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The Official Magazine of



Indian Machine Tool  
Manufacturers' Association

In Association with



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## tachyon<sup>1</sup>

/tæki.on/ or tachyonic

noun

is a hypothetical particle that always moves faster than light. Conceptualized by a team of scientists Which includes Indian scientists Mr. V.K. Deshpande and Mr. E.C.G Sudarshan in 1962.



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# CHARTING A NEW PATH IN MANUFACTURING



**INDRADEV BABU**  
PRESIDENT  
IMTMA

Dear Readers,

Wish you and your families a Happy, Healthy and Prosperous New Year 2020!

We are at the beginning of a new decade and it is great to see much hope and optimism for the manufacturing sector. A revival of the sector and an upscale in its sphere of business is on the cards. The developments which defied the manufacturing sector in the year gone by seem to be hopefully diminishing as we see the undercurrent of positive vibes.

The Automobile sector, which underwent some turbulent times with disruptions and changing emission norms, is now looking for an uptick in its business, and I am sanguine that the uncertainties that hit the sector will be history. The changing time is a wake-up call and the Indian Machine Tool industry should explore new avenues instead of being too reliant on a few select sectors to sustain. Industries need to reorient themselves with long-term planning, strategy, vision, and focus on export-led growth. This will help tide over the aberrations created by market fluctuations.

Trends are changing sharply with the customer demands for high 'Build Quality' and customizable products on the rise. To meet these needs, manufacturers must improve their design and process capabilities to bring out world-class offerings.

Indian Machine Tool Manufacturers' Association (IMTMA) has constantly endeavored to aid industries by taking strong developmental initiatives on areas spanning technology, R&D and data analytics. The Association, by bringing national and international industry leaders, products and innovations to IMTEX, has been a catalyst and trendsetter for the Machine Tool industry and its stakeholders. The exhibition is a forum where policymakers, technocrats, academia and manufacturers congregate to realize common business goals.

To continue this tradition, IMTMA is organizing 'IMTEX FORMING 2020 & Tooltech 2020' from January 23-28, 2020, at Bangalore International Exhibition Centre (BIEC) in Bengaluru. The exhibition will showcase technologies in metal forming with the focus on digital manufacturing comprising additive manufacturing and new generation technologies that form Industry 4.0. Visitors can learn, interact, network and collaborate with manufacturing fraternity from around 25 countries participating in the show.

I call upon all of you to wholeheartedly support me in this journey, as we take IMTMA's legacy forward.

Wishing you readers an interesting and bountiful year.

Happy reading!  
Indradev Babu

IMTMA is organizing  
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V ANBU  
DIRECTOR GENERAL & CEO  
IMTMA

*The opinion piece by IMTMA offers a quick peek into the opportunities in store for various user industries in the Association's upcoming flagship IMTEX FORMING exhibition with its focus on metal forming.*

Dear MMI Readers,

Wishing you a happy New Year 2020!

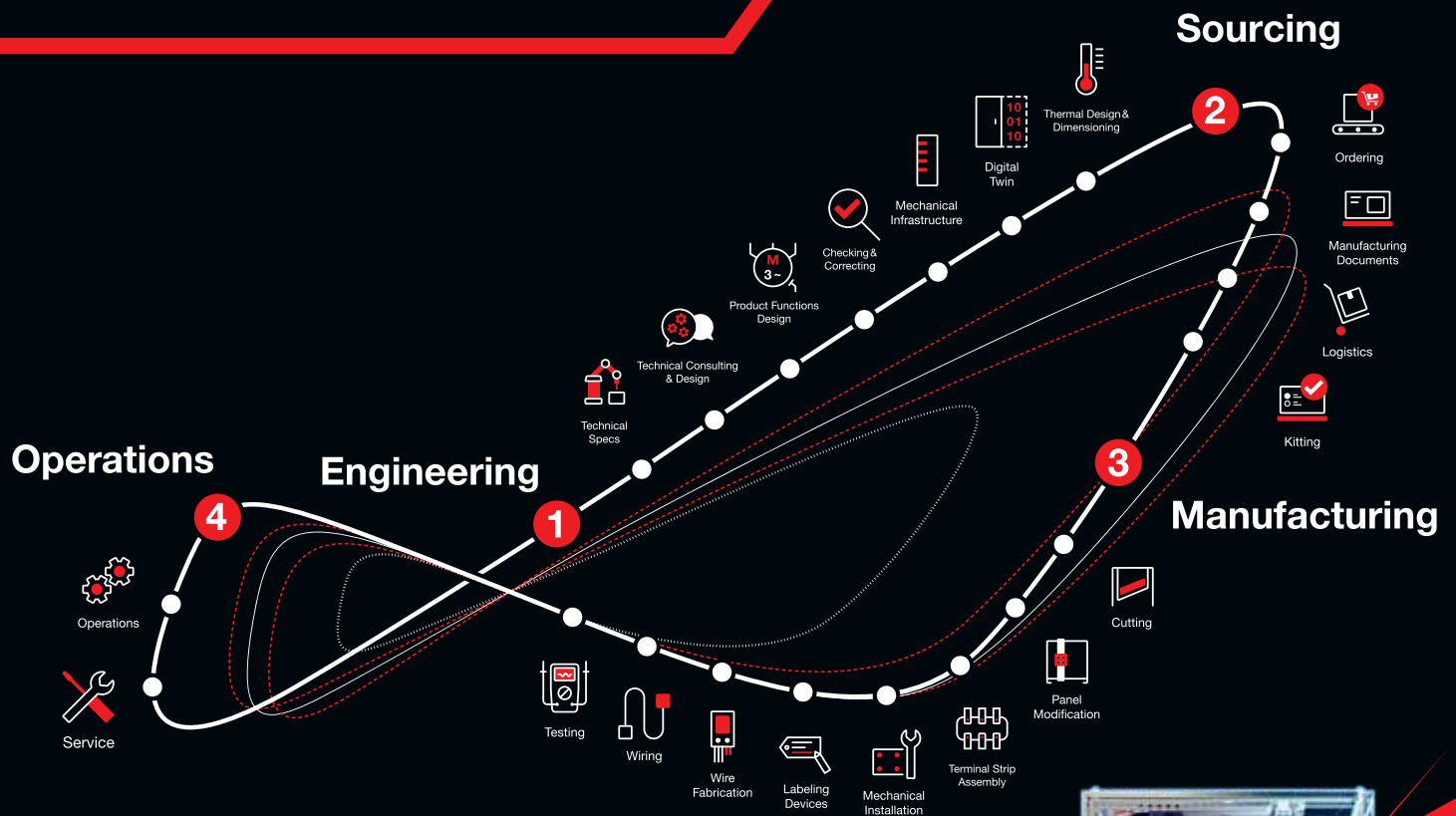
Indian Machine Tool Manufacturers' Association (IMTMA) is delighted to publish the January edition of its Modern Manufacturing India (MMI) magazine. Many thanks for your continued interest. Our MMI editorial team with its rigorous research and analysis continues to bring you the latest information on the developments in the manufacturing industry.

This month's edition focuses on laser cutting which plays a prominent role in industrial manufacturing applications. The opinion piece by IMTMA offers a quick peek into the opportunities in store for various user industries in the Association's upcoming flagship IMTEX FORMING exhibition with its focus on metal forming.

As we continue to share inspirational stories from the industry, we also reach out to you for your feedback, comments and thoughts to make this magazine more insightful and interesting. This will help us understand your requirements and enable us to meet your expectations.

I thank you once again for your interest in the activities of IMTMA. You can download previous issues of MMI from the IMTMA website. Please write to us at [mmi@imtma.in](mailto:mmi@imtma.in)

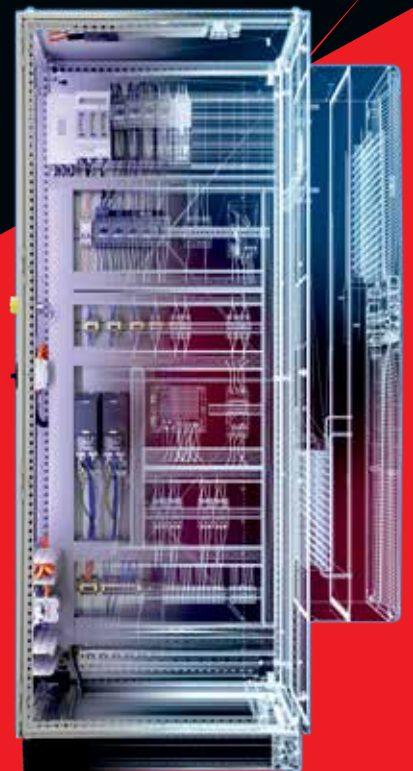
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# STICKING TO RIGHT RESOLUTIONS

**S**ince my early days welcoming a new year meant creating New Year's resolutions. As the beginning of the year is like a clean slate, most of us set new goals to begin a healthier lifestyle or getting rid of a bad habit or acquiring new skills and so on.

Though the thought process behind setting resolutions is good, studies show by mid-January about 50 percent of all those 'New Year Resolutions' already give up. So, how can we ensure sticking to our resolutions and following them until completion.

The first thing is that one must condition one's mind to be patient since it takes time to form a new habit. Liken it to a marathon, which seems unending and grueling at the start but eventually one begins to enjoy the strive to make it to the finish line.

Growth-focused manufacturing companies resort to consistent strategic thinking and calculated risk-taking to sail through rainy days. Successful organizations develop strong

*"And now we welcome  
 the new year.  
 Full of things that have  
 never been."  
 - Rainer Maria Rilke*

organizational work cultures and their personnel's skill sets, adopt newer technologies and invest in R&D to cope up with shifting market conditions, and even tiding over challenging times.

IMTEX FORMING 2020 & Tooltech 2020 emerges at a time when the industry is in need of such events more than ever. It is time to get

together, share each other's strengths, and present and witness colossal innovations. It is time to remind each other of our resolution to stay resilient. The finish line is close.

Here's wishing you 'our readers' a year full of accomplishments!



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Today we have sold more than 150+ Laser cutting machine and leading with great future potential and plan, the coming age will dominated by high power laser, this powerful tool must be stable, productive and efficient this year we are launching 10KW fiber laser capacity with utmost built quality and off-course the best service anyone can expect.

Our other solutions like CNC Press Break, Shearing Machine, and Laser welding machine are going equally popular as our fiber laser cutting machine, the need of the hour is expertise and with multiple office at Mumbai, Pune, Bangalore, Ahmedabad & Delhi and technical staff more than 60+ we are building a infrastructure for our customer benefit, making everything easy for our customers.

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CNC Press Break / CNC Bending machines

Laser Welding machines

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## IMTEX FORMING 2020: PROPELLING METAL FORMING GROWTH

The Indian metal forming sector is on the rise, slowly reducing dependence on imported forming machinery and fulfilling needs of various domestic industries. IMTEX FORMING 2020 & Tooltech 2020 will showcase the advancements we have made in the metal forming space and provide a learning ground for us to continue doing the same.

**M**etal forming plays a vital role in manufacturing of diverse products in automobile sector, high-precision components for instrumentation and electronics industries, and is the backbone of manufacturing in many other sectors. Metal forming machines constitute around 25 percent of the total consumption of machine tools in India, and around 69 percent of the metal forming machines consumed in India are imported. The consumption of metal forming machinery in India during FY 2018-2019 was around ₹5,590 crore. The sector which is unevenly spread out geographically with many small and medium players besides some large entities is projected to grow further as it continues with its initiatives to enhance the quality and standard of its products.

### Indian metal forming booming

There has been a surge in demand for high precision machine tools in the country's sunrise sectors including aerospace and defence, railways, power, medical equipment manufacturing, construction, consumer durables, furniture, for the last few years, which normally is being met through imports. Domestic manufacturers have realized the importance of innovations and technology development to reduce the dependency on imports. They see this achievable through judicious



Source: Magic Wand Media

use of resources to improve their brand image, broadening their customer base, and enhancing their competitive edge as well. Speaking about the challenges, Indradev Babu, President, Indian Machine Tool Manufacturers' Association (IMTMA), says that the Indian metal forming sector is evolving and warming up to the developments. The fear of low demand and profit margins are the bottlenecks that need to be addressed, especially with SMEs that have constraint on budgets. Babu adds that changes are occurring with foreign firms setting up bases in India through joint ventures, mergers and acquisitions, leading to technology transfer. Adding on to Babu's views, V Anbu, Director General & CEO, IMTMA, opines that metal forming offers immense potential for highly productive and specialized niche machines and processes. 3D printing closely associated with near net shape manufacturing is

also heralding new developments in manufacturing. The high level of automation adopted by the auto sector in sheet metal forming, presses, as well as robotics for welding can be replicated in other sectors. Customers are also realizing the potential of Industry 4.0 in the metal forming industry for quality improvement and safety in handling sheet metal, etc.

### Showcasing advancements

IMTEX FORMING, organized by IMTMA, will bring the global manufacturing fraternity, products and innovations on a common platform, and the advancements in metal forming when showcased to user industries will pay rich dividends. IMTEX FORMING 2020 & Tooltech 2020 will showcase digital manufacturing (3D printing and technologies that form Industry 4.0) in dedicated arenas. Visitors will have a lot to unearth from exhibitors coming from around 25 countries during the show. 

**Metal forming machines constitute around 25 percent of the total consumption of machine tools in India. The consumption of metal forming machinery in India during FY 2018-2019 was around ₹5,590 crore.**

# LESS SPATTER WELD FASTER MORE THROUGHPUT

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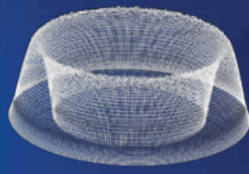
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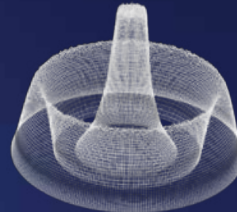
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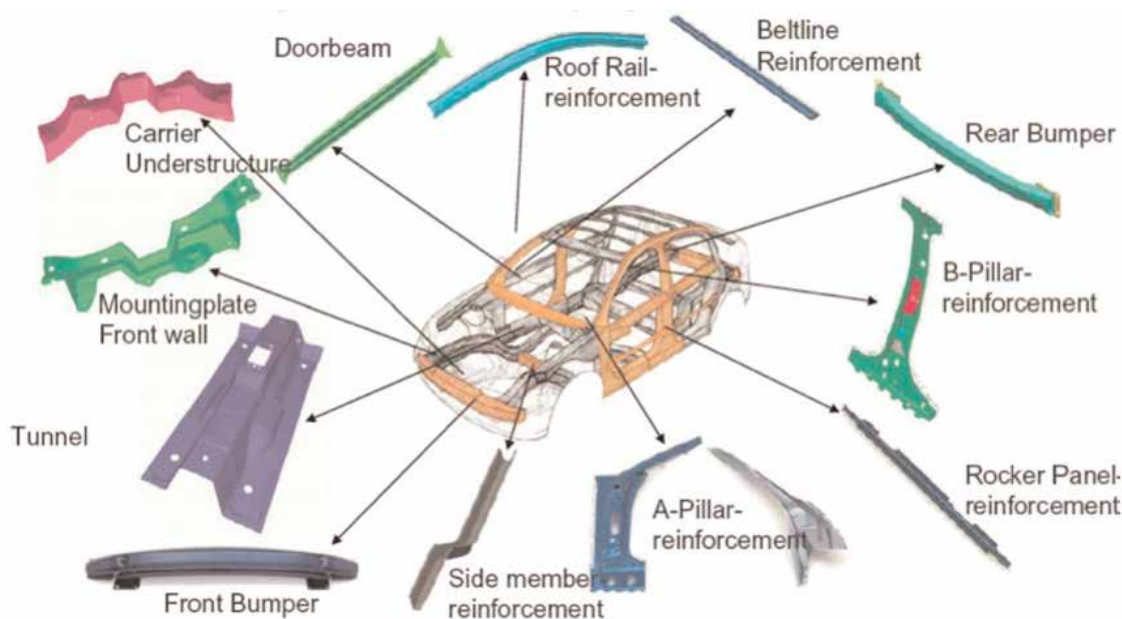
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# PERSPECTIVE ON HOT FORMING TECHNOLOGY

A take on hot forming technology and hot formed Advanced High Strength Steels



Boron-based AHSS (Advanced High Strength Steels)

Source: IMTMA

**H**ot Forming Technology has earned itself a reputation for being capital intensive, energy guzzling, slower, costly, difficult but hot forming and warm forming become inevitable for:

- Lightweighting of vehicles and aircraft for lesser emissions and fuel cost saving through their service life;
- Lightweighting while improving crash performance of cars owing to higher strength material usage for their structural members (safety cage);
- Killing the ill effects of higher springback and reducing the forming force for higher strength material;
- Getting over the poor forma-

bility and lower ductility;

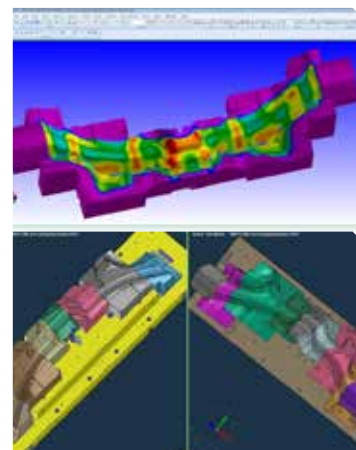
- Extending the application window for other forming technologies with addition of Hot Forming Supplement e.g. Incremental Forming, Hydro-forming, Roll Forming etc.

### Boron-based AHSS

The process of hot forming of Boron-based Advanced High Strength Steels (AHSS) involves:

- The temperature is raised to Austenizing temperature of 950°C, blanks are heated in long furnaces with conveyor and material handling can only be through robots;
- While forming, the sheets are rapidly cooled through die;
- Depending upon the Cooling

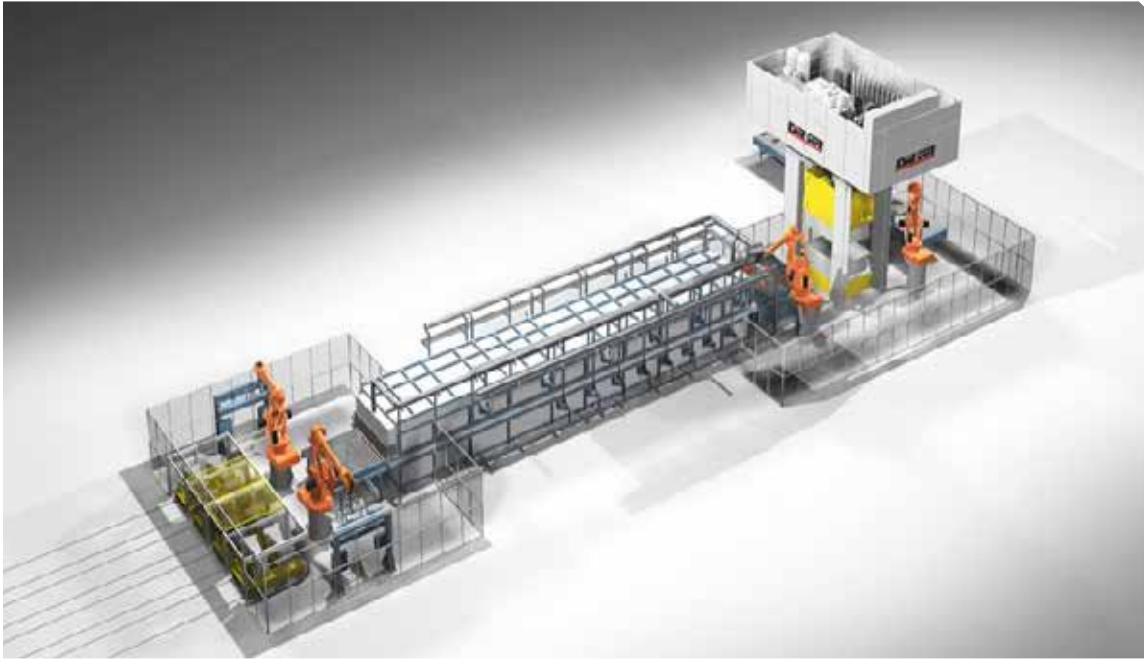
Curve vis-à-vis TTT (Temperature Time Transformation) diagram, the extent of precipitation of Martensite and consequently the strength acquired by part upon cooling varies;



Source: IMTMA

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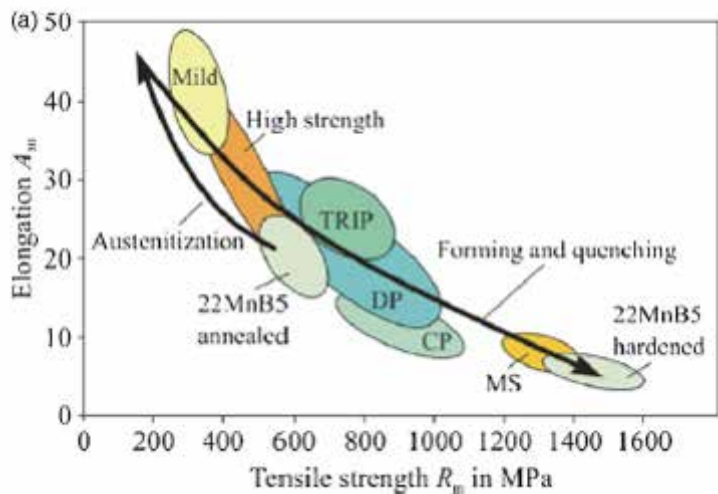
Source: IMTMA

For further insight into hot forming technology, ISFT20 would be hosting a few sessions. IMTEX FORMING 2020 is also holding a one-day training session on January 24, 2019 which would be conducted by Avinash Khare and the faculty from AP&T Sweden




Laser Softened B Pillar

Source: IMTMA



Source: IMTMA

- In addition to Forming, the dies have additional requirement of rapid heat extraction so they are segmented with separate conformal coolant channels, independent guiding and cushioning for maximizing contact area with formed sheet part profile;
- The Forming Press must be Hydraulic or Servo since it must dwell upon bottoming while pressing;
- The part becomes so hard on forming that it could only be Laser cut subsequently and no 'restrike' operation is possible;
- For welding, parts must be locally softened by Induction / Laser annealing;

- It is possible to tailor high or lower strength locally in a part by differential heating of blank or cooling rate upon forming apart from using Tailor Welded Blank;
- Hot Forming deserves a full software eco-system to design parts using differential properties, to design dies and to simulate forming with mechanics, elasticity, heat flow, computation fluid dynamics as well as to forecast metallurgical phase distribution. 



Source: IMTMA

### Ecoclean Machines Pvt Ltd

**Position:** Dy Manager Operations

**Location:** Pune

**Key Requirements:**

- The candidate should be a Diploma or BE in Mechanical Engineering or Equivalent with over 5 to 6 years' experience; • MBA or other equivalent PG degree will be preferred.

**Job Description:**

- Managing and planning employees in the production department; • Daily, weekly and monthly reporting of production employees; • Production overview and monitoring as well as reporting to Works Manager, CFO and MD; • Development of production and stores employees: Training need identification, execution and performance monitoring post training; • Focus on timely delivery of machines and spares to the customers; • Providing support to - projects, sales, service, purchasing, accounts; • Customer support on-site (as required); • Any other task as assigned by the organization.

**Position:** Engineer – Service

**Location:** Chennai

**Key Requirements:**

- The candidate must be a BE in Electrical or Electronics Engineering or Equivalent and must have over 3 years of experience in D.E.E.; • Knowledge of Siemens PLC, robot handling/programming will be an added advantage.

**Job Description:**

- Installation and Commissioning of cleaning machines in Asia; • Providing service support during machine breakdowns, AMC and other service work; • Generation of spare parts orders and coordination with head office in Pune; • Coordination with sales team and service team with excellent documentation and reporting; • Focused Customer Relationship Management; • Training of service engineers.

**Position:** Engineer – Service

**Location:** Pune

**Key Requirements:**

- The candidate must be a BE in Electrical or Electronics Engineering or Equivalent and must have over 3 years of experience in D.E.E.; • Knowledge of Siemens PLC, robot handling/programming will be an added advantage.

**Job Description:**

- Installation and Commissioning of cleaning machines in Asia; • Providing service support during machine breakdowns, AMC and other service work; • Generation of spare parts orders and coordination with head office in Pune; • Coordination with sales and service teams; • Commissioning of machines in the factory; • Tech-center trials; • Spares dispatch coordination; • Assistance during manufacturing of the machines; • Training of service engineers.



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### Anand Engineers Pvt Ltd

**Position:** Marketing Manager/Marketing Head

**Location:** Andheri, Mumbai

**Key Requirements:**

- The candidate should be a Science graduate with MBA in Marketing from a reputed institute; • He should have 5-7 years of experience in Marketing, preferably Brand Development and Lead Generation; • Other key skills include excellent verbal and written communication, good analytical skills, a professional and can-do attitude with the ability to take rejection in the right spirit.

**Job Description:**

- Generation of new sales leads via: Targeted web search in databases and publications, e-mail/telephone and using social media like Twitter, LinkedIn, Facebook etc.;
- Search Engine Optimization; • Writing blogs;
- Getting referrals from existing customers;
- Participating in trade shows and cluster wise customer events; • Networking; • Being in constant dialogue with the sales managers/engineers spread throughout the country;
- Identifying opportunities for cross pollination;
- Initiating and leading actions for brand promotion.

### Laser Technologies Pvt Ltd

**Position:** Senior Sales Executive

**Location:** Across India (Bangalore, Coimbatore, Hyderabad, Chennai, Vadodara, Surat, Nagpur, Indore, Bhopal, Chandigarh, Delhi, Kolkata, Kochi, Tirupur, Kanpur etc.)

**Key Requirements:**

- The candidate should have a Bachelor's or Master's degree in Science or Engineering, or a professional degree or diploma in the relevant field; • Should have worked in the relevant industry for a minimum of 2 years in a sales role; • Should have excellent communication skills in English as well as a regional language.

**Job Description:**

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## Conference on Advanced Manufacturing Technology

**Ahmedabad, India** - With a view to spread awareness on the capabilities to be developed by the industry and plan its technology upgradation to meet future requirements, the Confederation of Indian Industry (CII) recently organized a Conference on Advanced Manufacturing Technology (CAMTECH) in Ahmedabad.

The discussions revolved around the latest available manufacturing technologies and the best practices in manufacturing. The conference also focused on the urgent need to build capabilities of people to accept, adopt and take advantage of the influx of data, and to fully benefit from Industry 4.0.

The eminent speakers included Raju Shah, Chairman, CII Gujarat State Council & Chairman, Harsha Engineers Ltd; Yatindra Sharma, Past Chairman, CII Gujarat State Council & Managing Director, KHS Machinery Pvt Ltd; Gajanan

Patil, Joint Managing Director, Aurangabad Industrial City; Jagdish Salgaonkar, Vice President, AECOM & Programme Director, Dholera Industrial City Development Ltd; Piyush Tamboli, Vice Chairman, CII Gujarat State Council & Chairman & Managing Director, Investment and Precision Casting Ltd; Amol Nagar, Director - Manufacturing Operations & Global Supply Chain, GE Aviation; and Naresh Kantoor, Founder & CEO, Encon Systems; Dr Nagahanumaiah, Director, Central Manufacturing Technology Institute; Santosh Bannur, Head Technical Services - Sanand Plant, Tata Motors Ltd; and Vipul Vachhani, Founder & Chief Executive Officer, Jaivel Aerospace (Boeing - Jaival Skill Development Center).

"Technology is evolving at a rapid pace. Our focus should be on creating next-gen manufacturing, which will usher in high productivity in the sector along with creating more jobs," Shah pointed out.

Sharma seconded him, "Transformation in manufacturing will be led through human-machine collaboration, digital disruptions, the use of new business models and the demand for high-end technology skills in manufacturing, resulting in higher productivity and predictability. The future of manufacturing lies in ensuring faster time to market, lower production costs and improved production efficiency."

The conference brought together over 100 high-level industry captains, technology providers and seekers, and academicians on a common platform to deliberate on various aspects of advanced manufacturing and review strategies for their effective implementation across the industry.



Source: CII

Industry experts at the CAMTECH conference

## 32.BI-MU off to a Good Start

**fieramilano Rho, Italy** - Already 466 companies have sent their applications to exhibit at 32.BI-MU, the international exhibition for the machine tool sector, held at fieramilano Rho, Italy from October 14 -17, 2020. To date, the number of exhibiting companies has increased by 3.5 percent as compared with the number achieved in December 2017 for the previous edition of BI-MU.

Considering the total exhibitors, there are 194 foreign enterprises, representing 21 countries. Even this figure has grown by 10 percent, thus confirming the international popularity of this trade show. The new exhibitors are currently 7.5 percent of the total.

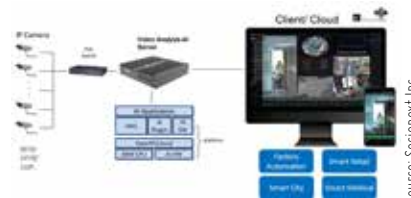
Alfredo Mariotti, General Manager, UCIMU-SISTEMI PER PRODURRE, stated: "A mirror of the changes and transformations characterizing the manufacturing industry, 32.BI-MU will show the best solutions related to 'the factory of the future'. Therefore, it will be an unmissable meeting for end users. The organizers are aiming to repeat the same satisfactory result of two years ago."

## Socionext Joins Foxconn and Network Optix

**New Delhi, India** - Socionext Inc., world's leading system-on-chip (SoC) solutions provider, has introduced new, intelligent, scalable edge-AI solutions developed in partnership with Foxconn Technology Group, a global leader in smart manufacturing, and Network Optix Inc., a creator of innovative video management software (VMS).

Developed with Foxconn, BOXiedge is a high-density, fan-less, highly efficient edge server that measures a compact 200mm x 200mm (1U) and typically consumes only 30W of power. It is ideal for industrial internet AI applications as it provides over 20TOPS in total with AI accelerating card that offers excellent performance in object classification.

BOXiedge Plus Nx Witness VMS is a new edge computing system developed with Network Optix. It combines the ultra-fast processing capabilities of Arm-based CPU with Network Optix's Nx Witness VMS that integrates seamlessly with other products 'Powered-by-Nx' built on the Nx Meta Video Development Platform for analyzing and enriching video data. It enables multiple video input processing in real-time and provides a powerful and intuitive user interface to view and manage multiple incoming IP video streams. The lightweight VMS can run on most hardware and leading server platforms.



Source: Socionext Inc.

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## CII's Conference on Welding Technology

**Mumbai, India** - The CII Naoroji Godrej Centre of Manufacturing Excellence recently organized a conference on Welding Technology. This was the third edition of the conference.

Speaking on the occasion, GK Pillai, Managing Director & CEO, Walchandnagar Industries Ltd, noted, "India needs 10 lakh skilled welding professionals by 2022 who will play a critical role in giving boost to the manufacturing sector productivity and taking Indian economy to the \$5 trillion-mark by 2024 as envisaged by Prime Minister Shri Narendra Modi."

"If the manufacturing sector has to grow beyond 15 per cent share (in GDP) then the role of welding technology, which is the backbone of manufacturing process, is very important.

It should play a greater role in improving industry's march towards \$5 trillion economy, along with digital technologies," he added.

Anil Parab, Executive Vice President, Heavy Engineering and Nuclear, Larsen & Toubro Ltd, predicted that India, which was at the 10<sup>th</sup> position in 2010 in advancement in manufacturing technology, has been steadily progressing to reach 5<sup>th</sup> position by the next year.

Alakesh Roy, Vice Chairman, CII Pune Zonal Council & Managing Director, Zamil Steel India, warned the manufacturing sector players to guard against the rapid technological changes that the industry is likely to face in the years to come, and that they should try to be relevant.

Citing a recent survey of 500 manufacturers, Satish Bhat, Conference Chairman & Managing Director, Ador Welding Ltd, said about 65 percent of the leaders plan to increase capital injection in digitalization of their manufacturing processes in the next few years.

High competitiveness and manufacturing excellence are important in digital economy. Investment is going the way of cost-effective digital manufacturing. "Manufacturers are talking nothing less than Industry 4.0 or smart manufacturing. This will help manufacturers to transform from mass production to customized production via digital supply network for catering to the ever-changing needs of the customers," he added.



Source: CII

Industry stalwarts at the Conference

## METALEX 2019 Aces with Germany as Partner Country

**Bangkok, Thailand** - The recently held METALEX 2019, the 33<sup>rd</sup> edition of machine tools and metalworking exhibition serving ASEAN, showcased cutting-edge technologies from Partner Country German and more than 4,000 brands from 50 countries. Under the theme of 'New Smart Technologies', METALEX through its focus on high-precision technologies highlighted Thailand's national strategy to drive its manufacturing industry. Suttisak Wilanan, Deputy Managing Director, Reed Tradex Co., Ltd, said, "The 33<sup>rd</sup> edition of METALEX has been honored with Germany participating as the first Partner Country of the event. The technologies in 'German High Tech in Metal Working Pavilion' are highly special and can directly provide answers to our industrialists' needs."

Forty-eight companies joined in Pavilion, revealing 'umati', the universal machine tool interface for the first time in Asia. The Pavilion showed German innovations from globally renowned brands such as Siemens, Chiron, Emuge Franken, Gühring, Schütte, FFG, Zoller, Index Traub, Mapal and Grob. The companies displayed the entire range of machine tools and accessories, tools and tool handling, sheet metal forming, mould and die, precision measuring and testing to controller and computer systems.



Source: Magic Wand Media

## Cyclops Meltmaster for Enhancing Efficiency

**Chennai, India** - SAC Engine Components Pvt Ltd, a manufacturer of valve train IC engine components, has chosen AMETEK Land's Cyclops Meltmaster high-precision portable non-contact thermometers to optimize the quality of its molten metal and make significant savings on consumables.

AMETEK Land recommended use of six Cyclops 055L-2F Meltmasters with Bluetooth jumbo display installed at the factory near Chennai. The main advantage of the Cyclops 055L-2F is that it provides an accurate temperature reading of molten metal, which makes a fundamental difference to the quality of the casting.

The operator is positioned 5 - 6m away from the molten metal and points the Cyclops Meltmaster at the liquid. The trigger is then pulled to take a measurement, which is displayed in four simultaneous modes including Continuous, Peak,



Source: AMETEK Land

Valley and Meltmaster to meet specific requirements. The device provides accurate measurement of liquid metal temperatures in the range 1,000 to 2,000°C.



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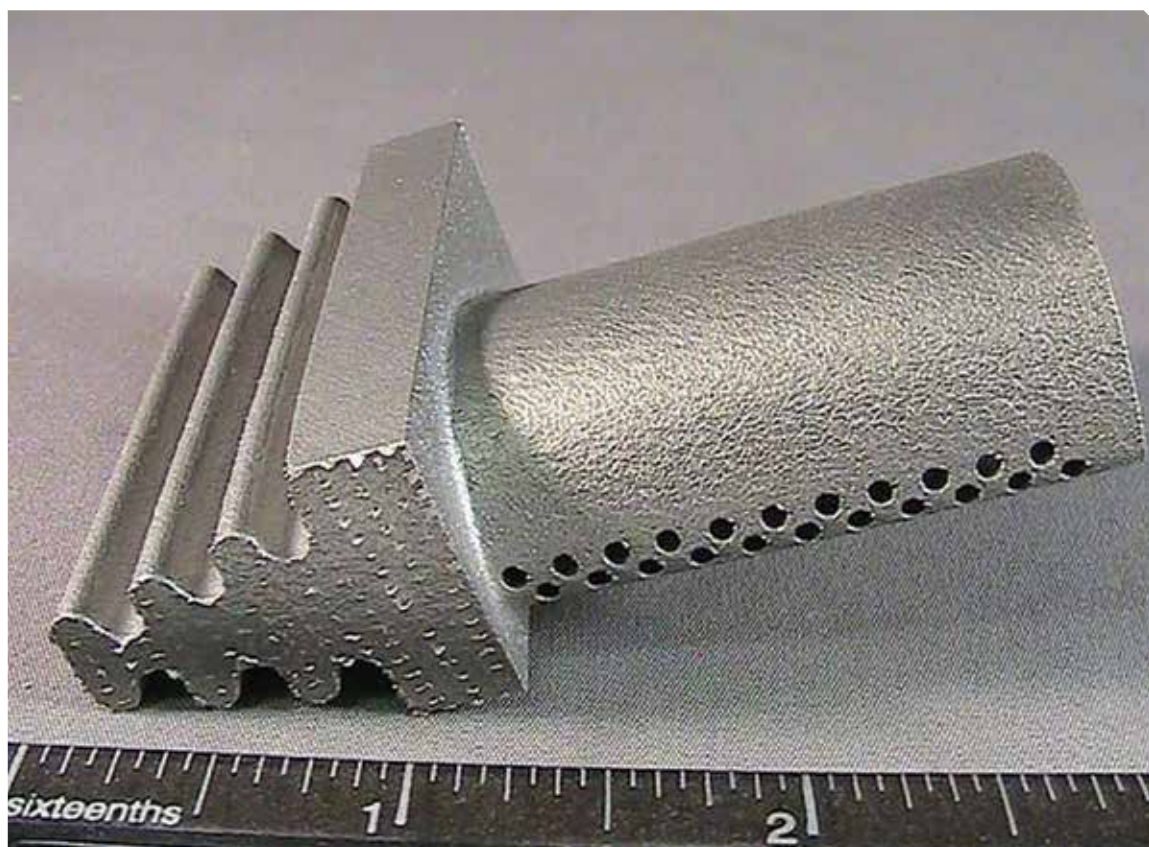
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# A GUIDE TO FINISHING METAL 3D-PRINTED PARTS

Finishing 3D-printed parts is a different ball game than conventionally machined ones. An expert explains...



This first article of a sample air compressor blade is shown as-printed.

Source: Modern Machine Shop

**3D** printing offers production advantages by allowing parts to be made with more complicated geometries, fewer components and limited assembly. But many 3D-printed parts will need some kind of finishing work, and this presents challenges when it comes to achieving quality surface finish.

Steven Alvit, President, Bel Air Finishing Supply, offers the following tips for improving the surface finish of 3D-printed metal parts:

**Do understand there is no one technology that suits all 3D printing finishing applications.** The surface of the printed part is directly affected by the type of printer, the printing technology and the material grain size. Finishing technologies must be mixed and matched with each individual part design based on material, printing techniques and part geometry. It is also important to note that multiple techniques can be used on the same part.

**Don't design a part with a conventional manufacturing thought process.** Chances are that there will be dimensional challenges and/or surface finishing problems when a printed part is integrated into its functional assembly. Corner, angle and surface geometries will probably need to be built in an unconventional manner. Loss of material at a surface, other than a corner, can range between 0.001 to 0.005 in. **Don't design a part with the 3D hype mentality.** The hype

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suggests that you can take a five-piece assembly and turn it into a one-shot build with your printer. But considering surface finish requirements and understanding that conventional finishing methods will not be applicable may make it necessary to break down and simplify the design. For example, a one-shot build could be divided into a two-part build with a single assembly. This may allow for standard finishing techniques to handle dimensional requirements and still have a more efficient process of production.

**Do use a technique that Alvit refers to as the feedback loop. Using expert finishing recommendations, print a first article part of a design. Then evaluate the dimensional tolerance, surface finish and any lost geometry. Next, feed this information back to the build design. This may entail adding extra material and sharper corners, breaking the design into multiple parts, or even adding what is called a mask. This is a breakaway structure that can protect a particular**



Source: Modern Machine Shop


Here, the same blade is pictured following a superpolish postprocessing operation. Imperfections are visible on the leading edge of the profile.

part geometry from extra material removal.

**Do define your surface finish requirements before you choose your 3D printing method, technology and part design.** A part prints with many different surface finishes, depending on its orientation with relation to the build plate, the position in the box and its own geometry. So, for the best surface finish, take into account

the printing method and critical surfaces in orienting the part. Keep in mind that the speed of a build and the resulting surface finish are at opposite ends of the spectrum. For example, the lower the starting as-printed Ra, the more likely and faster you will achieve the required surface specification.

**Do understand postprocessing finishing techniques.** The finishing process should include an appropriate cleaning process as well as wet grinding for the gross surface smoothing operation. It is important to note, however, that wet grinding and other mechanical surface finishing methods require material removal; these effects must be fed back into the build geometry and orientation to compensate for the loss.

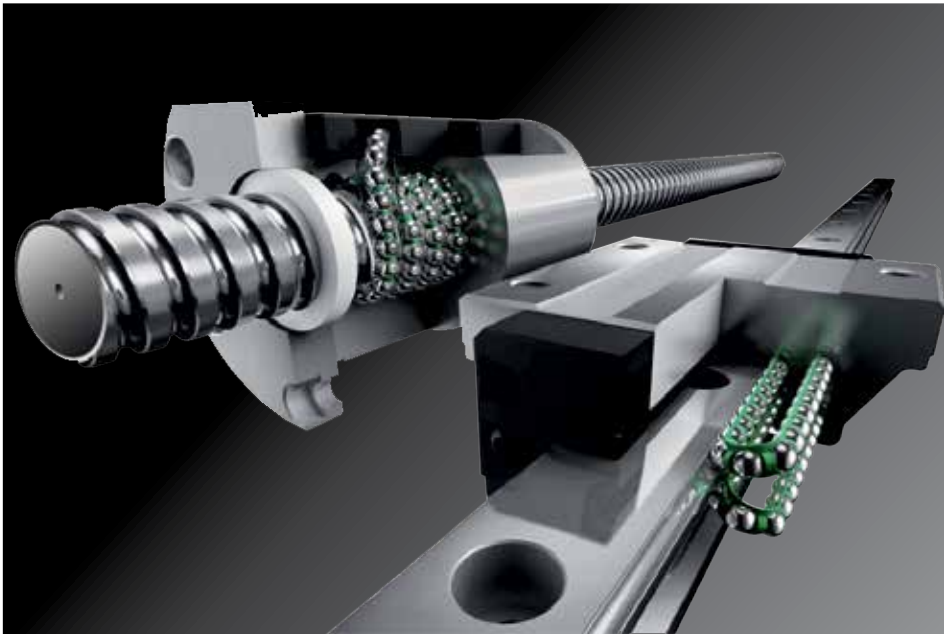
**Do take the time to understand and experiment with whatever finishing methods you have available.** Have some specifically designed shapes built in several machine technologies and then have the surfaces finished by conventional methods to analyze the results and limitations before you purchase or before you design a part. 

**Finishing technologies must be mixed and matched with each individual part design based on material, printing techniques and part geometry.**



Source: Modern Machine Shop

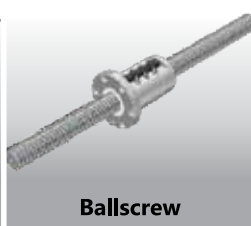
This image shows a second article, built after the feedback loop. The air compressor blade was reoriented to avoid porosity after postprocessing.



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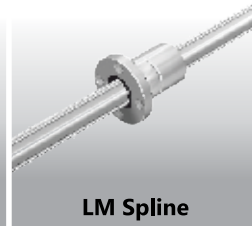
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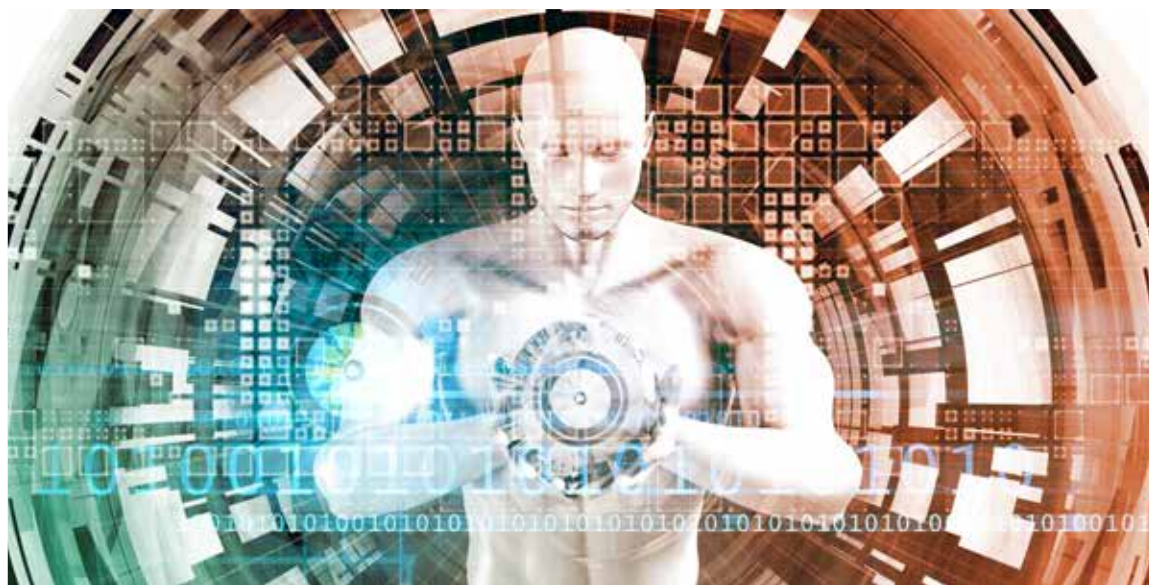
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## NEW MANUFACTURING PARADIGMS

The manufacturing sector is undergoing a transition, wherein there is a need for creating more and better with less. Businesses around the world are evolving and adapting to advanced technologies in Industry 4.0. A take on how the smart factory of the future is slated to be...



Source: Magic Wand Media

**A**s countries around the world strive for development, they continue to focus on industries that will help them scale growth through enhanced exports and increased employment for its labor force. Manufacturing is among the many industries responsible for a country's economic growth. In the April-June quarter of 2019-20, India's gross domestic product (GDP) growth slumped to over a six-year low of 5 percent compared to 8 percent last year. The reason was a sharp deceleration in its manufacturing output.

In recent times, the manufacturing sector is undergoing a transition, wherein there is a need for creating more and better with less. Businesses around the world are evolving and are adapting

to advanced technologies in Industry 4.0.

### Challenges abound

When an industry sets on a journey to embrace new paradigms, it is bound to face challenges. In case of manufacturing, these generally involve economic pressure, customers demanding customization of products, and traditional forms of manufacturing. Customized products are in demand now more than ever and help one connect at a personal level with the consumer. Traditional methods of manufacturing hinder the path toward taking advantage of opportunities in a competitive global marketplace.

In an effort to gain competitive differentiation as well as

optimize the manufacturing process, companies have to deploy advanced technologies such as smart robots, human-robot collaboration, additive manufacturing, augmented reality, production simulation, immersive training, integration of the value chain, and decentralization and production steering. In other words, the challenge is to adopt advanced manufacturing which integrates new technologies and techniques, and elevates the process of design and manufacturing to create products, which are highly differentiated, cost-effective and competitive.

### Role of design

Experts say that by 2023, the competitive advantage of business in all industries

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will be driven primarily by innovations developed in artificial intelligence (AI). Industry 4.0 will allow for new ways to design organizations to operate and also transform the way we work. From real estate to automobile, most sectors are highly focused on designing the best-in-class products, which becomes the enabler of efficient manufacturing. Given the pace of advancement in manufacturing what helps make better designs are options such as automation and generative design. Even developing countries like India are transitioning from traditional manufacturing to push button methods with the help of design technologies and tools. It gives businesses the power to create most ambitious ideas, collaborate more efficiently, automate the busywork and explore more design options than ever before. As we transition to explore the nuances of the digital phase, we are witnessing several practical implementations of Industry 4.0, especially in the automotive industry. Tech-enabled or 'connected cars' are the new reality. Generative design tools help auto companies to confidently take a smart approach toward concept design. In this process, manufacturing is considered early in the design

stage, so you can get to market faster, thereby offering several benefits including lightweighting, performance improvements, part consolidation and sustainability. Lightweighting, enabled by generative design, can help automobile manufacturers to develop energy efficient vehicles. A 10 percent weight reduction in a vehicle typically leads to a 6 to 7 percent increase in fuel economy according to the Automotive Lightweighting report by Autodesk. For example, Airbus has reimaged multiple structural aircraft components, applying generative design to develop lighter-weight parts that exceed performance and safety standards. Lightning Motorcycle Corp. leveraged the next generation electric superbikes which were faster than traditional superbikes powered by combustion engines with the help of generative design. Furthermore, the advancement of design technologies has led to productivity improvement. With shortened design cycles, streamlined manufacturing processes, and product introductions in the market, businesses are now getting a chance to improve the flow of product design information and communication. Faster time-to-market and higher quality

products certainly translate into increased revenue, while reducing design costs provide larger profit margins.

### Future is digital

There is no denying the fact that the digital factory is shaping the future of manufacturing. Smart factories of the future are going to be digitized and intelligent, and in no time, we could see the rise of cobots on factory floors, cloud-based collaborative tools, additive manufacturing and mass customization gaining ground. On their part, Indian companies are already seeing a growing convergence between digital and traditional manufacturing, and are adopting AI, cloud, machine learning, Internet of Things (IoT) to make production faster, cheaper, efficient and sustainable. Here, new age technology revolves around generative design, which has catalyzed a paradigm shift in product development, thereby opening doors to unlimited design options. With rapid advancements in technological breakthroughs, experts opine that these trends will continue, promising a massive impact. Their combined unlocked potential will help accelerate the manufacturing sector's digital transformation. 

Indian companies are already adopting AI, cloud, machine learning, Internet of Things (IoT) to make production faster, cheaper, efficient and sustainable.



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# UPPING YOUR SELLING GAME

**S**ales and Marketing is an area rife with challenges that come in the way of communicating effectively with clients and prospects, and eventually selling them products or services. FABS is a Sales jargon which stands for Features, Advantages, and Benefits Selling, the understanding of which will slowly unfold here.

Many salespeople fail because they succeed in raising awareness about the need to buy a particular product or service, then fail to sell their company. This can lead to the customer shopping around for the cheapest option, which may not actually be in their best interests. They present information or Features of their products or company in statements such as: 'Our calculator has a solar battery' or 'Our company has been established for 100 years' when the customer really wants to know 'What's in it for me?'

Hence, a more persuasive style could be: 'Because it has a solar battery our calculator can run indefinitely in normal daylight.' This goes beyond simple product characteristics. It shows how a characteristic or Feature can be used and applied. Such statements are called Advantages.

Benefits are the most powerful way in which a seller can describe a product. By having a clear understanding of the buyer's needs, one can sell particular benefits of the product that meet those needs.

**T K RAMESH**  
**Managing Director and CEO**  
**Micromatic Machine Tools Pvt Ltd**

## Catering to needs

People buy because they have needs. If the seller can demonstrate that the product will meet those needs, then there is a high probability of making a sale. Statements that show how the buyer's needs can be met by product features and advantages are called Benefits.

Benefits are the most powerful way in which a seller can describe a product. By having a clear understanding of the buyer's needs, one can sell particular benefits of the product that meet those needs.

In this case, 'Because it has a solar battery, our calculator can run indefinitely in normal daylight, which means that you will not need to worry about the cost of replacement batteries' is a statement that can relate to the buyer. It says how the features and advantages will affect the individual and is, therefore, much more persuasive.

Benefits describe what is in it for the customer and reflect feelings of confidence, reassurance and peace of mind. The Benefit phrases people like to hear are:

@You don't have to worry because...

@You can be confident that...

@You can be reassured that...

@This will give you peace of mind because...

Whatever it takes to sell, as they say.

The views expressed by the author are personal and he can be contacted at [rameshtkr@gmail.com](mailto:rameshtkr@gmail.com)



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Facing Spindle Head-Servo / Flange Type



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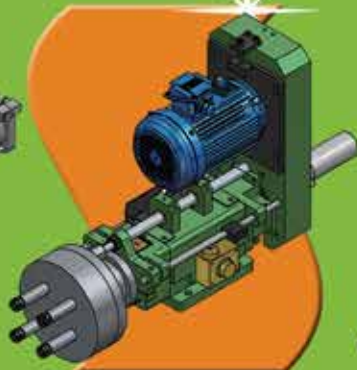
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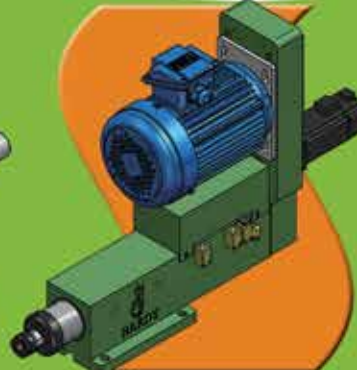
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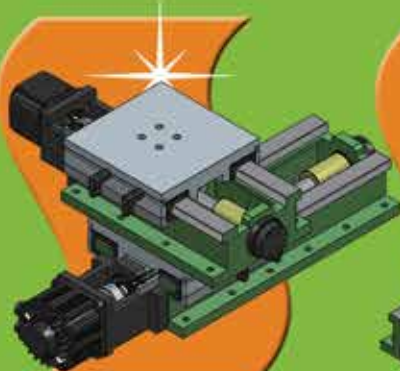


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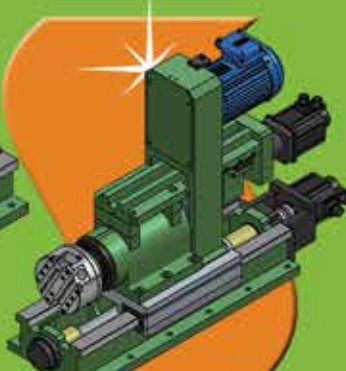


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Source: Magic Wand Media

AI technologies are a key success factor for Industry 4.0. However, their use in the latter presents both opportunities and hurdles for real-world production facilities. Read on to know about them...

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dfki.de



**T**he factory of the future is versatile, safe and uses resources in an optimal way to manufacture anything from single products to mass series. Such flexibility requires a high level of maturity as far as Industry 4.0 is concerned: In hybrid teams, humans work hand-in-hand with robots and are supported in their activities by intelligent assistance systems.

The German Research Center for Artificial Intelligence (DFKI) was founded in 1988 as a non-profit public-private partnership. In the field of innovative commercial software technology using Artificial Intelligence (AI), DFKI is the leading research center in Germany. Based on application oriented basic research, the center develops product functions, prototypes and patentable solutions in

the field of information and communication technology. DFKI is one of the main co-founders of Industry 4.0, the so-called 4<sup>th</sup> industrial revolution brought about by the integration of modern information and communication technologies into the production process. The use of AI in Industry 4.0 presents both opportunities and hurdles for real-world production facilities. All too often, inadequate digitization in

companies and establishments combined with poor data quality stand in the way of a rollout of innovative technologies.

### Digitalization 'with rhyme and reason'

Unfortunately, digitalization and Industry 4.0 are often confused with each other. But it is important to be very clear in distinguishing them precisely: there is no Industry 4.0 without digitalization.

Today, we are in the middle of the second wave of digitalization. The first wave was about digital data and how to record, store, transmit and process it to enable machine-readable data for the Internet and cloud technologies. Nowadays, digital data must become machine-understandable, refinable data for active usage in AI and Machine Learning systems and applications as a base for (new) business models (e.g. smart services) and monetization.

A digitalization 'with rhyme and reason' leads from (Big) data to Smart data and meta-knowledge - Data mining, the systematic application of statistical methods to large amounts of data (in particular 'Big data' or mass data) - with the aim of identifying new cross-connections and

trends. Information extraction generates knowledge, which can then be used for meta data reference systems, leading to digital understanding.

The meaning of digital understanding is two-fold: Understanding digital data and understanding with the help of digital systems. Examples are understanding written text, spoken language, images, videos, or sensor data with the help of AI on digital computers that lead to adequate results, e.g. in terms of answering questions based on texts, videos or sensor values, or a physical reaction of robots or networked devices.

### Industry 4.0 readiness

It is crucial for companies to have a deep insight in their degree of digitalization and Industry 4.0 readiness in order to take appropriate decisions for their development. For this task of Industry 4.0 maturity assessment of production, several indices have been created. Increasing levels of maturity may be computerization, connectivity, visibility, transparency, predictability, and adaptability. A maturity index developed by the German FIR institute, together with DFKI and other partners, follows

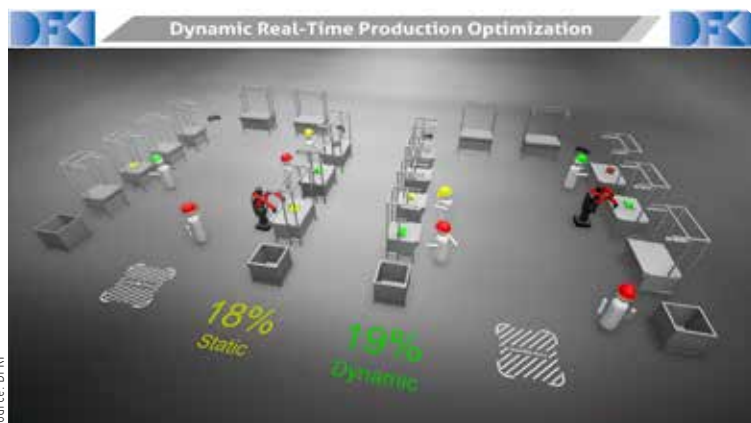
an assess and assist approach that enables companies to set up specific, benefit-oriented I4.0 roadmaps. This approach takes into account the four different structuring forces of companies: information systems, resources, organizational structure, and culture for an enterprise-wide assessment.

The assessment examines relevant core processes of a company and consists of three phases. Evaluation and recommendation are based on the surveys conducted at the enterprise. The results of the survey are transferred and combined to the maturity level radar for the four structuring forces. The analysis of this combined radar identifies the functions and structuring forces where capabilities have to be expanded. It allows for a clear vision of what has to be targeted next by deriving action items for a transformation roadmap to Industry 4.0.

### Intelligent software systems

Given a sufficient degree of digitalization as described before, intelligent software systems based on knowledge processing can be employed with AI entering the scene. Being a part of Computer Science, with its aspects of Computational Science and Engineering, AI has also strong links to Cognitive Sciences and, therefore, integrates insights from Linguistics, Biosciences, Psychology, and Philosophy. AI is meant here as Avantgarde Informatics and, in this sense, describes realizing intelligent behavior and the underlying cognitive abilities on computer systems. Knowledge processing covers retrieval, extraction and inference of knowledge as well as its presentation and

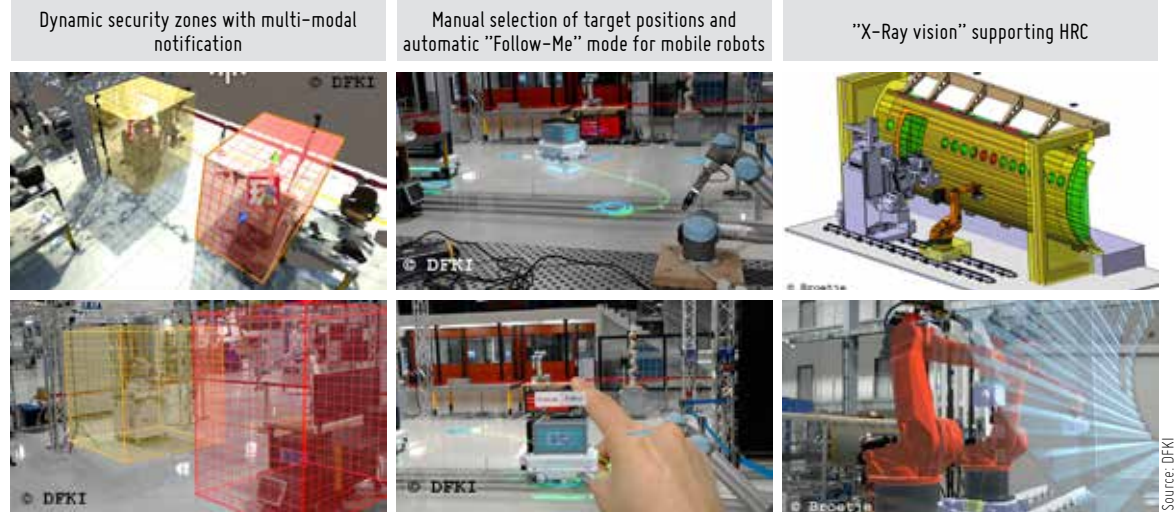
Nowadays, digital data must become machine-understandable, refinable data for active usage in AI and Machine Learning systems, and applications as a base for business models and monetization.



Source: DFKI

Real-time, on-the-fly optimization and planning of manufacturing systems based on dynamic line balancing.

Today's rapidly developing IT environments like Web and Cloud technologies, in-memory computing, GPU parallel cluster, mobile internet, 5G, and Big Data boost AI solutions.



HRC-Modules as Assistance Systems

distribution. Core aspects are the representation and the management of knowledge, deployed by discovery, learning and teaching of (inferred) knowledge. At present, in cognitive systems, we often use hybrid architectures: knowledge bases combined with Machine Learning. Today's rapidly developing IT environments like Web and Cloud technologies, in-memory computing, and GPU parallel cluster as well as mobile internet, 5G, and Big Data boost AI solutions. Combining AI with Smart Data creates (new) smart products and services. Being collaborative, autonomous, proactive, interoperable, adaptive, self-healing, self-explanatory, self-learning, self-optimizing, and fault-tolerant are the key features of AI systems.

**Industry 4.0 based on AI**  
 The key aspects of Industry 4.0 based on AI for the Internet of Things (IoT) must cope with the needs of the manufacturing industry to increase efficiency, handle batch size 1, and apply to the multi-adaptivity required. According to and adapted from Siemens, these needs can be clustered into four core aspects:

Modularity, Connectivity, Autonomy, and Digital Twin. Smart Factories are defined by several factors that refer to these core aspects: Dynamic networks of local controllers and anytime planning in real-time are needed for a flexible production configured in response to rapidly changing processes. Self-organization lead to an optimization of production, e.g. through Cyber-Physical Production Systems. Digital Twins of the entire process and its constituent elements are essential to monitor components and results, even simulated in advance, to plan in detail the start-up of a new asset, product or line. Complex AI systems cope with these manifold requirements by the idea of 'AI on Demand': AI components ('building blocks') for sensing, understanding, and acting work together in complex systems. Here are some examples of AI technologies for Industry 4.0 characteristics:

- Semantic Service Matching for Mass Customization
- Machine Learning for Predictive Maintenance
- Ontology Merging for Plug & Produce

- GPU-based Anytime AI Planning Algorithms for Real-time Line Balancing
- Deep Learning, and Active Sensor Fusion for Online Quality Control
- Semantic Product Memories and further Semantic AI Technologies for the Digital Twin
- Plan Recognition, and User Modelling, AR/MR/DR for Worker Assistance
- Deep Learning for Process Anomaly Detection
- Multiagent Planning, BDI (belief-desire-intention) Architectures for Hybrid Teams

In this context, the DFKI research department 'Cognitive Assistants' present a system for planning and optimizing production systems on-the-fly in real-time. In collaboration with various industrial partners, the system is currently being validated under real conditions. Here, we choose optimization approach based on GPU computing for Extremely Large State Spaces. Besides generic Optimizer Library designed for GPUs that make available the generic functionality required



Source: DFKI

Human-Robot Lab in the Power4Production Smart Factory in Saarbrücken, Germany, with more than 20 robots in a hybrid team cell

by all optimizers, on the domain side specific knowledge (a domain model) as well as state descriptions, optimization goals, and exploration heuristics are essential.


Let me give you another example: Robots will no longer be locked in safety work cells but collaborate with human workers in the same place at the same time on the same asset. (Yes, this will take some more time to become common.) A new generation of light-weight, flexible robots will collaborate with humans in the smart factory. HRC (Human Robot Collaboration) modules as assistance systems based on AI allow for an 'X-Ray' view through the workers' HoloLens for tracking dangerous actions of occluded heavy-weight robots. Hybrid teams of human workers and robots apply for multi-adaptive manufacturing tasks.

#### **BaSys 4.0**

The joint German reference

research project, BaSys 4.0 aims at building a software infrastructure for Industry 4.0, which also supports production-relevant change processes. Main building blocks are the so-called Asset administration shell (Digital Twin), Structured (semantic) domain models, and a Service-oriented production concept. BaSys 4.0 provides an open source reference implementation. Its service-oriented production approach covers three layers: The orchestrated production process specifies the required resource capabilities, the asset administration shell of device provides uniform service interface for access to capabilities, while Powerline Communication (PLC) functions realize the pure skills (not the production logic). All services participate in the same distributed service platform via communication APIs and a uniform service structure.

#### **Conclusion**

AI technologies are a key success factor for Industry 4.0. Semantic technologies guarantee interoperability in multi-vendor factories and are the basis for a disruptive SOA production logic. GPU-based automated production planning in real-time is a breakthrough for flexible automation. User Modeling, Plan Recognition as well as Intelligent Multimodal Interfaces are the basis for a new generation of worker assistance systems. Hybrid teams of cobots, softbots and people are a challenge for basic research in multi-agent coordination, e.g. with an acceptable solution of the transfer of control problem. Industry 4.0 brings many AI subfields together in one of the most important fields of industrialized countries like Germany. But the base line is that there is no Industry 4.0 without digitalization. 

**Industry 4.0 brings many AI subfields together in one of the most important fields of industrialized countries. But the base line is that there is no Industry 4.0 without digitalization.**

# TOWARDS A SECURE FUTURE

In an earnest interview with Team MMI, Baba Kalyani, CMD, Bharat Forge, Kalyani Group, shares how the company has always focused on portfolio diversification for its growth, and sheds light on its foray into several new business initiatives.



Baba Kalyani, CMD, Bharat Forge, Kalyani Group

were being imported. It was during those times when my father, Neelkanth Kalyani of Karad, near Sangli, set up Bharat Forge around 1964, and over a period of five decades now, it has grown to become India's largest and one of the top three global forging companies with a strong metallurgical expertise, design, engineering and manufacturing capabilities. Today, we have a manufacturing footprint across India, Germany, Sweden, France and the US. The company has always focused on portfolio diversification to amplify growth and de-risk business. Even though our primary business is to cater to the automotive sector, we have also created a significant presence in industrial sectors across aerospace and defence, oil and gas, marine, railways, etc. Our expertise in metal forming helped us in diversifying to these segments. The industrial business now accounts for about 44 percent of overall FY19 revenues.

In FY19, our consolidated revenue crossed ₹10,000 crore-mark and despite the global slowdown that year, our company managed to win about \$50 million of new business.

Our journey so far has been a fair mix of highs and lows, but we have managed to overcome every challenge coming our way. By 2050, the company envisions to become a technology company from a forging company.

**How has the journey of creating the world's largest forging company, which is also one of the best automotive forging companies, been?**

**Baba Kalyani:** For a couple of decades after India's

independence, the automobile industry was almost non-existent like most other industries. Almost everything including the ancillaries and infrastructure were either scarce or absent and, therefore,

Source: Team MMI

Source: Bharat Forge

**Bharat Forge's revenue mix is expected to move away from commercial vehicles and industrial segment, and towards passenger vehicles and new business initiatives in the long-term. The latter two segments are expected to significantly contribute to the company's top-line by FY25. Kindly shed light on this.**

**Kalyani:** In future, forging may just be one of the parts of Bharat Forge's overall portfolio as the forging industry shall undergo dramatic change and the conventional industry as it is today shall not survive.

As the world is slowly moving towards greener forms of mobility, we do not want to be left behind in the race. And, therefore, we started our journey some four years ago on becoming a vertically integrated technology company.

We have already been putting a lot of resources in developing solutions across the entire spectrum of Electric Vehicles (EVs), from low voltage to high voltage electrification technologies and increase content per vehicle.

This is apart from exploring business development opportunities in the electric two- and three- wheeler and commercial vehicle space.

We have already invested in almost eight startups in the last one year covering electronics, composites, high technology and electric motorcycles. We have also set up big tech centers where technologies are being developed including those for AI, digitalization, defence electronics, microwave technology among others.

We have invested ₹34 crore in Pune-based Tork Motors, a developer of technology for e-motorcycles and electric three-wheeler powertrains. The company is in the process



Source: Bharat Forge

“It is of paramount importance that India stop relying on foreign powers for Transfer of Technology (ToT) and create 'know-how' and 'know-why' for fighter aircraft, warships, guns, land combat systems, helicopters and all those 13 weapon systems which have been identified in the Production Policy 2018.”

**Baba Kalyani  
CMD  
Bharat Forge  
Kalyani Group**

of setting up a plant in Pune with a production capacity of 60,000 units of the T6X e-performance bikes.

In June 2018, we also picked up a strategic stake in UK-based Tevva Motors, for £10 million. It is an electric powertrain provider for CVs and its technology can be used on a 7 tonne or a 14 tonne bus for city or school transport.

**Kalyani Rafael Advanced Systems (KRAS) has bagged \$100 million order from the Indian Army and Air Force for 1,000 Barak-8 MRSAM missile kits. What are the opportunities you foresee post this?**

**Kalyani:** For many years, we have been suppliers of components for the defence industry – whether components for tanks or guns, or shells for artillery; we have been doing that for more than

30 years. It was only in the last four-five years that we realized that we were at a stage where we could move from components to designing complete systems, and we took up the challenge of doing this with an artillery gun.

Today, we can boast of having developed a highly sophisticated indigenous gun to enable our artillery force to fight Indian wars with Indian solutions. The gun has successfully completed trials in deserts and is now under trial in hilly terrain.

We are working on five gun platforms and have developed small indigenous jet engines for drones. This is a smaller engine (for UAVs (unmanned aerial vehicles) and drones) and has about 120kg thrust. We will now target a 400kg thrust, then we will go to a helicopter engine, which is a 1,100kg thrust.

**There are encouraging signs of growth in the Indian A&D industry since the country is now being preferred by global OEMs for parts manufacturing. What, according to you, are our country's competitive advantages that draw them to us?**

**Kalyani:** Never in the past have so many measures been taken to give a fillip to the private sector in defence than in the last four and a half years. However, going forward in the next 12-15 months, the focus must be on implementation, expediting execution of major procurement programmes and awarding contracts to the private sector.

During the last few years, there has been a special emphasis on promoting Made in India equipment to countries abroad. Markets around South East Asia is a natural area for us. Even the Middle East is a market. But we have to go to markets where the government of India would

**Indian machine tool builders need to produce high-end machine tools by investing more into R&D and automation, move to next generation technologies such as Internet of Things, 3D Printing, AI etc., and also develop export potential.**

**Bharat Forge aims to become one of the top three artillery gun manufacturers in the world. We have tied up with Israel's Elbit and Rafael to manufacture gun platforms and missiles respectively and set up a greenfield facility in Hyderabad.**

allow Indian companies to export – the green channel countries, so the opportunities rest there. Plus, we can also become a sub-supplier to the US and European OEMs (original equipment manufacturers) and defence companies, the largest defence market in the world.

Implementing the Defence Production Policy 2018 in right earnest and with speed will give the much-needed fillip to investments, production scale capacities and indigenous capability building. This is much required in the sector if we wish to become top suppliers of defence equipment to the world.

**Bharat Forge has invested \$56 million to set up a new plant in the US as part of the company's strategy to increase focus on lightweight materials. It seems the country's automobile industry is gearing up to embrace electric mobility. How far have we come in our efforts to build a robust EV ecosystem?**

**Kalyani:** We are focusing on the future of mobility and looking at a combination of greenfield and brownfield expansion, focusing more on greenfield for capacity enhancement and new developments. Ours is a very cyclical business. I think now we are in the down-cycle but our normal capex has always been somewhere in the region of ₹200-300 crore, which is largely equal to our depreciation. I think our capex for the next two or three years will be at least double of that and this is evident from the \$56 million we have invested in setting up a new plant on lightweight materials in the US. This strategically located new plant shall serve to our customers across the North American continent.

We have also set up a lightweight materials plant in Nellore district of Andhra

**“Our vision for 2050 is very clear – we shall no more be just a forging company for sure but a technology company. That is a long-term vision, but in the medium term, I do see the capabilities we are learning to start adding to the top-line and supporting our growth.”**

Pradesh. This plant is being set up to serve the Indian customers in their efforts of providing an efficient mobility technology.

Talking about the Indian EV ecosystem, it is still in a nascent stage as compared to China, the US and Europe. It is largely dominated by e-rickshaws and two-wheelers with a very less percentage of four-wheelers presently, but the present government seems committed to making a robust EV ecosystem in the country as evident through recently launched FAME II policies. This policy aims at India's EV fleet to keep moving forward, the need for which is adequate charging infrastructure. This policy provides an assurance for the stakeholders to firstly make investments to set up and develop the suitable infrastructure, followed by manufacturing of EV components and systems in the country, and gives clear measures which are further backed up with incentives and mandates to give stakeholders a clearer picture of the future.


India shall soon emerge as the top destination for supplying EVs to the global market.

**Are the Indian machine tool builders well equipped with the machines, technologies and know-how needed to cater to the EV sector and precision-oriented A&D sector?**

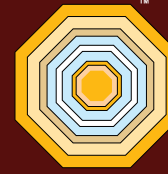
**Kalyani:** The Indian machine tool industry needs continual improvement in productivity and costs to sustain itself in the global market. With Additive Manufacturing (AM) offering several advantages over CNC machining, there is a general belief that it would replace subtractive manufacturing process in selected areas. But AM will also work together with CNC machines to deliver productive solutions. Manufacturers who have understood the benefits of this have merged these technologies to create 'hybrid machines'.

Taking another example, although internal combustion cars may be phased out over time and replaced by EVs, hybrid vehicles will most likely ease the transformation for several years and so the machine tools required for conventional IC engines won't be phased out all at once.

Our industry will embrace the changes in the automotive sector and adjust accordingly by providing new machine tooling solutions and automation of processes into manufacturing and engineering sectors will drive this.

The aerospace and defence manufacturer looks for a machine tool builder who has proven solutions to meet their requirement. Since the references are not available, the machine tool builder finds it difficult to cater to the needs of the aerospace and defence sector. 

# Witness latest trends and developments in Forming Technology



## INTERNATIONAL SEMINAR ON FORMING TECHNOLOGY

*“Shaping the future of Manufacturing”*

22 January 2020, BIEC, Bangalore

### Facilitators

Experts from Austria, Germany, Holland, Italy, Switzerland, Sweden, UK, USA, as well as from India will facilitate sessions at this International seminar. Spread over 3 concurrent sessions and 6 technology tracks, this seminar will cover key technology areas and their application related to metal forming.

### TECHNOLOGY TRACKS

Forming Processes

Equipment

Smart Solutions

Cutting & Bending Processes

Emerging Technology Trends

Software

### Focus Areas

- Advances in niche forming technologies such as Hot Forming of Aluminum, Incremental Forming and Hot Hydroforming
- Automation in Cutting and Bending Processes for sheets and tubes
- Application of Industry 4.0 to forming processes and equipment
- Innovative Solutions in Press Tools, Sheet Joining and Fabrication
- Emerging Technologies



### Participation invited from

Automotive, Auto components, Consumer durables, Machine tool, Tool rooms, Aerospace, Defence and Railway units, PSUs, Pumps & Valves, General Engg. and other manufacturing industries. Decision makers including CEOs, senior executives, practicing engineers, industry experts, R&D specialists and academia will immensely benefit from this seminar.



### Visit IMTEX FORMING 2020

While the participants come to attend this International Seminar on 22 January 2020, it is a good opportunity to visit IMTEX FORMING 2020 exhibition scheduled at Bangalore International Exhibition Centre (BIEC), from 23-28 January 2020 and witness the latest technologies in metal forming from reputed companies across the globe.

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## INDIAN MACHINE TOOL MANUFACTURERS' ASSOCIATION

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For details please contact : Abhishek (abhishek@imtma.in)

Tel: 080-66246829 / 6805, Mobile : +91 9886611007

# YET ANOTHER MILESTONE

Since its foray into the Indian market, DMG MORI India has been consistently expanding its activities while proactively promoting the development of the machine tool industry of the country. On the occasion of the company's 20<sup>th</sup> year in the industry, here's recounting successful landmarks in its journey and gathering its plans for further accomplishments...



Source: DMG MORI India

**T**he opening of the first location in Bangalore in the year 1999 saw the start of a success story for DMG MORI that has continued relentlessly right up to the present day. The establishment of the modern Technology Center in Bangalore in 2011 makes for a befitting example in which the company bundles its activities in application technology, training, service and sales. "More than 1,400 satisfied customers and 4,000 installed machines after 20 years speak for themselves and for the other four DMG MORI locations," says Sunil Rao, Deputy Managing

Director, DMG MORI India Pvt Ltd, with evident pride as the company completes its two decades in the subcontinent building a matchless reputation for itself.

**From Germany to India**  
DMG MORI recognized the potential of the Indian economy as early as 1999, and with its local presence played a decisive role in the development of the market in the country. With the tagline 'Machines from Germany - Solutions from India', the company started direct operations in India to avoid middlemen and reach the customers directly.

"The merger of DMG and Mori Seiki further strengthened the capability to serve the needs of the Indian market with world-class products. As a result, we were able to both support and shape the production industry with our innovative manufacturing solutions," shares Rao recounting highlights that contributed in making DMG MORI India what it is today. The company has continuously kept expanding its activities in India in order to meet the rising demand. Additional branches in Delhi, Ahmedabad and Pune were opened in the year 2010, allowing DMG MORI

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India even better control of its sales and service activities. “The journey of moving from 25 machines to 230 machines was overwhelming. I still remember our landmark order of 50 machines which was negotiated in the year 2000 with HAL for its center of excellence, Bangalore,” he adds.

### Right products for the market

DMG MORI India has been serving the needs of the Indian market with its world-class products. Throwing light on the products that are a hit with the market, Rao says, “Our highly popular products for the Indian market include the monoBLOCK, duoBLOCK, NHX and NVX series. They are known for their excellent precision and productivity.”

With the surging growth of aerospace sector in India, the company sees significant potential for its 5-axis machines. “Apart from aerospace, the automotive and defense sectors also contribute a large share in our revenue,” he shares.

According to him, the Government policies and



Source: DMG MORI India

“The industry has seen many changes in the last 20 years. However, DMG MORI has always been at the forefront of the technological advancements which has given us an upper hand over all other players.”

**Sunil Rao**  
Deputy Managing Director  
DMG MORI India Pvt Ltd

campaigns, especially the ‘Make in India’ initiative, have proven to be a boon to manufacturing entities, both local and foreign.

### State-of-the-art Tech Center

With DMG MORI’s operations growing in India, the team was also expanding. “There was a need to have some sort of in-house set-up to support our customers better. With this thought, we decided to open a

Technology Center equipped with world-class training facility and a showroom for machine display and test cuts,” informs Rao.

Since its opening, over a hundred of the company’s employees have taken up their work in the fields of service, application and sales. The Center also houses the service hotline and the DMG MORI spare parts store. The company concentrates its entire expertise at the location so it can develop ideal manufacturing solutions for its customers. “Our experts have already been able to develop over 200 individual turnkey projects with the aid of the diverse machine portfolio, particularly in the automotive, aerospace, die & mould and medical fields of technology excellence,” he adds. The company uses the well-equipped showroom with its five machining centers and turning machines for the necessary trial machining of parts. The customers also have the chance here to watch live demonstrations of the manufacturing solutions.

### Imparting training

DMG MORI Academy, the academic wing of DMG MORI Global, is the world’s leader of knowledge transfer in the area of CNC machine tools which trains its customers and employees in its own training centers or on site when requested. The innovative course program includes CNC as well as Service training for DMG MORI products.

“The Technology Center at DMG MORI Bangalore has sufficient space available for training facilities, in which the well-qualified trainers of the DMG MORI Academy have already provided training in the use of the innovative

The company’s popular products for the Indian market include the monoBLOCK, duoBLOCK, NHX and NVX series. They are known for their excellent precision and productivity.



Source: DMG MORI India

DMG MORI India

**DMG MORI Academy is the world's leader in knowledge transfer in the area of CNC machine tools which trains its customers and employees in its own training centers or on site when requested.**



Source: DMG MORI India

Digitization wall

manufacturing technologies to over 600 customers since 2011," shares Rao.

The courses have a practical hands-on orientation taking place at training stations with controls from Siemens, Heidenhain, Fanuc and Mitsubishi on the machines in the showroom. The company leverages this medium in its endeavor to promote the use of

modern machine tools, which in turn, boosts productivity of its customers.

**Reaching customers directly**

The Indian market, Rao believes, is a relationship driven market. The customer wants to get in touch with the decision makers directly in any purchase transaction.



Source: DMG MORI India

DMG India Tech Center

This mindset was basically the motivation for the company to avoid the middlemen when it started off in the country.

"Some of our very close customers from the DMG MORI beginning days insisted us to come in the market directly. This idea was welcomed by other customers as well. Our relationship with customers is based on the bedrock of trust in terms of our product quality which helped us move forward without any hurdles and penetrate in the market directly. We also ensured our sales and service presence in all states of the country with offices in all four regions for better control and coordination," he notes.

**Success mantra**

DMG MORI has been a technology leader in the machine tool market not only in India, but also across the globe. Rao lets out the strategy that has helped the company retain its competitive edge for so long. "The industry has seen many changes in the last 20 years. However, DMG MORI has always been at the forefront of the technological advancements which has given us an upper hand over all other players. We have also recently launched our first 'Crafter in Japan - Produced in India' product, the new Vertical Machining Center - CMX 600Vi keeping in mind the demands of customer in changing market trends where everyone expects quicker delivery. The future will be more demanding and we will soon see all the manufacturing systems getting automated. We have come a long way from manual lathes to machining centers. Next is the era of additive manufacturing combined with hybrid machines and DMG MORI is ready for it," he concludes. 



February 11 - 15, 2020  
Tue - Fri 9:00 a.m. - 5:00 p.m. | Sat 9:00 a.m. - 2:00 p.m.

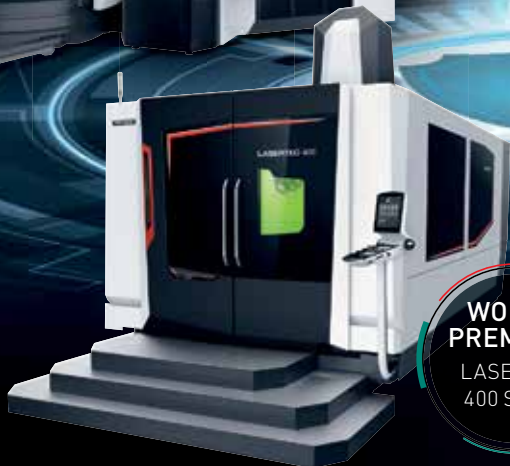
# DMG MORI OPEN HOUSE IN PFRONTEN

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CONNECTIVITY

WORLD  
PREMIERE  
PH CELL

AUTOMATION



WORLD  
PREMIERE  
LASERTEC  
400 Shape

XXL Center

WORLD  
PREMIERE  
DMC 65 H  
monoBLOCK



ADDITIVE  
MANUFACTURING



# FORMING A SOLID FOUNDATION

Asia's leading exhibition on metal forming and manufacturing technologies, organized by Indian Machine Tool Manufacturers' Association (IMTMA), is making a comeback at Bangalore International Exhibition Centre (BIEC), Bengaluru, from January 23 - 28, 2020. A sneak peek into what's to unfold at what is predicted to be the largest IMTEX FORMING exhibition held so far.



Source: Magic Wand Media

**I**MTEX FORMING 2020 & Tooltech 2020 is all set to once again present itself as an ideal platform for knowledge sharing and transacting business, converging industry captains, stakeholders, experts and academicians from a wide spectrum of manufacturing and ancillary industries.

Taking place from a sprawling area of 33,000 sq mt with more than 500 exhibitors from over 22 countries including India, IMTMA's flagship event's 6<sup>th</sup> edition will continue its tradition of showcasing the cutting-edge technologies in metal forming. The latest from high-speed laser cutting, sheet metal working, welding and joining, presses, metrology, and CAD/CAM essential for Indian manufacturing will be exhibited 'live' enabling business visitors to make informed decisions. Companies will showcase technologies to suit user industry sec-

tors such as aerospace, defence, railways, power, medical equipment, white and brown goods, oil and gas equipment, shipbuilding, and many more. Trade delegations from leading industries, public sector undertakings, national and international associations will be visiting the show.

### Concurrent shows

**Tooltech 2020:** It is an event of dies & moulds, forming tools, machine tool accessories, metrology and CAD/CAM, which will be held parallel to IMTEX FORMING.

**International Seminar on Forming Technology (ISFT) 2020:** The theme of the seminar is 'Shaping the future of Manufacturing'.

Over 300 delegates from various segments of manufacturing industry such as automotive, aerospace, defence, railway establishments, consumer durables, general engineering, and so on, are expected to participate in

### Highlights of the Show:

- 500+ exhibitors
- Exhibitors from 22+ countries
- 500+ live demos
- Focus on Additive Manufacturing and Industry 4.0
- Over 33,000 sq mt of exhibition space
- International Seminar on Forming Technology (ISFT) 2020
- i2 Academia Pavilion: an event for academia and industry to interact and explore possibilities for tie-ups)
- Connect: an awareness programme on machine tool industry
- Reverse International Buyer-Seller Meet: an interaction platform for machine tool manufacturers and international buyers
- 40,000+ business visitor footfall expected

the seminar to explore the rapid technology transitions in forming industry.

Experts from Germany, Italy, Switzerland, the UK, India, and other countries will facilitate sessions at this International Seminar. Spread over 3 concurrent sessions and 6 technology tracks focusing on forming processes, cutting and bending processes, equipment, innovative solutions, software, and emerging trends in forming technology, this seminar will cover key technology areas and their application related to metal forming.

**Connect:** It is an awareness programme for imparting knowledge on the machine tool industry to young engineers during IMTEX FORMING 2020. Students from



Source: IMTMA

“IMTMA has constantly endeavored to aid industries by taking strong developmental initiatives on areas spanning technology, R&D and data analytics. The Association, by bringing national and international industry leaders, products and innovations to IMTEX, has been a catalyst and trendsetter for the machine tool industry and its stakeholders. The exhibition is a forum where policymakers, technocrats, academia and manufacturers congregate to realize common business goals.”

**Indradev Babu**  
**President**  
**IMTMA**



Source: IMTMA

“It is incredibly inspiring to see the growth of the brand. IMTEX FORMING 2020, now counted as Asia’s leading exhibition, is highly relevant given the prevailing tough market conditions. The exhibition creates a welcoming environment for visitors. Industrialists feel privileged to conduct transactions at the show. IMTEX FORMING is an expression of showing the world the capabilities of India’s manufacturing industries.”

**V Anbu**  
**Director General & CEO,**  
**IMTMA**

both mechanical and electrical engineering streams can avail this opportunity to gather more knowledge of the opportunities in store for them in the manufacturing industry. By interacting with industry experts, they will get to understand how the machine tool industry helps in industry growth and the role of an engineer in the manufacturing industry.

**i2 Academia Pavilion:** IMTMA has been in the forefront of bonding Industry - Academia linkage and is continuously taking several initiatives and offering a platform for Indian Academia institutions to participate in its machine tool exhibitions every year. At IMTEX FORMING 2020, Indian Academic / R&D Institutions have an opportunity to showcase their R&D capabilities in the metal working field. This participation will be through display of four posters and product demonstration from each institution. 

**INCREASE YOUR SALES VOLUME BY OUR AI POWERED SOLUTION**

The diagram illustrates an AI-powered sales solution. It features a central figure of a person's head profile with circuitry, surrounded by five key features: Automatic Lead Generation, Followup Tracking & Reminder, Integrated with email client, Automatic Quote Generation & Mailing, and Best Pricing. To the right, a bar chart shows increasing sales volume, with a person standing on the highest bar holding a target. The background includes a hand holding a pen and a target icon.

**FOR ENQUIRIES**

**A:** E302, Shriram Shankari Apartments, Thairitteri Road, Sanganoor, Coimbatore, Tamil Nadu, India. Pin : 641027.  
**M:** +91 9944 58 0485 | **E:** sales@ixploretch.com | **W:** www.ixploretch.com

**iXplore Technologies**  
Powering Enterprises

# A PLATFORM TO GROW

IMTEX FORMING & Tooltech has always been instrumental in the progress of companies in the metal working industry, offering them a platform to exhibit their strengths and learn from their peers and experts in the field. The industry fraternity acknowledge the show's contribution to their success.



Being the largest machinery show in India, IMTEX is the best platform to introduce the latest technologies. Specially after the show has been split into Metal Cutting and Metal Forming, the customers experience has vastly improved. All praises to the IMTMA functionaries to aggressively raise awareness regarding the show. Amada has been pioneering in factory digitization specially for sheet metal fabrication. We launched our IoT-based software almost 15 years back and now IoT equipped machinery, process and software are part of our line-up. At IMTEX FORMING 2020, we are projecting solution-based approach. Visitors will experience not just the machine, but a total process solution, including software that will connect the entire manufacturing process. We will also give them a glimpse of the latest trends in automation that is used globally.

**Niraj Seth**  
President  
Amada (India) Pvt Ltd



IMTEX FORMING 2020 & Tooltech 2020 is a medium which is highly useful for customer engagement and face to face interaction. It brings them under one roof and helps them explore each other and grow. The show helps us enhance our brand value, take our public relations to the next level, attract new customers and strengthen the loyalty of existing customers. It assists us in understanding our customers' issues and offering them the best solutions with our AMPCO® & AMPCOLOY® high-performance alloys. IMTEX Forming attracts people across India looking for solutions. We mainly focus on the audience looking for solutions in metal forming and bending of tubes. We want to capitalize on this opportunity by interacting with interested visitors and helping them with the best solutions.

**Tushar Pawar**  
National Head  
AMPCO METAL  
India Pvt Ltd



Batliboi Ltd has been participating in the IMTEX shows for several decades now. We consider the show as one of the most important exhibitions for machine tools in Asia and definitely the best in India. Since we are into manufacturing and sourcing leading brands of machine tools and equipment from across the world, the show gives us an opportunity to know customer requirements in the Indian market. Our focus at IMTEX FORMING 2020 & Tooltech 2020 is on representing our Principal M/s PROMAU S.r.l, Italy who manufactures and markets its machines under the brand name of 'DAVI'. We are bringing the best of manufacturing technologies from DAVI to the diverse groups and stakeholders coming to the show.

**Kabir Bhogilal**  
CXO - Corporate Strategy  
Batliboi Ltd



Since many years, IMTEX has been a pivotal exhibition platform in India for all the machine tool manufacturers. We look forward to each edition to further strengthen Ecoclean brand in India, create new opportunities, bring state-of-the-art cleaning technologies to Indian market and extend our network. IMTEX and concurrent events are major attractions every year for the Indian machine tool industry. Visitors to these events are learned, focused and always looking for smart and innovative solutions. This is a big motivating factor for exhibitors to bring the latest technologies to the event. With SBS Ecoclean exhibiting its 'Made in India' Hydrocarbon and Aqueous-based cleaning technology for metal components as well as a Particle Scanner for Technical Cleanliness Analysis, we see good opportunities to present our innovative, high-quality and energy-efficient product lines to these key stakeholders visiting IMTEX FORMING 2020.

**Manoj Velhal**  
Designation: AGM - Sales  
EcoClean Machines Pvt Ltd



We have been participating in IMTEX FORMING show since its inception. It is an exhibition solely dedicated to the Forming fraternity wherein, top global manufacturers and suppliers of all type of forming machines and accessories participate. GUTHLE Germany make products mainly used on press machines. These are Die lifters, Die clamps, Die loading arms and Die logistic equipment. We see IMTEX FORMING as the most relevant platform in India to showcase our GUTHLE products. The visitors come looking for the accessories required for their machines to increase productivity and safety by automating the die changing process. We get the opportunity to discuss with the visitors regarding their requirements and impart them the knowledge, and our experts from GUTHLE Germany can guide them to take the appropriate decision.

**Vishwanath Ammanagi**  
Managing Director-Sales  
Guthle Pressenspannen  
GmbH



We have been a regular participant at IMTEX FORMING and have witnessed the growth story of this show which has run in conjunction with our own. The diversity of footfalls and the presence of industries in huge numbers across sectors is what makes it stand out from other similar shows. IMTEX FORMING 2020 & Tooltech 2020 is an ideal platform for IPG India to make people aware of the applications of fiber lasers that can replace conventional methods. The bandwidth of customers visiting IMTEX has always been diverse and, hence, we plan to propagate our technology to the vast expanse of industry representatives coming in. The gamut of industries exhibiting in this show in the machine tool segment can benefit tremendously with fiber lasers. They can achieve superior quality and finish in their job, which is of prime importance, with the use of fiber lasers.

**Rajesh Sharma**  
General Manager  
IPG Photonics (India)  
Pvt Ltd



IMTEX FORMING is one of the prominent trade exhibitions for metal forming and tooling. We take part in this expo every year and have been receiving a great response here. As a company, we trade and export to more than 30 countries. Since the expo is attended by international visitors too, it opens up significant opportunities for us for doing business and connecting with our prospects. SLTL Group finds the show ideal to launch new products. Year on year we have been launching our innovations here. In 2018, we launched Nova and continuing the tradition, we are launching two new systems this time at the show. One is a versatile Fiber Laser Tube Cutting System and another is a portable Handheld Fiber Laser Welding System. We hope to have a great expo this year

**Maulik Patel**  
Executive Director  
Sahajanand Laser  
Technology Ltd



Prior to 2018, we never participated in any exhibition in India. We used to participate in only Europe-based exhibitions as previously we were focusing only on the international market. But from 2018 onwards we turned our focus to India and participated in IMTEX in 2018 and got a good response. Now as we wanted to cover the south market, so we have participated again this time as south is a very good market for sheet metal fabrication.

**Dr Arvind Patel**  
Founder and CEO  
Valgro India Limited

# SEEKING NEXT-GEN FUEL

Although Lithium-Ion batteries and Hydrogen fuel cell technology have been ruling the roost in the electric vehicles space, there exist several unresolved issues which can be mitigated with Aluminum-fuel cells technology as an alternative.



Source: Magic Wand Media

**T**he modern-day society is currently in a transition phase from being fossil fuel-based economies to adopting clean energy solutions so as to minimize environmental pollution and ensure sustainable development. In line with this plan, various renewable resources like hydropower, solar and wind energy have been gaining popularity lately. Efficient energy storage technologies that can be deployed to power end-user application have also emerged.

## Issues with LIBs

When it comes to batteries to run portable electronic devices and electric vehicles (EVs), Lithium-Ion Batteries (LIBs) are leading the market as of now.

However, despite causing the prevention of air pollution, this current technology presents its own share of problems.

First of all, the energy density of the state-of-the-art LIBs is seen to be approximately 200 Wh/kg, which is mostly inadequate to run EVs that demand high energy and power density. Also, these systems provide a very low range on the vehicle of approximately 150-250 km, leading to range anxiety.

Furthermore, LIBs pose key monetary, safety and environmental sustainability challenges which render their large-scale adoption rather unfeasible.

Some of the key issues are:

- LIB-based vehicles, being very expensive, cannot be afforded

by majority of the general population, therefore limiting the reach of this technology solely to the elite class.

- Lithium-ion-based systems are highly unsafe and prone to explosions which invokes a lot of scepticism among people regarding the adoption of this technology.
- Lithium is a scarce metal and it is difficult to recycle it back from used batteries. Thus, the batteries mostly end up in landfills and new Lithium reserves have to be used each time batteries have to be made, giving rise to problems of resource depletion and waste management.
- Last but not the least, these batteries have a limited cycle life. This implies that

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their cost to the consumer at the total ownership level is expected to rise exponentially in the times to come.

All of the above listed key concerns make it obvious that LIBs create far too many problems to be seen as the fuel for the future or current energy demands.

### Alternatives to consider

Hydrogen fuel cell technology is another option which has been in the market for quite some time now. It solves some of the problems with LIBs by generating high amounts of clean energy with negligible waste generation in the process. As this technology allows refueling of the vehicles rather than charging from grid power, it also solves the challenge of long charging times and humongous task of setting up charging infrastructure. However, it fails to become an everyday technology as it requires exorbitant capital investment and special storage set-ups for hydrogen.

Again, hydrogen fuel is also not the next-generation fuel we have been seeking, owing to its cost structure and safety issues.

### Aluminum-fuel cells

This technology is one step ahead of the above-mentioned leading technologies by seeking to solve the problems and merging the benefits of both into one affordable technology.

These fuel cells have gained

great interest in recent times due to their high energy density (which can go as high as 8,000 Wh/kg, low cost (roughly 1/10<sup>th</sup> of that of hydrogen fuel cell) and safe nature.

It basically works on aluminum and water, combined with the graphene-based novel cathode, to harness electricity in much higher capabilities than the LIBs. It essentially contains around 60 percent water, and is safer to handle than hydrogen fuel which uses the prone-to-explosion hydrogen as fuel.

As it only runs on aluminum, air and water as fuel, it is a cheap and recyclable technology. Also, it provides a similar comfortable end-user experience as that of any fossil fuel-driven vehicle as there is no long-term charging hassle. All one needs to do is add water after every 300 km and replace aluminum sheets after more than 1,000 km.

Most importantly, the scope of aluminum fuel cells is not just restricted to powering vehicles. They have the potential to serve as stationary energy sources in place of present-day options of diesel generators and hydrogen fuel cells.

Unlike the generators currently in use, these fuel cells have no need for purchasing, storing and managing fossil fuels. Instead, they run on water and aluminum, making them a pollution-free and cost-effective power generation tool. Moreover,

their unlimited standby life and easy-to-operate functioning makes them suitable as the next generation sustainable power backup system.

Furthermore, aluminum fuel cell technology provides for an end-to-end clean and circular energy economy wherein clean energy is generated from solar / wind / hydro-electricity, which is used to convert aluminum oxide to aluminum metal. This aluminum metal becomes a solid, safe and clean fuel which can generate electricity on demand in an aluminum fuel cell and power up a vehicle or a building alike. At the end, you get aluminum hydroxide (oxidised form of aluminum) out of the aluminum fuel cell which can be converted back to aluminum metal again by using energy from wind / solar / hydro.

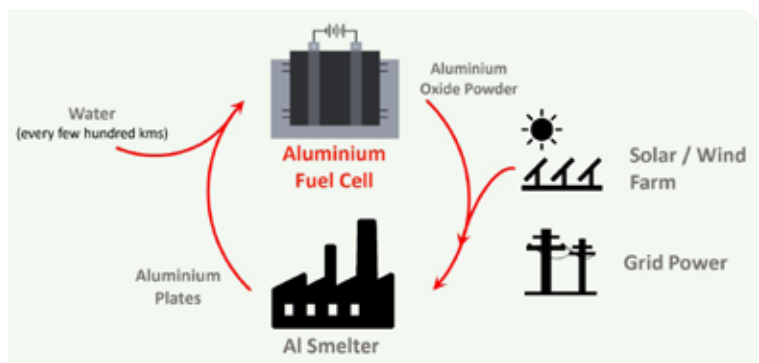
### Technology with potential

Aluminum fuel cells have emerged as a safe, affordable and scalable clean energy solution, and as the technology involved it is nascent, system efficiency and cost structure will only continue to tremendously improve in the days to come.

The solution has an enormous potential to cater to the energy requirements, whether it be fuel for vehicles or even as a sustainable power generation system. It also proves to be better than other market-leading technologies like Lithium-ion battery and hydrogen fuel cells in terms of overall capabilities on economic, end-user experience and environmental grounds.

Therefore, it would not be wrong to call it a next-generation power generation tool as it is only a matter of time before this technology becomes accepted by the masses from far and wide and consequently leads our day-to-day life.

As it only runs on aluminum, air and water as fuel, it is a cheap and recyclable technology. There is no long-term charging hassle too. All one needs to do is add water after every 300 km and replace aluminum sheets after more than 1,000 km.



Source: Log 9 Materials

## IMPLEMENTING FAVORABLE CHANGES

Despite the adoption of automation in the Indian manufacturing space on the rise, there are many who remain unaware of the benefits that accrue it. Here's a few kinds of automation solutions from Felsomat India that can be of immense help in boosting productivity, saving costs, improving quality and staying competitive.



Source: Felsomat India Pvt Ltd

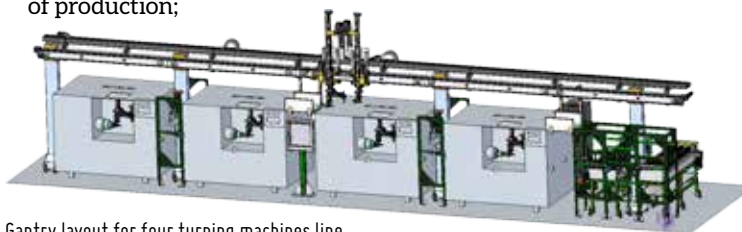
**I**ndian manufacturing has evolved considerably over the last decade after several leading global automotive manufacturers set up their production base in India. The high growth in the production and sale of two wheelers in India has also made automation viable in the autocomponent manufacturing. Additionally, operator safety and fatigue has gained prominence in the last few years, necessitating the move towards the use of automation for hazardous and strenuous production activities.

**Why adopt automation**  
Generally speaking, following

are some of the key factors that make automation in manufacturing crucial:

- When dealing with heavy components: Manual loading is difficult and the loading time is very high as compared to the machining time;
- When cycle times are very low: Frequent loading leads to operator fatigue and loss of production;

- While working with high-cost or critical machines where the loss of production is not acceptable;
- For minimizing manpower and maximizing production;
- For replacing aged and unproductive workforce;
- For increasing reliability of output and removing dependence on operator efficiency, absenteeism etc.;



Gantry layout for four turning machines line

Source: Felsomat India Pvt Ltd

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Managing Director  
Felsomat India Pvt Ltd  
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- For enhancing output from existing machines instead of investing in a new line;
- While working on a bottle-neck machine.

### Automation types

Machine tending automation can be broadly categorized into Gantry-based automation and Robot-based automation.

*Gantry-based automation has the following features:*

- Machines to be automated are arranged in a line;
- The Gantry system is positioned overhead above the machines;
- It requires access from the top of the machines to reach the fixtures for load/unload;
- Separate automatic top door is required in the machine;
- Typically, it is a 2/3 axes system but it can have more axes if required;
- The arrangement of Raw parts supply/Finished parts receipt can be at one end or at both ends or in between depending on configuration/customer requirement;
- Gantry is controlled by a CNC system.

*The features of Robot-based automation include:*

- A standard Robot from any manufacturer can be used;
- Depending on the application, the Robot can be: SCARA Robot, Fixed Robot with 6 axes, Floor track mounted Robot with 7 axes, or Overhead Gantry mounted Robot with 7 axes;
- In the case of Fixed Robot application, machines are arranged around the Robot, including the raw part supply/finished part receipt;
- In the case of Floor track mounted or overhead Gantry mounted Robots, machines are arranged on both sides in a line including the raw part supply/finished part receipt;



Gantry mounted Robot automation line

Source: Feisomat India Pvt Ltd

### Gantry- v/s Robot-based Automation

Feature	Gantry Automation	Robot Automation
Layout	Line Layout- streamlined shop floor	Cell with machines all around may not give streamlined layout
	Simpler to fit in the shop bay width	May be difficult to fit into bay width
Visual Control	Since Gantry is overhead, one can stand in the front and observe operations	With machines all around/ on either side, one cannot stand in the front of the machine and observe operations
	Easy to troubleshoot	Difficult to troubleshoot
Access	Good access to machines from all sides	Restricted accessibility
Operation	For set-up change/tool change, easy access from front/sides without any obstruction	For set-up change, one may have to enter the cell. Restricted space from the front because of the Robot positioned in the middle
	Clean shop floor, no coolant/chips spillage since Gantry moves overhead in the coolant trough	Chips/coolant may spill during the Robot movement
		May need a platform in the middle for operator safety
Flexibility	Limited flexibility for major changes in future	Good flexibility for major changes in future
	Can be modified for similar components	Robot can be used for any other application
Suitability	<ul style="list-style-type: none"> <li>• Need access from the top</li> <li>• Need automatic top door</li> <li>• Not suitable for all m/cs</li> <li>• Cost increases to provide accessibility from front</li> <li>• Automatic front door is sufficient</li> <li>• Suitable for all types of machines</li> </ul>	<ul style="list-style-type: none"> <li>• Can easily access from front</li> <li>• Automatic front door is sufficient</li> <li>• Suitable for all types of machines</li> </ul>

**If implemented properly, the returns from automation far exceeds the investment over a period of time and also frees the production team from the stress of daily variability in output and meeting the scheduled production targets.**

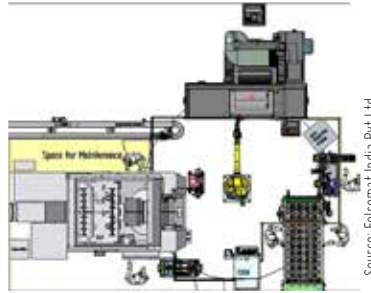
**Automation should never be considered as one-size-fits-all. If proper analysis is not done before finalizing the automation solution, then the customers will have to endure frequent production stoppages and ultimately may even be forced to discard the automation.**

- The Robot is controlled by its own controller;
- A separate PLC is used for controlling cell operations.

**Customer check-list**

Implementing automation solutions requires extensive discussion between the customer and the automation supplier. Not only the automation provider has to ensure a reliable system, the manufacturing customer also has to ensure that he has taken care of critical requirements from the manufacturing process side for successful automation. Some of the points to be taken care are:

- Fixture to be clean from chips for new part loading. If otherwise, this can cause frequent interruptions;
- If machining involves close accuracy, then seat check is a must;
- Fixture should provide good accessibility to grip the part;
- Process and tool reliability must be ensured. Tool breakage sensing/tool monitoring must be provided if the tool is prone to breakage;
- If existing machines are to be automated, then the reliability of machines is important;
- Frequency for the inspection of components has to be predetermined so that the components are auto-

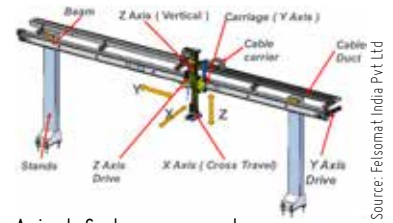


Robot layout for two machines cell

- atically brought out of line for inspection;
- If required, the inspection equipment can be integrated in automation line with or without auto feedback and correction in the machines;
- Handling of rejected parts, post inspection or seat check failure etc. should be defined and automated.

**Every automation solution is unique**

Automation is a specialized activity that aids in increasing the output from the line/cell. Hence, experienced automation suppliers are the best fit to fulfil

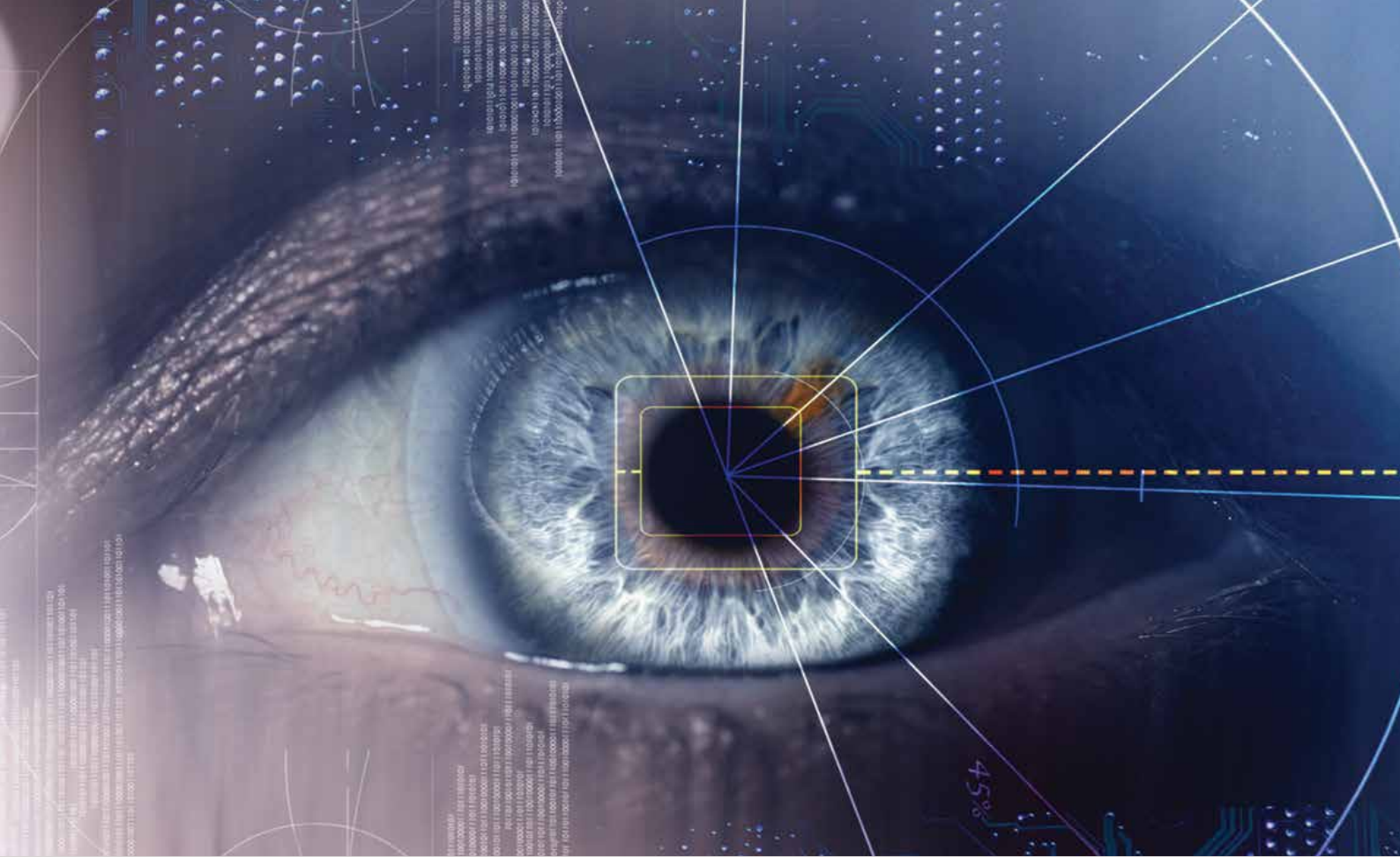


A simple Gantry arrangement

all the requirements and provide a stable solution. In India, many manufacturers are hesitant to take up automation as they are not clear in quantitative terms about the benefits that accrue from proper automation, and hence, are not in the position to justify the ROI from the investment. But if implemented properly, the returns from automation far exceeds the investment over a period of time and also frees the production team from the stress of daily variability in output and meeting the scheduled production targets.

Gantry automation line supplied to a US plant





# TECHNOLOGY @ work



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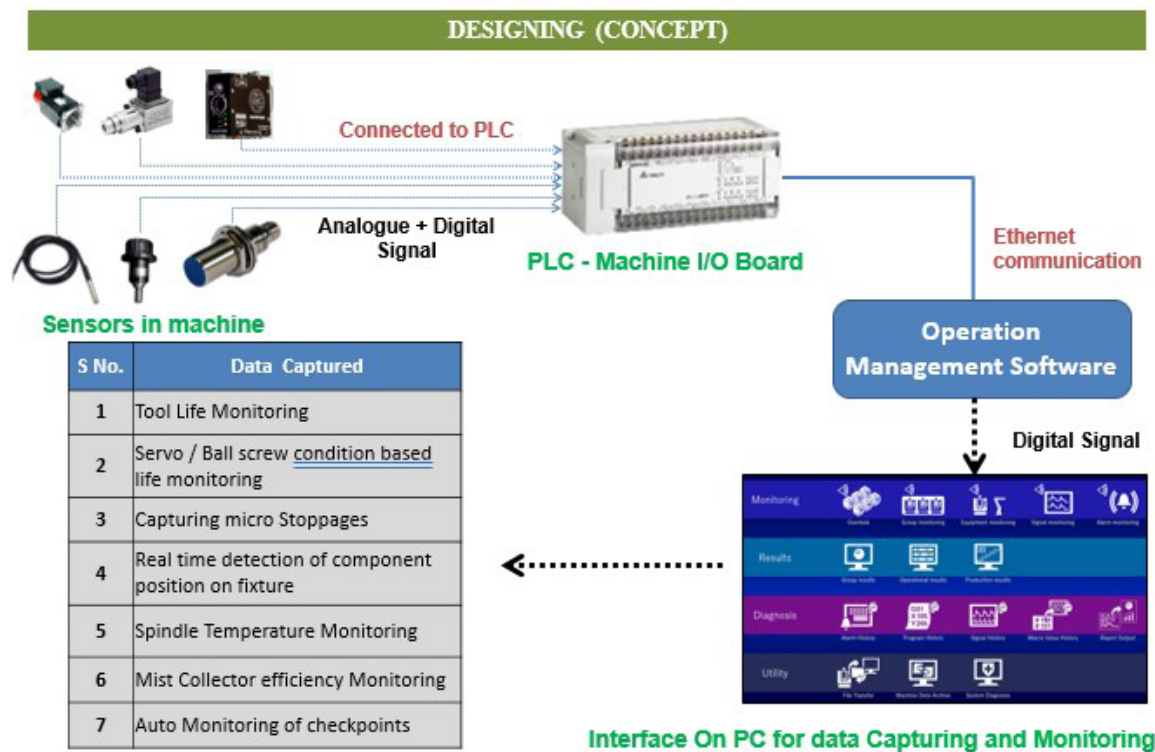
Venue



[www.imtex.in](http://www.imtex.in)

# INDUSTRY 4.0 IN MANUFACTURING

An interesting read on how Godrej & Boyce enhanced productivity of its compressor plant and reduced the conversion cost by converging digitization with its ongoing practices.



Source: Godrej & Boyce Mfg Co. Ltd

**W**ith the view to gain an edge over its competition, Godrej & Boyce, for the last few years, has been practising various lean and green initiatives. In phase 1, we started with basic lean tools like 5S, Line Balancing etc. for improving production processes. In phase 2, we resorted to Total Lean Management through CII's industry cluster program to facilitate total mindset change. In the next phase, we implemented Total Productive Maintenance (TPM) philosophy for improving plant efficiency. All the above initiatives resulted in us achieving significant improvements. And then dawned a realization that we needed to integrate all the processes for improvement across the entire value chain, for which we had to pursue digitization.

## Resolving the issue

The Compressor plant's installed capacity was 24 lakh per annum and the demand in 2018-19 was 27 lakh. This led to a shortage of about 3 lakh compressors. The conversion cost was also high. The challenge was to increase the production capacity along with reduction in the conversion cost. Capacity enhancement by adding a few new machines required around ₹5 crore investment

and a payback period of 7 years. Hence, this idea was evidently dismissed. Shop floor engineers concluded that if they could somehow increase the machine efficiency by 10 percent, they could fulfill the production demand. The challenge now was finding a way to improve Overall Equipment Effectiveness (OEE) by 10 percent as we had already practised and implemented various lean tools like Kaizen, TPM, Poka-Yoke, LCA (Low Cost

## Benefits derived:

- Overall equipment efficiency improved by 11.5%, resulting in capacity enhancement by 2.8 lakh compressors annually;
- Tooling cost reduced by 18.2%;
- Machine spare cost reduced by 65%;
- Saving of ₹5 crore which was required as a capital investment for capacity enhancement;
- Rejection cost reduced by 25% because of quick feedback.

ABHISHEK SHARMA  
DGM Manufacturing  
Godrej & Boyce Mfg  
Co Ltd  
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Automation) etc. over the last few years and had improved OEE of the existing machines from 70 to 82 percent. Hence, we opted for digitization which would go on to act as a catalyst to boost the results of other initiatives that we were already practicing.

Our CFT (Cross Functional) conducted a brain storming session and came up with 5 critical requirements for achieving the targets.

**For productivity improvement:**

1. Real-time capturing of machine stoppages contributing to production loss
2. Auto monitoring of machine check points which was performed by operators resulting in the stoppage of machines.

**For conversion cost reduction:**

3. Tool condition monitoring for optimum use of tool life
4. Real-time health monitoring of critical machine spares for reducing machine downtime and spare part consumption.

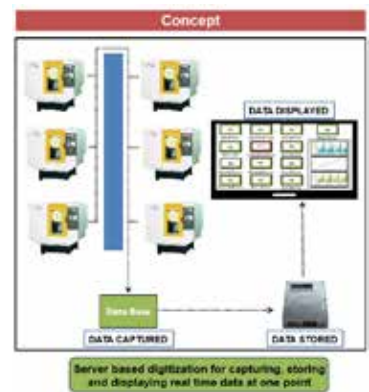
**For work environment improvement:**

5. Real-time mist collector's efficiency monitoring.

Engineers from CFT designed the working concept and prepared the prototypes for validation of designed concept. The IT team developed a local server and provided LAN connectivity on the shop floor. A dashboard was developed for monitoring and analysis of real-time data of all the connected machines.



In dashboard, we could have a look at all the machines connected to the software from anywhere any time. Just by looking on the screen we could identify the abnormal state of the machine and take appropriate action. This dashboard is capable of autonomous inspection of a machine leading to 80 percent saving of the total machine inspection time before starting the machine. Also, in case of any alarm or minor stoppage, it automatically generates trigger by email and SMS to production and maintenance team for the abnormality. It also shows real-time production performance of the machines against the designed output. Dashboard captures data from the machine after every 0.5 second which makes it capable of capturing minor as well as micro stoppages on all the machine affecting the productivity. Apart from production, like ECG it keeps check on the health of critical machine element at the time of cutting operation by monitoring critical parameters in real-time like current withdrawn by motors,



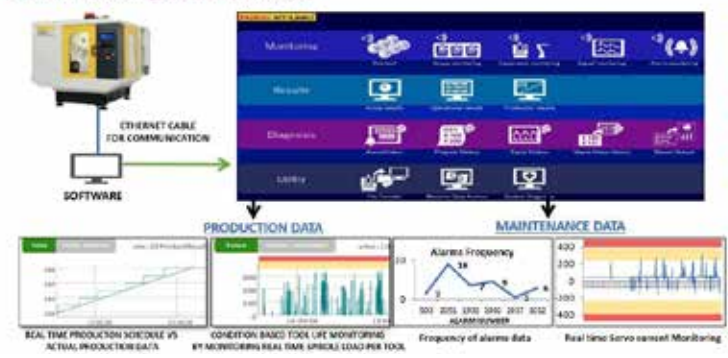
safe working temperatures of all motors and spindle, cutting load on the spindle etc. If during machine running any parameter reaches the warning point, it automatically triggers mail to the production and maintenance team so that appropriate action can be taken at the right time. In case no action is taken and the spindle load reaches the error limit, the dashboard will not let the machine run and the critical part will be saved from getting failed. A good working environment leads to better employee engagement and improves productivity. For this, we installed real-time efficiency monitoring devices for the monitoring of mist collectors which are also connected to the dashboard. It automatically generates trigger of the mist collector servicing which helps in reducing the mist level in the working area.

**Tooling is a biggest contributor in the running cost of machine as it contributes about 40 percent of the total cost. By monitoring of real-time spindle motor load at the time of cutting operation, we derive the tool life on the basis of actual condition, leading to immense saving in the tooling cost.**

**Hurdles encountered**

It was a challenge to upgrade our 40-year-old machines and make them IoT-enabled. One of the major challenges that we faced was the lack of skill and competencies as it was a new area for us. Our engineers have done a great job here. We have retrofitted our machines inhouse and replaced hydraulic system completely with servo motors. We have done hardware upgradation in the machines and made them IoT compatible.

Real time monitoring of critical parameters



Source: Godrej & Boyce Mfg Co Ltd

# INTEGRATING LEAN AND GREEN

With the aim to achieve manufacturing excellence in its processes and become a world-class manufacturing unit, Khutale Engineering successfully dealt with numerous challenges in its path towards growth with the Lean and Green approach.



Source: Khutale Engineering Pvt Ltd

**A**fter having gained 15 years of experience in the automobile industry, Shirish Khutale, Managing Director, Khutale Engineering Pvt Ltd (KEPL), found himself ready to take the plunge into the manufacturing industry. What started as a humble powder coating set-up in 1989, is today a world-class manufacturing unit spread over 30,000 sq ft, providing employment to 140 individuals. Located in Satara, Maharashtra, these units are QMS, EMS and among the first GreenCo Platinum Rated SME units of the country. A key vendor to Godrej & Boyce Mfg. Co. Ltd's three divisions: Appliances, Interio and Prima since 1996, KEPL is into sheet metal pressed, formed, tubular fabricated components and assemblies for white goods,

furniture, auto and other engineering industries.

### Taking the Lean way

While Khutale's vision was rooted in building a competitive, efficient and quality-driven enterprise with the customer at its core, the alignment came with the introduction of white goods Lean manufacturing cluster activities in 2010 that helped employees at every level understand the importance of Lean Manufacturing Practices. Additionally, a visit to Japan as a member of international study mission, CII-MSME delegation in 2014, convinced Khutale that Lean is the only way forward. "These activities eventually formed the very DNA of our day to day routine and resulted in safe working environments, clean shop floors, inventory

control, well-managed raw material, organized man-material movement, low-cost automation, segregated scraps, better inter-department communication, improved documentation, reduced breakdowns and increased employee participation," shares Khutale.

### Towards boosting productivity

At KEPL, the thrust has always been upon continuous improvement in production practices. Its meticulous research and kaizen-based approach helped the company in zeroing down on a much-needed layout change for the shop floor in order to increase efficiency. The following case study elaborates the ways in which resources can be managed well while simultaneously increasing the

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magicwandmedia.in



productivity of the fabrication line by reducing material transportation time, waiting time and operator movement.

Of the three production lines and one finishing line i.e. Powder coating line, the latter needed immediate attention since it was lagging behind in all parameters in comparison with other lines. Primary contributors to poor productivity were: scattered layout, extreme throughput time, unnecessary inventory, improper utilization of space and long waiting time. The working conditions were poor and unsafe besides the high Muda (waste), Muri (overburden) and Mura (unevenness). Unorganized material storage also posed a threat to movement. Also, due to long distance movement, the material was getting damaged while in transit. Of the total time, 79 percent would get consumed in material handling, wasting the potential of the labor.

Before implementing any major change in the organization, especially those related to the layout, Khutale faced a few challenges. The first one was capital investment in refurbishing the civil structure. Second issue was the production loss during the implementation phase. Lastly, it was a difficult task to change the mindset of employees to adapt to the transformation. To address these, internal teams were formed, and roles and responsibilities were assigned towards data collection, analysis, implementation and validation.

### **Role of industrial engineering in layout conceptualization**

**PQ Analysis:** PQ Analysis helped the company in finding



Source: Khutale Engineering Pvt Ltd

“At the macro level, all Lean practices contributed in reduced losses for the company, resulting in enhanced bottomline.”

**Shirish Khutale**  
**Managing Director**  
**Khutale Engineering Pvt Ltd**

Runners, Repeaters and Strangers which benefited in redesigning the layout. Due to the size and the scale of Runner and Repeater items, it was imperative to change the layout. With the help of Flow Chart, String Diagram of existing layout was made, which indicated paths or movements of man and material, back tracking, congestion, bottlenecks, and over and underutilized paths on the shop floor.

**REL Chart:** With the help of REL Chart, Qualitative Closeness between departments was determined. Rating was assigned by the KEPL team on the basis of various factors like flow of material, need for supervision, use of some equipment, high noise levels and chances of contamination. The concept of ‘Everything on wheels, Nothing on the shop floor’ was implemented, which made the team put all the items on wheeled crates, trolleys and pallets.

**Flow Process Chart:** The chart helped them record each activity within the process involved in making the product



Source: Khutale Engineering Pvt Ltd

“Our goal is not limiting ourselves to Lean, but also venturing into Green techniques.”

**Aditya Khutale**  
**Associate Director**  
**Khutale Engineering Pvt Ltd**

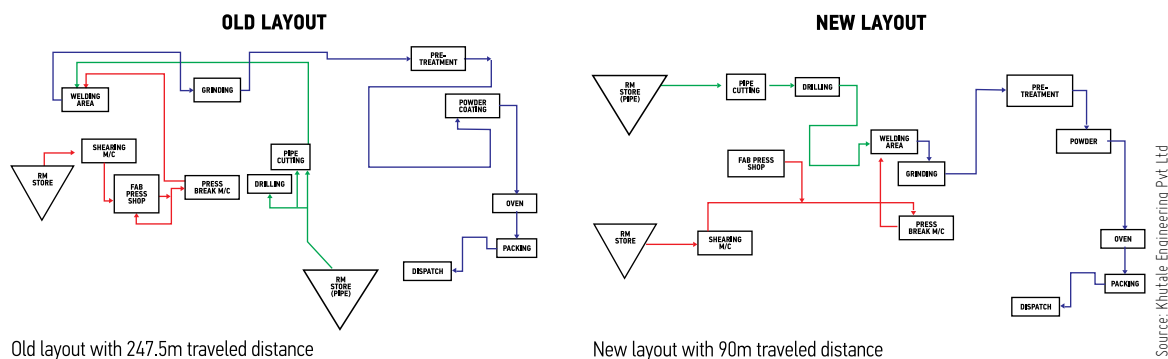
along with its cycle time and distance traveled. One of the bottleneck operations was bending and welding. In order to overcome these, enhancing facility and redesigning the layout were two major priorities on the agenda.

The old layout was scattered, and high material movement resulted in poor quality and underutilization of workers. The distance travelled by the product was 247.5m; daily trips between RM store to Pipe Cutting M/C were four to six and the distance between the same was 45m i.e. 5.9 Km/month.

**Activity Relationship Diagram:** For MSMEs like KEPL, Khutale asserts that space is a prime concern and constraint. The diagram derived from REL Chart helped in determining the necessity of closeness between certain departments. At the same time, the available and required space for each department was also determined.

**Space Relationship Diagram:** The diagram was derived from Activity Relationship Diagram. Each department was drawn

KEPL is the first company to acquire GreenCo Platinum rating in the MSME category throughout the country and it is proud to have Green Vision and Green Purchase Policy.



Old layout with 247.5m traveled distance

New layout with 90m traveled distance

Source: Khutale Engineering Pvt Ltd

Layout implementation has improved production per shift by 20%. Productivity has gone up from 60% to 80%, and production of sub components per shift has improved by 78%.

to scale. After analysis, four proposals were made out of which the best was selected. All stakeholders from department heads to their subordinates were aligned and trained. Machines were shifted to suit the new layout under safe and secure conditions. Manpower was trained to the new layout change. For the layout to function to its full capacity, addition of machines and manpower was done wherever necessary. For better safety and alertness, implementation of 'working in the standing position' was done across the shop floor.

**Benefits abound**

Chaitanya Rasane, Industrial Engineer, KEPL, adds that productivity has been improved by 20 percent, inventory decreased to max two days, floor space utilization increased by ₹29,480, throughput time improved by two days resulting in improved DSA by 11 percent. Productivity has gone up to



Source: Khutale Engineering Pvt Ltd

80 percent from the earlier 60 percent. Additionally, a manpower of five individuals has been saved. Other benefits through layout implementation are added space availability for productive use, gangways throughout the shop floor and jogging track of 1m width along the periphery wall of the company.

**Holistic development through Lean activities**

Other than layout implementation, other important facets of LEAN cluster activities have been data collection, documentation, monitoring and analysis of key performance indicators related to P-Production, Q-Quality, C-Cost, D-Delivery, S-Safety, M-Morale and E-Environment termed as PQCDSME. A culture of identification and elimination of MUDA in every process has been created by encouraging suggestions and participation from various levels of hierarchy within the company. There is an increase in the use of Personal Protective Equipment (PPE) wherever required and awareness of safe working conditions. This has led to rise in the number of employees taking ownership and handling tasks end to end, resulting in efficient and smooth working of the system.

**Merging Green and Lean strategies**

Khutale shares that exposure to Greenco rating has led to the realization that there are not just seven types of wastes but an eighth waste too, which is a collective waste of resources such as gas, electricity, water and raw material. This waste is often ignored by entrepreneurs in their competitive pursuits but has a lasting impact on productivity in the long run.

Learnings in Green manufacturing and GHG study has helped KEPL in reducing carbon emissions. In this pursuit, the company has installed VFD and replaced the conventional reciprocating compressors with energy efficient screw compressors. This has resulted in more flexible and efficient movement and also saved on the cost of shearing. All GI C class air lines have been replaced with aluminum airlines, and IE 2 class Elect Motors have been replaced with IE 3 class. Rooftop PV Solar Renewable Energy System of 40KW has also been installed.

According to Khutale, customers like Godrej and association with CII has been of immense help in transforming KEPL into Lean, Green and ZED (Zero Defect, Zero Effect) in its journey towards becoming a world-class manufacturing unit.

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# MAKING IDEAS HAPPEN

It takes a lot more to crystallize the 'Big' ideas that form the basic hallmark of any startup. Read on to know the inspiration behind Leotek Coatings, its innovative products, and the team's assiduous efforts towards developing them.



Miniature paint making model

Source: Leotek Coatings Pvt Ltd

**L**eotek Coatings Pvt Ltd (LCPL) is the result of a decade of innovative research nurtured at various institutes such as IIT Bombay, Monash University (Australia) and ISTAR. The company specializes in undertaking assignments to develop company-specific paints and coatings prepared using Epoxy, PolyUrethane and Acrylic chemistry. It endeavors to innovate and develop futuristic paints and coatings for corrosion, decoration and functional applications to provide a wide range of green and internationally acceptable products.

### Recognizing opportunity

On what sparked the idea of founding a paints and coatings

company, Dr Karan Thanawala, Director & CEO, LCPL, shares, "I pursued bachelors and masters in polymer chemistry and coatings. During my doctorate research at IITB-Monash Research Academy, I was introduced to self-healing coatings. While pursuing my doctorate research and working on several contract research projects funded by Boeing, Dow and Tata Group, I realized there is a potential opportunity for next generation speciality coatings."

However, he was aware that although a lot of next generation coating materials had been reported in the scientific literature, reproducing them on the larger scale was difficult.

"I am fascinated by the words of Prof R Mashelkar and Ratan Tata who advocate commercializing lab scale research. Their ideas of innovation and transformation were one of the key motivations behind this new venture," he adds.

### Accolades for Leotek Coatings

- Awarded with an innovation grant of ₹10,00,000 from AIT-Swissnex, an Indo-Swiss innovation training cum competition;
- \* Awarded with an amount of ₹3,60,000 for NIDHI EIR fellowship;
- \* Incubated in SINE IIT Bombay in 2019;
- \* Selected for 90 days speed mentoring for SANOFI Bridge 2019.

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### Working with basics

‘Leo’tek follows the philosophy of a Lion, shares Dr Thanawala. “In the jungle, a lion walks for a few meters and looks back to the path it has followed so far. We as a team, believe that retrospection of our research is a principal component of our DNA,” he adds. Hence, instead of writing a fancy chemical polymeric structure on a blank paper the team strives to improve and modify the existing polymers to suit its specialized applications. “This philosophy not only helps us to deliver better and quicker results, but also generates revenue for our basic research,” he further adds. The other bright minds of the team include Rachita Gadoya, Director, LCPL with BE in Computer Science; Prof. Murali Sastry, Mentor - Research Strategy, LCPL with PhD from IIT Madras; and Prof. Anand Khanna, Advisor - New Product Development. LCPL with PhD from IIT Madras.

### Tailor-made offerings

The team early on realized that its standard solutions will not meet requirements of its wide and varied customer base. “What excites us more is that we could come up with customized solutions for our customers,” shares Dr Thanawala delightedly. **KORRTEK™ RCP 300** came into being while catering to



Source: Leotek Coatings Pvt Ltd

“‘Leo’tek follows the philosophy of a Lion. In the jungle, a lion walks for a few meters and looks back to the path it has followed so far. We as a team, believe that retrospection of our research is a principal component of our DNA.”

**Dr Karan Thanawala**  
Director & CEO  
Leotek Coatings Pvt Ltd

the Tata Group. This coating solution maintains the Group’s solar panel placed in Dwarka. “What makes it more special is that while protecting the surface from corrosion, it also modifies the surface below it to a more stable form. This results in the increased shelf life of the panels,” he informs.

For Coromandel International Ltd, the company has designed and developed **KORRTEK™ RCP 351**, a high-performance surface tolerant coating which has excellent adhesion on the chemically corroded structures. “This is unique in the sense that the coating application does not require extensive surface

preparation before application on chemically corroded materials. This was designed to achieve a) zero downtime in the factory, b) techno-economic feasibility and c) easy application properties,” explains Dr Thanawala.

### Overcoming hurdles

It was not long after the launch that Leotek started facing challenges, the prime among them being a fierce competition in the market. “During our neonatal period we realized that market is so saturated with low-quality products that piercing it with just the normal strategy will be very difficult. Quality is secondary and what matters is the price,” he shares.

This followed roundtable conferences with the company’s partners and stakeholders. Despite all, the team decided to stick to its vision of innovation and product development. To generate revenue and market for the company, they started participating in international business competitions.

“Since I am trained to do research and not business, selling my dreams was a tough job. However, I have learned it over the years under the guidance of my mentors. After my share of failures in these competitions, we stood first on the international podium at the AIT-Swissnex. Additionally, SINE is vouching for us now,” says Dr Thanawala with evident pride.

### Need to diversify

Leotek team soon realized that since they were in the niche market, it was important that they diversified their business. “After discussing with our business strategy mentor Prof Murali Shastri, we developed an entirely new range of products,” explains Dr Thanawala.

The new solutions are now garnering interest from

The team early on realized that its standard solutions will not meet requirements of its wide and varied customer base.



Source: Leotek Coatings Pvt Ltd

Shop floor and machinery at Leotek Coatings Pvt Ltd

the clients who have so far been unable to solve issues of failures using conventional available products.

Leotek was approached by them, and the following new coating solutions have been successfully developed:

**KORRTEK™ PRIM 1401:** It is a completely water-based coating system. As a result, it has zero VOC emissions, no application harms, very low life-cycle impact and superior properties as compared to conventional oil-solvent based coatings. This product has been specially designed for storage and to eliminate odor and hazards of any burning sensation to skin. Mayur Engineering from Umbergaon has been using this Leotek's offering.

**KORRTEK™ GAS 310:** A speciality coating which has excellent adhesion on galvanized aluminum and stainless steel substrate. It resists chemical and acid attack in acid and waste management plants. Anandi Specialities and Services Ltd, Palghar can vouch for this product.

**KORRTEK™ TOP 461:** A specially designed, ready-to-use, single component polyurethane coating is used as a monocoat. It helps achieve 100 micron dry film coating in one coat. It is



Shop floor and machinery at Leotek Coatings Pvt Ltd

claimed to have excellent UV protection, corrosion resistance, and saves painting time by 40 percent. Manek Group of Companies, Umbergaon and ISL Industries, Pune use the product.

**Entrepreneurship, a calling** Rife with constant challenges, an entrepreneur's journey is marked by relentless innovation. Dr Thanawala tells of one that needed some more out-of-the-box thinking.

The company's usual production capacity per batch is 350 lt. However, going niche in the market has technical manufacturing challenges. The requirement is usually meager, and the bulk manufacturing options are not economically viable. "We have developed a specially designed laboratory model, which can produce paints from 1-40 lt. I call this innovation. We are able to produce faster with less wastage and more accuracy, and deliver quickly to our clients," he shares.

He further adds, "Our strategy to stay in the market is very simple and is based on the philosophy described by Indra Nooyi, former CEO of PepsiCo, "To be a CEO is a calling. You should not do it because it is a job. It is a calling, and you have got to be involved in it with your head, heart, and hands... And if you are not willing to get into the CEO job that way, there is no point getting into it."

The kind of success and accolades Leotek has already achieved, it seems Dr Thanawala and the team have all the points getting into it.

### Bright minds behind Leotek Coatings:

- Dr Karan Thanawala, Director & CEO, LCPL, PhD - IITB-Monash Research Academy
- Rachita Gadoya, Director, LCPL, BE, Computer Science
- Prof Murali Sastry, Mentor - Research Strategy, LCPL, PhD - IIT Madras
- Prof Anand Khanna, Advisor - New Product Development, LCPL, PhD - IIT Madras

Going niche in the market has technical manufacturing challenges. The requirement is usually meager, and the bulk manufacturing options are not economically viable.



Shop floor and machinery at Leotek Coatings Pvt Ltd

Source: Leotek Coatings Pvt Ltd

## EVENT CALENDAR

EVENT NAME	CONTACT	DATE & VENUE
<b>IMTEX FORMING 2020 &amp; TOOLTECH 2020</b>	T: +91 80 6624 6600 E: info@imtma.in www.imtex.in	January 23-28, 2020 BIEC Bangalore, India
<b>METAV DUSSELDORF INTERNATIONAL TRADE FAIR</b>	T: +49 (0) 69 756081 53/54 E: metav@vdw.de www.metav.com	March 10-12, 2020 Düsseldorf Exhibition Centre Düsseldorf, Germany
<b>HANNOVER MESSE</b>	T: +49 511 89 34466 E: geeta.bisht@hmf-india.com www.hannovermesse.de	April 20-24, 2020 Hannover Fairground Hannover, Germany
<b>TAGMA DIEMOULD 2020</b>	T: +91 22 28526876 E: tagma.mumbai@tagmaindia.org www.diemouldindia.org	April 22-25, 2020 Bombay Exhibition Centre Goregaon Mumbai, India
<b>MACHINE TOOLS AFRICA</b>	T: +27 (0) 11 835 1565 E: info@machinetools.co.za www.machinetoolsafrica.co.za	May 12-15, 2020 Johannesburg Expo Centre Johannesburg, South Africa
<b>BIEMH 2020</b>	T: +34 94 404 00 00 E: bec@bec.eu www.biemh.bilbaoexhibitioncentre.com	May 25-29, 2020 BEC Bilbao Exhibition Centre Bilbao, Spain
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<b>MTA VIETNAM 2020</b>	T: +65 6233 6688 E: machine-isoa@ubm.com www.mtavietnam.com	July 10-12, 2020 Saigon Exhibition & Convention Center (SECC) Ho Chi Minh, Vietnam

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## ACHIEVING COMPETENCE IN MANUFACTURING

Indian Machine Tool Manufacturers' Association (IMTMA) organized a symposium on Smart Automation on November 21, 2019 at Bangalore International Exhibition Centre (BIEC), Bengaluru. Highlights...



Indradev Babu, President, IMTMA, on the importance of adopting automation to drive innovation

Source: IMTMA

**Technical tours were also organized for the delegates to witness automation on the shopfloor of leading manufacturing companies including Sansera Engineering, SKF India, TVS Motor Company, and Titan Engineering and Automation.**

**F**or the past two decades, automation has been changing the manufacturing scene, heralding technologies that demand limited human intervention. Of late, there is an emergence of a new automation era comprising advanced technologies such as Robotics, Artificial Intelligence (AI), Industrial Internet of Things (IIoT), which need to be leveraged by manufacturers to enhance their processes and maximize their productivity.

With the view to converge industry players who have already embraced automation and edify those who are yet to adopt it, IMTMA arranged a 'Symposium on Smart Automation' that featured presentations and discussions on the various facets of automation with case studies and panel discussions. Over 300 delegates from around 125 companies participated in the day-long symposium.

### The Indian angle

Easwaran Subramanian, Partner, Deloitte Touche Tohmatsu India LLP, did the honors of inaugurating the Symposium on

Smart Automation 2019. In his keynote address on 'Smart Automation in the Indian Context', he called upon industries to capitalize on new technologies for targeting self-steering production systems. He said that industries should think big, start small, act fast for deploying smart automation solutions and for achieving rapid results.

"Smart factories enable companies to be more responsive to customer demands, achieve greater operational efficiency, and speed up product innovation. Setting the vision for smart automation, today's factories need to adopt smart automation to become factories of the future," he added.

Highlighting the importance of automation, Indradev Babu, President, IMTMA, noted, "The path for realizing the vision of 'Make in India' calls for a paradigm shift in our manufacturing process. This necessitates adoption of automation and smart technologies not only in our respective manufacturing facility, but also across the entire manufacturing value chain."

### Engaging presentations

The sessions were divided into parallel tracks: Robotics & Automation, and Digitalization, which ran concurrently, followed by a panel discussion on 'Overcoming Obstacles in the Journey to Smart Automation'. Thought provoking presentations made by technocrats at the Symposium covered subjects including Workplace Automation, Smart Automation in Assembly and Testing, Using Augmented Reality for Maintenance and Operation, Smart Automation in Tool and Work holding, Gantry- and Robot-based Automation, Digitization of 3D Measurement, Smart Sensors, Automated Information Capture and Analysis, Machine Transparency, and Collaborative Robots.

A day before the Symposium on November 20, 2019, IMTMA also organized technical tours for the delegates to witness automation on the shopfloor of leading manufacturing companies including Sansera Engineering, SKF India, TVS Motor Company, and Titan Engineering and Automation. 

# CHANGING THE GAME

The latest product line launched by TaeguTec is a yet another milestone in its journey to make revolutionary and state-of-the-art tooling products and solutions.



(L-R): Jacob Harpaz, Chairman & President, IMC Group and L Krishnan, Managing Director, TaeguTec India during the launch of SFEEDTEC solutions.

**SFEEDTEC High Speed and Feed Lines are engineered to meet complicated challenges in machining – surface finish requirements, high feed rates, high accuracy and close tolerances.**

**T**aeguTec, since inception, has been consistently striving to aid its customers in setting up optimal manufacturing processes with least costs and downtimes.

To this end, the company has come with its latest innovation, an exclusive range of SFEEDTEC solutions which was recently launched across the country at four venues by Jacob Harpaz, Chairman and President, IMC Group.

SFEEDTEC High Speed and Feed Lines, categorized into SFEEDTURN, SFEEDCLAMP, SFEEDMILL and SFEEDDRILL, are high-productivity, high performance solutions engineered to meet the most complicated challenges in machining, be it surface finish requirements, high feed rates, high accuracy or close tolerances.

## Leaders affirm

Harpaz, undiminished in his energy at each venue, spoke about the onslaught of Industry 4.0 and dwelt on the company's capabilities to take it on and stay on course with TaeguTec's highly evolved range of technologies and solutions.

L Krishnan, Managing Director, TaeguTec India Pvt Ltd, noted, "TaeguTec's dedicated efforts are aimed at upgrading manufacturing in the age of Industry 4.0 and debottlenecking difficult machining areas. As part of these efforts, we have launched a new range of products and solutions to address a wide range of applications including turning, milling, grooving, holmaking etc. SFEEDTEC is all set to raise the bar in the machining world, and we hope for our customers to benefit the most from it."

## Product highlights

A few highlights from the extensive range of high-performance, high-productivity SFEEDTEC solutions:

**TURNSFEED:** TURNSFEED enables high-feed turning up to 3 mm/rev. This is important because machining depths are progressively decreasing in the manufacturing milieu. This tool enables customers to turn with low to moderate depths of cut at ultra-high feed rates. The TURNSFEED Tool holders come with the provision for supplying pointed


coolant to cutting zone, thus improving tool life and chip evacuation efficiency.

**DOUBLE-TAKE:** TURNSFEED also has a special capability to machine in two directions!

**MILLSFEED:** End milling operations for diameters below 12mm is a common productivity bottleneck in many a manufacturing set up. Generally, only solid carbide tools are used for these operations, which come with their own set of limitations. In the age of precision forging and casting, depths of cuts are progressively reducing. MILLSFEED effectively addresses these applications with many options of indexable-insert endmills covering dia range 6mm - 14mm.

**DOUBLE-TAKE:** The unique insert design enables light, moderate and high feed milling. Its special insert seating surface ensures rigid clamping of insert in the pocket.

**DRILLSFEED:** TaeguTec's Drill Rush helped the industry to significantly increase productivity in drilling performance. With the launch of DRILLSFEED, the company is raising its bar. DRILLSFEED effectively uses many unique features of Drill Rush and tops it with self-centering 3 flute geometry. This helps customers to reduce setup time and increase drilling feeds in rigid setups. Available in dias 16mm - 20mm range bracket to start with.

**DOUBLE-TAKE:** The triple cutting of the inserts imply high productivity in addition to excellent hole accuracy. 

Source: Team MMI

Lasers

# YLS Adjustable Mode Beam Laser

Available in total power of 3 to 25 kW with core power up to 12 kW and ring power up to 15 kW, these lasers are the most versatile in the market.

Normal laser welding can be accompanied by periodic keyhole instability revealed by spatter of molten metal. The keyhole instability results in porosity, variations in keyhole depth and poor finish. YLS Adjustable Mode Beam (AMB) enables high-speed, high-quality welding in automotive applications such as body in white, drivetrains and e-mobility such as AI battery enclosures and battery tabs. IPG's YLS AMB



Source: IPG Photonics (India) Pvt Ltd

lasers provide broadest range of beam profile tunability. This revolutionary technology enables independent and dynamic control of the size and

intensity of the core and ring beams for less spatter, faster welding and more throughput. With various core and ring fiber options and total output power up to 25 kW, AMB easily handles the most challenging processing demands. In normal laser welding, spatters propel out of the keyhole and gets fused to the surface. AMB eliminates spatter by stabilizing both the keyhole and the weld core. Eliminating spatter means less rework of parts, less downtime and no contamination of the weld area. For automotive applications, AMB improves welding speed, reduces pinhole and zero gap welding and improves mechanical properties for tailored blank welding. For e-mobility applications, AMB improves welding speed and stability, and also enhances the aesthetics of hermetic seals. These lasers are available in total power of 3 to 25 kW with core power up to 12 kW and ring power up to 15 kW, making these the most versatile lasers in the market. An intuitive interface provides simple control of the beam profile and power configuration. AMB lasers are fully compatible with IPG Standard, Wobble and High-Power Scanning Heads, matching the need of any application. Unique IPG diode designs provide efficient and reliable power for independent and dynamic control of the beam profile.

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# BRANKAMP Sensors from Marposs

Sensor technology enables recording the course of the process between the tool and the work piece and observing any changes to intervene or optimize.

Whether it be in reshaping, punching, pressing or metal cutting - process monitoring is the key to an optimized production. Process monitoring helps the worker in every phase: from the fitting of the machine to the observation of the production process to the quick stop in case of the threat of damage to the machine. Every machine tool is a complex construction carrying out the actual processing work by means of one or several tools. In the end, the quality of the product is determined by the behavior of the tool and the work piece. Any influencing quantities affecting the machine (or the process) will be seen in the process quality. Thus, the process is affected by changes in the machines, the tool, the environment (temperature), etc. Only if this process has defined courses, will the product quality meet the requirements.

BRANKAMP process monitoring devices from Marposs are fitted directly to the machine to record a process quality factor (PQ factor). This factor is displayed on the devices.

### Process monitoring without sensor technology

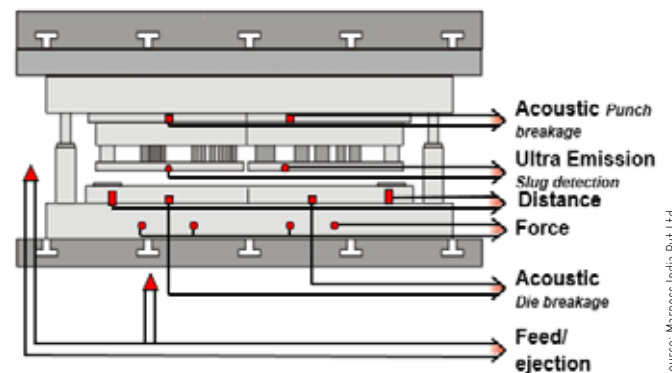
The worker visually observes the process. By hearing certain disruptions and measuring the work pieces, he learns about deviations in the process. The more today's machine tools are enclosed, the less he is able to watch or hear anything directly. He is, therefore, fully dependent on trouble signals or on the results of his measurements.

### Process monitoring with BRANKAMP sensors

By means of sensor technology, recording the course of the process between the tool and the work piece, the worker is able to watch the process purposefully. The standard display shows the current process factor, the

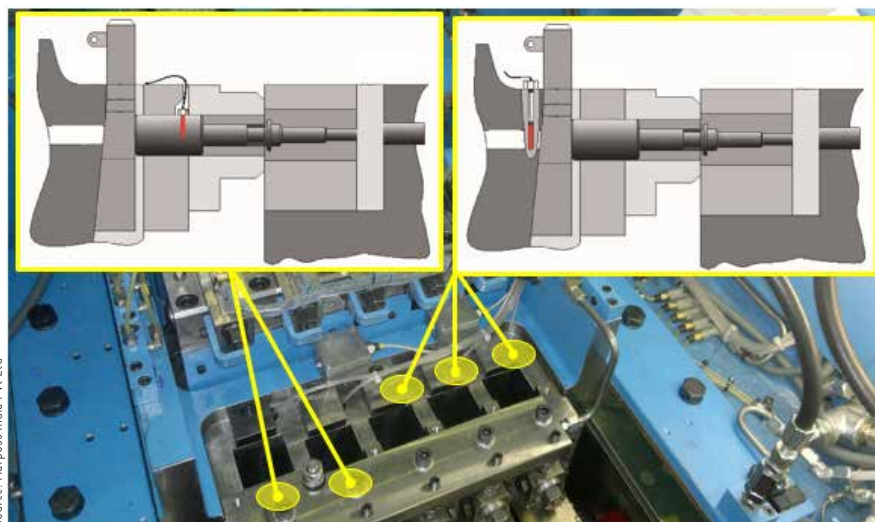


Cockpit Mask Display for various sensors



Various sensor positions in Stamping Press

highest PQ factor thus far, and a limit set by him. He can then observe any changes and intervene or optimize. With the PQ factor, the worker now has an objective measured variable by means of which he is able to assess the process quality.



Various sensor positions in multi-station Cold Forming Press

### Benefits for implementing Process Monitoring:

- Machine and tool protection
- In-process quality control
- Increased productivity due to extended run-time, reduced down-time and stroke optimization
- Minimized tool and scrap costs
- Process optimization for more stable processes
- FactoryNet®4.0 interface to the MES / ERP interface.

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Parts Cleaning Machines

# EcoCtwin, Twin Chamber Cleaning Machine



The machine is suitable not only for removing oil and emulsion from mass-produced parts, but also for the fine cleaning of assembly parts.

The EcoCtwin cleaning system is a low-cost, highly efficient system which, owing to its modular design, can be used for a very wide range of applications in cleaning parts with 50 percent less cycle time. Depending on the features installed, the EcoCtwin is suitable not only for removing oil and emulsion from mass-produced parts but also for the fine cleaning of assembly parts.

### Two chambers, an advantage

All the cleaning stages are divided into two categories and use an immersion process and aqueous media. Removal of large quantities of swarf from mass-produced parts and particles of dirt with a defined size in fine cleaning can be achieved by

selecting the appropriate filtering system and other application-dependent optional extras. Different types of optional equipment make it possible to use the EcoCtwin cleaning system in numerous areas of metal processing.

The special feature of this machine is its two chambered cleaning system, which reduces the cycle time by 50 percent. The entire process is divided into two chambers while maintaining all the advantages of single chamber systems. For example, cleaning and rinsing respectively with Tank 1 and Tank 2 media will take place in the first working chamber. While rinsing or passivation with Tank 3, along with hot air and vacuum drying processes, is carried out in work chamber 2. Both the work chambers are equipped to perform cleaning processes like Spray, Ultrasonic and Injection Flood Wash.

EcoCtwin can be used in all industrial sectors including Automotive, Aerospace, Fasteners, E-mobility, Metal Working, Railways, Machine Tools, and many more.

Its advantages include: best millipore results, low energy consumption, low water consumption, low running cost, maintenance friendliness, local service support, compact footprint, high uptime and modular design.



Source: EcoClean Machines Pvt Ltd

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Press Brakes

# For a Connected Factory

SafanDarley showcases its latest innovations for the sheet metal industry at IMTEX FORMING 2020.

SafanDarley has been the world leader for Electronic, Hybrid and Hydraulic press brakes. 25 years of experience gives SafanDarley a permanent competitive edge in fully electric press brakes that will be demonstrated at IMTEX 2020. Discover how you can also achieve the highest degree of efficiency with the fastest and safest bending cycle, off-line programming and unrivalled energy and CO<sub>2</sub> reduction.

### E-Brake Premium series

At IMTEX 2020, SafanDarley will demonstrate the E-Brake Premium 100T-3100. The latest version of the multi-award winning fully electronic press brake series.

The E-Brake Premium is fitted with a split screen touch control system operating on a Windows platform, which facilitates a paper-free working environment.

The series can also be fitted with a 3D back-gauge, the patented E-Bend L Blue angle measurement system and a range of CNC-driven bending aids.

### AutoPOL off-line bending software

The company's unique AutoPOL off-line bending software is a modern 3D system for off-line press brake programming and unfolding of 3D CAD files. The optional Batch & Remote function enables automatic processing of multiple parts. All tasks are performed without user input, results are reported back and production data created. It dramatically reduces programming costs.

### Hybrid and Hydraulic Machines

SafanDarley also offers a range of unique energy-saving hybrid and hydraulic machines up to 1,250 tonne capacity.

### Industry 4.0 interface

In addition to all the machine innovations, the company also offers an Industry 4.0 interface, the E-Control GateWay. With this interface, one's overall press brake production is claimed to be more efficient through better planning, shorter downtime, greater flexibility and faster adjustment. A solution to take a big step towards a connected factory.



Source: SafanDarley B.V.

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## Cutting Thin to Mid-thick Materials on Single Lens

The latest upgrade to the Amada global standard fiber laser cutting machine, LCG AJ series is the most efficient fiber laser cutting system for processing thin to mid-thick sheet metal.

LCG AJ series machines have following features:

### High Production Efficiency

- The machines eliminate any need to change lens for various materials. This reduces burden on the operator, cutting risk, and helps achieve efficient and stable processing.
- The Automatic 8-station nozzle changer helps in continuous cutting and production planning, reducing preparation time of nozzles for various materials and thicknesses. This helps achieve flexible response to urgent parts.
- Oil shot sprays oils on the material before piercing, preventing spatter build-up and improving the processing quality and stability.

### New Application

- High-pressure Air Cutting: Auxiliary gas high-pressure expansion of air cutting range. High-grade processing with reduced cost (reducing the secondary process).
- Deep Etching: Deeper depth marking is possible, which is visible even after the powder coating process.

### Automation

- Adapted to diversified production patterns.

### Easy Operation

- The latest NC unit, AMNC3i can be operated quickly and intuitively like a smartphone. A large screen provides good visibility and can display many functions and information items. Operability is improved substantially, setup time reduced drastically, and many quality and equipment management support functions have been provided.

### Factory Monitoring

- Connecting IoT to visualize factory issues in real time. All employees from the manager to the operator share the same information through 'My V-Factory'.

Source: Amada (India) Pvt Ltd



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## 'Q' Plasma Cutting Series from Kjellberg

Kjellberg is showing its latest generation of plasma cutting technology live at IMTEX FORMING 2020.

The 'Q' power sources show how networking and communication will change production processes of the future. According to the requirements of Industry 4.0, the power sources with a modular design can form networks and exchange information with their own as well as other components. The 'Q' plasma cutting system is based on an entirely new approach to design; Worldwide, it is the first pure inverter power source with a modular structure. It can

produce a subsequent increase in cutting current intensity, enabling effective adaptation to changing production conditions with only little effort.

All well-known, high-quality technologies are implemented in this 'Q' series including Silent Cut, Contour Cut, Contour Cut Speed, and the new Q hole and Q mark. The cutting process is controlled digitally with real-time communication between all components. At the same time, a wide range of sensors are used to monitor process and status indicators, which, in turn, can be analyzed and evaluated by integrated microprocessors. From now on, the browser-based 'Q-Desk' user interface, developed in-house, will provide all information including FAQs and video tutorials in a user-friendly format on smartphones, tablets or desktop PCs. In addition to displaying up-to-date system information, this also allows targeted forecasting and preventive recommendations for maintenance and service. With an Ethernet connection and the approval of the user, various data can be transferred securely to service partners. This means that permanent status monitoring of components and the cutting process are now part of this sophisticated technology.

Source: Kjellberg Vertrieb GmbH



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- Predictive Maintenance of Fixture and Machine
- Analytics of Operator Efficiency
- Historical Analysis of performance of machine, powerpack, tools and fixture
- Powerpack oil level and oil contamination alerts

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