

Well, I would like to give a message to those who are seeking career guidance that, try every possible thing at an early age and then decide what you love doing be it Science, Art or sports, create your own path rather than going with the crowd. And do more of what makes you happy. Also, being multi-talented is a privilege nowadays. So trying different things is good, which in return will definitely make you bold and brave.

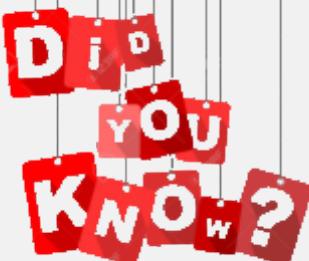
#### What are the three words that best capture the essential you?

Discipline. Dedication. Determination.

Prakash Padukone once said, 'To excel in any sport the formula of 3 Ds - discipline, dedication, and determination is a must'. But I believe that this theory can be used in everyday tasks, hence I follow this in my life.



*Samiksha Bhokare is currently a final year student in Instrumentation and Control Engineering from D Y Patil College of Engineering, Akurdi, Pune. Fascinated by Robotics since childhood, she developed an interest in automation and during second year of engineering, joined the college's Robotics Club and not only participated in national-level events, competitions and workshops, but also conducted and organised workshops, webinars, and competitions with fellow enthusiasts.*



# Worlds First Computer programmer

**From a mathematician to writing the world's first machine algorithm for an early computing machine in the mid-nineteenth century**



Augusta Ada King, Countess of Lovelace (née Byron; 10 December 1815 – 27 November 1852) was an English mathematician and writer, chiefly known for her work on Charles Babbage's proposed mechanical general-purpose computer, the Analytical Engine. She was the first to recognise that the machine had applications beyond pure calculation, and to have published the first algorithm intended to be carried out by such a machine. As a result, she is often regarded as one of the first computer programmers

- She worked along with Charles Babbage and invented a computer program that she called "The plan", which later became known as 'The Analytical Engine of 1843'.
- She also translated one of Charles Babbage's Paper in English on his request.
- Ada Lovelace's notes were labelled alphabetically from A to G. In note G, she describes an algorithm for the Analytical Engine to compute Bernoulli numbers.
- The first published algorithm ever specifically tailored for implementation on a computer is by her.
- Ada Lovelace's notes on Babbage's Analytical Engine were found and republished in 1953 after her death. The engine has gained the recognition of an early model for a computer and her notes as a description of a computer and software.

# Lessons Learned-2: Avoiding the Hard Way

**Ninad Deshpande narrates his experience of learning on the job for the benefit of engineers entering the automation and robotics world.**

The life of application, commissioning, service and software engineers might be termed as difficult with everyone enduring extreme pressure on the job and several hardships especially in the early part of their career. Pressures are usually part of any profile, but especially coming out of college, application engineers are subject to not only corporate pressure such as punctuality, bosses and colleagues but also customer pressures. While growing up our grandparents or parents have always taught us 'Athithi Devo Bhava' (Guest is God), and as we enter and grow in the automation world we are taught by our seniors, 'Customer Devo Bhava' (Customer is God).

In this edition of the column, I will focus on some learning during my time as an application engineer and some mistakes which I made and many learning I had by committing these errors.

## Hard-work and smart-work is the key

Most of us know that hard work and dedication is the key to success. As we grow in our professional careers, we see our seniors or peers and

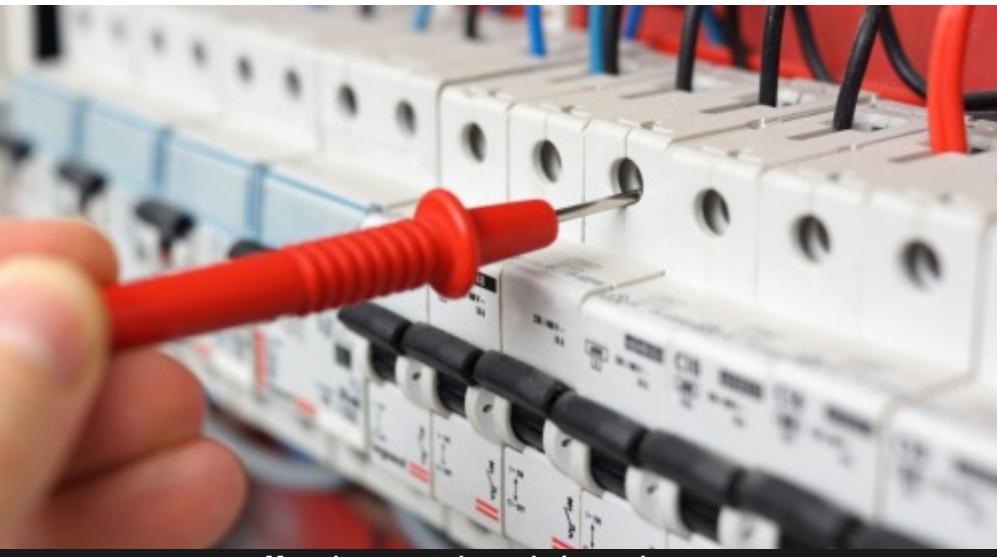


Many lessons to learn during early years.

understand that the ladder to the top is built on a solid foundation of hard work. In my previous company, where I was working as an electronics engineer, I was reporting to the automation and electrical head of the organisation manufacturing special purpose machines. During this time, I learned corporate as well as life lessons from my seniors Ashtekar (automation head) and Pawar (design head). The way my previous boss had learnt and honed his programming skills was simply amazing. In his early part of his career, laptops were not common, and programming was done via desktops, which were locked away after office hours. Only specialised programmers could program machines. During the day he completed his wiring and electrical tasks and observed the specialist program. Later he stayed back after office hours, took back up of the system and tried various programming techniques. Before dawn, he downloaded the last known backup, locked away

systems, returned home only to reach the office for the brand-new day. I always tried to walk on his path of hard work, which helped me in my career. I learnt hard work, dedication and focus together with smart work makes life easier, comfortable and faster.

Another important aspect I learnt from Pawar and Ashtekar was brainstorming and out-of-the-box thinking. Many times, it happened that we got stuck in development and all roads seemed to be leading nowhere. Here was the spark of brilliance where Pawar and Ashtekar discussed for a couple of minutes and voila there was the solution to the pestering problem. Moreover, Pawar had a mechanical and design background, yet had that out-of-the-box innovative thinking which usually led to brilliant ideas. These were some of the many learning I had working with them. Words are too less to describe the wonderful times and learning I had in those early years of my career.



Many lessons to learn during early years.

### Programming, but with efficiency

In another instance, I was tasked to complete offline programming of 3 different machines in a matter of a few weeks and then visit the end user place for commissioning them. Post discussion with the customer and my boss I immediately got down to work. Within a week I had completed basic logic development and was 80% ready for visiting the end user site. I made a brief visit to my bosses' cabin and informed him of the progress. I restarted my work on my desk and at this point in time a senior application engineer named Bhavin happened to pass by my desk. He is very knowledgeable, a master in motion systems and very particular about standardisation and efficient way of working. He asked me a few questions and asked to look into the logic I was working on. Within the first glance, he was displeased with the way I had written the code. The nomenclature was not as per the defined organisation standards. He told me to redo the entire code of all projects. I requested him that it's too much effort and if it is fine to follow the nomenclature in upcoming projects. He simply smiled and told me that I might be programming the system today, but tomorrow the project modifications might be handled by another engineer owing to a change in profile or me quitting the organisation. In this scenario, a consistent nomenclature, a good commenting pattern and following the organisational set style guide will help everyone and make the life of others easier. I realised how important it was and in one day I modified my projects based on the organisational set coding and nomenclature rules. I

informed him the following day and he was happy I had followed his orders. He is a very strict person and upfront to express positive as well as negative feedback. Thanks to him my programming improved and it became easier for others to understand and debug. Today, we work side by side in different departments and he is a good friend.

### Performing valuable checks saves trouble and money

Delegating tasks is necessary but it is equally important to review the work before you take the next necessary actions. I learnt this the hard way. In one of my first commissioning visits, I made an error in assessing the efficiency of an electrician. Connecting a 24V signal to electronics is not rocket science. It is connecting 2 wires, one to 24V and the other to ground 0V, which are coming out of an SMPS. I had checked the wiring for 24V in the cabinet on site before power on. There were some errors, which the electrician rectified. Post which he connected the HMI. As I had checked earlier, I was reluctant to do so again and told him to power on the system. However, the electrician had inverted the 24V and ground connections. Boom! The HMI was in smoke and the capacitor and power circuit shorted out. I called up my boss and informed him of the situation. On urgency, he had to send another engineer on site with a replacement device so that I could restart my work. This activity resulted in my sales head blasting me when I returned from site for the additional cost incurred and the time lost for the customer

commissioning. The company had to bear the cost of an engineer traveling 700km with a hardware and then traveling back. If only I had made a final check before powering on the system would have saved time as well as costs. This was a useful lesson learned and unfortunately learnt the hard way. However, in all my future commissioning visits I took extra care on these checks and never made these mistakes again.

### Learning going a long way

These are only a few learning I could put together from the immense learning I had during my 5 years of application and R&D career, which I found were important for engineers entering the automation and robotics world. I am happy that these learning have helped me not only in application development but also helped me in other areas of corporate life. I hope these will be helpful for young engineers too helping them make the most of available opportunities that lie in front of them.



*Ninad Deshpande, Head - Marketing and Corporate Communication, B&R Industrial Automation, has made it a mission to get to know the needs of internal as well as external customers and understanding their unfulfilled desires thus, being able to provide extraordinary experience. Whether it is executing an exhibition, seminar, conference, implementing a campaign for print or social media, delivering a technology oriented presentation, implementing a branding campaign, or internal and external branding, Ninad takes pride in providing best in class service and experience in record time while always leading by example.*

# Fluid Power Technology: Enhancement in Modern Hydraulic System

**Jasbir Singh on  
how digital  
technologies will  
help the world  
navigate the new  
normal post the  
Covid-19 pandemic.**



The vision of industry is to transform fluid power and make it compact, effective and efficient.

For years now, fluid power system manufacturing companies have developed new energy efficient components in collaboration with design institutions. Despite considerable improvements in the design and metallurgy of components, the hydraulic systems still remain inefficient. The reason is poor overall system functional designs that often compel efficient components to operate in low efficiency regions. Hydraulic systems offer tremendous power densities in operation. In general a hydraulic system delivers more than 10 times power compared to any electric system of the same size and occupies overall less critical space while in operation. The challenge here is that the system has never been efficient as it needs to be. Design institutions are more focused on developing efficient components such as high-speed switching valves, high pressure pumps, quick start/stop motors and high-efficiency hydraulic fluids. The digital transformation and digital technology in fluid power provides new gateways for innovative



**Directional control valve for fluid power.**

devices. Adding to the new concept is system integration with ratio opening of fluid control valves of various flow characteristics, use of binary combinations of levers to intelligently control fluid flow and fast switching electro-hydraulic on/off valves. Digital flow control and switching valves improve system performance, efficiency and eliminate chance of leakages.

Hydraulic technological innovation drapes the advancement of hydraulic components, a safe and quick release electrical connection, in-built force lever testing rod, operating procedures and techniques are the most relevant

parts of the whole package for the system's trouble-free operation. Hydraulic system innovations are important because they include improving the development and application of sensors and measurement systems for measurement, monitoring, control and diagnostics of overall systems. Oil pressure, flow temperature, tank level and oil contamination are very critical measurements for overall functioning of hydraulic systems which operate based on feedback signals from equipment. The flow control valve in the hydraulic system regulates the flow rate in specific directions of the hydraulic circuit. Hydraulic control valves are used to control the flow rate to hydraulic



**Electro-hydraulic axis: all in one solution. (Image: Bosch Rexroth)**

coupled motors or cylinders connected to load and thereby regulating the speed. In hydraulic circuits, various options for controlling the flow are achieved, ranging from the simple to the sophisticated, for hybrids systems that may couple with hydraulic valve actuation using sophisticated electronic controls. The purpose of a flow control valve is to regulate the flow rate in a specific portion of a hydraulic circuit.

#### **Flow regulation system components and functions**

Operation of a particular hydraulic system is achieved by various devices like orifices, flow regulators, bypass flow regulators, etc. Demand-compensated flow control bypasses full pump output to the tank during the idle portion of the work cycle. Pressure-compensated variable flow-control valve adjusts to varying inlet and load pressures and shut off valve. Pressure relief valve, hydraulic fuse, pressure- and temperature-compensated variable flow-control valve adjusts the orifice size to offset changes in fluid viscosity. Priority valve supplies fluid at a set rate to a primary circuit. Deceleration valve slows load by being gradually closed by the action of the cam mounted on the cylinder load. Linear-type flow divider splits single input into two output flows. Flow dividers can be

cascaded in series to control multiple actuator circuits, rotary flow dividers, proportional flow-control valves, pressure-compensated proportional flow-control valves, proportional flow-logic valves and so on many sophisticated add on devices.

#### **Factors that influence performance**

Many factors will drastically reduce the operational/service life of hydraulic components and overall systems performance. The solution lies in reliable monitoring and prompt action. Contamination of dust particles, water, or gas ingress are dangerous for the hydraulic system. An appropriate fluid purification must be maintained. Regular online and offline monitoring of the contamination level in oil used for hydraulic systems provides valuable information to the system operator. It enables further analysis of inline filtration efficiency, wear and tear of moving parts in oil submerged systems, ingress of secondary contamination through oil coolers or simply alarm the schedule cleanliness/maintenance of the fluid. Timely and accurate information enables the operator to decide the outage schedule for maintenance. Continuous cleaning of fluid is possible while the system is in operation. Contamination has multiple negative effects on hydraulic systems by accelerated oil aging, shortened fluid life, additive

deterioration, increased corrosion, valve cavitation, abrasion, erosion and increased wear tear. Therefore, continuous monitoring by using precise instrumentation and defining the rate of change in level of contamination is necessary for the improved functionality and efficiency of a system.

A range of devices used to measure particulate contamination is an important part of reliable maintenance planning. All diagnoses are made based on gathered information from fluid circuits in real time and accurately. The contamination measuring device is fixed outside but is connected to the machine and its control system. Laser sensors are used to detect particles in the fluid based on the light gate principle. The metal particle monitor and contamination measurement and control are installed as in-line monitoring system for regular operations:

- 1- Automatic particle counting and display of measuring results in every 20 seconds
- 2- Measured data storage in defined storage intervals
- 3- Real time transmission of measured figure via RS 232 bus interface
- 4- Define programmable contamination limit trigger values connected with four potential free relay terminals.

The potential free relays will trigger a relay contact, when process value exceeds the limit value, allowing control functions to operate in the hydraulic and lubrication system. It provides real-time precise diagnosis of a hydraulic system's health; prompt the optimal date for filter element replacement and continuous monitoring of filter performance with respect to the required laid down guidelines by the manufacturer. Installing contamination measurement provides continuous condition

monitoring and health diagnosis of hydraulic systems. It enables wear and tear, continuous surveillance and early alarming of damage/breakage, which is essential for smooth operation.

Modern sensor technology with high speed Ethernet connectivity becomes a guided factor of 'Smart Manufacturing' on 'Industry 4.0' platform.

Digital microprocessors have made a great contribution to automated control, for new component designs and modern manufacturing techniques. Fluid power innovation and shared challenges are guided factors for integration of electronics with fluid power components on development of new efficient systems in the modern world of smart manufacturing.

#### **Acceptance of IoT devices in hydraulic systems**

IoT is mainly powered and connected with servers, Ethernet, and wireless devices and presently reaching out to many different fields of industry. Looking at its advantages, IoT's influence reached the fluid-power systems, i.e., hydraulic and pneumatic systems. Hydraulic product manufacturing companies understand the value of large digitalisation and consider it for the hydraulic product portfolio also. They tried systematically expanding electrohydraulics components/modules having digital interfaces with sensor intelligence. These products exchange data via multi-Ethernet interfaces with other devices and gain fastest controls on equipment performance. Modern hydraulics coupled with intelligent electronic sensors are as intelligent and have the ability superior than most of the electromechanical actuators.

Hydraulic components are being produced with more and more miniature electronics for use in intelligent motion. Smart sensors are used for gathering operating

data online for machine learning. This real time gathered data is used for condition monitoring, predictive maintenance, and bus communication for remote access.

Embedded with low-power Bluetooth connectivity for remote valve-controller configuration are new features added where remote operation of equipment is possible without having a direct line of sight. With the evolution of this technology a valve can be installed for optimised operation instead of for tough accessibility.

#### **Wide application surfacing out for hydraulic systems**

The technology trends to drive development of smaller valve envelopes with embedded controllers. Lower electrical power consumption with high electrical efficiency is considered for standard, hybrid, and electrical vehicle (EV) systems that are also creating large demand.

Modern hydraulics actuation as the final element of the loop with digital electronics to control offer the best solution. The advantage of fluid technology integrated with the flexibility of modern controls architecture is the modern trend. Hydraulic controls have some unique physical properties, of higher power density, robustness against overload and resistance against shocks. Fluid-power drives are so compact that they need no gearboxes to increase torque or speed. Hydraulic solutions offer substantially increased power relative to total weight compared to electric motors.

There is a massive change of functionality observed in the software architecture of drive technologies. The challenge now is to standardise these across different software protocols, technology interfaces, communication protocols and interfaces which can connect to web services of 3rd party applications and engineering tools. Along with configuration wizard for

engineering tools and control algorithms for hydraulic actuators, commissioning engineers do not need knowledge of hydraulics. In future, we shall probably have smart hydraulic fluids, where fluid properties can be changed to suit an application.

#### **Future technology**

Electro-rheological or magneto-rheological fluids might eliminate moving parts from valves. Electro-rheological (ER) and magneto-rheological (MR) fluids, which can transform the fluid from the liquid state to the nearly solid state in milliseconds by applying either an electric or a magnetic field, may revolutionise the hydraulic system performance. The viscosity of such fluids increases when they are subjected to a magnetic field or voltage, so we can implement them to control fluid flow without any moving parts.



*Jasbir Singh is an Automation Expert with experience in Factory Automation and Line Automation in a large production house. He is an Implementation Strategist, Business Coach and a regular writer on automation, AI, robotics, digital technology, network communication, IIoT, wireless communication, blockchain and use of advanced digital technology. Jasbir has a long association with industry to improve factory automation in production lines for productivity improvement in India and overseas by advising and also transforming into a digital platform by use of AI.*

**The Cover Story of April 2021  
edition will focus on**



# **Robotics in Manufacturing**

**More Details**

Industrial robots, now joined by cobots, are revolutionising manufacturing, adding a new dimension to automation in recent years. Growing volumes, falling process and easy programming are factors leading to the increasing popularity of robots, aided in no small measure by the Covid pandemic which brought home the need for more automation. Yet there are challenges in opportunities.

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**Media Kit**

# Fluid Power: The Oldest Form of Power Transmission

**Fluid power-based machinery offers greater reliability and consistency of operations, says Darshana Thakkar.**

A fluid power transmission system is the most efficient and cost-effective method of power transmission. An average industry professional knows about the Hydraulic and Pneumatic systems. Here I love to share the basics and benefits of the same for the non-engineering professionals of the industry.

Before 1700, the industry was run predominantly by human and animal power; farmers in the field and animals assisting them with the daily rigours of work. From nature wind and water is available as the source of energy. Later on, water became one of the most important power sources and thus the driving force behind the industrial revolution.

## Water power industrial revolution

Water was used in conjunction with the Water Frame invention by Richard Arkwright to power the whole production cycle in large factories. Giant water wheels would sit next to the factory and drive production through the flowing water over the machine. The water would be powered downstream in a river to turn the machinery.

Water power was having many limitations like weather conditions, a factory next to a river, level of rainfall,

## Approx. Power Unit Size Comparison



### Advantages of fluid power.

drought in the summer, or ice in the winter. These limitations are overcome with the evolution of steam power.

## Steam power industrial revolution

Boiling water was used to create a mechanical motion and was the driving force behind several inventions including the steam engine locomotive. The benefits of the steam process over the water were that it didn't vary by season like water power. It could also be located anywhere meaning factories didn't need to be close to a water source.

Steam engines are a great example of how industrialisation led to changes across all areas.

Richard Arkwright is the first to use Watt's steam engine to power textile machinery. By 1775 Arkwright developed mills in which the whole process of yarn manufacture is carried on by one machine.

In 1879 with the invention of the Light Bulb by Thomas Edison, the next phase of the industrial revolution started and as such apart from fluid and mechanical power transmission, the new age of electrical power transmission started. Long-distance transmission of power became possible with the invention of electricity.

As such to run any machine or to produce any products some kind of energy is required. The following 4 types of power transmission methods were available:

- 1) Mechanical
- 2) Electrical
- 3) Hydraulic, and
- 4) Pneumatic.

The Power Transmission method is an engineering method that matches the power required by the machine and the working parts of the machine in terms of energy configuration, movement speed, and motion form.

There are several advantages and disadvantages of each power

<b>Performance</b>	<i>El-motor</i>	<i>Hyd-motor</i>
<b>(max power: 100 kW)</b>	<i>UQM PowerPhase</i>	<i>Artemis DD</i>
<i>Power density</i>	0.5 kW/kg	>4 kW/kg
<i>Efficiency at 20% load</i>	90 %	93 %
<i>Cost</i>	1 / kW	0.3 / kW

#### Comparison of electric motor vs hydraulic motor.

transmission method over others.

I believe this background is enough to understand more about the basics of a fluid power system.

The fluid power system is divided into two parts.

1) Hydraulic system: This method uses liquid (oil or water) as a working medium to transfer the energy and control the operation.

2) Pneumatic System: This method uses compressed gas or air as a working medium to transfer energy and control the pressure of the gas.

#### Advantages of fluid power

Hydraulic and pneumatic systems share many benefits for the machines in which they are installed. These include:

i. High horsepower-to-weight ratio: You could probably hold a 5-hp hydraulic motor in the palm of your hand, but a 5-hp electric motor might weigh 18 kg or more.

ii. Safety in hazardous environments: Because they are inherently spark-free and can tolerate high temperatures.

iii. Force or torque can be held constant: This is unique to fluid power transmission.

iv. High torque at low speed: Unlike electric motors, pneumatic and hydraulic motors can produce high torque while operating at low rotational speeds. Some fluid power motors can even maintain torque at zero speed without overheating.

v. Energy and cost efficient: pressurised fluids can be transmitted over long distances and through complex machine configurations with only a small loss in power.

vi. Multi-functional control: a single hydraulic pump or air compressor can

provide power to many cylinders, motors, or other actuators.

vii. Simple construction: elimination of complicated mechanical trains of gears, chains, belts, cams, and linkages

viii. Quick operations: motion can be almost instantly reversed.

Hydraulic and pneumatic systems are both widely used in stationary (industrial) and off-highway (mobile) equipment. Hydraulic systems are widely used when heavy force or torque is involved, such as lifting loads weighing several tons, crushing or pressing strong materials like rock and solid metal, and digging, lifting, and moving large amounts of earth.

Although pneumatics is capable of transmitting high force and torque, it is more widely used for fast-moving, repetitive applications, such as pick-and-place operations, gripping, and repetitive gripping or stamping.

Of course, in both cases, electronic controls and sensors have been implemented into fluid power systems

for the last few decades. These electronics make hydraulic and pneumatic systems faster, more precise and efficient, more reliable, and allow them to be tied into statistical process control and other factory and mobile equipment control networks.

#### Major components of fluid power system

Fluid power systems consist of multiple components that work together or in sequence to perform some action or work.

The major components of any fluid power system include:

a. A pumping device: A hydraulic pump or air compressor to provide fluid power to the system.

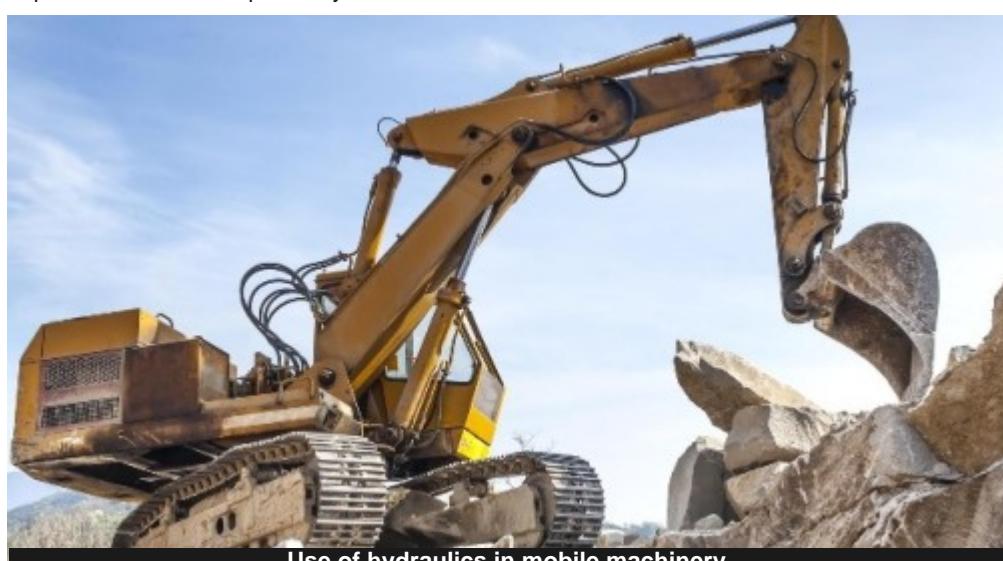
b. Fluid conductors: Tubing, hoses, fittings, manifolds, and other components that distribute pressurised fluid throughout the system.

c. Valves: Devices that control fluid flow, pressure, starting, stopping, and direction.

d. Actuators: Cylinders, motors, rotary actuators, grippers, vacuum cups, and other components that perform the end function of the fluid power system.

e. Support components: Filters, heat exchangers, manifolds, hydraulic reservoirs, pneumatic mufflers, and other components that enable the fluid power system to operate more effectively.

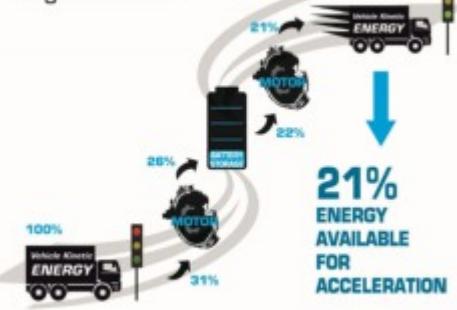
Electronic sensors and switches are incorporated into fluid power systems



Use of hydraulics in mobile machinery.

## Electric

Regeneration:



## Hydraulic

Regeneration:



the operating cost and breakdown cost for a customer site is reduced.

5. The reduced maintenance cost of the overall system for the customer helps to become competitive in the market.

### For machinery buyers

With my vast experience in the machine manufacturing industry, I recommend machinery buyers to choose machines with a fluid power operating system instead of electro-mechanical power. It may be possible that the initial cost of hydraulic or pneumatic system base machinery is higher. But be assured that in the long run in terms of operating and maintenance costs, it will be cheaper than the electro-mechanical counterpart. Not only this, reliability and consistency of operations are also higher in fluid power-based machinery.

to provide electronic controls to monitor the operation of components. Diagnostic instruments are also used for measuring pressure, temperature, and flow in assessing the condition of the system and for troubleshooting.

### Hydraulic applications

Off-highway equipment is probably the most common application of hydraulics. Whether it is construction, mining, agriculture, waste reduction or utility equipment, hydraulics provide the power and control to tackle the task. Hydraulics is also used in heavy industrial equipment in factories, marine and offshore equipment for lifting, bending, pressing, cutting, forming and moving heavy workpieces. Examples: agriculture machinery; construction machinery; entertainment parks; marine & offshore; waste & recycling; energy; machine tools; metal forming; military & aerospace; mining; and utility equipment.

### Pneumatic applications

Factory automation is the largest sector for pneumatics technology, which is widely used for manipulating products in manufacturing, processing, and packaging operations. Pneumatics is also widely used in medical and food processing equipment and chemical plants and refineries to actuate large valves. It's used on mobile equipment for transmitting power where hydraulics or electromechanical drives are less practical or not as convenient pneumatics is typically a pick-and-place technology, to perform the repetitive operation thousands of times per day.

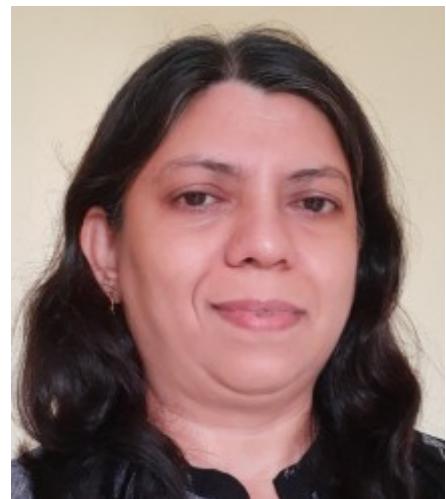
Vacuum is used for lifting and moving workpieces and products. Combining multiple vacuum cups into a single assembly allows lifting large and heavy objects. Major sectors include: food & beverages - ensures reliability and helps to move hard to handle foods; entertainment & amusement parks; factory automation; material handling; medical equipment; off- and on-highway vehicle systems; packaging industries, etc.

How can MSME industries leverage the benefits of fluid power technology?

### Machinery manufacturers

In our country, a large number of MSME industries are involved in the manufacturing of machinery from basic to fully automatic. With increasing global competition in terms of technology, machine cost, operating cost size, and delivery period of the machines, MSME entrepreneurs need to enhance the business performance with the adoption of the latest trends in the industry.

1. By replacing the electrical motor with a hydraulic system and/or mechanical transmission with the hydraulic or pneumatic system the overall cost can be reduced.
2. Assembly is simpler and has fewer moving mechanical parts which helps to reduce manufacturing time and reduce labour cost as well.
3. The size of the machine becomes compact as such requires less space during manufacturing, in a warehouse and also requires less space at the customer site.
4. By eliminating moving parts like gears, belt drives, chain blocks, etc.,



*Darshana Thakkar is MSME Transformation Specialist and Founder, Transformation - The Strategy Hub. An Electrical Engineer followed by MBA - Operations with rich industry experience, Darshana is an expert in transformation, cost reduction, and utilisation of resources. She has invested 25 years in transforming Micro and Small Enterprises. Her rich experience in resolving pain areas and real-life problems of SMEs helps organisations achieve quick results. Her expertise in managing business operations with limited resources helps clients transform their business practices from person driven to system driven with existing resources.*

## 'Imaginarium's collaboration with GE is a match made in heaven'

**Kamlesh Parekh,  
CEO, Imaginarium  
India Pvt Ltd.**

**As a pioneer in the field, how do you view the present scenario for additive manufacturing in India?**

Additive Manufacturing has come of age. It is now a truly mature technology that is not just a prototyping tool but a serious production process that is changing many old workflows.

The pandemic turned out to be a litmus test for AM. At a time when conventional manufacturing and global supply chains came to a grinding halt, firms worldwide turned to 3D printing to innovate and meet the demand for essential products such as Face Shields, Masks and Ventilators. In a matter of days, the AM community proved the power of collaborative innovation and on-demand manufacturing and helped combat the challenges during the lockdown.

Additionally, as the world looks for alternatives to Chinese manufacturing, India is one of the top choices owing to its favourable location, manufacturing expertise, comfort with new technologies like AM and a valuable English speaking workforce. India is bound to see increasing interest from global giants who wish to move their R&D as well as manufacturing hubs away from China.

**What are the kind of services Imaginarium offers to the**



**Kamlesh Parekh, CEO, Imaginarium India Pvt Ltd.**

## **engineering industry?**

We act as end-to-end consultants and offer services like Design for Additive Manufacturing, Simulation, Prototyping, Pre-Production, Low Volume production, Mass Manufacturing, Training & Education, Technology consultancy, AM Factory and Lab set-up, and Software Development. Basically, we help them get past any tricky challenge during the New Product Development journey.

## **What is the significance of the collaboration between Imaginari um and GE additive for the Indian market?**

GE is a world leader in Engineering and Advanced Manufacturing, and their Additive Manufacturing portfolio includes Direct Metal Laser Melting and Electron Beam Melting technologies which are used by industrial manufacturers from the aerospace, medical, defence, automotive, dental, tool & die and jewellery industries.

Imaginari um's collaboration with GE is a match made in heaven because the cutting edge technology of GE can now be optimised by the Application Expertise of Imaginari um and introduced to the Indian market in a way that makes it accessible, affordable and impactful. We help companies understand the best use cases for metal additive manufacturing.

## **What are the opportunities for 3D printing in India in general, metal additive manufacturing in particular?**

The opportunities are endless. 3D printing can be used to make prototypes, end-use parts, spare parts, changeover parts, lightweight parts. It allows you to eliminate spare part inventory by producing these parts on demand and decreasing lead times. Metal AM greatly benefits dental and health care allows for lightweight parts, complex and efficient geometry, and fully customised products such as Titanium Implants and Prosthetic limbs. With Metal AM, hybrid manufacturing - a

mix of Additive and Subtractive processes - is now a reality. Metal AM directly impacts the Tooling and Moulding industry positively through the possibility of printing Conformal Cooling Channels for metal moulds which drastically improves moulded part cooling time and brings down cycle times.

**“ Hybrid manufacturing allows you to experience the best of both worlds when it comes to technologies.**

## **Some machine tool makers are now offering hybrid manufacturing solutions. Is this the way forward?**

It is! Hybrid manufacturing allows you to experience the best of both worlds when it comes to technologies. Traditional metal subtractive and forming technologies aren't able to consolidate multiple assemblies or form complex parts, whereas Metal AM is often expensive and sub-optimal in raw surface finish. By using a combination of two, new levels of design and manufacturing can be unlocked. Parts can be produced faster with fewer errors, and multiple metals can be combined in a part without compromising the integrity of the part, not to mention the superior quality that is now possible with additively manufactured parts that are finished via CNC machining processes.

## **Though the prices of hardware are becoming more affordable, these are still not within the reach of most SMEs. Would a cluster approach or job shops be more feasible?**

SME's now have a host of options available when it comes to accessing advanced manufacturing technologies. Government and Industry sponsored clusters (example: Auto Clusters for the

Automotive Industry) are fully equipped centres with the latest technologies available at affordable rates for SMEs. In addition, Service Bureaus such as Imaginari um exist to solve this exact pain point. SMEs can avail of services from Design, Prototyping, Production and Assembly as well as consult manufacturing experts for their projects, all through a single point of contact.

Imaginari um is constantly acquiring the latest technologies and machines in order to serve the various industries and their needs. Starting off with a service bureau and eventually taking production in-house as they scale is the preferred path for most SMEs, and is a win-win for all parties involved.

## **How do you see Imaginari um evolving amidst this rapidly changing scenario?**

As technology evolves, so should we. Being users first, we're always looking out for the latest technology and are excited to adopt them and apply it to our manufacturing processes. Over the past decade, we have successfully scaled up from a small prototyping job shop into a one-stop shop for all Design and Manufacturing needs for over 40 industries. We've added technology and experts from every domain we wish to cater to. In addition, we have also invested into Software Development capabilities in order to provide clients with complete applications that require digital interfaces. We have also successfully taken the entire portfolio of our services online - allowing clients from anywhere in the world to access our Cloud Factory and start their Prototyping and Production projects with us. The coming years will be all about co-creating new applications with our end customers, and also taking our expertise to as many markets around the world as possible. Imaginari um wishes to be a leading partner to the Make in India, Make for the World movement that is transforming our nation.

# Editorial Calendar

The editorial calendar gives you a preview of the topics to be covered in the coming months so that you can plan your promotions accordingly and get the maximum possible target audience for your promotions. To know more about the deadlines and publishing dates please read the guidelines mentioned below.

## JANUARY 2021

### Automation Trends for 2021

Emerging Technologies & Smart Developments - Cities, Mobility, etc

## MARCH 2021

### Fluid Power - Hydraulics & Pneumatics

Valves, Regulators, Actuators, Controls, etc

## MAY 2021

### Environment Engineering & Sustainability

Innovations & Solutions for Green Environment

## JULY 2021

### Digital Transformation

Smart Factories, Remote Workplaces, Security Challenges

## SEPTEMBER 2021

### The Sensor Revolution

How sensors are revolutionising everything

## NOVEMBER 2021

### Edge Computing Vs Cloud Computing

The changing trends

## FEBRUARY 2021

### Industrial Safety & Enterprise security

Fire Safety, Personal Safety, Cybersecurity

## APRIL 2021

### Robots in Manufacturing

Opportunities and challenges for Robotics

## JUNE 2021

### Maintenance & MRO

Plant maintenance, Equipment monitoring, Innovations

## AUGUST 2021

### Independence Day Special Edition

Make in India - Innovations & Startups

## OCTOBER 2021

### IIoT for Manufacturing

Aerospace, Automotive & Healthcare Industry

## DECEMBER 2021

### Emerging Technologies in Process Industries

Petrochemicals & Pharma Industry

## GUIDELINES

The magazine is published monthly and the go live date for digital edition is 1st of every month and print edition is dispatched by 4th of every month.

The content for editorials (Articles/Interviews/Cover story) should reach us before minimum 12 days before publishing date of the digital edition of the magazine.

Advertisement artwork should be as per the mentioned dimensions and should reach us minimum 10 days before publishing date of the digital edition of the magazine so that our creative team can check and revert on the quality of the artwork and if required ask for any revisions if content is not suitable as per the editorial policies of "Industrial Automation Magazine".

Word count of 1200 to 1500 words has to be maintained for editorials along with 2 images and 1 author image with 150 word profile.

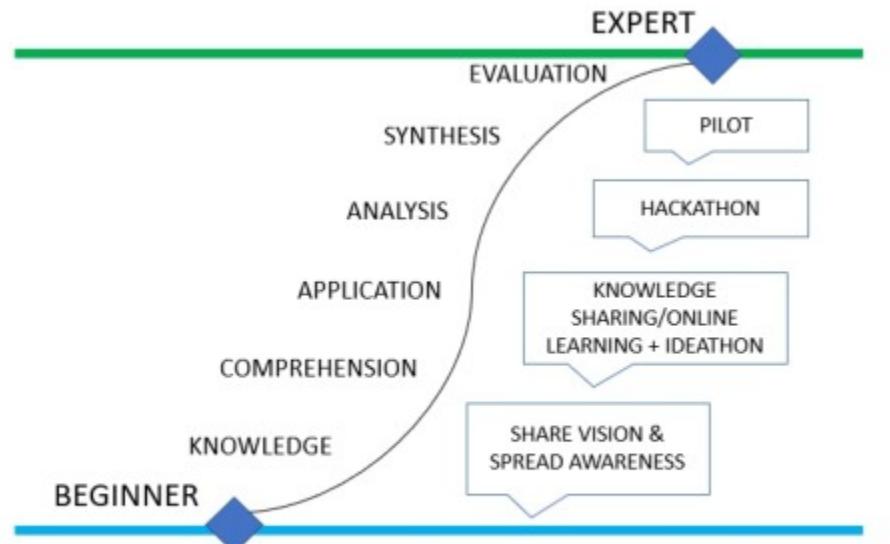
Word count of 150 words has to be maintained for product writeups for magazine along with 1 image the online edition can have a longer content length.

# A Blueprint for Turning Trends into Action

**Abhilash  
Gopalakrishnan  
presents an  
industrial automation  
point of view for  
turning trends into  
action.**

In recent years, we have been observing disruptive trends in terms of business as well as technology. For many Small and Medium Enterprises, this can cause havoc and add challenges in addition to traditional trends in the market. The Covid-19 pandemic has further amplified the effects. These questions bother us the most. How to approach the trends? How can we differentiate ourselves in the market applying these trends?

From an Industrial Automation viewpoint, we can safely attribute these to Industry 4.0, which symbolises smart systems. Smartness can be achieved using the fusion of technologies and their interaction across physical, digital, and biological domains. Two key elements that stay central to all these efforts are digitalisation and flow of data across the system to deliver insights<sup>1</sup>. Lean start-ups ride the change. Large enterprises bring experts from other organisations and make a new digital cross-cutting team. In between them are the small businesses who are in a balancing act and trying to cross over to medium, by attracting more customers. The purpose of this article is to set directions to turn these trends into action, thus turning the tide towards organisational benefit. Two quotes



Left: Blooms Taxonomy applied to learning curve

Right: Organizational Initiative Mapping

## Learning curve mapped to organisation initiatives.

from visionaries holds some hints:

'What we need is an entrepreneurial society in which innovation and entrepreneurship are normal, steady and continuous'

-Peter Drucker

'You've got to start with the customer experience and work backwards to the technology'

-Steve Jobs

Let's take a look at Netflix. As of 2019, Netflix had 8600 employees. During its own reinvention in 2014, they went back to the first principles and asked the hard questions. Today we find them as a software led business, where developers are responsible for all areas of the software lifecycle and they can deploy many times a day without failure<sup>2</sup>. They used Amazon AWS, built a full-fledged delivery platform, with verification and validation integrated. In addition, they made the flow of product, services and data seamless leading to data analytics. Their recommendation

engines today are seen as value by customers<sup>3</sup>.

**The key takeaways from Netflix journey can be summarised as:**

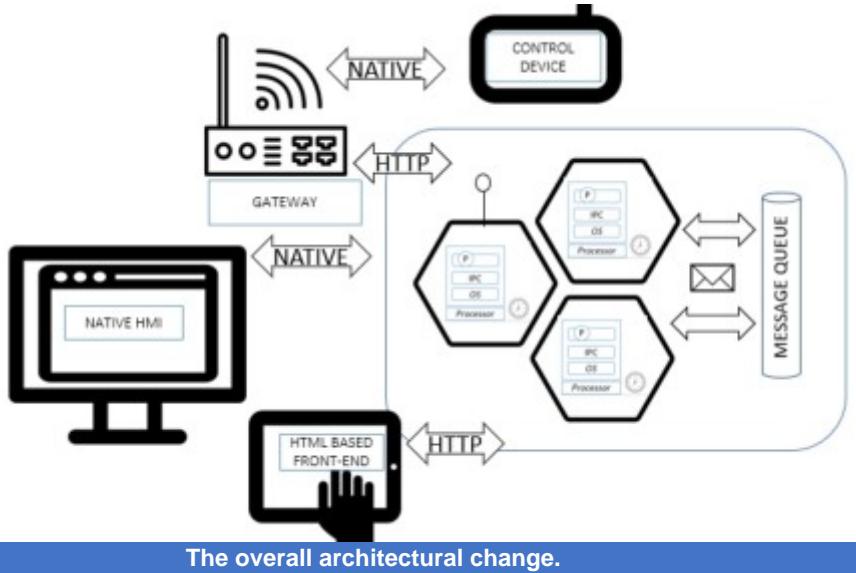
1. Identify what is important for customers
2. Build on organisational strengths
3. Turn into a software led organisation
4. Create a data flow across the system; also able data extraction for analysis, and
5. Experiment and evolve based on insights from data analysis.

But wait a moment. This is about a digital first organisation. How does it translate to an industrial automation organisation? In his book on Cloud Strategy, Gregor Hohpe lays out a step-by-step approach involving Understand, Organise, Move, Architect, Embrace the Cloud<sup>4</sup>. We would use these steps as guidance.

## Organising for a change

'Begin with the end in mind'

-Stephen Covey



We need to begin the journey. There key considerations to start are:

1. Current State of Systems, People and Tools in the organisation.
2. Vision or Future State of Systems, People, Competencies and Tools.
3. Organisational Strengths or Core competence.

Once we have clarity on these, we can move to experimentation. With experiments performed, we gain insights to architecting for the new world. These steps are iterations across all three cycles, broken into 3 months. At high level effectiveness can be measured in terms of:

- a. Speed or velocity of end to end business delivery
- b. Data flow and how seamless is to measure and generate insights, and
- c. Ecosystems including partners and processes.

#### A. Clarity on how to ride the wave

In order to comprehend trends, we need to categorise them into three categories:

1. Foundational in nature and can cause ripples across the entire system.
2. Connects systems to real-world

as well as people.

3. Can be incremental.

Examples of foundational change are cloud computing and IoT. Both are approaches to distributed systems. Distributed systems can be considered a distant cousin of Distributed Control Systems standard IEC 61499<sup>5</sup>. Standards like IEC 61499 and IEC 61850 integrate digital modelling and consider functions getting distributed across devices. Artificial Intelligence and Data Analytics are those we can build incrementally and deliver starting with statistical approaches in the beginning, then moving to probability-based approaches like Bayesian and later towards advanced approaches like deep learning. In house experts with good knowledge of Six Sigma and its statistical methods are a good starting point.

An example of trends which get us more connected to the customer involves connectivity and DevOps or continuous integration embracing the cloud. These together with cloud is a lifestyle change to continuous mode of delivery.

Together they make an innovation engine. An approach like Design Thinking plays a key role and puts focus on customer needs and empathy.

The outcome of this step should

include:

1. A renewed vision for the organisation
2. An assessment of the current state, and
3. A roadmap for the change involving how current systems could evolve.

At this point, leaders can start inspiring teams by sharing the roadmap and building awareness on the organisational initiative.

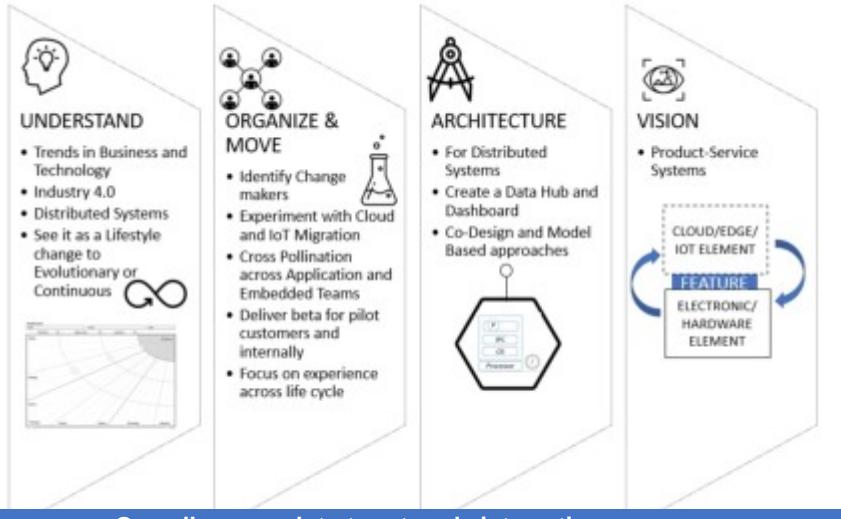
#### B. Experimentation leading to an innovation engine

With clarity on the directions, we can start preparing our organisation for the change. An onboarding step consisting of awareness sessions like Industry 4.0 are essential. This sets the direction and inspires thinking.

The next step is to start ideation summits, to pick good ideas. These lead to hackathons. At hackathons, leaders provide organisational support and resources to realise ideas. Once three to four ideas are realised in hackathons, leaders can promote them to pilots. In this stage we share them with a small set of prospective customers.

Identification of makers is the biggest outcome of hackathon. These employees are passionate about change. They need to be recognised, to encourage the behaviour. It is important to keep them as part of the core innovation engine including as leads in the pilot projects. This builds appreciation for bottom-up innovations. Internships from university students can also enable a healthy trigger to supply fresh thinking.

A way of recognition to makers include vouchers for attending online or internal/external training aligned to organisational directions. Leaders can also encourage them to share the learning and journey, thus



### Overall approach to turn trends into action.

creating communities.

A small team needs to be built to support design thinking approach. This team can support the makers to drive the workshops and nurture people to bringing ideas to life. Tools like Mural and Miro serve well as collaboration tools capturing discussions and customer journeys. Support team like Intellectual Property management needs to be knit into this to potentially capture novelty.

Now we are ready to start with bigger experiments. One typical starting point is migrating selected functions to cloud as services with APIs. Cloud platforms to consider include Amazon AWS, Microsoft Azure as well as local players like E2E Networks. These initiatives should align with organisational digital transformation. The approach should focus on renewed customer experience across different form factors like Tablets, Mobiles and PC/Laptop. As in Fig. 3, experiments can make use of open-source approaches like Linux, Jenkins, etc., to stay lean and stay away from getting vendor locked.

This stage results in two or three running pilots. Data from pilot users lets us get more insights on business value, which can be used to ignite the next step.

### C. Architect for the new world

By now, we would have gained good understanding. This is a great time to architect for change. An approach of integrating products and services as product-service systems with a platform approach is a common observed direction of vision. We can bring together teams from earlier experiments to make architecture decisions like cloud provider, technology for backend and front end, operating systems, database approaches and scaling methods. These are generally driven in alignment to domain functional distribution like IEC 61499 combining architecture principles like reactive manifesto<sup>6</sup>.

### Conclusion

We have described an approach for turning trends into action based on iteratively building clarity on directions, experimenting and architecting. This unleashes the strength of makers, to build an innovation engine. A direction towards a continuous delivery based on product-service systems holds the key. We believe this approach will assist organisations to turn trends to pilots thus leading to continuous innovation.

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Abhilash Gopalakrishnan has spent over two decades in architecture and design of software intensive systems and emerging initiatives. He focuses at the intersection of research, technology, and business. Having played the role of Principal Engineer at ABB R&D in intelligent systems, his current focus is on education like makerspaces as Technology Lead at Learnovate Centre, Trinity College Dublin. A lifelong learner, Abhilash is committed to knowledge and experimentation. He holds a Bachelor's in Mechanical Engineering from Amrita Institute, and Masters in Software Systems from BITS, Pilani.

## 'We are seeing smarter utilisation of need-based automation'

**Anbu Varathan,  
Director General &  
CEO, Indian Machine  
Tool Manufacturers'  
Association (IMTMA)  
and Bangalore  
International  
Exhibition Centre  
(BIEC).**

**How was the response of the industry during the IMTEX Connect virtual event, especially now that the pandemic appears to be under control?**

IMTEX Connect 2021 successfully brought the machine tool industry and user industries together on the digital platform. This digital initiative enabled exhibitors to present their products and enabled them to interact with visitors successfully.

IMTMA organised this unique show in response to the pandemic that had restricted physical meeting opportunities momentarily. The digital platform successfully bridged the void created in business transactions, renewed acquaintances and created new ones. IMTEX Connect was an excellent platform for manufacturers to showcase products and technology and share knowledge ahead of the main show scheduled in June this year.

The exhibition drew a good response from stakeholders across the world. The event featured over 90 exhibitors and more than 7000 visitors from 45 countries. The feedback from



**Anbu Varathan, DG & CEO, IMTMA and BIEC**



IMTMA organises IMTEX series of exhibitions

exhibitors has been impressive and many were satisfied with the outcome and network opportunities that they availed.

User industries connected with latest innovations in 3D printing and Industry 4.0 concepts.

#### **What is the impact of the pandemic on the manufacturing industry and how has the Budget 2021 addressed the concerns?**

The Machine Tool industry, which is the backbone of the manufacturing sector, faced challenges during the lockdown period with around 70% of business being affected in the first quarter of FY 2020-2021. Gradually in the unlock phase industries began reporting encouraging sales and orders and we may see growth rate coming back to pre-Covid levels by the mid of CY 2021. Emergency credit line guarantee schemes, large cap allocation for MSMEs, production linked incentives in auto and electronics, redefinition of MSMEs, increase in budget outlays for machine tool user sectors are expected to help the machine tool industry business. Also preference for local manufacturers in public procurement, measures for ease of doing business, incentives for start-ups, NRF allocation for propelling technology development and Atmanirbhar and Make in India initiatives are expected to address

business concerns over short to medium-term.

#### **The pandemic has re-emphasised the need for more automation and greater adoption of Industry 4.0 concepts. Is the machine tool industry ready for this?**

Undoubtedly the pandemic has brought changes in the way of office functioning with companies experimenting with 'work from home' wherever possible. We are also seeing smarter utilisation of need-based automation across the entire spectrum of the manufacturing ecosystem. Further, we are seeing digitalisation of shop floor arena and allied areas, mostly customised for enhancing efficiency and cost competitiveness.

#### **How is the industry coming to terms with the fact that there has been no physical event during this period which is the main point of contact with customers?**

The pandemic has perhaps reaffirmed the adage that change is constant and evolution is inevitable. Interface between exhibitors and visitors on the digital mode has become an add-on for what was being done face-to-face. Artificial intelligence, virtual reality, augmented reality, data analytics, etc., are gaining momentum and finding wider applications including usage in exhibitions.

**The industry is still wary about the holding of actual (physical) events. How about the logistics of handling a major event like IMTEX in June?**

With vaccines and SOPs in place, industry is no more wary of organising physical events anymore. Exhibition organisers are preparing to move ahead with their planned shows and venues are also gearing up to welcome them. IMTEX & Tooltech 2021 will be one of the first major exhibitions to be held since the outbreak of the pandemic and will set the tone for others to follow.

#### **What is the new normal for exhibitors and event organisers?**

All of us are going through the learning curve, be it exhibitors, visitors or show organisers. Technology is bringing value propositions to shows by helping visitors explore and understand more about the products before they visit the venue so that they spend quality time at the expo. This may lead to better business outcomes among exhibitors. Also exhibition industry stakeholders will be focusing on safety and hygiene aspects while organising shows. People unable to travel can explore hybrid formats at physical exhibitions in accessible product/service categories and gain insight into the products and technologies on offer.

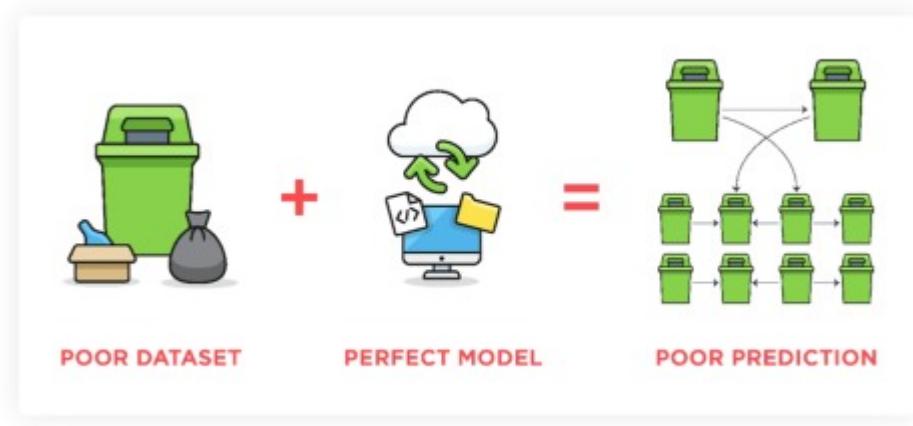
*Anbu Varathan is a Metallurgical Engineer from Indian Institute of Science, Bangalore and has working experience of about 30 years. At present he is the Director General & CEO of Indian Machine Tool Manufacturers' Association (IMTMA) - the apex industry association for the machine tool sector in India. He is also the Chief Executive Officer of Bangalore International Exhibition Centre (BIEC). BIEC is a 'Centre of Excellence' established by IMTMA with Exhibition & Conference facilities of the highest quality at par with international standards and is certified as 'Green' project as per LEED (Leadership in Energy and Environmental Design) standards of US Green Building Council (USGBC) and by Indian Green Building Council (IGBC).*

## The Achilles' Heel of AI – Training Data

**The demand for well-labelled training data is huge and with increasing advancements in AI, is going to increase exponentially over the next few years, says Reema Aswani.**

We have heard this saying a lot in the context of Artificial Intelligence (AI) - Garbage in is Garbage out. The success of AI-powered algorithms relies on data, well-labelled training data that the model is built upon. As AI becomes pervasive, enterprises across the sectors are transforming their businesses relying heavily on AI-led decision-making. A recent NASSCOM-EY survey of 500+ CXOs across four key sectors to understand the challenges they face while implementing AI, and the top areas of concern comprised Technology and Data, Trust, Ethics and Regulations, amongst others. Enterprises are struggling with the success of their AI deployment projects despite having a perfect model.

The dataset on which the model is trained on definitely has a big role to play. If the machine learning model is training with a poor data set (garbage in), there is no surprise that the model will produce poor prediction (garbage out). The issues of trust and ethics are eventually also a function of the model results, which is dependent heavily on the



Dataset has a big role to play. Image Source: CloudCover

dataset and the algorithm. While most of the organisations figure out the algorithm piece, the data part is something that they often struggle with. Inadequate training data was pointed out as a major challenge by 36% of the CXOs as per the NASSCOM-EY survey conducted between January to March 2020.

This challenge worsened amidst the Covid-19 pandemic as AI became a 'must-have' technology instead of a 'good to have' in the increasingly contactless society. There came an unprecedented need to solve a lot of problems via AI-led decision making and not only enterprises but the government also realised the importance of as well as gaps in data assets and integrated systems that are fundamental for pandemic response and reopening the economy.

### Importance of data labelling/annotation

We know that data is a critical lever of success of AI models. It is for this reason that over 80% of the time spent during AI projects is on the data preparation phase

including data identification, cleaning, augmentation, cleansing and labelling phases. Moreover, as training data plays a critically essential role in the success of an AI model, 25% of the time is spent specifically on data labelling, creating relevant training data for the AI model.

The data labelling and annotation tasks depend completely on the type of data to be labelled for the ML model and task at hand. Data annotation can be done for all data types including text, audio, image and video and across use cases from computer vision, natural language processing and content services. Some of the primary use cases comprise image classification/tagging, speech and text labelling, sentiment analysis, conversational tagging, relevance and personalisation labelling, amongst others.

As the problems that enterprises are trying to solve through AI vary, so do the data required by them - the need for training data is also contextual. The same image can be used to train an AI model to predict different things. For example, if we consider



**Labelling data for machine learning.** Image Source: Quantanite

the below image and consider multiple annotation use cases.

Someone would just need to locate the number of pedestrians in the accompanying image, while another use case might want to focus on the number plate for surveillance purposes or a third model might require only identifying the number of non-yellow cars. Depending on the use case, the type of annotation also varies from a simple bounding box to a precise polygon annotation to even more complex types. The requirement varies hugely with different data types and the use cases.

### Concluding remarks

The demand for well-labelled training data is huge and with increasing advancements in AI across sectors specifically like automotive, retail, healthcare and BFSI, the demand is going to increase exponentially at least over the next few years.

Watch out for my next article that delves deeper in the data annotation space.

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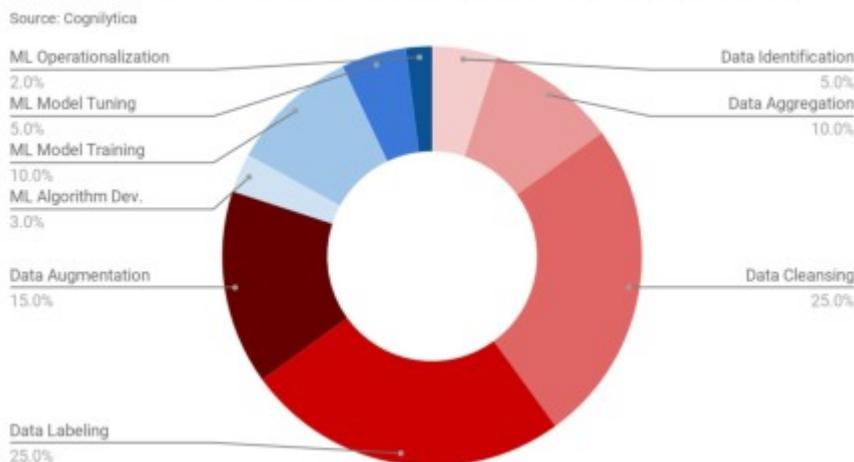
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**Article Courtesy: NASSCOM Community - an open knowledge sharing platform for the Indian technology industry:**  
<https://community.nasscom.in/communities/emerging-tech/ai/the-achilles-heel-of-ai-training-data.html>



*Reema Aswani is AI Research Specialist, NASSCOM, specialised in solving business problems with AI, and an ex-Research Associate at DMS, IIT Delhi. Armed with a PhD in AI and Data Science, Reema is an experienced researcher with a demonstrated history of working in the higher education industry. Her primary strength is the unique experience of both industry and higher education space that gives an in-depth understanding of both academic and as well as business research.*

### Percentage of Time Allocated to Machine Learning Project Tasks



**Requirement varies hugely with different data types.** Image Source: Cognilytica

## Plug-and-Play Motion Control Solution

**Trio Motion Technology, a member of the Estun Group, has expanded on its motion controller range with the launch of a servo drive and motor package.**

Trio Motion Technology, an Estun Group company specialising in motion control, has expanded its range of motion controllers with the launch of a servo drive and motor package. This will benefit OEMs with a complete plug-and-play solution, enabling faster machine development and optimum cost effectiveness. The new DX4 servo drive and MX servo motor series makes it faster and easier for OEMs to utilise the high performance motion control available from the Trio Motion range of Motion Coordinators. The DX4 servo drive has plug-and-play compatibility with Trio's controllers and slice I/O systems, all programmed within a single software, Motion Perfect 5. This increases the speed of application development and commissioning for OEMs in industries including packaging, medical, metal, CNC, robotics and 3C. The DX4 servo drive operates at 200V AC and power extends from 50W to 3kW.

Trio's specialisation in high performance motion control enables machine builders to achieve optimum productivity. Utilising high speed EtherCAT communications,



**Trio Motion's DX4 servo drive and MX motors.**

the Motion Coordinator range can control up to 128 axes with precision accuracy. Developed over more than 30 years of motion control expertise, Trio's Motion-iX technology core encapsulates a motion-first approach, capable of complex kinematics within a powerful application programming interface (API). Trio's open communications mean that the performance of its controllers can connect to factory automation across the primary Ethernet-based protocols.

The new DX4 servo drive extends high control performance to the motor shaft, achieving fast and accurate positioning with the matched MXL low inertia and MXM medium inertia servo motors. The drive features EtherCAT update rates down to 125 $\mu$ s and 350% overload for high dynamic applications, as well as functional safety dual STO (SIL3, PLe). The motors host 23-bit absolute multi-turn capability for increased positioning accuracy.

High performance motion control as well as servo drive and motor precision are rapidly achieved through the Motion Perfect 5 software. Plug-and-play functionality instantly identifies the drive and motor for easy configuration, and accurate motor performance is quickly achieved using tools including adaptive autotuning and anti-resonance features.

For motion programming, Motion Perfect 5 flexibly supports IEC 61131-3 languages and PLCopen to enable development to suit all programming backgrounds. The Windows-based software includes an oscilloscope for up to 8 channels as well as a digital twin visualisation tool. The 3D offline simulation speeds up development by validating motion control before it is physically deployed. This technology is particularly useful for complex control such as robotics, and Motion Perfect 5 can be used to program robots with up to six axes.

The new DX4 servo drive is highly compact. It has amongst the lowest footprint available across each of its

automation vendors and system integrators.

In 2017 Trio Motion was acquired by the Estun Group, which is supporting Trio in its growth with assistance through shared facilities and R&D as well as financial backing. Trio has exceeded 15% growth year on year since the acquisition. The launch of the DX4 is symbolic of the collaboration between Trio's engineers and the wider Estun Group. Led by Trio's domain expertise in motion control, the launch has delivered a jointly developed servo system, specifically optimised for superior performance in motion applications.

#### Trio's Flex-6 Nano 64-axis Motion Coordinator.

three versions, which span 50W - 400W, 750W - 1.5kW and 2kW - 3kW. With a slim frontal area and zero stacking gap, space saving advantages are further emphasised for higher axis counts. Reduced dimensions are also achieved by retaining additional control functionality within the Motion Coordinator and I/O slices, instead of including it within a more sizable, complex drive. Compact footprint is an established benefit of Trio's Motion Coordinator range, for example the Flex-6 Nano, which controls up to 64 axes, is literally pocket-sized.

Trio's motion control solution is also scalable and additional functionality can be quickly added when required. Flexslice I/O modules covering a broad range of control functionality are easily clicked into place and programmed through Motion Perfect 5.

Scalable functionality has also been

designed for cost effectiveness and the OEM only pays for the capabilities they need, according to Trio's design principle of 'everything you need and nothing more'. As a result, the DX4 servo drive doesn't require additional functionality onboard which significantly reduces cost and even greater savings are evident as axis count increases. The Motion Perfect 5 software is available free of charge and the competitively priced Motion Coordinators mean that Trio offers the lowest cost-per-axis motion control at 64 axes.

Trio Motion Technology was founded in the UK in 1987 as a manufacturer of motion controllers. Today the range, branded Motion Coordinators, can control up to 128 axes of servo, stepper and piezo motors as well as hydraulic systems. Trio's expertise in motion programming is based within its Motion-iX technology. Launch of the new servo drive and motor package now develops Trio's offering into a motion solution in addition to providing motion controllers for

Trio Motion India was established in Pune in 2010 to introduce high performance motion control to OEMs in India. Today, Trio India focuses on industries including packaging machinery, machine tools and textiles. Within the packaging sector, Trio is India's market leader for fast moving consumer goods (FMCG) food packaging machines, and expertise also includes pharmaceutical industry packaging.

With its headquarters in Pune, Trio Motion India has a 7,000 sq.ft state-of-the-art facility that includes a training suite as well as a robotics and machinery lab. Trio has coverage across India with offices in Ahmedabad, Vadodara, Bengaluru, Delhi and Mumbai and customer support is also available 24-hours a day. Trio India has 24 employees including application engineers, maintenance engineers, sales, accounts, administration and logistics. The company has delivered solutions to almost 8,000+ machines for end users through its network of OEMs.

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# Industrial IoT Trends in 2021

Shyam Ravindranathan on why IIoT is going to drive a lot of IoT adoption in 2021 and further.

Internet of Things (IoT) as a term and technology has been around since some time but acquired prevalence in the last two decades. It was a lot of 'hype' initially like it is for new technologies and opportunities. In the last few years though, enterprises have now started to see beyond the hype, as they start adopting and implementing IoT with clear business cases highlighting tangible benefits and business outcomes. Since 2020, the pandemic has also spurred on the urgency for companies to digitise and automate.

IoT has an important role to play in digitisation of manufacturing companies and global supply chain. It offers tangible benefits in their digital evolution in areas such as Retail, Procurement, Manufacturing and Supply Chain to name a few. I have always worked in the intersection of technology and applications meeting enterprise business needs, so I can be accused of a slight bias (and maybe rightly so) when I say that manufacturing and supply chain use cases are where we will see the biggest returns on investment in IoT.

Companies today are increasingly being pushed to deliver more with less, increase margins and to take products to market faster than ever to keep up with global competition. Getting products to the market faster and cheaper is the new reality, but at the same time, the market does not afford you the luxury to experiment and make mistakes in this process. Add to that, global issues ranging from trade wars, managing global supply chains to skill shortages are pushing companies to adapt to changes faster, optimise, and automate operations to meet customer needs. Also last year we noticed how the global supply chain groaned under the weight of the pandemic, as it was optimised only for cost efficiency and failed to anticipate and react to the growing need of specific products. Today's connected world requires companies to be in ship shape, and they must be on top of all areas such as planning, procurement, inventory, production and quality operations along with a responsive supply chain which is able to meet ever changing customer demand and still meet goals of higher revenue growth and providing an overall positive customer experience.

## The future of IoT is Industrial IoT

Not taking away anything from consumer IoT offerings, but for the reasons mentioned above, I believe that Industrial IoT (IIoT) is going to drive a lot of IoT adoption in 2021 and further. Industrial IoT is not very dissimilar from what I call 'consumer IoT', because it consists of a lot of the same principles such as - connecting devices, collecting data, ensuring security, and analysing data. More importantly IIoT is about optimising business operations and the ability to react to fluctuating customer demands and market signals. IoT and Edge



**Supply chain in the connected world.**

play a key role in connecting industry value chains and enabling companies to automate their business processes - by connecting and bringing machines, people and business processes together.

## Why is business context so important for IoT?

Raw telemetry data collected from machines can only be made sense of when business context information is correlated with it. Augmenting sensor data with operational data stored in systems of records (such as product information, inventory or bin level, asset, or material characteristics) gives meaning to raw telemetry data, building insights. This enhanced information can then be leveraged in business applications and services, enabling end users to take better decisions, increasing their productivity - which in turn leads to better business outcomes.

Now let me try illustrating business context in IoT with an example. Imagine a manufacturing company, storing their raw materials in huge silos at their plants. These silos are enabled with sensors which give them accurate readings of the inventory levels for all the silos so that they have real-time visibility which is vital for their production process and output.

Normally an IoT platform will collect the sensor data and dump it

## Operations Technology



(1) Smart Asset

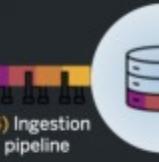
## Information Technology



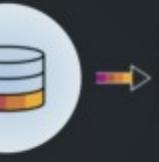
(2) Device Connectivity



(3) Digital Twin



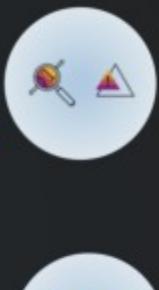
(4) Ingestion pipeline



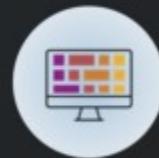
(5) Bigdata Storage



(6) Contextualized sensor data



(7.1) Rules /  
Events / Business  
Integration



(7.2) Applications  
Analytics  
Predictive, ML

Device signals to business outcomes.

to a data lake with some metadata embedded in the sensor. Then they hook it up to a dashboard or analytics tool to slice and dice or to send real-time alerts based on rules and configured thresholds. This is great and the company now has visibility into their inventory levels and gets real-time alerts and can view things on a dashboard. But is that the complete process? Does it mean that the specific business process is now automated and that the employee who oversees the inventory knows what to do? In most cases, the answer is no.

Now imagine the same sensor data correlated with business context and integrated with business process systems. The IoT data in your application will tell you that the alert for a specific silo is coming from Silo 'xyz' which contains the material 'abc' with material id '123'. The suppliers for this material are 'supplier 1', 'supplier 2'. Supplier 1 has a better overall delivery track record. It can also tell you the planned consumption of the specific material in the production process, forecast inventory levels in the future and find the reserve or excess inventory of the material available in other plants belonging to the same company. This gives the employee in charge of the inventory an end to end perspective in terms of the business outcome of the specific IoT data. Armed with this information, the employee can start a replenishment process just in time so that the company doesn't have to wait forever to get inventory and the supplier doesn't have to run delivery runs as they were not able to unload their entire inventory due to problems with manual planning. In this example, IoT is so much more than a red blip on a chart.

### What's in store for IoT in 2021 and ahead?

The demand for Industrial IoT as I see it today, is a mixed bag with specialised cloud applications catering to a specific business outcome and platform offerings enabling customers to build their own IoT applications (on top) for their unique business needs. Enterprise customers want the best of both worlds with managed IoT offerings, out-of-the-box IoT functionality integrated with their existing business applications as well as the ability to build and extend their existing application portfolio with IoT capabilities.

The following points are my two cents on some of the trends and challenges that will be key to the widespread adoption of Industrial IoT.

General disclaimer: These are trends that I observed based on numerous conversations that I have had with people in my ecosystem, who are IoT experts, involved in IIoT implementations or planning for it - and not based on any extensive surveys or

interviews. In short, they are subjective and my opinions!

**1) Business Integration:** Is key to Industrial IoT, as projects focused on achieving business outcomes for enterprise use cases in manufacturing, supply chain, inventory, etc., require IoT data to semantically interoperate with business data. Business-to-business applications will derive more value from IoT, and data integration is critical for these businesses.

**2) IoT Edge Computing:** Increasingly enterprise-generated data will be created and processed at the edge and outside a traditional centralised data centre or cloud. Companies will need to bring data, applications and business processes to the edge but always integrated with the cloud. The role of traditional business applications in enterprises as the central point for all decisions in line of businesses such as manufacturing, planning, and maintenance will start to be now optimised at micro-sites such as an individual plant or factory, integrated with the cloud - driving IoT adoption.

**3) Lower Cost of Data Storage:** In the last few years, enterprises have really warmed up to the idea of adoption of cloud data lakes. This has been driven almost exclusively by the big cloud providers operating in this space. Data lake offerings have proven to be cost effective, scalable and companies are capitalising on it by monetising vast amounts of data accumulated over years. Data lake as an offering has become commoditised and companies are shopping the multi-cloud way to avoid vendor lock-in. IoT generates a lot of data and big data management is a prerequisite. Adoption of cloud data lakes will further lower the IoT adoption barriers in enterprises.

**4) Hyper-Connectivity:** Connectivity is growing with the number of devices getting added every day and will explode with new technologies such as 5G. We saw how availability of connectivity with 4G technologies gave a big boost to new business models such as ride hailing. Once it becomes prevalent and affordable, I expect 5G to spawn new use cases and business models with hyper-connectivity. Manufacturing shop floors struggling with wired and unreliable connectivity, can now run micro-services and applications at the edge - faster and cheaper and integrate with central planning and execution systems when needed. It will also bring the edge closer to the cloud, with the cloud being an aggregator of data.

**5) Interoperable IoT offerings:** Companies realise that no one IoT provider can do all and be all. Some IoT vendors have superior IoT



security offerings embedded into sensors and others have better PaaS components and yet others might use IoT SaaS applications and value-added services. Some firms might take a best-of-breed approach that will enable them to maximise value from their investment in IoT. Ideally, they don't want to be stuck integrating these best of breed technologies in a heterogeneous IT landscape. In today's, multi-cloud world, customers will push IoT providers to build technology which will be more interoperable with similar offerings from multiple platforms and software stacks. So, significant partnerships in the IIoT space might become more and more common, to cater to this customer need.

Despite our best beliefs, technology always manages to throw in surprises and disrupt our grand plans. What do you think about the future of Industrial IoT? DM me @LinkedIn. I am always happy to learn something new and share what I know.

**Disclaimer: Opinions expressed are solely my own and do not express the views or opinions of my employer.**

*Shyam Ravindranathan is a Director of Product Management in IoT at SAP Labs LLC in Palo Alto, California. He is focused on product strategy, definition, and roll out, in addition to engaging with customers on the IoT product portfolio. Shyam is a technology enthusiast and has worked in different roles in development, consulting in technologies such as SAP Cloud Platform, cloud-native applications, SAP HANA, and SAP Mobile Platform. Shyam also worked as the Chief of Staff of an Executive Vice President at SAP.*

## Ola to build the world's largest two-wheeler factory



India-headquartered Ola, one of the world's leading mobility companies, has commenced construction of the world's largest two-wheeler mega-factory on its 500-acre site.

The company announced a MoU with an estimated Rs 2400 crore investment with the Tamil Nadu government in December 2020 and rapidly completed land acquisition in January this year. The company is racing ahead to operationalise its factory in the next few months. An estimated more than 10 million man-hours have been planned to bring the factory up in record time, with the first phase becoming operational in the coming months.

Through this entire process, Ola is maintaining its strong focus on sustainability. The company has ensured the conservation of the green belt in the area by preserving and transplanting the trees on site. Ola plans to have a large forest area within the site and reuse the excavated soil and rocks within the factory.

Ola's mega-factory will have an initial capacity of 2M units a year in phase 1 and will serve as the company's global manufacturing hub for its range of electric-powered scooters and two-wheelers across India and international markets including Europe, UK, Latin America, Asia Pacific, Australia and New Zealand.

Expected to create 10,000 jobs, the factory will incorporate Industry 4.0 principles, and will be powered by Ola's own proprietary AI Engine and tech stack that will be deeply integrated into all its systems.

The factory is also expected to be the country's most automated, with about 5,000 robots and automated guided vehicles in use once it is operational to its full capacity. The company has already brought on board global partners and suppliers as it works towards getting its factory, billed to be the world's largest scooter factory, operational in the coming months.

# Humanity & Technology – Our Janus moment...

**The evolution of humans almost always has been closely linked to the evolution of technology, says Prasan Prabhakaran.**

**"A bend in the road is not the end of the road...Unless you fail to make the turn."**

- Helen Keller

We are living in a time that has been 'interesting' to say the least - in my parlance our Janus moment. While Covid has given us a reason to re-look and re-evaluate the way we work, the way we live, etc., I believe change is much more than something which is current. This change, which will have a sustained impact on life and business, comes however in the backdrop of a few things, which in my opinion are more profound and makes us re-look at our basic assumptions and our baseline of what we considered as cast in stone facts which I call super macro factors. This is anything from whether our civilisation is only a few thousand years old as we believed in the past, to now maybe being hypothesised as several hundred thousand years old; to the other extreme of a hypothesis being



Will Work from Home (WFH) stay permanent?

considered whether we live in a 'simulation'. Also, will we fundamentally transform the way human beings interact and live with technologies like Neuralink; will we as humans colonise Mars by 2035 (maybe beyond Mars too) and will we rid ourselves of fossil fuels in its entirety by 2050?

Now, the reason I bring the super macro picture to this discussion is to emphasise the age of change we are living in and most of the changes will certainly occur or be known in our lifetimes; what Covid has done in my opinion has just fast tracked these changes and helped create a foundation for operationalising the changes... I would classify the change and disruption we are going through now in two broad areas. Changes in the context and environment we live in; Changes in the way we work, run and respond to the needs of businesses leveraging technology. In the sections below I will try to articulate

my perspective on these two facets over a 5 year timeline with not only the current context of crisis but also keeping in mind the super macro picture, in a journey that I look forward to with great expectations and optimism.

Back to the Future...

## Reimagining work

Another paradigm change is in the metamorphosis of work and the worker - an area where Covid has made a profound impact. This organic transformation to remote work, though born of necessity, has extended the longevity of the worker. Will Work from Home (WFH) stay permanent? Will labour laws change? Will retirement have two brackets, compulsory and optional? The scope for greater productivity, enhanced work-life balance is right in front of us with technology as the backbone.

## Of trillionaires and unicorns



Big tech innovation has totally changed the game. Data, AI and the Cloud have upped the ante in the innovation stakes. The Trillionaire club is not a possibility but now a probability. Entrepreneurs are leading from the front, with change just a transformation factor in their quest to be the next billionaire, to create the new unicorn. The next decade would in my opinion be called the age of entrepreneurs - mostly associated with Technology industry.

#### The talent uprising

We should be seeing a surge of talent from non-traditional areas which are rural and distributed especially in developing and third world countries. This will be directly proportional to increase in internet penetration with lots of gig workers and freelancers.

#### Co-existing local & global economies

The world has never come closer as one as recent times would testify and economies too are evolving. Countries are focussed on what works best for them, playing to their strengths and adapting to market dynamics and geo-political factors. Thus, we are likely to see a combination of extreme local to Glocal economies co-existing

enabled by technology.

#### Healthcare transformation

First of all, a big shout out to all the frontline healthcare workers! And yes, tech innovation has always played a harbinger of change in healthcare. A compelling case; virtual reality headsets for caregivers that offer persona simulations of aging Alzheimer patients. Of course the 'Digital Health Twin', a personalised health recommendation engine is already in the works. Big game changers like self-health management aids driven by IoT++ and backed by wearable sensors will be in the offing very soon.

#### The Future's Foundation is Technology...

"Any sufficiently advanced technology is indistinguishable from Magic!" - Arthur C Clarke

#### Brothers in Arms - The data and AI combo

AI has become omnipresent with collaborative intelligence at play all round our lives with the base of exponential data being generated on a daily basis. Smart homes are almost passé now. Humanoid robots seem not far away. Robotics for human augmentation is extending the human sensory experience, physical and cognitive big-time. Innovative tech is working towards human-machine technological

embodiment to enhance labour productivity, human longevity and alleviate disabilities. Accurate weather prediction has never been more important ever in the history of humanity.

#### IoT++ & 5G

We are staring at a future where machines, systems and objects will be interconnected, the IoT++ experience. Enterprises can monitor the state of connected assets, get insights on predictive maintenance and improve their CX via personalised analytics suggestions, by sifting through data lakes captured by IoT sensors and devices. IoT++ deployments in areas ranging from critical healthcare, inhospitable environments and remote surveillance can fundamentally change the way humans interact and benefit from.

#### Autonomous transport tech

I called this out specifically, as technology piloted here will trickle down to all other business application areas. Robot taxis, shuttles, commercial logistics fleets are innovations in wait as connected cars shape up to offer new business models of value.

#### Quantum computing

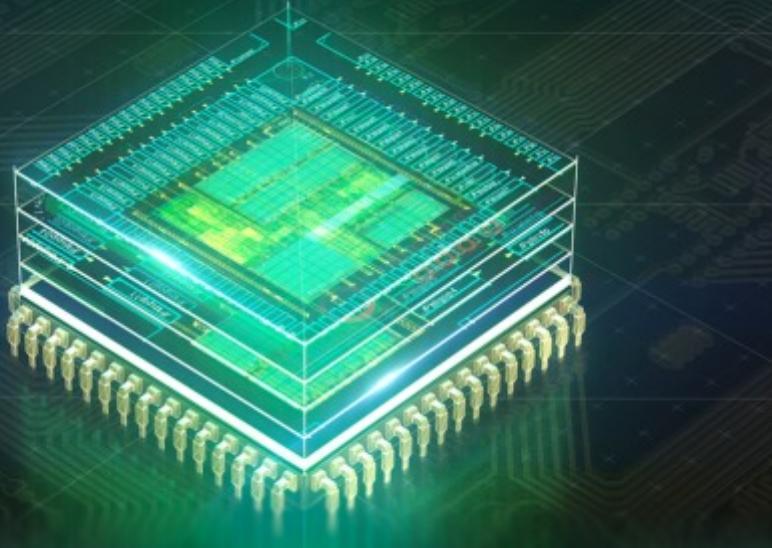
Quantum computing, with its transformational computing potential can solve complex problems in seconds, a huge leap from traditional computers that might take 1000s of years. For example, its deployment in Pharma research will exponentially quicken drug design and development. Financial modelling for investors and fund managers will help them get the right mix of investments and expected returns. Other exciting use cases include logistics optimisation for autonomous vehicles and weather forecasting for predicting disasters ahead in time.

#### The Janus moment...

"Change is the law of life. And



*Prasan Prabhakaran, SVP & Global Head - Enterprise & NextGen Services - Hexaware Technologies. Prasan is a Strategic Leader with extensive experience in the area of Practice and P&L Management, Customer orchestration, Change Management, and core Product Development. He is a specialist in turning around practices and in incubating and managing large service lines including areas that include various Cloud products, large and mid-sized ERP platforms, BPM, J2EE/Microsoft platforms and IP driven software engineering toolsets.*



those who look only to the past or present are certain to miss the future." - John F Kennedy

While I understand that we live in challenging times, I urge you to consider someone who was born around 1900. First the World War 1, then the Spanish Flu, followed by the Great Depression, the Holocaust tragedy, and finally World War 2! Well, that's something...

What followed though was the birth of modern technology as we know today - the mainstay, most of it was created in the last 70 years! In

comparison to technology growth, sometimes I feel that there has been less focus on the evolution of the human mind, the inner resilience that had internalised and celebrated change. I often wonder, why has the evolution of humans almost always been closely linked to the evolution of technology? Maybe time will tell, in the meanwhile... the future is already happening!

**Article Courtesy: NASSCOM Community - an open knowledge sharing platform for the Indian technology industry:**

<https://community.nasscom.in/com>

## Grene Robotics signs MoU with BEL at Aero India 2021

Hyderabad-based firm Grene Robotics has signed a MoU with Bharat Electronics Limited (BEL) at Aero India 2021 to jointly develop Autonomous Man-portable Air-Defence Data Link (AMDAL) system, a first-of-its-kind air defence solution that brings isolated man-portable air-defence (MANPAD) operators into a networked environment.

The company said that partnership is aimed to bolster India's autonomous air defence capability, bringing it on par with the best autonomous defence systems of the world. This technological collaboration has significance for various C5ISR (Command, Control, Communication, Computers, Collaboration, Intelligence, Surveillance, Reconnaissance, and Targeting) segments and will reduce the asymmetries in controlled warfare. The technology will be the first to be deployed on MANPADS (short-range weapon systems).

In a statement, the company said that MANPADS are forward-deployed air defence systems widely used across the world. It addresses existing operational limitations in forward areas enabling the Command Centre to give real-time firing commands to the soldier leveraging sensor-to-sight capabilities using Augmented Reality and Virtual Reality.

The company claimed that the system has the capability to reduce fratricide, improve dispersed deployment and make MANPADS all-weather capable. The communication system enables real-time target assignment and complete engagement cycle management, which in turn improves the Observe Orient Decide and Act (OODA) loop. The system thereby, enables greater dispersal of launcher elements in the object area.

# 'High level of digital adoption makes businesses vulnerable to cyber-attacks'

**Zakir Hussain  
Rangwala, CEO, BD  
Software  
Distribution Pvt Ltd.**

**As a young enterprise, what was the rationale of launching the company as a distributor rather than own solutions?**

I have been in the channel and distribution business since 1993, I am well versed with the Industry and have strong expertise and network with distributors and partners, and hence, becoming a national Virtual Address Descriptor (VAD) was a very organic move. Additionally, the entire team of BD Software, has strong market experience in channel setup, and sales. Secondly the ambition to cover India and neighbouring countries with quality products and solutions which are affordable and with necessary support, pushed me to launch a company as a VAD.

**No enterprise is free from cyber-attacks today. How effective are the remedies available?**

Yes, there isn't any enterprise free from cyber-attacks in today's time. But that does not mean that we do not deploy any security infrastructure in place. Like they say, it's better to be safe than sorry! There are several Indian and international tools for Cybersecurity with a proven track record to curb a given situation. If an enterprise uses good tools and products that are available, worldwide and proven, the chances of cyber-attacks can be minimised to a very negligible or



**Zakir Hussain Rangwala, CEO, BD Software Distribution Pvt Ltd.**

almost no incident in some cases.

**BD Software has a large number of principals. What is the basis of deciding the right solution?**

We chose our solutions based on the need of our markets and all our products complement each other. For example, the customer will start with endpoint security, then go for

DLP, will use MDM for his sales team, will also then need backup solutions for his data, and will need to archive his emails and so on. The same customer can use all our solutions to save their enterprises from cyber-attacks too.

**How do these solutions work when companies are already**

### **following some form of preventive measures?**

Today's glut of digital data means advanced cybersecurity measures are more crucial. With cyber-attacks occurring every 14 seconds, firewalls, antivirus software, anti-spyware software and password management tools must all work in harmony to outwit surprisingly creative cybercriminals. Understanding this, every small or big company requires a better and robust solution. In technology, upgrading to a better solution is always on the card of every customer. All our solutions are proven leaders in the market at the right value, which saves financial and reputation damage for the customer too.

### **With Work from Home, the threats have multiplied manifolds. Is there a holistic solution?**

There never was and is any solution that can give holistic protection to any cybersecurity architecture. It is a basket of multiple solutions that needs to be applied to minimise the threats that have multiplied manifolds.

### **Are there any specific solutions for the discrete manufacturing and process industries?**

Manufacturing is the third most likely sector to experience a data breach, after BFSI (Banking, Insurance and Financial services). But it's the least protected sector. With India entering the Industry 4.0 revolution, manufacturing businesses have adopted several new age technologies and have gone more connected than ever. The high level of digital adoption makes businesses vulnerable to many attacks. To ensure a seamless process there are several solutions right from data protection, employee monitoring to anti-virus and firewall, depending upon the nature of the business.

### **What is the significance of the most recent strategic partnership with Zecurion?**

The evolution of the Indian market has made cybersecurity an increasing priority for organisations in the region. With 'Work From Home' culture and rapid attacks with compromised security network architectures, corporates are especially vulnerable and don't have enough manpower to triage and respond to the number of security incidents. Managing data and securing the data in rest and motion has become of utmost importance, which is where employee monitoring solutions are needed. Zecurion - one of our

partners gives both - DLP and User Behaviour modules. We believe Zecurion will be a very useful tool in mid enterprise, SMB markets.

### **India is traditionally a price sensitive market, especially the SMEs. Are there any special products tailor-made for this segment?**

The Indian SME market is well aware about the importance of Cyber solutions and also the cost attached to it. Matching the mindset, all our products are priced reasonably. We understand the Indian buyer and have priced all our products where the customers get value for money.

### **India is a huge country. How effective is the coverage in terms of reach and spread?**

We have covered most of the Tier 1 cities and are currently establishing our outreach in the Tier 2 & 3 cities. Our promotions are continuous in areas where we are physically not present, so we get necessary leads and partner enquiries. By the end of 2021, we aim to be present in over 100 cities of India.

## **Global Cybersecurity Market estimated to be US\$ 352.7 Bn by 2029**

According to a recent report by Prophecy Market Insights, the global cybersecurity market accounted for US\$ 161.2 billion in 2020 and is estimated to be US\$ 352.7 billion by 2029 and is anticipated to register a CAGR of 9.3%. Cybersecurity and protection of internet-connected systems including data, software, and hardware against cyber intrusions and attacks undertake greater significance in today's digital changing landscape. The major players in cybersecurity market are focused on the product up gradation and establishing partnerships to operate in emerging markets. The demand for real-time solutions and services to safeguard and maintain data, information, program, and networks is projected to boost the global cybersecurity market in the forecast period.

In January 2021, Quick Heal has invested US\$ 2 million in Israel based cybersecurity startup L7 Defense to acquire customers in telecom, financial, and IT industries across the US and Europe. In April 2020, Investcorp Technology Partners acquired Avira Operations GmbH & Co KG, which is a cybersecurity solution provider to bring its decades of experience to accelerate growth in the cyber security and antivirus industry.

Cybersecurity and protection of internet-connected systems including data, software, and hardware against cyber intrusions and attacks undertake greater significance in today's digital changing landscape. Moreover, the rapid increase in cybercrimes, malware, phishing threats, frauds, and vulnerabilities brings the business organisation to adopt different cyber security solutions and services which is likely to drive the market growth. The emerging threats landscape in defence, retail, IT, banking, and manufacturing sectors is considered being a prominent factor for the development of cyber security market during the forecast period.

## Hannover Messe 2021 Preview: Accelerating Digitalisation of Industry

**The world's leading trade fair for industrial technology remains the central platform for innovations and solutions.**

For the second year in a row, there is going to be no Hannover Messe happening physically at the famed Hannover Fairgrounds, the annual jamboree of the world of technological innovations. Instead, there will be the HANNOVER MESSE Digital Edition - the central platform for innovation, networking and orientation in the age of industrial transformation, where the global industry will converge April 12-16, 2021. The Digital Preview of the event was held in early February, watched globally by the industry and media representatives, who normally gather at the fairgrounds in what is an annual networking event.

"Globalisation, Digitalisation and Automation are the three key trends for the industry. Industrial companies have to carry out in a few months what would otherwise have taken years," said Dr Jochen Köckler, CEO of Deutsche Messe AG, addressing the virtual event. "This requires a platform where challenges can be discussed, solutions presented and networks expanded - which is exactly what the HANNOVER MESSE Digital Edition is. Even in times of Corona, the world's leading trade fair for industrial technology remains the central platform for innovations and solutions surrounding industrial



**Dr Jochen Köckler, CEO Deutsche Messe.**

transformation." The HANNOVER MESSE Digital Edition - which features an expo, a conference and networking - focuses on the needs of visitors. "We create the greatest added value for our exhibitors because our platform creates the greatest maximum benefit for their customers," explained Köckler.

Indonesia, the Partner Country for the 2020 edition that did not take place, is again the Partner Country for the 2021 Digital Edition. Arif Havas Oegroseno, Ambassador of the Republic of Indonesia to the Federal Republic of Germany, in his presentation at the Preview mentioned that the country is technically under recession, but there are many positives. "Indonesia in recession but the digital economy grew 11% and there were three important developments witnessed - the pandemic gave a boost to the health sector to go digital; exports

have gone up substantially; and foreign and domestic investments showed an upward trend. Indonesia received 16 new relocations during the pandemic worth USD 7 billion and will now take this forward during the Hannover Messe by connecting with other global companies," he said. In another important announcement, the Ambassador mentioned that Indonesia has reserved a location with 100 hectares of land for German companies with free 5 year lease for companies engaged in emerging technologies in automation, batteries, EVs and digitalisation, with further incentives like tax breaks.

### A sneak peek

A total of 16 companies participated in the Preview: Harting, Emerson, Festo, Weidmuller, KUKA, Ziehl Abegg, igus, German Edge Cloud, NORD Drivesystems, Pepperl+Fuchs, Karlsruhe Institute of Technology, ifm,



**Arif Havas Oegroseno, Ambassador of Indonesia to Germany.**

Huawei, SAP, Schneider Electric and Amazon Web Services. The presentations from each of these companies offered tantalising insights into what to expect at the main event.

#### Digital operator assistance system

Sensor specialist ifm will be presenting the digital operator assistance system "ifm mate", which supports workers with manual processes in production or at packaging workstations. Equipped with an optical 2D/3D camera, it identifies the operator's hands and detects, for example, whether the operator has reached inside a box. The recognition of the hand, which is based on powerful deep learning technology, is the key component of the system. Whether workers are right- or left-handed is just as irrelevant for recognition as the position of the hand. The assistance system consists of a computer with a touch screen, the software and a photoelectric sensor that captures both a 2D video image and a 3D image. Thanks to the hand recognition in the 2D camera image, ifm mate does not require any further accessories such as VR goggles or

wrist trackers. This greatly increases operator comfort compared to other guidance systems, resulting in very high acceptance levels among workers.



**Digital operator assistance system "ifm mate".**

#### Modular gearbox kit for cobots

Motion plastics specialist igus presented a new modular gearbox kit for cobots that makes automation easy and cost-effective. The kit includes a fully integrated tribo strain-wave-gear with motor, absolute-value encoder, force control system, and controller. "With our low-cost automation solutions, we enable design engineers to cost-effectively take part in the future of service robotics," explains Stefan Niermann of igus. "This opens up space for new ideas in automation: for example, robots that can dispense coffee in retail shops or clear out the dishwasher at home, or cobots for the healthcare and manufacturing sectors." Niermann emphasises that the gearboxes are the heart of any modern robot.

#### All in one: marker, printer, software and service

Weidmüller's high-performance inkjet printer PrintJet CONNECT for plastic and metal markers - combines maximum process and cost efficiency with intelligent networking - as well as complete data consistency.

Today's marking processes need to be



New modular gearbox kit for cobots.

as fast, reliable, efficient and flexible as possible. At the same time, customers also expect a print result that is perfect in every respect. And this is precisely where the new PrintJet CONNECT from Weidmüller comes in. Fitted with a high-quality industrial print head, the high-performance PrintJet CONNECT inkjet printer is the logical continuation of the successful PrintJet series. Designed to meet the changing needs of industry and panel building, it combines process and cost efficiency with intelligent networking and complete data consistency thanks to the options to connect either via LAN or wirelessly via WiFi. The PrintJet CONNECT, which has been developed with a wide range of customer requirements in mind, is suitable for almost every industrial requirement thanks to its wide range of applications, and can be integrated perfectly into customer-specific functional sequences.

#### 'Cloudifying' factories

German Edge Cloud and IBM take a hybrid cloud solution for industrial edge computing directly onto the shop floor. The rapid and straightforward implementation of data-driven shop floor applications with simultaneous data sovereignty is currently one of the most significant challenges facing the manufacturing industry. ONCITE industrial edge appliance from German Edge Cloud (GEC) has been expanded to include components from the IBM Cloud Paks, which is built on

Red Hat's "OpenShift" Kubernetes platform for enterprises. Even if they have few resources and little expertise, production companies, OEM manufacturers and the supply industry can quickly benefit from digitalisation in manufacturing through hybrid cloud deployment with this package that consists of hardware, software and application management services.

"We are delighted to be contributing - with ONCITE - to an efficient realignment of IT-based on cloud principles at the factory," says Gregor

Pillen, General Manager for Germany, Austria and Switzerland at IBM. "ONCITE powered by IBM corresponds to our understanding of 'cloudifying' factories: With our hybrid cloud approach, companies retain complete data sovereignty because they can determine which data is processed how and where, whether it be locally, centrally or in the public cloud."

#### The Productivity Master

The Productivity Master, a modular demonstration system for personalised USB memory sticks from Festo, is showing how automation technology will evolve along the value chain when combined with digitalisation. Thanks to seamless connectivity, everything fits perfectly, from the mechanical and electric systems to the intelligence. The Festo automation platform provides an integrated and practical system to link all Festo engineering tools, components and solutions in hardware and software. The plant achieves the automation balancing act between mass production and individualisation of a finished product. The electrical products, the axis mechanics, the electrics and the software are planned as a complete automation platform with seamless connectivity. With this consistency, users save a lot of time in their



The Productivity Master is a modular demonstration system.



### Programming a robot will be as easy as working on a PC.

machines and systems - from planning to commissioning - and gain process reliability because everything fits together. Industry 4.0 included. The Productivity Master uses a cloud-based concept for registering and storing customer data complying with data protection regulations. This allows USB sticks to be produced with a personalised design as well as personalised data content. Customers could do this from home via the Internet

without having to enter further data from other people on the supplier side.

#### Working with robots

In the next ten years, more and more people around the world will be working with robots. Automation is becoming mainstream and is finding its way into more and more areas. Easy access to robotics: That's KUKA's ambitious goal - and the

company will present the first elements of a preview of an operating system of the future at the digital Hannover Messe 2021. Because therein lies the key: simple operation and intuitive handling of automation solutions, which until now have often been reserved for experts.

"Our mission by 2030 is: Automation will be simpler, more intuitive, and thus available to everyone. This will lower the entry threshold.

Programming a robot will then be as easy as working on a PC today," says Peter Mohnen, CEO KUKA Group. Prototypes have already been in use at various customers since the end of 2020. This is less about the product "robot" alone, but rather about its use and the possible applications. In the coming years, automation will find its way into more and more areas - all around the globe. This development is already evident from current projects of the KUKA Group. These include major orders from the battery and e-mobility sectors, as well as the establishment of additional robot types in the portfolio, such as the KR SCARA for small parts assembly, material handling and testing tasks.

## ABB launches next gen cobots



ABB is expanding its collaborative robot (cobot) portfolio with the new GoFa™ and SWIFTI™ cobot families, offering higher payloads and speeds, to complement YuMi® and Single Arm YuMi® in ABB's cobot line-up. These stronger, faster and more capable cobots will accelerate the company's expansion in high-growth segments including electronics, healthcare, consumer goods, logistics and food and beverage, amongst others, meeting the growing demand for automation across multiple industries.

GoFa™ and SWIFTI™ are intuitively designed so customers need not rely on in-house programming specialists. This will unlock industries that have low levels of automation, with customers able to operate their cobot within minutes of installation, straight out of the box, with no specialized training.

"Our new cobot portfolio is the most diverse on the market, offering the potential to transform workplaces and help our customers achieve new levels of operational performance and growth," said Sami Atiya, President of ABB's Robotics & Discrete Automation Business Area. "They are easy to use and configure and backed by our global network of on-call, on-line service experts to ensure that businesses of all sizes and new sectors of the economy, far beyond manufacturing, can embrace robots for the first time."

ABB's cobot portfolio expansion is engineered to help existing and new robot users accelerate automation amid four key megatrends including individualised consumers, labour shortages, digitalisation and uncertainty that are transforming business and driving automation into new sectors of the economy. The expansion follows the Business Area's focus on high-growth segments through portfolio innovation, helping to drive profitable growth.

## Connectivity for Future Technologies

### Innovative solutions portfolio for industrial automation, energy infrastructure, e-mobility, and railways.

The HARTING Experts Camp Kick-Off and the annual trade press conference was held as a joint digital event this year. The event showcased developments in the field of 'Connectivity for Future Technologies' with high-speed data transmission as the key feature. The presentation featured a comprehensive and innovative solutions portfolio for the Industrial Automation, Energy Infrastructure, E-Mobility and Railway sectors. Particular attention is being paid to "Connectivity+", emphasised Dr-Ing Kurt D Bettenhausen, Board Member for New Technologies and Development at Harting.

As one of the world's leading providers of industrial connection technology for the three lifelines of Data, Signal and Power, Harting is focused on the three global social megatrends of demographic change, (de)globalisation and sustainability. These topics and closely related challenges lead to technological megatrends such as modularisation, autonomy, and digital twin technology. At the heart of these technological trends, the company sees fundamental requirements for the connectivity of the future as a necessary and unifying element. Specifically, these are key topics such as electromobility, DC power



T1 connector bouquet for optimum communication for Industrial Ethernet.

supply in industry and new ecosystems such as Single Pair Ethernet (SPE) in the field of industrial communications. "At Harting, we are bringing these three topics together under the term Connectivity+," said Dr-Ing Bettenhausen.

#### Ethernet - the most important communication standard

Ethernet has become the most important communication standard in industrial automation. With rising transmission rates, space-saving infrastructure, and new physical layers such as Single Pair Ethernet, IP-based networks are now also conquering the last remaining field-level areas. "With Connectivity+, we are driving the development of innovative solutions forward for our customers, setting industry-wide standards via active committee work and bringing new technologies to market maturity in

strong collaborations," stressed Ralf Klein, Managing Director Harting Electronics.

Customers will be able to see the latest developments in IIoT applications at the Industrial Ethernet Trends 2021 web seminar series. Attendees have access to exciting talk formats, Tech Deep Dive sessions and top-class guests during next month. In another series of web seminars, customers can familiarise themselves with the latest modular PCB connectivity solutions. Live configurations of specific solutions and all one needs to know about PCB connectivity is available to all interested participants over the next few weeks at the Harting Experts Camp.

#### Fast-lane developments in energy storage

The energy storage market has evolved extremely quickly over the last few years. Global discussions



System concepts for the railway industry.

about the environmental footprint have given overall developments an additional boost. Sustainable use of renewable energies can only be achieved through energy storage systems, as they enable time-delayed, demand-oriented use of the power produced by renewable energy. Connectors speed up the assembly and operation of energy storage systems based on battery modules. "Harting has worked with its partners to develop various applications that have been successfully established on the market, making a significant contribution to sustainability," said Norbert Gemmeke, Managing Director Harting Electric. The Han® S connector concept offers an optimal solution for the front wiring of energy storage systems, for example.

#### High-speed data transmission for railways

High-speed data transmission, weight reduction and the reduction of the CO<sub>2</sub> footprint are major trends in the railway industry. The energy distribution sector is also undergoing a highly dynamic phase at the moment. Existing demands and requirements are changing, while new ones are being added.

Power density is also increasing - and systems need to be more efficient. High currents and voltages must be transmitted safely. Harting employs system concepts that cover these needs specifically. With its 'Railway Technology' web seminar series, Harting showcases these system concepts for the major trends in the railway industry over the next few weeks as part of the Harting Experts Camp.

#### Joint engineering with partners

Developing solutions in partnership is one of the core competencies of Harting Customised Solutions and can take place in a wide variety of areas of industry. From integration in

power supply units for decentralised drive technology to the design, manufacture and testing of wagon crossing cabling for the railway industry. "Joint engineering brings the strengths of all partners together. Together, we are creating efficient, sustainable and future-proof solutions," said Christian Schumacher, Managing Director of Harting Customised Solutions.

**Ethernet has become the most important communication standard in industrial automation**

#### The Experts Camp is now well-established

With its now well-established 'Harting Experts Camp' label, the connectivity specialist is providing a powerful platform for customer dialogue and communication. A wide-ranging offering of product presentations, web seminars, expert talks and much more will be on the agenda. The latest developments and solutions relating to 'Connectivity for Future Technologies' will form the focus for spring 2021.

<https://www.harting.com/DE/en-gb/expertscamp>



Joint engineering is a core competency of Harting Customised Solutions.

# India – The Emerging Innovation Hub for Global Products

**India is expected to become a critical stakeholder in the global product development value chain over the next decade.**

**I**ndia is today one of the largest exporters of Engineering & R&D (ER&D) services worldwide, comprising close to one-third of the US\$100 billion global engineering outsourcing market. The success story for this rapidly growing engineering services ecosystem had started with the global organisations leveraging the vast talent pool to set up their global capability centres or partnering with service providers to provide support to their product development activities. However, over the past decade the capabilities of the Indian ER&D ecosystem have matured and it has emerged as the global hub for innovation for enterprises worldwide.

The scale and depth of India's talent in engineering has enhanced the enterprises' confidence in the Indian ER&D to own and deliver products for the global, local and regional markets. Owning the development of these cutting-edge products has been a true testament to the Indian engineering and product development capabilities.

## Driving ownership for global product lines



**GE Power has developed several solutions for electric grid.**

Many global enterprises are increasingly looking at India as the key hub for development of their global product lines. For the global enterprises undertaking this initiative, combining India's ER&D competencies with its manufacturing capabilities provides them with unique advantages in managing the products over their entire lifecycle. Philips Healthcare has tapped into this advantage by setting up its Healthcare Innovation Centre in Pune that serves as a global hub for mobile surgery portfolio of products. The BV Vectra mobile C-Arm system which is primarily used in orthopaedic surgeries was one of the first products developed from the centre and is currently being sold in over 90 countries worldwide. Its assembly plant in Chakan, a few kilometres outskirts of the city of Pune also manufactures these products giving the Philips a complete view of the entire product life cycle.

## Opening up new markets for the

### global enterprises

The Indian ER&D centres have long been serving as development centres for India-specific products which would support the enterprises' expansion in the local market. However, these products are also helping the enterprises to unlock new market segments in both developing and developed markets worldwide.

GE's John F Welch Technology Centre in India provides us with a good example of this trend. The centre has been foundational in GE's expansion in Indian market by developing India-specific new products which are driving their expansion strategy in the Indian market. Their power division had recently teamed up with Tata Power to develop Hybrid Distributed Power units which consist of an integrated system of solar panels, battery and diesel generators to provide electricity in rural India. The unit can help provide a village of about 1000 people with electricity to meet their basic needs such as lighting bulbs,

running fans and charging mobile phones. The success of the product has encouraged GE to take it to other markets with similar needs. The product has also been installed in Ethiopia to support medical centres on the outskirts of the main town and in Australia to provide energy to remote mining sites operating outside of the main grid. Indian innovation is thus helping enterprises not just expand into new markets but also improve lives across multiple continents.

**Many global enterprises are increasingly looking at India as the key hub for development of their global product lines.**

#### **India as the Innovation Hub for new-age technology products**

Indian ER&D ecosystem has increasingly embraced next-gen technologies which are fuelling the development of digital products. Technologies such as IoT, big data, analytics, robotics, etc., have become the core of the product development programs in India. For example, LTTS, the engineering services company had leveraged its expertise in digital technologies to engineer an autonomous welding robot for a major pipeline manufacturer. The battery-operated robot is capable of internally welding pipes as small as 8 in internal diameter. The robot employs special algorithms to intelligently weld pipes of varying thicknesses in offshore conditions with high weld integrity. The product is expected to vastly improve operator safety while also reducing overall welding costs for the enterprise's customers.

Another company that has been leveraging their India R&D centre to provide customised customer solutions by using advanced technologies is Siemens. Its India centre helped Siemens Power

Generation Services business unit to develop the industry's first ever 3D-printed part to be installed in the steam turbine. The project involved engineering, design and development of two oil sealing rings which are used to keep oil separated from steam inside the steam turbine using pressurised air. The collaborative efforts of Siemens experts in Germany, India and Sweden helped deliver this project for a steel manufacturer in India. Usage of additive manufacturing process allowed the team to redesign the components with functional improvements while also reducing the part replacement lead-time by 40%. The precedent set by the project is expected to provide an impetus to the use of 3D-printing for producing replacement parts globally.

#### **Enabling flexible and agile innovation**

The current Covid-19 pandemic had been the ultimate test for the Indian ER&D ecosystem. The Indian ER&D organisations have adapted rapidly to continue with their development projects with minimum disruptions. Some of them have excelled to develop unique innovations which would help the world cope with crisis. Honeywell's India R&D centre has developed a portable ultraviolet system to sanitise aircraft cabin surfaces after each flight, as a response to the requirement of reducing surface transmission of the virus. The product is undergoing trials by multiple airlines globally such as Qatar Airways and JetBlue among others. With the opening up of air travel, the solution is expected to help airlines ensure the safety of the passengers travelling on-board. This latest product is another addition to the portfolio of more than 3000 products, solutions and innovative applications that Honeywell has engineered in India for India and for the rest of the world.

During Covid-19 pandemic Indian Companies rose to the occasion and developed ventilators that they had

never done before. Nocca Robotics, an Indian startup developed an indigenous ventilator at about one-fourth the price of imported ones, which not only assists the patient in respiration but also eliminates the virus in the exhaled air. This unique solution helps to reduce the risks for healthcare workers treating the Covid-19 patients. With the pandemic putting a severe constraint on India's ability to import medical equipment due to heavy international demand, the indigenously developed product proved to be a game-changer in delivering essential healthcare to affected populations.

**Nocca Robotics, an Indian startup developed an indigenous ventilator at about one-fourth the price of imported ones**

#### **Recognising the ingenuity of Indian Engineering**

The Indian ER&D ecosystem has evolved rapidly over the last few years. The ecosystem's capabilities in technology, the favourable policies for investment and strong laws for protecting intellectual property are significantly boosting its profile as the top destination for global R&D investment. With the current pace of growth, India is expected to become a critical stakeholder in the global product development value chain over the next decade. Nasscom seeks to recognise the inventiveness of products engineered in India for the global markets through the Engineering and Innovation Excellence Awards.

**Article Courtesy: NASSCOM Community - an open knowledge sharing platform for the Indian technology industry:**  
<https://community.nasscom.in/comunities/erd/india-the-emerging-innovation-hub-for-global-products.html>

## Technology in Agriculture

Technology can solve many of agriculture's challenges, says **Rajesh Aggarwal**.



The need to leverage technology in agriculture.

Technology is the mainstay of the modern world. Therefore, it has a critical role to play in modern agricultural practices also. But looking at an average farmland, one will find it almost conspicuous in its absence. Entering the third decade of the new millennium and at a time when India has earned a reputation for its technological prowess, one needs to introspect why India's agriculture is still stuck in the previous century. We have reached space and under the sea, and yet agriculture remains one of the most labour-intensive sectors. The bigger issue is, even in the 21st century, Indian farmers are dependent on Monsoon rain and struggle to fetch the right price for their produce when both the issues can be solved with the help of technology. With a growing population to feed and a need to improve their own earnings, it is only imperative that farmers in India leverage technology more.

### Tech interventions that agriculture needs

Some of the aspects of farming need quicker technological support

than others. These are weather forecast, climate-resilient seeds, more irrigated land, availability of finance or credit facility, and market link and access. Right from in-hand use of mobile applications and drones to back-end technologies such as artificial intelligence (AI) and big data can help farmers measure soil salinity, pH balance, and soil fertility. AI-enabled tools make it possible to generate solution-oriented data indicating weather conditions, type of suitable soil, etc., while analytics provided by big data at the back end provide crucial real-time insights such as whether the techniques are working to identify what changes are needed to prepare for better output. Realising the potential of such cutting-edge technologies, Government of India schemes such as Pradhan Mantri Fasal Bima Yojana (PMFBY) has chosen to integrate AI technology to reduce the time to settle farmers' claims and has signed a memorandum of understanding (MoU) with IBM to monitor the agriculture sector<sup>1</sup>.



The Pusa decomposer invented by the scientists of IARI.

#### **Role of policymakers and business important**

Despite the obvious benefits of adopting technology, the ground reality is that farmers, especially those who are elderly, are reluctant, which adversely affects the uptake. They seek help from the younger generation to solve any problem that may need using an app or searching on the internet. In absence of any such help, they seek help from the credit officers of the bank or go to their nearest KVK. They are unable to see the value of investing in the cost of purchasing a smartphone since an accidental drop in the field will lead to a cost that they find avoidable, not realising that the availability of any information they want without depending on someone can improve their efficiency manifold.

While academia remains the cradle of innovation, it is largely up to the right policies and profitability that help them scale in a free market. The policymakers must devise ways to enable academia reach the farming lands and conduct their experiments real-time outside the 'ideal conditions' of their laboratories. Besides, provisions must be created to enable costly technologies being purchased by the government bodies or panchayats and leased out to farmers - a case in point can be the Pusa decomposer, invented by the scientists of Indian Agricultural Research Institute (IARI). A product straight out of the laboratory faces a trust barrier. The Delhi government took the initiative of reaching out to the farmers and convinced them to use it under the guidance of IARI scientists. Similarly, the government may get in touch with smartphone manufacturers to bring out versions suitable for farmers use with pre-loaded apps at a rate suitable to the end consumer. This will help the farmer use the necessary apps without undergoing the hassle of installing it and feeding common information.

*Rajesh Aggarwal, Managing Director, Insecticides India Ltd, is a commerce graduate. He possesses a Diploma in Marketing. In 1993 he joined his family's business as Marketing Incharge. Combining this work experience with utilising state-of-the-art technologies, he took the additional responsibility of production and allied fields.*

*Under his inspiring leadership, the company's turnover increased multi-fold. In the year 2002, he came up with a new banner of Insecticides (India) Limited and has been pioneering sterling performance in the organisation since then.*

#### **Reference**

<https://bit.ly/3aLNi3F>



## Industrial Switch - A6 ?16mm Unibody Light-Duty

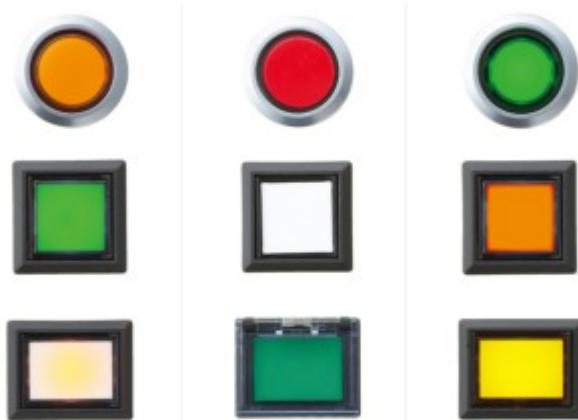


IDEC Corporation offers a wide range of Industrial Switches. The A6 series of pushbuttons and pilot devices offer a very competitive price and simple construction in a space saving package in only 22mm body length. Features include snap action, double throw contacts, with gold plating for reliable low level switching. Ideal for such applications as PLC inputs, logic level switching, or anywhere space is at a premium. Flush bezels accessories are also available for Flush Silhouette switches.

Offered in three styles (round, square, or rectangular), all units are terminated via .110 quick connect/solder tabs. LED illumination includes a built-in current limiting resistor, and gasketed lenses provide an IP65 watertight/oiltight panel seal. Models include illuminated and non-illuminated pushbuttons, pilot lights, selectors, key switches, and short unibody E-stops of X6 series.

### Key Features:

Super bright LED Illumination, Momentary, Maintained, Selector, Key, Pilot Light and E-stops (X6 series), Gold-clad silver snap acting contacts for reliable low level switching, IP40 (dust proof) or IP65 (oil tight) versions, .110in solder/quick connect termination, UL Recognised, CSA Certified.



IDEC is a global manufacturer known worldwide for its reliable Automation and Control products including industrial switches and pilot devices, industrial relays, contactors, sockets, timers, Programmable logic controllers (PLCs), operator interfaces (HMIs), power supplies and more.

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[Product Details](#)

## Connectors for Energy Storage Systems



The energy storage market has evolved extremely quickly over the last few years. Global discussions about the environmental footprint have given overall developments an additional boost.

Sustainable use of renewable energies can only be achieved through energy storage systems, as they enable time-delayed, demand-oriented use of the power produced by renewable energy. Connectors speed up the assembly and operation of energy storage systems based on battery modules. HARTING has worked with its partners to develop various applications that have been successfully established on the market, making a significant contribution to sustainability. The Han® S connector concept offers an optimal solution for the front wiring of energy storage systems, for example. The HARTING Technology Group is one of the world's leading providers of industrial connection technology for the three lifelines of Data, Signal and Power and has 14 production plants and 44 sales companies.

**HARTING Technology Group.** Tel: 044-43560417.  
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## OPC Communication & Cloud Connectivity



Version V5.10 of Softing's dataFEED OPC Suite Extended has been released. With the help of the new MQTT Subscriber, data can be received from an MQTT Broker and transmitted to other

applications via OPC UA or written to a controller. This allows, for example, a recipe manager to be implemented in the cloud. In addition, extensive and flexible data preprocessing features now permit the execution of mathematical and logical calculations. Use cases include converting a temperature value from Celsius to Fahrenheit or filtering out a specific bit of a word. dataFEED OPC Suite Extended is a complete package for OPC communication and cloud connectivity in a single product. The suite can be used to access the controllers of leading suppliers and to connect to IoT devices. A free trial version of dataFEED OPC Suite Extended V5.10 is available for download from the Softing website.

**Softing Industrial Automation GmbH.**  
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## Silencer Box for Vacuum Pumps



Schmalz has developed a new silencer box for the vacuum pumps in its EVE 25-50 series. The box is not only more compact than its predecessor, it also protects the vacuum generator from external contamination. The

user can now lower the sound level by up to nine decibels, dissipate operating noises in a targeted way and further reduce noise pollution as a result. Schmalz offers the new silencer box as an accessory for the vacuum tube lifters in the JumboFlex series. It is suitable for the small vacuum pumps EVE 25 to EVE 50. The silencer box protects the component from external contamination and reduces the noise level by up to nine decibels. That provides for a much more agreeable working atmosphere in production and logistics halls. The metal tray on the box is made from galvanised steel, while the hood is made from impact-resistant ABS plastic.

**Schmalz India Pvt Ltd, Pune.** Tel: 020-40725500/02.  
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[marketing@schmalz.co.in](mailto:marketing@schmalz.co.in)

## Clamping Technology



It takes a maximum of 60 seconds until a conventional 3-jaw chuck with SCHUNK RAPIDO clamping inserts is retooled. For granting such a speedy jaw change, the RAPIDO clamping inserts must be put onto the base or intermediate jaws and moved backwards until they snap in. The exchange can be done manually or in case of lathe chucks with integrated base jaws, it can be done fully automatic with a robot. A locking mechanism always ensures safe hold of the snapped-in clamping inserts, even if they are not clamped. The system can be used, no matter if the spindle is horizontally and vertically positioned. Due to the high-precision quick-change interface, the SCHUNK RAPIDO achieves an appropriate repeat accuracy of < 0.02 mm. The quick-change system can be used for ID and OD clamping. On request, the RAPIDO clamping inserts can be individually equipped with an RFID chip, QR code, or an individual labelling.

**SCHUNK Intec India Private Ltd, Bangalore.**  
Tel: 080-40538999. Email: [info@in.schunk.com](mailto:info@in.schunk.com)

## mGuard Secure Remote Service



Phoenix Contact is introducing version 2.11 of its mGuard Secure Remote Service ecosystem to the market with added features and new system functions. It is

not just Android-based mobile end devices for service technicians and iOS-based Apple devices that are supported. On the machine side, PLCnext Control devices from Phoenix Contact can also be easily and securely connected to the mGuard Secure Remote Service. The "mGuard Secure Remote Service Connector" app is available in the PLCnext Store for this purpose. To keep customer data secure, the security-related parameters of the mGuard Secure Remote Service have been future-proofed by bringing them in line with the recommendations of the German Federal Office for Information Security (BSI) concerning encryption algorithms and lengths. With version 2.11, various subnets of a machine or system can now be easily added in the user interface.

**PHOENIX CONTACT (I) Pvt Ltd, New Delhi.**  
Tel: 011-30262800. Email: [info@phoenixcontact.co.in](mailto:info@phoenixcontact.co.in)

## Stainless Steel Adjusting Screws



On production machines and mechanisms, it is often necessary to carry out repeated positioning operations as simply and reliably as possible. For precisely such secure and simple adjustments as well as for quick changing of

mechanisms or tools, Ganter now offers three new parts that complement each other perfectly: stainless steel adjusting screws with an adjustment scale plus matching bearing blocks and knurled nuts. The innovative stainless steel adjusting screw GN 827 from Ganter, the specialist of standard parts, is intended for use with bearing blocks GN 828 and simplifies the attachment of parts to various processing and assembly mechanisms in machines, installations and jigs. This means that processes that require the repeated exchange, repositioning and adjustment of devices can be carried out much more quickly. The mechanisms are moved into or out of position using an adjusting screw with rotating knob and hexagon socket fitted with a scale with 0.1 mm graduations.

**Otto Ganter GmbH & Co KG.**  
Email: [info@ganternorm.com](mailto:info@ganternorm.com)

## Power Panel C80



The new Power Panel C80 offers the combined advantages of a powerful controller and a modern operator terminal in a single HMI device. The C80 installation is compatible with B&R Automation Panels.

Machine builders thus have full flexibility when using the new panel and can scale their machine to meet changing performance and cost requirements. With its low installation depth, the C80 multi-touch HMI is suitable for particularly compact machines where space in the control cabinet is limited. Operation without a hard disk and fan also make it particularly low-maintenance. Time-saving plug and play: The Power Panel C80 can be put into operation quickly and easily, because all the necessary software packages are pre-installed. I/O modules, motion control axes and safety components can be connected directly to the panel. There's no need for additional controllers. The user only has to switch on the Power Panel C80 and transfer the application.

**B&R Industrial Automation Pvt Ltd, Pune.**  
Tel: 020-41478999. Email: [pooja.patil@br-automation.com](mailto:pooja.patil@br-automation.com)

## CAN FD Connection via Ethernet



The PCAN-Gateway product family from PEAK-System is designed for the transmission of CAN messages over IP networks. With the PCAN-Ethernet Gateway FD DR, the German company releases a new model that supports the modern CAN FD in addition to the classic CAN standard.

Two High-speed CAN interfaces enable the connection of CAN FD buses with data bit rates of up to 10 Mbit/s. The connection to the IP network is established via Ethernet. An AM5716 Sitara processor provides the required performance. If a CAN bus is equipped with a PCAN-Ethernet Gateway FD DR, a LAN interface is all that is needed to access the CAN bus with one or more computers. A conventional CAN interface is not required. When using two gateways, distant CAN buses can be connected via an IP network. The limiting factor of the maximum CAN bus length does not apply.

**PEAK-System Technik GmbH, Germany.**  
Email: [info@peak-system.com](mailto:info@peak-system.com)

## Actuators for Small Valves



Siemens Smart Infrastructure has upgraded its range of SSA actuators for small valves by adding new features for more energy efficient and versatile hydronic room applications. The updated SSA actuators now offer more flexibility

due to their broad control possibilities - from analog control to KNX communication capabilities for room solutions and fast integration into connected systems. While using the same cable for communication and power, the customer saves time and cost. Thanks to the operating mode 'nightmode', the actuators are more silent than ever, with less than 28 dB. This makes them ideal for use in noise-sensitive areas, such as hotels, recording studios, meeting rooms and libraries. All new actuators are delivered pre-configured and are ready for immediate installation. The newly introduced IP54 protection rating enables all installation directions, including overhead installations, for greater versatility. The new LED status display on the SSA actuators ensures fast and error-free commissioning.

**Siemens Ltd, Industry Sales, Mumbai.**  
Tel: 022-39663792. Email: [Krishnamurthy@siemens.com](mailto:Krishnamurthy@siemens.com)

## Ultrasonic Metal Spot Welder



Emerson offers its new Branson™ GMX-20MA ultrasonic metal spot welder, an advanced spot welder that bonds nonferrous metals, including bus bars, foils, switches,

and wire terminations in automotive electrical systems, electric vehicles, batteries and battery packs, power storage systems and related applications. The GMX-20MA metal spot welder is built around an all-new, rigid pneumatic actuator with dual linear bearings and a digital load cell to ensure smoother vertical motion and more precise downforce control for maximum weld quality and repeatability. Actuator travel and tool positioning relative to the welded parts are tracked and measured using a linear encoder. Once tooling/part contact is made, a digital load cell measures and maintains a precise level of actuator downforce on the parts, ensuring that weld energy is accurately delivered and consistent weld quality is assured from one weld to the next. The GMX-20MA is programmed through a user-friendly, touchscreen HMI.

**Emerson Process Management (India) Pvt Ltd. Tel: 91 22 6662-0566. Email: infocentral@emersonprocess.com**

## Cleaning with JetBoy



JetBoy SP cleans air conditioners/coolers quickly and gently. The process technology corresponds to the JetMaster system for cleaning large exchanger surfaces with significantly lower compressed air consumption. JetBoy SP offers new possibilities for cleaning the heat transfer apparatus of air conditioners and coolers with a compressed air input of 1.50-2.25 cbm/min with 5 bar pressure. JetBoy SP works without electricity, it uses ca. 0.20 l water per minute. Due to the cavitation effect of the nozzle jet, cleaning of heat

exchangers without any use of chemicals is usually sufficient. For special problems/cleaning of other surfaces, however, the JetBoy SP can also be used with a cleaning agent or even disinfectant. Cleaning agents approved for the JetBoy SP are supplied. The sensitive fins of the heat exchangers are not damaged by the gentle jet cleaning with JetBoy SP. JetBoy, the little brother of JetBoy SP, can also be used for radiator cleaning.

**mycon GmbH, Germany.  
Email: info@mycon-germany.com**

## Energy Chains for Cleanrooms



igus has developed the e-skin flat to guide cables compactly and virtually particle-free in cleanrooms. In order to enable the users to install the energy chain even faster and exchange cables easily, igus now also offers the e-skin flat as 'single pods'. This allows the user to define the number of chambers, combine them modularly and insert cables in seconds. A new support chain additionally strengthens the e-skin flat and provides a higher unsupported length. With the e-skin flat, igus now offers an easy-to-maintain solution as a single pod option. The user can now define the number of chambers, connect them together, extend them at any time, cut them to the desired length and insert the cables. Alternatively, igus also offers a direct ready-to-connect system with specially developed cleanroom cables. The e-skin flat single pods are available in two dimensions as closed and open versions. All products are tested according to ISO 14644-1.

**igus (India) Private Limited, Bangalore.  
Tel: 080-45127827. Email: sgeorge@igus.in**

## Video Security Cameras, ColorVu Technology



Prama Hikvision has been leading the Indian security industry in Video Security for years. The company has recently introduced its all new ColorVu Cameras powered by the new Hikvision ColorVu Technology. ColorVu Technology enables cameras to produce colourful videos, even in extremely dimly lit environments. When using a conventional camera with infrared lighting for night monitoring, people, vehicles, or other important objects are blurry and blend into the background, making it difficult to identify details. Conventional cameras often lose important details when rendering only black and white images. ColorVu Technology is a solution to this common challenge faced by many security system users. Hikvision ColorVu Cameras' powerful ability to capture details in low lighting comes from two specific breakthroughs in hardware technologies: advanced lenses and high-performance sensors. Coupled with a supplemental light for extremely dark scenarios, ColorVu cameras guarantee video with colourful details when you need them.

**Prama Hikvision India Pvt Ltd, Mumbai. Tel: 022-68229999.  
Email: sales@pramahikvision.com**

## Automotive Ethernet, ODU MINI-SNAP



The ODU MINI-SNAP® for Single Pair Ethernet (SPE) enables Ethernet connections via copper cables with a single twisted wire pair, while allowing for the voltage supply of terminal devices via PoDL - Power over Data Line. The simpler design of the new

generation of connectors and the associated weight and space reduction are good for designers and developers in various areas. The maximum bridgeable distances of the standards vary between 15.40 and 1,000 meters. SPE is currently being introduced in new automotive generations, replacing CAN and other bus systems. In the future, communication, controls and security functions will be managed uniformly via Ethernet. The field of industrial automation is also keen to benefit from this. Here, SPE allows the barrier-free connection of devices, sensor and actuator technology and a great deal more.

**ODU GmbH & Co KG, Germany.**  
Tel: +49 (8631) 6156-0. Email: [info@odu.de](mailto:info@odu.de)

## Multifunctional Measuring Relay



Detecting errors as they occur or continuous monitoring of machines and plants significantly increases system availability and avoids expensive downtimes and repairs. Measuring relays are used to reliably monitor electrical and physical operating variables.

Preventive maintenance is also possible through continuous monitoring. The multifunctional measuring relay UG 9400 of the VARIMETER PRO series from DOLD is ideally suited for this purpose. Up to nine measurement functions are combined in a 22.5 mm wide enclosure. Depending on requirements, the measuring relay UG 9400 monitors the three-phase mains simultaneously for over/undervoltage, voltage asymmetry, over/undercurrent, cos phi, active, apparent and reactive power, frequency and phase sequence. It can also be used in single phase mains. With an integrated Modbus RTU interface, the fieldbus connection offers extensive diagnostic options. In addition, the user-friendly device configuration enables optimum adaptation to the application. In this way, the response values for all monitoring functions can be easily set.

**DOLD Electric India Pvt Ltd. Mobile: 91-99090-01585.**  
Email: [m.diwanji@dold.in](mailto:m.diwanji@dold.in)

## Residual Current Monitors



Modern applications require market-driven solutions. One of these solutions is the new series of AC/DC sensitive SensorPRO residual current monitors with integrated measuring current transformer. Bender expands its portfolio with new sensors and devices for data acquisition and evaluation. These sensors and devices each consist of two components: a current transformer module (without electronic elements) and an electronic module which contains intelligence. The electronic module is located directly on the current transformer module to form a functional unit. One component of the modular series are new AC/DC sensitive devices for use as modular residual current devices - type B MRCDs - in accordance with the current version of the standard IEC 60947-2 Annex M. They can be used in industrial environments in conjunction with a suitable disconnecting device for protection of persons, fire or plant protection and combine measuring current transformers and evaluation electronics, making an additional evaluator no longer necessary.

**Bender India Private Limited, Navi Mumbai.**  
Tel: 022-27788501/8502. Email: [info@bender-in.com](mailto:info@bender-in.com)

## Safety Release for ECUs



STW, based in Kaufbeuren, Germany, has issued a new safety release for their ESX.3xm and ESX.3xl electronic control units. This new software package enables customers to create functional safety applications on

these control units using CODESYS V3.5 with the IEC61131 PLC programming languages. Additionally, these ESX-3 control units have now been integrated in the openSYDE Lifecycle suite. This new functionality significantly increases the usability of the ESX.3xm and ESX.3xl. Those mobile machine manufacturers and system developers who prefer programming in C can naturally continue to do so, while those that prefer PLC programming languages now have a certified CODESYS solution as a user-friendly option. The control units and the programming suites have been certified for safety relevant applications by TÜV SÜD according to EN ISO 13849 (to Performance Level PL d) and EN 61508 (Safety Integrity Level 2, or SIL2). The two control units share the same architectural concept.

**Sensor-Technik Wiedemann GmbH, Germany.**  
Email: [info.stw@wiedemann-group.com](mailto:info.stw@wiedemann-group.com)

## Motor Spindle Safety System MS<sup>3</sup>



The most common accidents involving the use of machine tools include spindle crashes. Common causes include programming errors, incorrectly defined tools, disregarded interference contours, or unintentional high-speed operation. The forces involved are so enormous that components of the motor spindle, ceramic spindle bearings, shafts, encoders, clamping system and the entire machine geometry can be affected or even completely destroyed. The motor spindle protection system MS<sup>3</sup> from JAKOB Antriebstechnik GmbH detects collisions by means of several sensors and reports them electronically to the machine control. This can bring the feed axes of the machine tool to a halt with measures such as braking and reversing the drives. But beyond that, the motor spindle protection system can immediately interrupt the power flow at the interface between the spindle box and the motor spindle by means of 3D deflection in the event of a collision-induced overload, even before the electronic emergency stop, mechanically and energy-autonomously.

**Jakob-Gruppe, Germany.** Tel: +49 (6022) 22080.  
Email: moeller@jakobantriebstechnik.de

## Brushless DC Motor



Portescap has added the 16ECS high-speed brushless motor to its Ultra EC™ mini brushless DC motor platform. These compact 16-millimeter motors are available in 36 and 52mm lengths and provide high power while running at speeds of 75,000 rpm. The 16ECS is comprised of an enhanced magnetic circuit that reduces iron and recirculation losses which can cause motor stator heating at high speeds. The heart of the motor - the proprietary Ultra EC coil - provides higher torque and mechanical power compared to similar motors. This highly efficient new motor offers cooler operation at high speeds, enhanced battery capacity and longer service life. Applications will run longer between charging cycles and the size of required batteries can be reduced, making mobile devices using the 16ECS smaller and lighter. Designed for battery-driven applications running at high speeds or requiring high power, the 16ECS is ideally suited for medical atherectomy devices, dental drills, cosmetic devices and lab automation equipment.

**Portescap, Mumbai.** Tel: 022-42006200.  
Email: sales.asia@portescap.com

## IEC Contactor Line



The expanded Allen-Bradley Bulletin 100-E energy-saving IEC contactor line from Rockwell Automation can help industrial companies save energy and reduce engineering time. With new sizes from 9 to 96 A, these contactors save energy by reducing inrush apparent power (VA) by up to 68% and sealed VA by over 75%

compared to standard, non-electronic coils. The electronic coils also save engineering time by covering 20 to 500 V AC/DC coil voltages with only four coil options, greatly simplifying selection. The contactors allow coil input terminals to be moved from the line to load side of the contactors without disassembly. This can make wiring and access easier when building starter assemblies. The contactors also offer a direct PLC interface option for contactors above 100A, as well as a full line of accessories, safety versions and reversing contactors. All Allen-Bradley contactors are tested in combination with relevant motor overload relays and circuit breakers to provide two- or three-component motor starters.

**Rockwell Automation India Pvt Ltd, Mumbai.**  
Tel: 022-30065600. Email: kamakshi@rockwell.co.in

## IO-Link Radar Sensor



The IO-Link-capable radar sensors of the recently developed LRS Series complete Turck's portfolio for level measurement in the 0.35 to 10 meter range. The new devices with protection to IP67/69K are especially recommended for level applications in factory automation, in which optical or ultrasonic sensors are unsuitable due to disturbance factors such as dust, wind or light. The freely radiating LRS radar sensors also offer detailed analysis functions which were previously only possible in the high-end radar sensors used in the process industry. Benefits: cost-effective for challenging applications thanks to high-end analysis functions; problem solver when other sensor technologies reach their limits; fast commissioning via Turck Radar Monitor; maximum plant availability thanks to simple condition monitoring; and additional information facilitates condition monitoring. The absence of a metallic guide rod favours use in hygienic areas and simplifies commissioning. The touchpad of the LRS series is based on Turck's Fluid 2.0 sensor platform.

**TURCK India Automation Pvt Ltd, Pune.**  
Email: india@turck.com

## Standstill Monitor, Sensorless



If a machine or system is expected to produce potentially hazardous overtravel movements, a combination of safety interlock on the guard and standstill monitor in the

switch cabinet can provide the requisite level of safety. The SSW303HV is the Schmersal Group's latest sensorless standstill monitor, offering a significant improvement over its AZR and FWS series predecessors. A key development goal was universal application of the new standstill monitor, which in total replaces fourteen variants of the previous product range. This is made possible thanks to use of a wide-range power supply for all common AC and DC operating voltages, from 24 V/DC / 24 V/AC to 230 V/AC. The increased temperature range of -25 to +55°C also opens up additional application potential. A further benefit is its compact design - the SSW303HV takes up just 45 mm of structural width in the switch cabinet.

**Schmersal India Pvt Ltd, Pune.** Tel: 02138-614700.  
Email: [info-in@schmersal.com](mailto:info-in@schmersal.com)

## Thermopile Sensor



As medical and industrial markets evolve, there is a high demand for accurate, non-contact temperature measurement. TE Connectivity (TE), a world leader in connectivity and sensors, manufactures non-contact Analog Infrared Thermopiles to support a wide range of accuracy,

packaging and performance requirements to meet the needs of these evolving industries and to help create a safer, sustainable, productive and connected future. Thermopile sensors are designed to measure temperature by detecting an object's emitted infrared energy from distances a fraction of an inch to several feet away. The thermopile sensing element, composed of small thermocouples on a silicon chip, absorbs the energy and produces an output signal. Additional benefits of TE's analog infrared thermopiles for applications across the auto, aerospace, industrial, appliance and medical device sectors include: measures a wide range of temperatures from -40°C to +300°C; multiple configurations for single pixel or multi pixel; and robust sensor packages including hermetically sealed housings.

**Mouser Electronics India Pvt Ltd, Bangalore.**  
Tel: 080-42650000. Email: [india@mouser.com](mailto:india@mouser.com)

## Continuous Inkjet Printer for Industry 4.0 pioneers



Videojet Technologies has launched new Videojet 1880 CIJ printer. The Videojet 1880 is designed to enable users to proactively prevent manufacturing downtime using advanced digitally-enabled technology to deliver unparalleled performance.

Engineered for productivity pioneers on their journey towards Industry 4.0, the Videojet 1880 features the advanced MAXIMiZE™ diagnostics platform that monitors printer health and performance patterns and helps operators easily identify if a fault is likely to occur. Advance alerts prevent expensive downtime so you can plan your maintenance and changeovers to suit your own production schedule. If an issue does occur, VideojetConnect™ Remote Service helps operators react and recover faster with real-time notifications and instant visibility to printer data. Rapid Recover™, included standard as part of VideojetConnect™ Remote Service, uses advanced automated troubleshooting to quickly diagnose a fault and recommend action to either repair or swap with a spare so that production is resumed within 20 minutes or less.

**Videojet Technologies (I) Private Ltd, Navi Mumbai.**  
Email: [marketing.india@videojet.com](mailto:marketing.india@videojet.com)

## Source Measure Units



With two new source measure units (SMU), Rohde & Schwarz enters a market previously not addressed by the power products of the test and measurement specialist.

The performance of the new R&S NGU201 and R&S NGU401 SMUs enables simultaneous sourcing and measuring of currents and voltages with high precision. The two-quadrant R&S NGU201 addresses wireless device battery tests and automatically switches from source mode to sink mode at a defined positive input voltage. The four-quadrant R&S NGU401 can also switch at negative voltages, supporting source measurements for a vast range of power supply types. The steady extension of the Rohde & Schwarz portfolio of specialty power supplies continues with the first two models in the R&S NGU series of high-precision SMUs. The instruments' innovative current feedback amplifier technology provides both maximum sensitivity and accuracy to reliably measure currents from nA to A in a single sweep.

**Rohde & Schwarz India, New Delhi.** Tel: +91-11-42535400. Email: [Anitha.Nambiar@rohde-schwarz.com](mailto:Anitha.Nambiar@rohde-schwarz.com)

## Support Module and Fieldstreaming Solution



ADTANCE, a leading international After-Sales Service technology platform provider for manufacturers, industrial companies and mechanical engineering organisations, recently announced a new ADTANCE Support Module and

Fieldstreaming solution that is fully integrated into the ADTANCE Smart Services Platform 4.0. The ADTANCE Fieldstreaming solution is the first live remote support software capable of connecting every type of camera to the system, including cameras within smartphones, tablets, computers, security cameras, drones and underwater Remote Operated Vehicles (ROVs). ADTANCE Support users can live stream views of machines from various angles simultaneously - significantly improving live support, remote training and long distance collaboration in the field. The solution can be implemented by using mobile devices such as smartphones and tablets or by wearing smartglasses.

**ADTANCE GmbH & Co. KG, Germany.**  
Email: [info@adtance.com](mailto:info@adtance.com)

## Autonomous Mobile Robot



K Hartwall has launched a brand-new AMR (Autonomous Mobile Robot) called A-MATE. This is the first fully electric free-lift pallet AGV with omnidirectional drive on the market. A-MATE is an extremely versatile mobile robot that will bring a new level of automation to intra-logistics, and to the movements of different load carriers, from pallets to roll

containers and foldable cages or "gitter" boxes. The proven free SLAM navigation combined with the innovative fleet management allows our customers to have a full overview of and control over their internal logistics operations.

Furthermore, safety has been a central point of focus in the development of A-MATE as AMRs become an integrated part of the overall logistics process. The result is that A-MATE is the only 360° safety pallet AGV on the market - not only when fetching load carriers but also when transporting them. A-mate offers clear advantages compared to existing AMR products on the market through its increased load capacity of 1000 kg.

**K Hartwall, Finland.**  
Email: [heinrich.jostkleigrewe@k-hartwall.com](mailto:heinrich.jostkleigrewe@k-hartwall.com)

## Safety Laser Scanner, SX5



Banner Engineering's SX5 Series of Safety Laser Scanners has expanded with master and remote models to provide advanced features for enhanced personnel and equipment protection. The SX5 master can monitor three safety zones simultaneously with three individual safety outputs. It also features

70 unique zone sets, selectable scan codes, and partial muting to mute all or part of a safety zone while protecting the remainder of the zone. SX5 Series safety laser scanners protect personnel, equipment, and mobile systems within a user-defined area. They continuously scan a 275° area to create a two-dimensional protected zone that must be crossed to reach the hazard. They are suitable for horizontal, vertical, and mobile applications. The versatility of the SX5 safety laser scanner makes it well-suited to a wide variety of applications, both traditional and non-traditional. Create horizontal or vertical detection zones and add remote scanners to reliably safeguard mobile vehicles, access points, and work areas.

**Banner Engineering India Pvt Ltd, Pune.**  
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### Form V

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I, M Arokiaswamy, hereby declare that the particulars given above are true to the best of my knowledge and belief.

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