VOL 6, ISSUE 5 - JANUARY-FEBRUARY 2023

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Indian Machine Tool Manufacturers' Association

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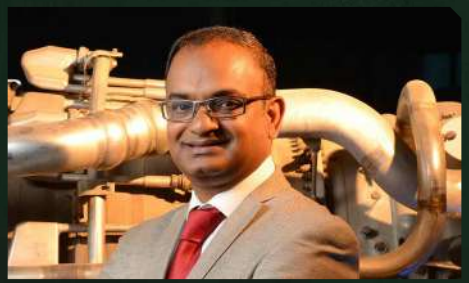
International Machine Tool & Manufacturing Technology Exhibition
19 - 25 January 2023, Bengaluru, India
Concurrent shows
ToolTech 2023
DIGITAL MANUFACTURING

COMPANY PROFILE
A LEGACY OF EXCELLENCE 42

STARTUP
SUCCESS THROUGH INNOVATION 54



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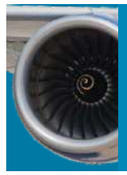
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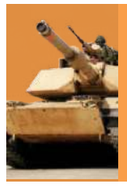
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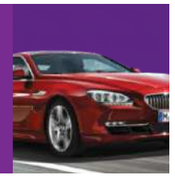

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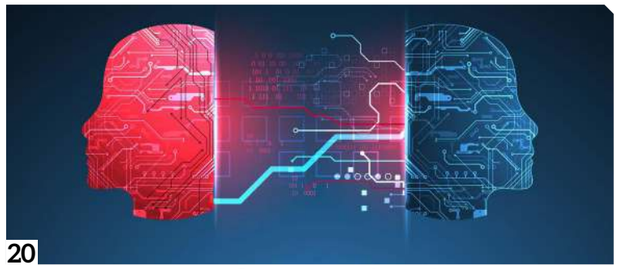
CONTENTS

VOL 6, ISSUE 5 – JANUARY–FEBRUARY 2023



20

46

60

66

72

08 **FOREWORD**
10 **PUBLISHER'S NOTE**
12 **EDITORIAL**
14 **IMTMA'S DESK**
IMTEX 2023 & Tooltech 2023 – A Gateway for Manufacturing Opportunities
18 **TECH TALKS**
Inventors We Must Definitely Know About
20 **VIEWPOINT**
Trends in Visual Quality Inspection
24 **COVER STORY**
Burgeoning Indian Manufacturing Sector
32 **IMTEX 2023 PRODUCTS**
IMTEX 2023 & Tooltech 2023 Product Showcase
38 **BIG INTERVIEW**
Changing the Game
42 **COMPANY PROFILE**
A Legacy of Excellence
46 **BEST PRACTICES**
In Pursuit of Perfection
50 **INDIA CYNOSURE**
Betting on India's Growth
52 **PRODUCTIVITY MATTERS**
Productivity, A State of Mind and Being
54 **STARTUP**
Success Through Innovation
60 **METALWORKING FLUIDS**
Celebrating Success with Customers
66 **SME SUCCESS**
Meeting Market Needs
72 **EVENT SNAPSHOT**
MODSIM 2022
74 **SUBSCRIPTION FORM**
74 **COMPANY INDEX & ADVERTISER INDEX**

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Published and Printed by Indian Machine Tool Manufacturers' Association (IMTMA). Printed at Pentaplus Printer's Pvt Ltd 20/1, 4th main, 5th cross, Industrial Town, Rajaji Nagar, Bangalore-560044, Karnataka and Published from Indian Machine Tool Manufacturers' Association; Head Office: 10th Mile, Tumkur Road, Madavara Post, Bengaluru - 562123, Karnataka. Editor: Soumi Mitra

Publishing frequency: 6 times per year

Manuscripts: No liability is accepted for unsolicited manuscripts. They will be returned only if accompanied by sufficient return postage.

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Source: BFW

RAVI RAGHAVAN
PRESIDENT
INDIAN MACHINE TOOL MANUFACTURERS' ASSOCIATION (IMTMA)

Dear Reader,

Happy New Year 2023.

The year 2022 was a significant one for industries as they not only sustained the difficult 'pandemic' years but also entered a phase of an upswing in businesses.

India's Manufacturing sector closed on an encouraging note in 2022 with business conditions improving to their greatest extent over the last two years. As per S&P Global India, the Purchasing Managers' Index (PMI) rose from 55.7 in November to 57.8 in December 2022, recording a robust improvement in the health of manufacturing.

The future looks promising, notwithstanding the global headwinds unleashed by the geopolitical climate, stagflation as well as the rising 'pandemic' situation.

Indian Machine Tool Manufacturers' Association (IMTMA) is organizing its flagship event - IMTEX 2023 & Tooltech 2023 and Digital Manufacturing 2023 which is scheduled from January 19-25, 2023 at Bangalore International Exhibition Centre (BIEC) in Bengaluru.

> *IMTEX 2023 & Tooltech 2023 and Digital Manufacturing 2023 is shaping up well, with more than 975 exhibitors from 23 countries registered for participation. The exhibition provides an apt platform for machine tool OEMs and their supply chain to showcase new-age technologies and network.*

The mega-event is shaping up well, with more than 975 exhibitors from 23 countries registered for participation. The exhibition provides an apt platform for machine tool OEMs and their supply chain to showcase new-age technologies and network.

I am hopeful that it would create more avenues for the growth of the Machine Tool and Manufacturing sectors in the country.

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JIBAK DASGUPTA
DIRECTOR GENERAL & CEO
INDIAN MACHINE TOOL MANUFACTURERS' ASSOCIATION

Dear Readers,

It is the right occasion for me to address you in this New Year season, and I am sure you must have enjoyed the festive time with your near and dear ones. I wish you all a healthy and prosperous 2023.

The beginning of a year is significant as we start our journey with renewed hope and vigor to experience new things and accept new challenges after a roller-coaster year. It is this spirit that has kept generations alive and would continue to be so in the future.

Globally, we are witnessing disruptions in Europe (continuing war in Ukraine and high inflation), Asia (pandemic in China), and America (inclement weather and high inflation). These may continue to impact livelihood and growth across the world as well as affect growing economies.

India, although placed in a relatively better situation, is likely to face some short- to medium-term challenges but with a stable macroeconomic outlook and growth forecast, the country is likely to weather these global disruptions in the long run.

Through the platform of IMTEX 2023, IMTMA urges the users of machine tools to connect extensively with the builders of machine tools to gain a deeper understanding of the new and existing technologies and offerings that will drive manufacturing in the future and grow business opportunities.

As we face these impending challenges, the Indian industry would need the right kind of support and guidance to move forward. It would need bigger platforms to leapfrog in its manufacturing journey. We are happy to see that IMTEX 2023 & Tooltech 2023 and Digital Manufacturing 2023 is providing such a platform to support the Indian industry at this opportune time.

At IMTEX 2023, machine tool companies will get an opportunity to showcase their products and technologies, network with user sectors, and capture their needs. Everything from machine tools to robotics and sensors, artificial intelligence, 3D printing, material technologies, and Industry 4.0 that can bring transformation in manufacturing will be showcased in the Digital Manufacturing show.

Through the platform of IMTEX 2023, IMTMA urges the users of machine tools to connect extensively with the builders of machine tools to gain a deeper understanding of the new and existing technologies and offerings that will drive manufacturing in the future and grow business opportunities.

I am sure that our collective effort to create more opportunities for the machine tool and the manufacturing industry will aid in sustaining growth and opening up new frontiers for India. This is probably an inflection point for the Indian manufacturing industry, and we must grab this opportunity to establish ourselves as a global leader in manufacturing technology and solutions. Let IMTEX 2023 be the harbinger of this great change.

In this edition, readers will find more information on IMTEX 2023. I hope to connect with you in person during the exhibition.

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MAKING STRIDES

SOUMI MITRA
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With the year 2023 progressing with new hopes and aspirations, India is propelling itself towards making its mark stronger than ever before. According to global financial experts, India is one of the few economies to have witnessed a robust recovery after the COVID-19 slump and rebound from the deep pandemic-related downturn.

Following a promising start to 2022, the Indian manufacturing industry maintained a strong performance, concluding the year with manufacturers scaling up production. According to S&P Global Purchasing Manager's Index (PMI), business activity in India's manufacturing sector rose to a 13-month high last month with an increase in factory orders, healthy inflows of new business, and strong demand conditions. The statistics pointed to a further increase in buying levels among manufacturers, supported by an improvement in demand strength.

Despite global economic uncertainty, slowing growth, and higher inflation around the world, overall demand in the Indian economy remained favorable toward growth.

Among the seven largest Emerging Markets and Developing Economies (EMDEs), India's economy is predicted to grow at the highest rate. Though major economies are headed to recession, it is slated that the impact on India will be modest because of its strong macroeconomic fundamentals. To this end, a report by Morgan Stanley states that India has conducive conditions for the economic boom fuelled by offshoring, investment in manufacturing, the energy transition, and the country's advanced digital infrastructure.

> *"The oak fought the wind and was broken, the willow bent when it must and survived."*
>
> *- Robert Jordan*

In this framework, South East Asia's biggest manufacturing show IMTEX 2023 & Tooltech 2023 and Digital Manufacturing 2023, organized by IMTMA, is being held at the most opportune time from January 19-25, at Bangalore International Exhibition Center.

We are excited to meet you in person in this magnus edition and wish you a successful show.

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IMTEX 2023 & TOOLTECH 2023 – A GATEWAY FOR MANUFACTURING OPPORTUNITIES

Several pointers make it clear that IMTEX 2023 & Tooltech 2023 and Digital Manufacturing 2023 is happening at just the right time. India is now in the pole position to seamlessly integrate into new global supply chains and realize the benefits brought forth by the new global order. The country's manufacturing players must pay heed to this fact and leverage the opportunity by being part of the IMTMA's event to spread their wings and reach newer heights.

Source: Magic Wand Media

The world sees India as a bright spot in a crisis-ridden global economy. India, with its strong domestic market consumption, finds its ship steady amidst the tectonic shift that the global trade order is undergoing currently in the wake of geopolitical events. The continuing Russia-Ukraine war, the COVID-19 surge in China, inclement weather conditions in the US, rising inflation, and fears of stagflation in the economy have had a cascading effect on global economies in various countries.

India is in the pole position to seamlessly integrate into new global supply chains and realize the benefits brought forth by the new global order. A gleaming example is the manufacture of cell phones in the country. India, which until the recent past was importing mobile phones in a big way, is now manufacturing them through the state-of-the-art facilities established by leading global companies in various cities. While policy reforms, such as the PLI schemes and AatmaNirbhar Bharat initiatives, are supplementing the domestic manufacturing capabilities of industries, the export growth can be realized only when India gains privileged market access overseas.

Compared to running the business for local needs, it is a different ball game altogether when it comes to penetrating new markets, for which industries need to prepare the ground. This is possible only when industries have the right talent and the right technologies. After all, manufacturing grows only when industrial units deploy the right machines.

Understanding IMTEX significance

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it first organized IMTEX in 1969 in Godrej's Vikhroli campus in Mumbai. Today, in its 20th edition, the exhibition is a platform to showcase the best in the world. It is a platform to demonstrate what the Machine Tool industry has done not just for the user industries in India but also for the global market.

After a four-year hiatus, IMTEX 2023, along with Tooltech and Digital Manufacturing, is scheduled from January 19-25, 2023, at Bangalore International Exhibition Centre (BIEC), Bengaluru. Tooltech will showcase the world of parts, accessories, and systems for machine tools and manufacturing technology. Digital Manufacturing will have exhibitors showcasing evolving Industry 4.0 hardware, software and solutions, additive manufacturing, and other prominent technologies.

IMTEX 2023 will create a welcoming environment for anyone participating in the show. The exhibition is an expression of showing a new India and its advancement in manufacturing journey, which has resiliently emerged from the pandemic effects. When one looks at IMTEX and benchmarks it with India's manufacturing prowess there is a correlation – one pushes the other, ultimately showing India in the best light. Additionally, many foreign exhibitors also get the opportunity to study and assess the Indian market and explore the possibilities of joint ventures or collaborations.

The last IMTEX held in 2019 reported orders worth ₹2,446 crore and enquiries worth ₹23,780 crore. The show attracted a footfall of 91,446 visitors from 57 countries.

IMTEX 2023 & Tooltech 2023 and Digital Manufacturing – A Sneak Peek

- It is being held as an in-person event after a span of 4 years. The last exhibition was held in 2019.
- Over 980 exhibitors from 23 countries including India are participating.
- The event will be occupying around 77,000 sq mt exhibition space in five halls.
- There is Group participation from Germany, Korea, Spain, Taiwan, and USA.
- International Seminar on Manufacturing Technologies will be held on January 18, one day prior to IMTEX 2023. The objective of this International Seminar is to present the latest technological developments in manufacturing and allied technologies that users can adopt in their production process. The seminar will have concurrent sessions on Machining, Work Holding & Tooling, Additive Manufacturing, Enabling Technologies, Emerging Trends, and Automation.
- i2 Academia Pavilion: Fruitful collaboration between industry and academia when put to good use can nurture technology development, resulting in industries enhancing their capacities to manufacture high-tech products, bring product diversification and help localization of imports. More than 20 academic institutions, including IITs, are presenting their research findings to the industry.
- International Buyer-Seller Meet on January 23 and 24: To promote exports of machine tools and to facilitate market linkages for machine tool exports from India to other countries, IMTMA is organizing an International Buyer-Seller Meet during IMTEX 2023. The meet provides a platform for B2B meetings between international and national players to explore different market needs and opportunities.
- Jagruti, on January 21 and 22, is a special initiative in which students will be given a guided tour of the entire event, including a visit to the IMTMA Technology Centre in BIEC. Students from select engineering institutions will be a part of the 15th JAGRUTI - IMTMA Youth Programme.
- Connect, on January 22, is an initiative wherein engineering students from mechanical and electrical streams, among others, can meet, network, and explore job opportunities in various machine tool and manufacturing companies.
- IMTMA Best Design Award: To recognize and reward companies for their exemplary indigenously designed, developed, and manufactured products in metal cutting technology, IMTMA is instituting the 'IMTMA Best Design Award' which will be given away during IMTEX 2023.
- IMTMA Export Performance Award: The award is to recognize and reward companies that have made a significant achievement in the export of machine tools and related products manufactured in India.

Things are looking up

IMTEX 2023 is a timely one as a few key indicators suggest. The Indian Auto industry has been doing well with the Auto component industry seeing a good 23 percent growth in FY22. India's IIP recorded a 3 percent growth in the month of October 2022 compared to the previous year. India's manufacturing PMI recorded 55.3 in October 2022, indicating healthy growth in the manufacturing economy. The country's Machine Tool industry's growth trends look positive. This is evident from the production and consumption figures for April to September FY 2022-23, which are estimated to have reached around ₹4,000 crore and ₹10,000 crore, respectively. The order book position points to a steady performance in 2023.

More than 980 exhibitors from as many as 23 countries will be showcasing new products such as high-precision, high-performance, multi-tasking, and special-purpose machines, robots, cobots, tools, accessories, manufacturing software, 3D printing solutions, evolving Industry 4.0 hardware, software, and solutions. OEMs, suppliers, manufacturers, sourcing agents, investors, and researchers, among others, will be at the show to get connected with end users and offer products and solutions to various user sectors.

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INVENTORS WE MUST DEFINITELY KNOW ABOUT

REJI VARGHESE
MD
RV Forms & Gears
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"If I have seen further," Isaac Newton wrote in a 1675 letter to fellow scientist Robert Hooke, "it is by standing on the shoulders of giants." Innovation and invention do not occur in a vacuum. Inventors and thinkers from Da Vinci to Thomas Edison to Steve Jobs liberally used inspiration from the doers and thinkers who came before them.

The Machine Tool industry is no different. Early versions of machine tools included bow drills and potter's wheels, which had existed in ancient Egypt prior to 2500 BC. Lathes are known to have existed in multiple regions of Europe since at least 1000 to 500 BC.

In this issue, we would like to pay tribute to Henry Maudslay, an English machine tool innovator, tool and die maker, and inventor. He is considered one of the founding fathers of machine tool technology. His inventions were an important foundation for the Industrial Revolution.

Maudslay is best known for his screw-cutting lathe, which he developed and perfected by 1797. Machinists had been cutting screws on lathes for centuries, but it was a laborious and uncertain process, with a cutting tool guided by hand and no real way to ensure a consistent pitch for the thread. Because of this inconsistency, every thread was slightly different, and a nut made to suit one thread would not fit any other.

Maudslay took the separate inventions of others, added a few of his own, and incorporated them all into one unified machine. In his newly designed machine, the cutting tool was not held by hand but fixed into a slide rest. The slide rest was fitted onto a long lead screw that ran parallel to the stock and was driven by the lathe so that the tool automatically moved along as the piece turned.

To produce the desired pitch (threads per inch), Maudslay designed a set of replaceable gears that drove the lead screw. Once the proper gears were inserted and the cutter was locked into place on the slide-rest, the operator could cut a thread on a rod, and then he could cut hundreds more just like it, and they were all truly interchangeable.

Before the development of Maudslay's lathe, which became the first to be used widely in manufacturing, each screw or bolt was a unique item that had to be matched with a unique nut. Every bolt and every nut had to be marked as a matching pair. The process of matching bolts and nuts in the construction of complicated machinery proved to be time-consuming, arduous, and expensive. Any machine that needed repair and had to be disassembled would become a nightmare of mismatched screws and nuts.

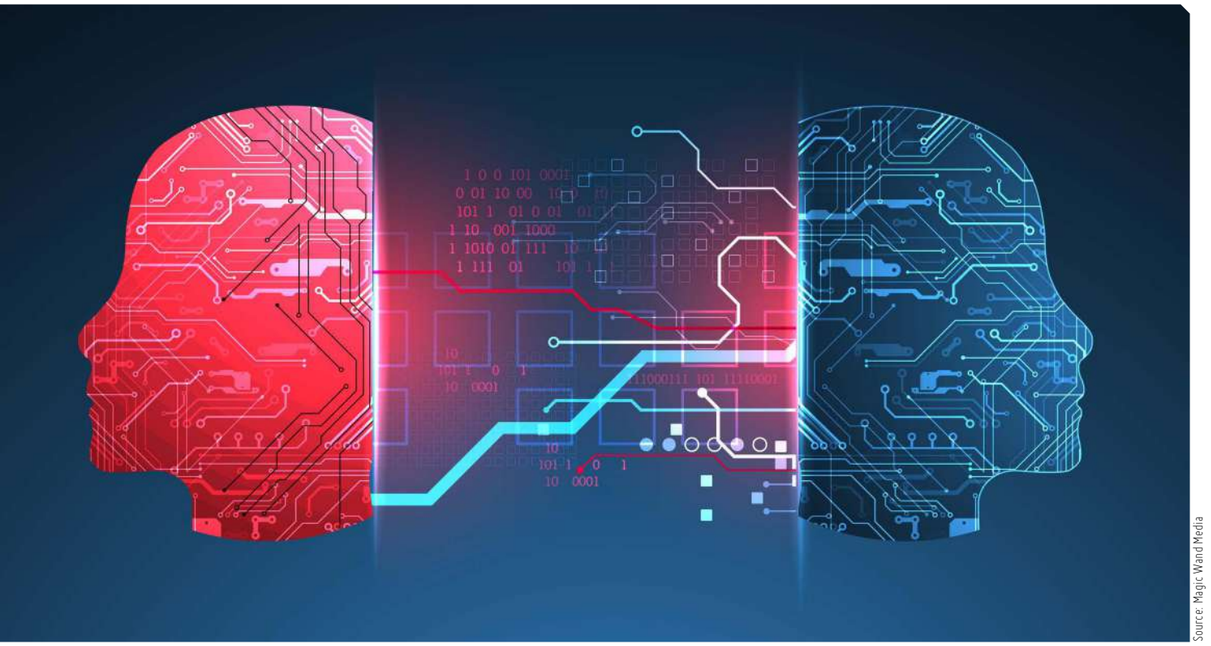
In his autobiography, James Nasmyth, inventor of the steam hammer, who worked as an assistant in Maudslay's workshop, noted: "None but those who lived in the comparatively early days of machine manufacture can form an adequate idea of the annoyance, delay, and cost of this utter want of system, or can appreciate the vast services rendered to mechanical engineering by Mr. Maudslay, who was the first to introduce the practical measures necessary for its remedy. In his system of screw-cutting machinery, and his taps and dies, and screw-tackle generally, he set the example, and laid the foundation, of all that has since been done in this most essential branch of machine construction."

To prove the perfection of his device, Maudslay used his screw-cutting lathe to create a screw that was five feet in length and two inches in diameter, with 50 thread cuts per inch. The accompanying nut was 12 inches long and contained 600 thread cuts. Although Maudslay's early version of his lathe required a machinist to take the lathe apart to change settings, later he added design improvements that allowed the operator to alter settings by simply switching removable gears.

Maudslay's mechanical advances were important because he developed a machine that could be used to build other machines. Because his lathes could cut tool steels, engineers who later improved upon his work were able to supply greatly needed consistency and precision in a wide array of industrial machine parts. Industries that specialized in precision manufacture like machine tool manufacturers, tool and die makers gunsmiths, clock makers, builders of telescopes, and navigational equipment, etc. were also aided by Maudslay's inventions.

There is an original Maudslay screw-cutting lathe on display at the Science Museum in London.

Tech Talks is a column by industry veteran and journalist Reji Varghese that talks about the latest advancements in Machine Tools, provides snippets from history, interesting facts, etc. about the Machine Tool industry.



Source: Magic Wand Media

TRENDS IN VISUAL QUALITY INSPECTION

As we step into 2023, more leaders in the manufacturing sector are becoming aware of the benefits of digital technologies in the quality inspection processes and are implementing them. AI-driven visual inspection specifically has brought about a paradigm shift in the shopfloor, making the workforce more productive and efficient.

SEKAR UDAYAMURTHY
CEO & Co-Founder
Jidoka Technologies

Organizations across industry verticals are leveraging new-age technologies to cater to the evolving market demand. The Manufacturing industry is also witnessing significant disruption across its business units, including the shopfloor and this will continue as organizations embrace Manufacturing 4.0. New developments in recent years, specifically in the quality control function, have significantly contributed to the Manufacturing sector's success in the new normal.

As we step into 2023, more leaders in the sector are becoming aware of the benefits of digital technologies in the quality inspection processes and are implementing them. AI-driven visual inspection specifically has brought about a paradigm shift in the shopfloor, making the workforce more productive and efficient. This includes machine learning and deep learning that can be leveraged for complex applications while saving time and resources. The implementation of this technology strategically has increased customers' trust and brand reputation with the organization gaining a competitive edge in the marketplace.

This article throws light on the trends in the quality control aspect in manufacturing for the coming year, with insights on how manufacturers are looking to leverage them for their benefit.

1 High-Mix Low-Volume (HMLV) with human-in-the-loop to gain more traction

Besides High-Volume Low-Mix (HVLM) businesses, there is an increasing focus on HMLV, also known as make-to-the-order manufacturing, today. This refers to the process of producing

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Today, multi-camera set-ups combined with human intelligence are more in demand. These cameras provide a complete 360-degree view and capture the entire image for analysis. These integrated solutions possess more capabilities, are flexible, and help in managing a wide variety of tasks.

a higher variety of products that are complex, and in smaller quantities, such as jewelry. In this case, each batch of jewelry must look different from the rest, in terms of gold weight, pearls, or any other gemstone used in the making of it. Here, AI is leveraged to support and enhance human inspection activity in the manufacturing process after the process automation, which takes place at the first level. Humans review the product with AI supporting them in making decisions, called Human-in-the-loop (HITL). This approach is more reliable and accepted by the industry as real people are involved in the algorithm cycle of training, tuning, and testing. With systems and products becoming more complex, this process is suitable especially when there is a need to augment human decision-making.

2 Integrated solutions to replace single-camera operations

Industry 4.0, the new phase in the industrial revolution, is drastically changing the ways companies manufacture where the focus is on interconnectivity, automation, real-time data, and AI. Single-camera solutions at the assembly lines have been used in visual-inspection requirements for a long time. However, these solutions deliver a single-dimensional view only, making the process highly time-consuming and less efficient. Today, multi-camera set-ups combined with human intelligence are more in demand. These cameras provide a complete 360-degree view and capture the entire image for analysis. These integrated solutions possess more capabilities, are flexible, and help in managing a wide variety of tasks. With advanced developments in automation and technology changing the entire setup, single-camera operations are becoming a thing of the past, especially for final inspections at assembly lines. In the coming year, integrated solutions with gain more traction.

3 Market adoption of anomaly-based detection on the rise

AI-based visual inspection for large-scale production of a new product has the requirement of numerous samples for each defect and this is highly difficult to procure. It becomes a greater challenge when the time-to-market is less and there are not many samples or past data available since the product is manufactured for the first time at the plant.

In such cases, the anomaly-based detection technique can come to the rescue. In this method, a smaller number of 'ok' products are used to train the AI model and anything other than that is classified as 'not-ok'. This method is gaining a lot of attention from manufacturers who are producing the product for the first time and don't have historical data to refer to.

4 Adoption of Cloud + Edge rather than Pure-Edge processing

When AI-based visual inspection was adopted at a single manufacturing unit, the processing of data was done at the Edge. However, when manufacturers started to expand to several units in different locations, they wanted to have a holistic view of the quality process by consolidating the information across plants. The need was addressed by adopting Cloud + Edge processing, where decision-making still happens at the Edge and data analytics takes place in the Cloud. Similarly, iterations for model accuracy could be performed on the Cloud, leaving inferencing at the Edge. This new process is adopted by large manufacturing organizations across industry verticals.

5 Demand for Full-Stack Engineers and Data Scientists with a 'product mindset'

For training the AI models in the visual inspection process on the shop floor, there are requirements of both Data Scientists and Full-Stack Engineers. Data Scientists help in collecting data and preprocessing it before analyzing the data. Full-Stack engineers or Full-Stack Developers design, test, and implement various applications. With India having more service companies than product-oriented ones, these specialists generally do not possess the expertise of having a product mindset. However, with the China + 1 policy and more product manufacturing companies established in the country, today, there is an increase in demand for those full-stack engineers and data scientists who have a 'product mindset'.

Businesses that focus on upgrading their inspection and quality control technologies, techniques, and processes undoubtedly achieve greater results. These new trends will certainly lead to optimum performance, higher and good quality throughput, and better business outcomes while enhancing the customer experience at manufacturing companies.

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BURGEONING INDIAN MANUFACTURING SECTOR

Source: Magic Wand Media

Organized by Indian Machine Tool Manufacturers' Association (IMTMA), the much-anticipated IMTEX, South Asia's apex international machine tool and manufacturing technology exhibition, is taking place from January 19-25, 2023, at Bangalore International Exhibition Centre (BIEC) with concurrent shows Tooltech and Digital Manufacturing, leveraging the right time as India preps up for global diversification as well as furthering 'Make in India' for the world.

SOVAN TUDU
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magicwandmedia.in

It's been four years since IMTEX for the Cutting Tool industry was last held. IMTEX 2019 & Tooltech 2019 had a different vibe to it as the biennial event for metal cutting tools completed its highly successful 50 years, growing from strength to strength and emerging as an unmatched platform for the global machine tool industry players to showcase their manufacturing prowess.

The pandemic-induced break has only worked in favor of the much-anticipated event as the stakeholders of the industry, showing resilience in despair, kept at their innovation. The wait is finally over, and now is the time for them to present their offerings created during the most challenging period for the global manufacturing industry. The platform will not just showcase their craft; it will be a stage to highlight and celebrate their resolute spirit.

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Source: Magic Wand Media

International Seminar on Manufacturing Technologies will explore global manufacturing trends in Machining, Emerging Trends, Additive Manufacturing, Workholding and Tooling, Enabling Technologies, and Industry 4.0.

Response from the industry

The popular trade fair will have 981 exhibitors from 23 countries, representing every aspect of traditional and modern manufacturing. IMTEX 2023 has companies displaying turning, drilling, boring, grinding, milling, tool grinding, and gear cutting machines; CNCs; flexible manufacturing systems; honing, lapping, polishing, and deburring machines; robotics and manufacturing automation, and many more.

Concurrent to IMTEX 2023 will be Tooltech 2023, showcasing machine tool accessories, metrology and CAD/CAM cutting tools, tooling systems, and current trends in the Tooling industry. 3D printing, sensors, robotics, software, and cobots will be on display spanning aisles at Digital Manufacturing. Companies can obtain technologies that go beyond Industry 4.0.

A comprehensive show

IMTEX holds the reputation of being an all-around industrial event, and IMTMA endeavors to spare no effort in ensuring that. The following are the programs that have been included in IMTEX 2023.

International Seminar on Manufacturing Technologies: The seminar on January 18 will explore global manufacturing trends in Machining, Emerging Trends, Additive Manufacturing, Workholding and Tooling, Enabling Technologies, and Industry 4.0 through parallel concurrent sessions.

International Buyer Seller Meet: Under the aegis of the Ministry of Commerce and Industry, Government of India, IMTMA, in collaboration with Engineering Export Promotion Council (EEPC) of India, is organizing the International Buyer Seller Meet 2023 on January 23 and 24, inviting potential buyers of machine tools from target overseas markets to explore mutual business opportunities between the Indian machine tool and accessories manufacturers. The delegation will be open to machine tool dealers interested in doing business with Indian machine tool makers. Around 40 representatives from Belarus, Brazil, Canada, Egypt, Germany, Indonesia, Iran, Italy, Korea, Russia, Thailand, Turkey, and USA are anticipated to attend. The two-day event will feature B2B meetings with Indian machine tool manufacturers interested in exploring the commercial potential in these nations, and would also be an excellent opportunity for Indian machine tool manufacturers to invite these dealers to their stalls at IMTEX and further explore new business opportunities.

IMTMA Export Performance Award: The award will be presented at the event to companies that have made notable

Source: Magic Wand Media

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IMTMA Best Design Award will be presented to recognize and honor enterprises for their excellent indigenously designed, developed, and manufactured products in metal cutting technology.

Source: AFM Cluster

"We expect a very vibrant show because of the exciting feeling of meeting again after such a long period. Despite all the issues that we are having to overcome globally, there is still a strong need for investment in different industrial sectors. Machine Tools and Advanced Manufacturing exhibitions are particularly sensitive to personal contact since our exhibits are critical for the business of our clients and technology usually 'needs to be touched'.**"**

José Pérez Berdud
President, AFM Cluster
Managing Director,
Fagor Automation

Source: AMT

"We expect IMTEX 2023 & Tooltech 2023 to follow the other very successful manufacturing technology events held in 2022. We have seen that there is a strong desire to be at events like this to evaluate the latest advances in manufacturing production solutions, as well as to network and meet with industry leaders and peers to share ideas, learn about new techniques, and look for opportunities to partner or collaborate.**"**

Douglas Woods
President
AMT – The Association for Manufacturing Technology

Source: JMTBA

"The Indian Government, which advocates 'Independent India', is actively promoting the domestic manufacturing industry and attracting factories from overseas, thus India's manufacturing industry has high potential.**"**

Kazuo Yuhara
President
Japan Machine Tool Builders' Association (JMTBA)

achievements in the export of machine tools and related products manufactured in India. This award is open to any IMTMA Indian member company that has demonstrated significant success with their products (machine tool/aggregate) manufactured in India and exported to other nations. The evaluation will be done by an independent jury committee formed by IMTMA and will be based on various parameters such as export performance over the last five years, export as a percentage of production, infrastructure in export markets, vision/mission for exports, countries exported to, repeat export orders, key USP in export markets, and so on. Ace Manufacturing Systems Ltd, Fenwick & Ravi, Grind Master Machines Pvt Ltd, ISGEC Heavy Engineering Ltd, Kirpekar Engineering Pvt Ltd, Sahajanand Laser & Technology Ltd, and Trishul Machine Tools Pvt Ltd have all applied for this award.

IMTMA Best Design Award 2023: IMTMA is initiating the 'IMTMA Best Design Award', which will be presented at the event, to recognize and honor enterprises for their excellent indigenously designed, developed, and manufactured products in metal cutting technology. Technology, Design, Innovation, Functionality, Energy efficiency features, Safety features, Import substitution (Aatma Nirbhar Bharat), and Unique Selling Proposition, among others, will be evaluated. Abhijat Equipments Pvt Ltd, Ace Designers

Source: Magic Wand Media

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CONNECT is where engineering students from mechanical and electrical streams, among others, can meet, network, and explore prospects in various machine tool and manufacturing companies.

Source: TAMI

"In the current post-pandemic times, we are eager to explore a new market for the Taiwan machinery industry. We expect IMTEX 2023 & Tooltech 2023 to rebuild the connection between Taiwanese companies and Indian customers. The event can also be a medium for us to seek information on the local sales channels and demands of the local market."

Tommy Hsu
President
Taiwan Association of Machinery Industry (TAMI)

Source: VDW

"India has long been an important market for the German Machine Tool industry. Currently, we rank 14th among its most important sales markets. IMTEX 2023 & Tooltech 2023, thus, is highly welcome as a business platform where our companies can show their innovation and competence for the Indian market and meet again existing and new customers in person."

Dr Wilfried Schäfer
Executive Director
VDW (German Machine Tool Builders' Association)

Ltd, m2nxt (a BFW subsidiary), Sahajanand Laser Technology Ltd, UCAM Pvt Ltd, Bestek Engineering Pvt Ltd, and Carbtools (India Pvt Ltd) are among the 13 companies that have submitted nominations for this award.

CONNECT – A Unique Forum for Next Generation Engineers: One of the extra attractions at IMTEX will be 'CONNECT' where engineering students from mechanical and electrical streams, among others, can meet, network, and explore prospects in various machine tool and manufacturing companies. CONNECT is meant to be a medium for recruiting companies to connect with industry aspirants, present their company profile, technology, and current job requirements, and interview them. The sessions enable aspiring engineers to become acquainted with organizations, products, technologies, job roles, and career opportunities.

Engineers can also display their capabilities, talents, and competitiveness. Job seekers can apply for jobs based on their personal preferences. On January 22, each recruiting company will be given its own booth at no cost. The forum features around 40 organizations and over 300 roles in Design, Production, Quality, Sales, and Marketing. Companies from major cities like Bengaluru, Chennai, Mumbai, Pune, and Hyderabad will be present. There are 185 students registered for CONNECT, including 132 from Mechanical, 14 from Electrical, 1 from Mechatronics, and 38 from Electronics.

Industry-Institute (i2) Academia Pavilion: It is an opportunity for the participating 22 top universities, including IITs, to display their R&D capabilities in the metalworking arena to the world.

Jagruti: This special initiative on January 21-22 is one in which students attending IMTEX will be guided around the exhibition (including visits to the IMTMA Technology Centre) and students from various engineering universities will take part in the 15th Jagruti - IMTMA Youth Programme as well.

The above-mentioned programs do not make up the entire show. IMTEX 2023 has ensured to cover a lot more for each of the participants to take away something of value. The show promises to be a rewarding experience which is advised to not miss, considering the steep learning curve we find ourselves on at the rate at which new technologies are emerging.

Source: Magic Wand Media

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HYDROSTATIC GUIDEWAYS MACHINES

HYDROSTATIC GUIDEWAYS MACHINE FROM ACE DESIGNERS

Hydrostatic Guideways Turning Centers make a big difference in achieving better surface finish, circularity, and GD&T. So far, no Indian machine tool manufacturer has ever built a turning machine with a Mineral Cast Bed and Hydrostatic Guideways. Ace Designers Ltd envisaged this product as an import substitute and worked towards building several technologies that culminated in this product HPT 180 HS.

Source: Ace Micromatic Group

HPT 180 HS

Ace Micromatic Group
www.acemicromatic.net
Hall & Stall: Hall 5, Ace Micromatic Group Pavillion

Features of the machine

Full Mineral Cast Bed provides excellent vibration damping and noise reduction. It has low heat conductivity than cast iron. The thermal capacity of mineral cast is about two times greater than cast iron.

In Hydrostatic Guideways, there is no metal-to-metal contact between the slide and the guideway. The friction of hydrostatic guides is a power of ten lower and proportional to speed. In contrast to plain guides, hydrostatic systems do not suffer from backlash when the direction of motion is reversed or the stick-slip effect. The guides are permanently play-free. Significantly higher level of positioning accuracy. Hydrostatic guides are more linear than the guide surfaces themselves.

Highly Accurate Spindle, which has a Thermo-symmetric structure. It is provided with P2 class (Grinding class) spindle bearings. The spindle is built-in with an oil-cooled headstock. A Spindle assembly with air-purging. Other features include special low friction wipers, bellows with lamella for axes, linear glass scale for axes.

MANUFACTURING SOFTWARE

FOR MACHINING MULTIBLADE SHAPES

Mastercam's Blade Expert is a powerful solution for streamlining the process of generating toolpaths for impellers, fans, and marine propellers. These complex shapes often require specialized programming techniques to be machined accurately, but Blade Expert simplifies the process by providing a user-friendly interface that follows the standard Mastercam layout for multi-axis toolpaths. This ensures that users can quickly become familiar with the software and start creating efficient toolpaths with minimal learning time.

Blade Expert is designed specifically to address the challenges of machining multiblade shapes. With this tool, users can easily remove the material between the blades, finish the blades and splitters, complete the floor, and finish the fillets. This helps to turn what could be a complex and time-consuming process into a routine solution that can be easily implemented in a variety of manufacturing settings.

Source: Mastercam India

In addition to its comprehensive capabilities for machining multiblade shapes, Blade Expert also integrates seamlessly with other Mastercam products. This allows users to take advantage of the full range of Mastercam's advanced features and functionality, including multi-axis toolpaths, 3D design and modeling, and advanced machining strategies. With Blade Expert, manufacturers can achieve greater efficiency and accuracy in their machining processes, resulting in higher-quality products and increased profitability.

Mastercam India
Hall & Stall: 4/C-122
www.mastercamindia.com

Source: UCAM Pvt Ltd

Nimble Machines – A strategic business unit of UCAM Pvt Ltd
www.nimblemachines.co.in
Hall & Stall: H1A/A-102

CNC SPIRAL BEVEL GEAR GENERATORS

TARANG-325 FROM UCAM

'Tarang-325', a new entrant in the Nimble Machines' product offerings, is a standard 5-axis CNC controlled Spiral Bevel Gear Generator machine which comes with SIEMENS 828D numerical control system and uses a sliding cutter spindle to obtain high-speed backlash-free generating motion.

The machine is capable of producing components up to 7 module and 325 mm diameter and can accommodate the cutters up to 7.5 in. The maximum speed of the cutter spindle is 500 rpm and that of the workhead is 100 rpm. The gears manufactured can achieve DIN 7 quality on the machine.

The use of Direct Drive Technology in spindle and work head and its quick tool change mechanism helps the user in reducing the overall cycle time and enhance productivity with accuracy. The UCRIDE® filling reduces machine vibrations and enables higher precision. The machine structure has undergone FEM analysis for simulating various operating conditions and environmental changes.

The algorithm for the spiral bevel gear generation has been developed in house and the user screens makes the user very easy to operate the machine with less parameter entry. The machine enclosure gives a visually aesthetic appeal, further enhancing the outlook of the shop floor.

The machine has recently won the 'CII Design Excellence' Awards and is gaining good traction in the MSME sector.

Source: CERATIZIT India Pvt Ltd

The DirectCooling system from CERATIZIT optimizes cooling lubrication: two coolant holes trained on the cutting edge ensure efficient cooling, lubrication, and chip evacuation.

DIRECT COOLING SYSTEMS

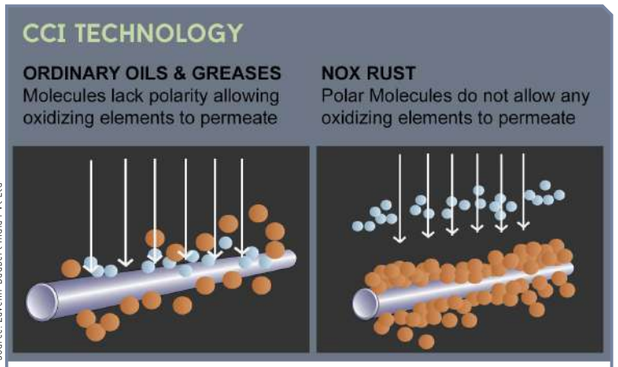
DIRECTCOOLING FROM CERATIZIT

Flood cooling remains unbeatable in most applications. However, more targeted delivery of cutting fluids is a welcome alternative, not least in the context of sustainability. Toolholders with DirectCooling (DC) are equipped with two inner holes that guide the coolant to where it has the greatest impact: directly at the cutting edge. One hole targets the rake face from above and the other the flank from below. So, in terms of transfer, instead of emptying a bucketful into the machining zone, the cutting edges are targeted. Targeted cooling improves both the service life and general process security.

DC VDI holder with 4-in-1 functionality

DirectCooling can be used for any application. The only prerequisite is that the coolant must be transferred via the turret of the turning or mill-turn center. In terms of versatility, the new VDI holder with DirectCooling truly shines: where two variants would typically be necessary for normal and overhead applications, CERATIZIT users only need one holder thanks to the double tooth profile. There is also the option of attaching clamping rails at the top or underside to eliminate the need for an extra holder on the left and right. The lengths of all DirectCooling holders can also be ideally matched to one another. This puts an end to interference and creates a compact complete package for optimal stability and unlimited flexibility.

CERATIZIT India Pvt Ltd
Hall & Stall: 3A/A-114
www.ceratizit.com



Source: Zavenir Daubert India Pvt Ltd

Zavenir Daubert India Pvt Ltd
www.zavenir.com
Hall & Stall: 4/A-154

RUST PREVENTIVE OILS

NOX-RUST® FROM ZAVENIR DAUBERT

In most manufacturing industries, part protection during shipping or storage before final assembly is crucial and the usage of RP (Rust Preventive) oils is essential. The performance of an RP oil to get the best corrosion protection can be demonstrated by high Salt Spray (SST) Life, an aspect in which Contact Corrosion Inhibition (CCI) based RP oils exemplify enduringness.

In specific cases, like in enclosed surface areas, VCI (volatile corrosion inhibitors) oils are recommended, and for the parts exposed to an acidic environment special acid protection RP oils are needed.

Invented by George Daubert, CCI technology is based on stronger adhesive intermolecular forces of the proprietary polar additives for superb rust protection even in tough conditions of high humidity and temperatures. The physical oil layer is thin as polar additives perform rust inhibition. This combination of adhesive polarity and thin film technology makes NOX-RUST® liquids form an impermeable layer for various corrosion-causing elements like moisture and oxygen that attack the metal surface. The thin film due to low viscosity results in high coverage, low consumption, easy removal, significant cost reduction, and performance benefits.

NOX-RUST® provides a range of specially formulated rust preventive oils, giving excellent protection in areas of high humidity and temperature. Other benefits include: Low evaporation losses - Higher flash points; Thin tack-free film - Very low aromatic content and strong demulsification; Higher coverage, low consumption - Lower viscosities based on thin film technology; and Excellent rust protection in severe conditions - High salt spray and humidity chamber life.

Source: Jyoti CNC Automation Ltd

Jyoti CNC Automation Ltd
www.jyoti.co.in
Hall & Stall: 5/B-112

VERTICAL SHAFT TURNING MACHINES

VST 160 FROM JYOTI CNC

Turning Machines are a class of machines that have not stopped evolving to offer still higher productivity, supreme accuracy, and human comfort, a continuous demand of modern industries. For the shaft turning process, swift loading-unloading and quicker process time is the most important factor to achieve higher productivity. To meet this demand, Jyoti has developed a state-of-the-art Vertical Shaft Turning Machine VST 160 which is a perfect blend of proven machine design, innovation, and advanced technology to assure maximum performance in the area of the shaft turning process.

VST 160 has two turrets, which integrate simultaneous two-tool engagement in cutting, providing incredible improvement in productivity. VST 160 is a compact footprint machine as compared to Horizontal Turning Machine. In addition, the compact loader design of VST 160 offers the most compact footprint in its class of machines offered with a gantry design. Completion of shaft jobs in a single set-up is easily possible with the machine due to the face driver. The programmable tailstock is a standard feature of the machine, which permits to use variable force conditions during various cutting cycles. A motorized spindle is an added advantage of VST 160 to achieve improved accuracy. Job loading and unloading is done through a gripper provided on the turret.

Source: Stamp 'It Robotai & Solutions Pvt Ltd

PIN MARKING MACHINES

MNS-HTC FOR DEEP MARKING

MNS-HTC (Touch Screen Model) comes with a robust construction with high-capacity motors and guides for deeper markings. All electronics built inside the marking head save floor space. The MNS-HTC pin marking machines are available as 2- and 4-axis versions in both Electric and Pneumatic working. The standard 2-axis marking heads, coupled with a manual or motorized Z stand and a true interpolated rotary axis, are available, especially for the Electric marker. The Electric markers also have an optional Auto-Sensing attachment that can be used with the motorized Z stand to mark different height components.

With unlimited storage capacity, the machine has a 7-inch display. A Resistive Touch Screen Display is built into the marking head. With regard to 2D Barcodes, Data matrix and QRCode marking are possible. It can directly print marking data to barcode labels from a barcode printer connected to the RS232 port. Any bus Converter Device for ProfiNET or Profibus Connectivity over RS485 Modbus can be used for industrial communication.

Stamp 'It Robotai & Solutions Pvt Ltd
www.marknstamp.com
Hall & Stall: 2A/B-102

Source: Eppinger Tooling Asia Pvt Ltd/ESA Eppinger GmbH

GEAR UNITS

GEAR UNITS FOR ALL SITUATIONS

Eppinger has the right product for every situation in the coaxial or angular arrangement between input and output.

Coaxial gear units

Eppinger's low backlash planetary gear units are designed for use in simple positioning tasks up to highly dynamic applications. They can be used both in intermittent and continuous operations. Planetary gear units have a small outer diameter; due to the cascading of the gear stages, the overall length of multi-stage planetary gear units is higher compared to cycloidal gear units.

The company's cycloidal gear units meet the highest demands in terms of rigidity, torsional backlash, and torque in the smallest installation space. They have a more compact design compared to planetary gear units. However, the diameter of the gear unit housing is increased compared to a planetary gear unit.

Types of Coaxial gear units available for different application needs include:

- Planetary Gear Units: PE/PF/PA/PT/PS/PR/PX
- Cycloidal Gear Units: C1T/C1F/C1Q/C1R/C3Q/C3R/C6F/C7R/C8R

Angular gear units

The robust bevel gear units are extremely compact, thanks to their monolithic housing. These gear units have a maximum gear ratio of i=5. If a larger gear ratio of i=5 to i=90 is required, single- and two-stage hypoid gear units are the right choice. The highest torque densities are achieved with the company's functionally designed angular planetary gear unit series, starting with a gear ratio of i=3:1 up to i=5500:1.

- Bevel Gear Units: BM/BT
- Hypoid Gear Units: HT/SHT
- Angular Planetary Gear Units: PBE/PBF/PBA/PHT/PHR/PHX

Eppinger Tooling Asia Pvt Ltd/ESA Eppinger GmbH
www.eppinger.de
Hall & Stall: 2B/B-101

Source: Carl Zeiss India (Bangalore) Pvt Ltd

Carl Zeiss India (Bangalore) Pvt Ltd
www.zeiss.com/metrology
www.zeiss.co.in
Hall & Stall: 2B/A-101

OPTICAL MEASURING MACHINES

ZEISS O-DETECT TO CAPTURE THINGS EASILY

ZEISS O-DETECT is an optical measuring machine that offers intuitive operation, high-quality imaging, and flexible lighting for precise measurements in an instant. The technology is suitable for a wide variety of components but excels with those that are best left untouched.

Key characteristics

Excellent optics: The machine offers a large field of view at high resolutions. It offers increased efficiency and captures more details.

Stable precision: The calibration of the machine is in compliance with ISO 10360-7. It provides consistent and reliable measurement results one can trust.

Versatility and ease of upgradation: Options of classic multi-segment blue and white top light for general part top lighting are available. There is also the option of homogeneous dome light for lighting shiny workpieces. The option for Darkfield optimized lighting for challenging edges will also be available soon.

Intuitive and user-friendly software: The machine comes with ZEISS CALYPSO software. Beginners can use ZEISS CALYPSO express, which is easy to learn and program.

Simple part navigation and visualization: The integrated 5MP overview color camera locates the part quickly to start measurements. Since it is controlled by the software, there is less need to use the joystick.

Fields of application

The industries where it finds applications include Electronics, Casting, Industrial Job Shop, Stamping, Medical, and Automotive. The parts where it can be used include 3D workpieces (one side), Small parts, Turned parts, and Flat parts.

Source: Chennai Metco Pvt Ltd

Chennai Metco Pvt Ltd
www.chennaimetco.com
Hall & Stall: 1A/A-101

CARBIDE ROD CUTTING SOLUTIONS

AUTOMATED CARBIDE ROD CUTTERS

Carbide material is now the most common material for cutting tools. While producing cutting tools, the primary step is to section the carbide rod to decide the length so that the cutting tool can be produced from the stock by extensive further processing.

Carbide rod cutting is a sophisticated operation that requires specialized machines, blades, and processing. The need arises by the simple cutting of the carbide rod for small-volume manufacturing or high-volume cutting tools producers needing to cut parts rapidly with speedy production. There is also the need for bigger cutters for cutting bigger raw materials.

Chennai Metco offers a full range of carbide cutters, whether for simple low-volume cutting or high-volume automated cutting. The simple cutters can be manual or automatic. They employ appropriate blades and coolants for effective sectioning of carbide materials. Such a machine comes with coolant deliveries, work holding devices, and coolant filtering systems.

High-volume mass-producing carbide rod cutting requires sophisticated automated systems. They employ sensors, auto feeders, and auto cutters with modern PLC-based automation. It is a total system ensuring interruption-free operation and operator safety. As the carbide rod cutting requires specialized subsystems, the machines incorporate spark suppression, safety modules, fume extractors, coolant filters etc.

In any modern cutting tool production facility, carbide rod cutting is the first and most important step. Chennai Metco now offers an entire range of carbide rod cutting solutions for all types of end requirements.

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Okuma's Double-Column Machining Centers

Total shipments reach

10,000 units

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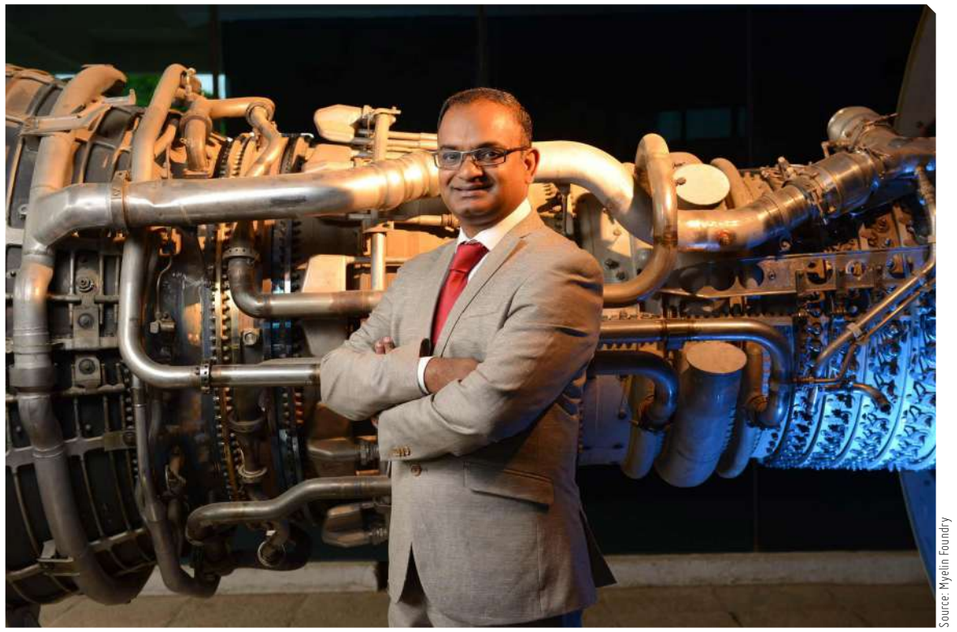
Special page is available here ▶

OKUMA

CHANGING THE GAME

Gopichand Katragadda, Founder & CEO, Myelin Foundry, shares with MMI's Editor-in-Chief Soumi Mitra the thought behind the intriguing 'Foundry' in the company's name and his views on Indian manufacturing players' standing in terms of investing in AI and how this is the time for India to take the lead in areas such as EDGE AI for manufacturing.



Source: Myelin Foundry

Gopichand Katragadda, Founder & CEO, Myelin Foundry

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Your company is a factory of Artificial Intelligence (AI) products. It's interesting that you have named it a foundry. Kindly tell us about Myelin Foundry and its solutions.

Gopichand Katragadda: Myelin Foundry was set up as a factory of innovative AI products. In terms of the name, Myelin is the protective covering of the neuron denoting AI and 'foundry' denotes a factory. Our products execute AI, closest to where the data is being generated or consumed. Examples include anomaly detection in manufacturing, enhancing user experiences on mobile for video streaming, and in-auto intelligence based on video and audio. The critical innovations are around real-time AI inferencing on low-compute at low-power overheads.

The impact of AI in manufacturing is game-changing. It automates complex tasks and comes up with new manufacturing processes. How far have the Indian manufacturing players come in terms of investing in it to boost the efficiency and productivity of their production plants?

Katragadda: There are many levels to tech adoption in a manufacturing set-up. Starting with simple automation all the way to using AI with multi-sensor fusion to improve productivity. The two key questions to ask are—one, does the AI product solve my problem? Second, does it make financial sense?

Most AI solutions in manufacturing set-ups are a demonstrator, if not constrained to a specific point on the shopfloor. This is because unleashing the potential of AI needs the solution to run in real-time or near real-time, providing results in sync with the takt time of the manufacturing line. This needs powerful EDGE to compute without live-cloud connectivity or a 5G network with cloud connectivity. This has been a limiting factor in the widespread adoption of AI solutions.

At Myelin, we have cracked the two problems of running AI in resource-constrained environments on the EDGE in near-real time and addressed the issue of affordability. I believe that it is only a matter of time, i.e., the advent of a way to run AI in real-time on the EDGE and 5G before AI solutions become commonplace in mainstream manufacturing.

> "The adoption of AI as part of digital transformation requires leadership vision and drive. Deploying AI on the manufacturing floor cannot be a half-hearted pilot, as such pilots will not see the light of day. Major transformations such as the automation of the shopfloor require the equivalent of a change acceleration process to make the change meaningful and lasting."
>
> **Gopichand Katragadda**
> **Founder & CEO**
> **Myelin Foundry**

How much of a catalyst has the impact of the pandemic been for the manufacturing units that struggled with labor shortages to adopt AI-based solutions for continuing their production?

Katragadda: Operations involving simple visual inspection such as counting, checking for labels, and correctness of assembly, are areas where machine intelligence can directly substitute human intelligence. We are seeing traction in adopting AI for performing tasks of a repetitive nature and freeing up limited manpower to carry on other complex and decision-intensive tasks up the value chain.

Having said this, with the increased adoption rates of AI in the industries, new and interesting career paths are opening, such as those of data scientists, machine learning operators, and so on.

However, a complex visual inspection that involves assessing data in real-time has not taken off in a big way today due to the limitations in the adoption of EDGE AI computing.

Global players are shifting their manufacturing bases from China to India. Are Indian players seizing this opportunity and leveraging AI to provide them with a conducive and interactive environment?

Katragadda: We have a long way to go in India to become competitive in manufacturing. Most of our expensive core manufacturing equipment is imported. Labor arbitrage is disappearing with automation. This is the time for India to take the lead in areas such as EDGE AI for manufacturing.

How helpful have been Indian Government's Aatmanirbhar Bharat and PLI schemes in the adoption of AI in the manufacturing industry?

Katragadda: The Government programs are great starting points. India also needs to look at the costs of energy, ultra-clean water, and import duties on critical manufacturing equipment to continue down the path of self-sufficiency. The adoption of AI in manufacturing will improve productivity and self-sufficiency, but it is still a journey for the Indian industry.

Limited skills, expertise, and know-how around AI present barriers to organizations exploring its adoption. Please share your thoughts on the challenges in deploying AI in the Indian manufacturing sector and how those can be overcome.

Katragadda: Organizations such as Bosch have done well in driving digital transformation through the organization. Successful digital transformation starts with workforce reskilling. Bespoke training programs are required for each level of the organization. The adoption of AI as part of digital transformation requires leadership vision and drive. Deploying AI on the manufacturing floor cannot be a half-hearted pilot, as such pilots will not see the light of day. Major transformations such as automation of the shopfloor require the equivalent of a change acceleration process to make the change meaningful and lasting.

What are the key industries where you see major AI adoption in the near future?

Katragadda: Consumers have been early to accept AI in maps, social networking sites, and personal photo drives. Industries where face recognition, gesture mapping, object detection, and anomaly detection provide significant value will be the first to adopt AI in business. Additionally, industries will demand demonstrable returns for inserting AI and must be able to afford the intervention. The industries that meet the criteria for first adopting AI include national security, surveillance, automotive, steel manufacturing, non-destructive testing, chemical manufacturing, textile manufacturing, and food production.

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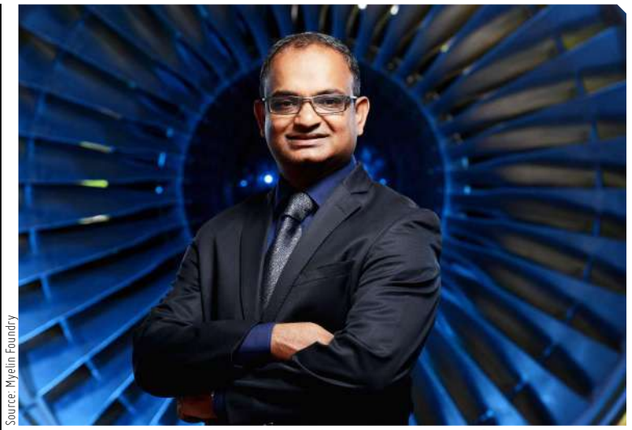
The adoption of AI in manufacturing will improve productivity and self-sufficiency but is still a journey for the Indian industry.



Source: Myelin Foundry

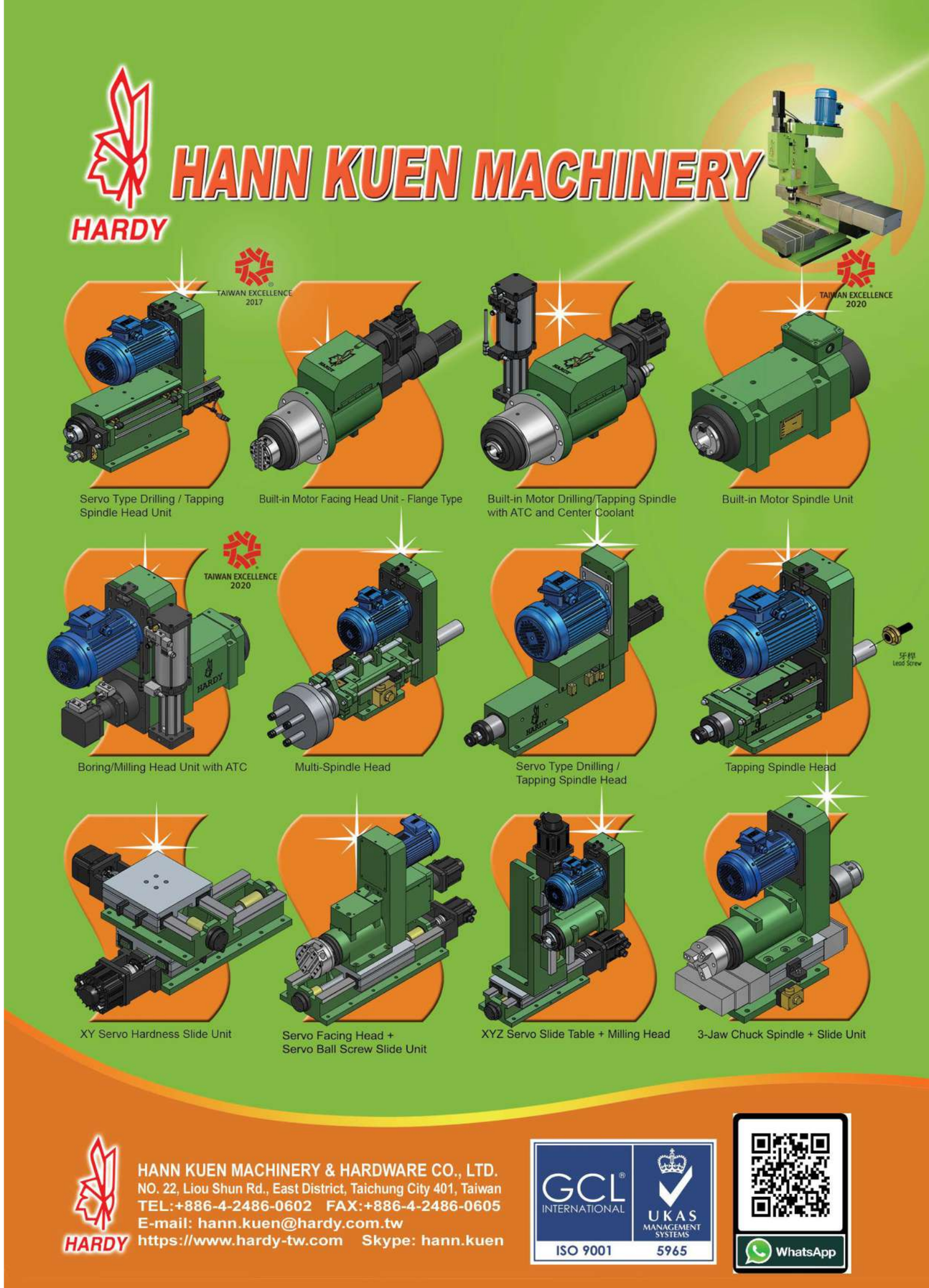
"There are many levels to tech adoption in a manufacturing set-up. Starting with simple automation all the way to using AI with multi-sensor fusion to improve productivity. The two key questions to ask are—one, does the AI product solve my problem? Second, does it make financial sense?**"**

Gopichand Katragadda, Founder & CEO, Myelin Foundry

How do you look at the potential of the Indian Manufacturing sector to become a global manufacturing hub and reach US$1 trillion by 2025?

Katragadda: Rather than 2025, I would suggest the following for India to reach its potential in manufacturing by 2030:

- Double power generation capacity (to 800 GW) last mile, smart measurements, and inclusion;
- Double transportation road miles per capita and air miles per capita;
- Government and industry partner to double R&D investment to 2 percent of GDP;
- Fund equipment at all primary and secondary care centers for women, infants, and elderly care. Total HC spending in India can increase from 3.6 percent of GDP to 5 percent of GDP. Which more than doubles the absolute spend with the growing GDP; and
- Train 500 million workers to contribute hands-on to power generation, water treatment, and healthcare.



Source: Micromatic Grinding Technologies Pvt Ltd

Shop floor of MGT's Ghaziabad plant

A LEGACY OF EXCELLENCE

Micromatic Grinding Technologies Pvt Ltd (MGT) has a 50-year history of ethical and transparent working and pursuing excellence. Emerging as the market leader with nearly 50 percent market share in India, the company continues to build trust by providing clients with the right solutions, advocating the 'AatmaNirbhar Bharat' initiative, and helping India become self-reliant.

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MGT, founded in 1973, offers a wide range of External, Internal, Universal, and Special-purpose cylindrical grinders in CNC, PLC, and Hydraulic variants to meet the most stringent customer needs. The company began in a rented shed and, currently, has three plants in Ghaziabad and one in Bangalore, totaling around 20,000 sq mt of working area.

The 'Collaborations' story

Kapil Dhand, Managing Director, MGT, describes the key milestone of the company as a story of 'Collaborations', saying, "MGT's 50-year journey began in 1973 with a partnership with entrepreneur VS Goindi, a machine-tool design veteran from CMTI."

"We began by collaborating with the late Ashok Sathe of Pragati Automation Ltd, who designed our first product, the GCU-100," he shares. "We collaborated further with Sathe to form the most successful machine tools sales and service organization in the country, Micromatic Machine Tools (MMT), in 1978."

At IMTEX 1979, the first model of the Universal Cylindrical Grinder GCU-100 won both the 1st prizes—the CMTI Best Design Award and the FIE Best Product Award. "ACE Designers Ltd, promoted by Sathe along with Shirgurkar & Machado, also joined MMT in 1982, and the synergy led to what's now AceMicromatic Group, the largest machine tool group in India," he adds.

The next collaboration—with the customers—happened when customers saw potential in Micromatic Grinding to develop their key production machine—the grinding machine, since grinding is the final critical operation for most products. "Starting with Rane Engine Valves Ltd in the 1980s, to Bosch, Bajaj Auto, Hero Honda, Delphi-TVS, Tata Motors, Mahindra & Mahindra, Bharat Forge Ltd, and many more, is the key reason for MGT's success during the last five decades," says Dhand. Hero MotoCorp, HMSI, Shriram Pistons & Rings Ltd, and TVS are among the other important Indian customers.

In addition, collaborating with like-minded entrepreneurs and dealers across the globe helped expand the company's footprint. "Starting with Lilienfein (ex-Fortuna, Germany) in the 1990s, Baccolo of Lizzini Spa (Italy), Waelti & Fumasoli and Rewitech (Swiss), Technum (Mexico), TGS (USA), Master Abrasives (UK), and BMT-Makina (Turkey)," he reveals. The company's major international clients include Honda, Guhring, JTEKT, and Total Grinding Solutions.

Finally, collaborating with suppliers and other stakeholders. "Last but not least, there are many co-developments with sub-system suppliers like coolant filtration systems, high-speed spindles, special grinding wheels, wheel dressing systems, etc.," he mentions. "These form an essential and integral part of a high-precision grinding machine, about 5,000 of which have been supplied by MGT worldwide."

Source: Micromatic Grinding Technologies Pvt Ltd

"MGT has been focusing on the Automotive industry for years, and this year besides Automotive, we are showcasing several new products catering to the Bearing, Aerospace, and Defence industries at IMTEX 2023. We are also launching our own MGT-IIoT solution, specific to Grinding machines. We continue to develop import substitute products to make Indian manufacturing more competitive and at par with global standards.**"**

Kapil Dhand
Managing Director
Micromatic Grinding Technologies Pvt Ltd

Access to resources and information

Since its inception, the company has grown from strength to strength, sensing market opportunities in terms of exploring the potential in new industry sectors, particularly by being close to customers and focusing on import substitution. Dhand explains, "We have also been participating in major international machine tool exhibitions over the last 30 years to get an insight into where the technology is heading."

The company is geared up to make the most of the Indian Machine Tools Manufacturers' Association's IMTEX 2023, South Asia's largest exhibition in machine tools and manufacturing technologies. "MGT has been focusing on the Automotive industry for years, and this year besides Automotive, we are showcasing several new products catering to the Bearing, Aerospace, and Defence industries. We are also launching our own MGT-IIoT solution, specific to Grinding machines. We continue to develop import substitute products to make Indian manufacturing more competitive and at par with global standards," he notes.

Developing game-changing innovations

MGT has also collaborated with technology experts and academic institutions for R&D. "It all started in 2008 with Dr K Subramanian, President, STIMS Inc, USA, for training in Grinding Technology," says Dhand. "He, along with Prof Ramesh Babu, helped set up the R&D department at MGT's Bangalore plant in 2012 by inducting young GETs from IITM."

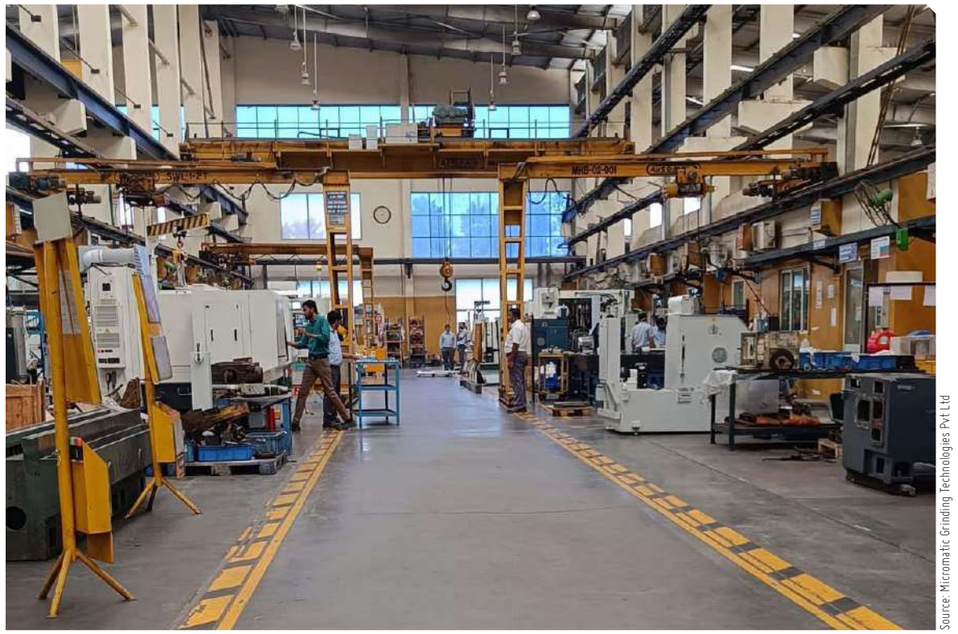
Dr Subramanian has been mentoring the company's R&D team of young engineers for the past ten years, which has led to the co-development of the Next Generation Precision Grinder (NGPG) in 2016, a project supported by the MHI, Government of India, in collaboration with Prof Babu, IITM.

Success is best when shared

The 50th anniversary, a significant milestone for MGT, will be celebrated all throughout 2023. "We intend to involve all stakeholders in our celebra-

MGT's significant Indian customers include Tata Motors, Mahindra & Mahindra, Hero MotoCorp, HMSI, Bosch, Delhi-TVS, Bharat Forge Ltd, Shriram Pistons & Rings Ltd, Rane Ltd, Bajaj Auto, and TVS. Honda, Guhring, JTEKT, Tecnum (Mexico), Total Grinding Solutions, and TGS-USA are among the company's major international clients.

With the world embracing a China+1 policy post-COVID, India's manufacturing industry has many opportunities. MGT has rapidly spread globally, and expansions at both the Ghaziabad and Bangalore plants are on the cards. A JV with Toyoda Japan (now JTEKT) formed Toyoda Micromatic Machinery India Ltd (TMI) in 2008 and is running successfully.



Source: Micromatic Grinding Technologies Pvt Ltd

Shop floor of MGT's Bangalore plant

tions. We are kick-starting the celebrations at IMTEX 2023; on each of the seven days (January 19-25), we will be inviting VIP stakeholders (customers, suppliers, employees and partners) to the MGT booth for a cake-cutting ceremony," shares Dhand. "The idea is to make them share their personal journey and contributions to the growth of MGT. Various internal and external events are also planned throughout the year to celebrate this important milestone."

Continuing its winning streak, the company looks to expand its global footprint in the manufacturing sector, particularly as the world builds on the idea of a China+1 post-COVID-19, which presents tremendous opportunities for manufacturing in India, as well as boosting the 'AatmaNirbhar Bharat' and 'Make India' initiatives. To this, he elaborates, "Expansions at both the Ghaziabad and Bangalore plants are on the cards. MGT has been able to spread its footprints slowly and steadily across the globe. A joint venture with Toyoda Japan (now JTEKT) formed Toyoda Micromatic Machinery India Ltd (TMI) in 2008 and is running successfully." Furthermore, MGT is also manufacturing a Toyoda Cam Grinder for small engines as well as another popular Toyoda Grinder model for the domestic market and exporting it to Southeast Asia.

Giving back to society

In India, according to Dhand, anyone who is fortunate enough to grow up in an urban middle-class environment has a natural awareness of the stark differences in society around them, but doing something about them is also a natural calling for some due to India's spiritual heritage.

In the early 90s, the company came in contact with a Ghaziabad-based NGO Gram Niyojan Kendra (GNK) that specializes in the development of girl-child and women empowerment, the basis of any sound society. The duo has worked toward their well-being, ensuring their secure future in the process.

A 'sound economy (business)' is dependent on a 'sound society', and 'sound society' is dependent on a 'sound environment', is what the company declared back in its 2010 annual issue of MG News, renamed Equilibrium, the company's in-house magazine. "Practising the same and showcasing it have been equally important agenda items for each subsequent issue of MG News," he further states.

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IN PURSUIT OF PERFECTION

An interesting case study on how Tata Motors increased the production of its Nexon EV through remarkably innovative solutions.

Fig 1: EV Shop frugal manufacturing set-up

Source: Tata Motors Passenger Vehicles Ltd

BHAGWAN BHOSALE
Deputy General Manager
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Operations Incharge
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Redefining mobility with eco-friendly raw materials and greener alternatives, Tata Motors is poised to help India achieve its net-zero carbon emission goals. The company is committed to being among the leaders of green mobility in India with innovative and futuristic electric vehicles. With this motive, Tata Motors plunged into the electric vehicles business and is currently leading India's electrification journey with exciting, eco-friendly products like Tigor and Nexon EV with 88 percent market share. In a bid to fortify its position in the segment where it is the first mover, Tata Motors plans to have a portfolio of 10 EVs over the next five years in various styles and driving range options at various price points.

With an eye on expanding its global footprint across the globe, Tata Motors soon will be launching Pure EV Platform cars like Avinya.

Trigger for productivity improvement

With an innovative design adoption, Nexon ICE (Internal Combustion Engine) vehicles have been converted to Nexon BEV (Battery Electric Vehicles). This adoption has resulted in faster product development and product availability for validation and mass production.

A separate EV plant for a nascent market would have been a huge amount of investment sitting on the potential of emerging volumes. To avoid a huge investment in an emerging product, newer technology, and overall forecasting, it was decided to split the process at two different manufacturing locations, i.e. Tata Fiat JV and Tata Motors' Pune Plant.

EV Shop, which could be mistaken for a prototype lab, had no fancy assembly line; Nexon SUV bodies designed for gasoline models were wired and fitted with battery packs by hand. Initially, just eight SUVs were made in a day. But the demand had shot up multi-fold over the two years since the Nexon EV's launch, and, hence, the team faced the challenge of meeting rising customer demands.

Fig 2

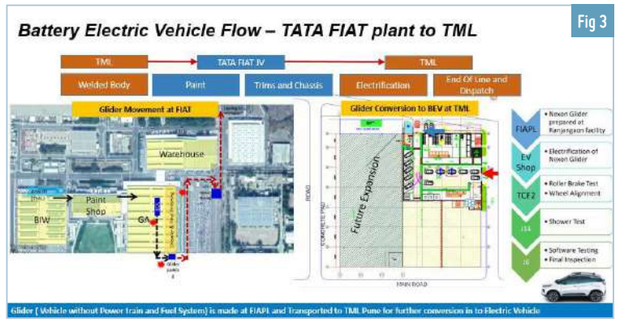


Fig 3

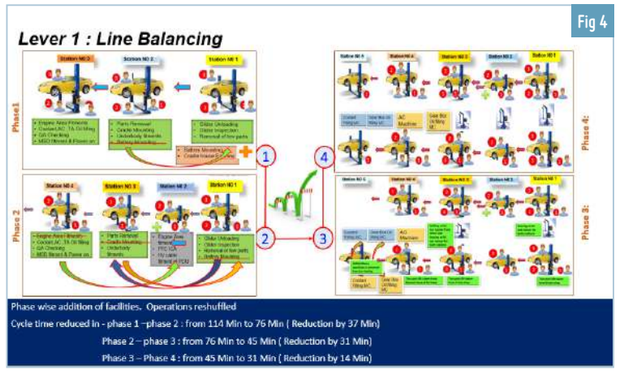
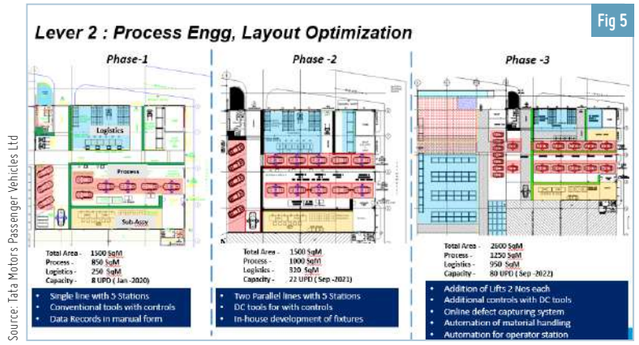


Fig 4



Source: Tata Motors Passenger Vehicles Ltd

Fig 5

Constraints in the existing shop layout and facilities, production ramp-up within the available footprint, and no provision of the Capex for the sudden ramp-up were key challenges to deal with.

Solution generation

To drive these improvements, a special CFT (Cross Functional Team) was formed that took a holistic approach toward productivity improvement. Rather than focusing only on time and motion-based improvements, the team explored all possible levers to minimize efforts and maximize the output. A special task force of LCA (Low-Cost Automation) was roped in to bring innovative solutions to overcome various challenges.

The team identified the following levers to work on and bring in collaborative efforts to result in exponential growth in productivity— • Line Balancing, • Layout Optimization, • Design for Assembly, • Ergonomics Improvement, • Rework Reduction, • Innovative Material Handling, • MUDA Elimination, and • Automation.

Description of Levers

Lever 1

Line Balancing and NVA (non-value added activities) Elimi-

All these improvements are built upon the guiding principles of Tata Motors' leader JRD Tata who believed that productivity and efficiency can be achieved only step by step with sustained hard work, relentless attention to detail, and insistence on the highest standards of quality and performance.

nation Line Balancing operations were done to evenly load all the stations. NVA activities were identified and small kaizens were done by the LCA team. (Fig 4)

Lever 2 ***Layout Optimization:*** Considering the space constraints, the layout was modified frequently for optimum use and to establish a pull flow to ensure smooth processes. (Fig 5)

Lever 3 ***Design for Assembly:*** Eighteen design modifications were implemented in Design to facilitate ease in the assembly process eliminating the cycle time of the process. (Fig 6 & 7)

Rework is a big waste in the process. Special focus was given to eliminating rework activities that consume resources.

Lever 4 ***Rework reduction through an Innovative Approach:*** Rework is a big waste in the process. Special focus was given to eliminating any rework activities that consume resources. Four design, 7 process improvements, and 2 poka-yoke (mistake-proofing) actions were carried out to eliminate rework. One such innovative poka-yoke is shown in Fig 8.

Lever 5 ***Innovative Material Handling:*** Innovation is pivotal in improvements. The LCA team developed several innovative material handling equipment which reduced efforts and facilitated doing the task with less effort and in less time. Twelve such innovative material handling equipment was developed by the in-house team with zero Capex investment. (Fig 9)

Lever 6 ***MUDA Elimination:*** Shop floor team members' involvement was very crucial in this journey. Special suggestion schemes were launched for employee participation in identifying the wastages in the processes and eliminating the same. Out of 111 suggestions, 47 suggestions were implemented, resulting in 24 minutes reduction in the work content. (Fig 10)

Before	Problem	After	Results
Due to hard cable it is very difficult to mount the HV cable on cradle mounting bracket as position is non ergonomic	Non ergonomic & time consuming process.	Parking eliminated from Bracket by ERC,ICA done for parking on Firewall bracket. PCA done to park these cables by modified firewall bracket	Ease in performing the process. Process cycle time reduced by 4 MIN

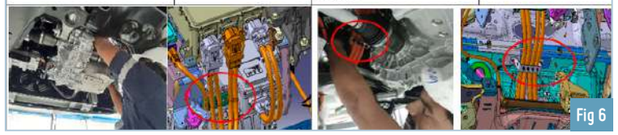


Fig 6

Before	Problem	After	Results
Chiller unit after subassembly is assembled at station number 1 from below the underbody. Operator takes this subassembly in one hand and with other hand he takes bolt Another operator takes nut while first operator continue to hold the chiller subassembly .	Due to this un-ergonomic position it gives lots of strain on the operator neck causing Fatigue. Also 2 operators are required for this Fitment	Design modification was suggested by team to ERC. Instead of bolt hole stud welding on bracket was implemented through design release. Now operator locates the chiller subassembly on these studs and tightens the joint with nut without needing another operator .	As process is made within reach, fatigue reduced Operation time of process reduced by 3 MIN No need for other person for this Fitment

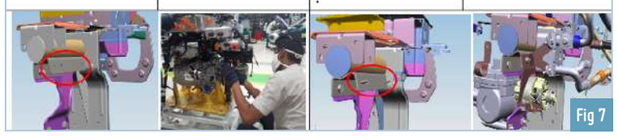


Fig 7

Before	Problem	After	Results
In Electric Vehicle there are many electrical components which are connected with each other through electric circuit through HV cables. This Operation of fitting all HV cables is performed at station 4 in EV Shop. Few of the cases one of the connection may be missed or loose fitted due to non-ergonomic process	Vehicle is not started Electric diagnosis team has to take this car on two post, remove battery guard, remove MSD & check the all HV cables for any issues like missing, lug bend, secondary lock breakage ,loose fitment etc to ensure series connection Continuity which is very time consuming & disturbing the flow	Dummy MSD prepared with help of existing MSD to accommodate 9V Battery, LED Bulb & Hooter in series as shown in circuit diagram. When this dummy MSD is fitted after making all the connections properly It will complete the circuit to glow LED Bulb on Dummy MSD .It also completes circuit for hooter which blows at the same time.	Saved lot of time in diagnosis of skilled Electrician Ensured safe operation Saved manpower wastage for unnecessary part replacements due to poor diagnostics. rework Manpower is eliminated

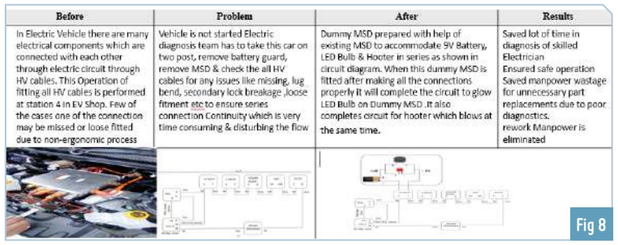


Fig 8

Before	Problem	After	Results
Earlier HV Battery fitment was taking high time as doing alignment of battery with BIW holes was not happening smoothly.	HV battery up down movement was being done with only one cylinder. Due to poor center of gravity the battery fixture was not in horizontal alignment. Additionally breakdown due to load on bearing	Instead of one cylinder two cylinders mounted on fixture to balance center of gravity resulting in proper alignment	1.Time required for battery change reduced from 6 min to 3 min 2.Frequent breakdown of battery fixture eliminated. 3..Line stoppages reduced.

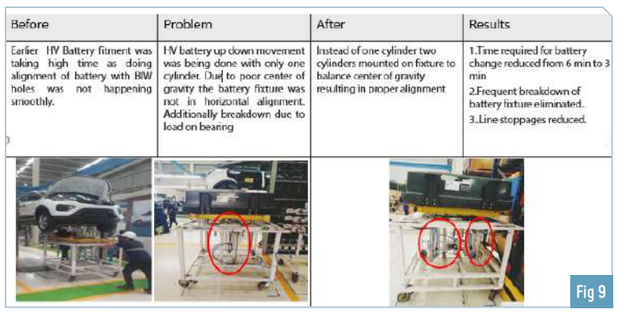


Fig 9

Lever 6: MUDA Elimination *Special Suggestion scheme for employees*

Fig 10

Source: Tata Motors Passenger Vehicles Ltd

Lever 7 ***Process Automation:*** Manual interventions in the processes were eliminated through the automation of several critical-to-quality processes. This eliminated excessive movement and additional inspection checks required for certifying quality. (Fig 11 & 12)

Before	Problem	After	Results
We have two cooling systems namely : Motor Cooling System [MCS] and Battery Cooling System[BCS].Coolant plays an important role in cooling down the two systems. The coolant is filled for 2 models Kanger1 & Kanger 2 having separate Coolant requirements	**Manual process having Motion MUDA** Locking of Gun Selector Switch (KANGER 1 and KANGER 2) Selector Switch (Motor and Battery) Master ON (Pushbutton) Auto Process START (Pushbutton) Manual process having Motion MUDA	**New Process Sequence** Lock the gun in coolant tank. Scan the VIN No. from Check Sheet of the car using zebra scanner. Scan the QR code(Part No.) of LH (Left Headlamp) for BCS and RH(Right Headlamp) for MCS.	Process Automated with elimination of excessive motion Rework elimination due to wrong coolant quantity filled

Fig 11

Before	Problem	After	Results
Currently one operator is stationed at each of the fast charger to monitor 80% charging who records it manually	Currently one operator is stationed at 2 fast chargers having 4 outlets.He has to continuously look at the charging station display and once 80% SOC is reached he has to cut off the Charging	**New Process Sequence** We interfaced circuit which continuously monitors and when charging goes at 80% it will show indication by turning on the lamp and cutting off power supply	Process Automated with elimination of continuous monitoring Instead of 4 men ,only one person monitors 4 fast chargers.

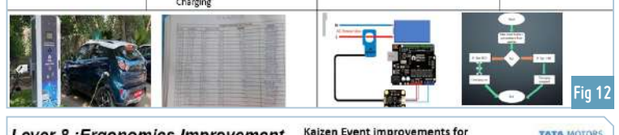


Fig 12

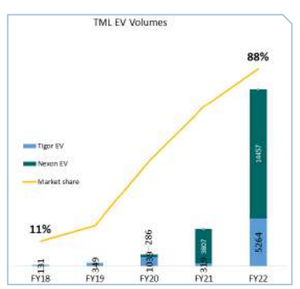
Fig 13

Lever 8 ***Ergonomics Improvement Initiatives:*** A Kaizen event was organized to identify non-ergonomic postures requiring more effort and leading to fatigue to the operator which indirectly has a strong bearing on his ability to perform. (Fig 13)

Results on business matrix

With this agile response from the Manufacturing team, a 10x improvement in the capacity was realized with innovative and optimized solutions, causing Capex avoidance of ₹206 lakh and improvement in quality matrices as an additional benefit.

This improvement has helped Tata Motors gain a market share of 88 percent in the Electric Vehicle industry.



Manual interventions in the processes were eliminated through the automation of several critical-to-quality processes. This eliminated excessive movement and additional inspection checks required for certifying quality.

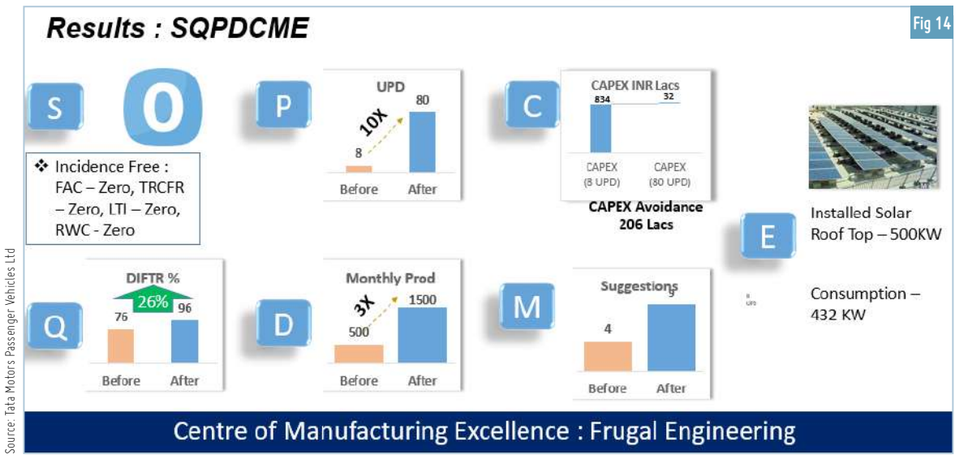
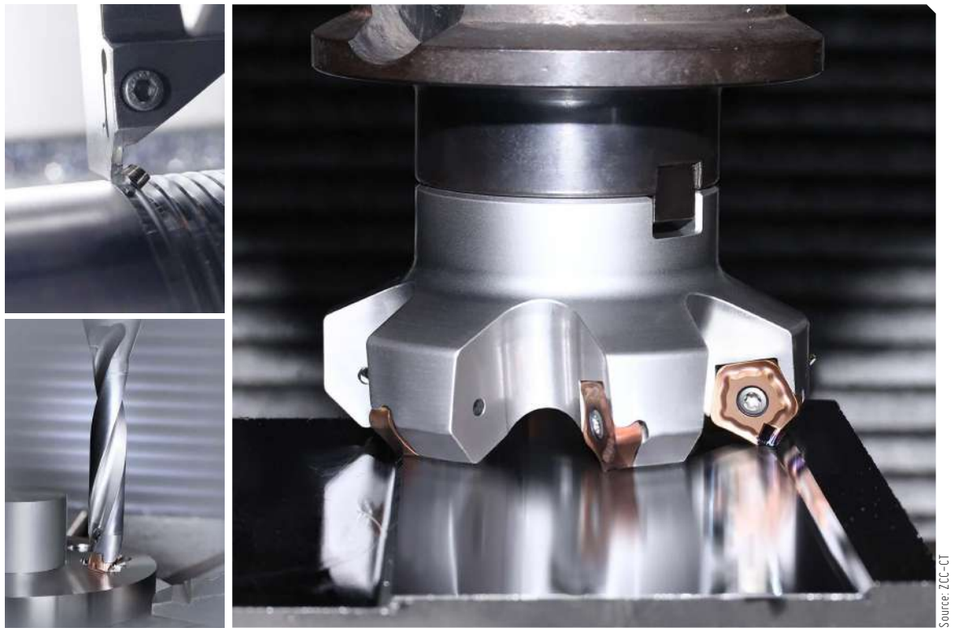


Fig 14

Source: Tata Motors Passenger Vehicles Ltd

BETTING ON INDIA'S GROWTH

As India is predicted to be one of the top three economic powers in the next 10-15 years, it is inevitable for global companies like Zhuzhou Cemented Carbide Cutting Tools (ZCC-CT) to look to expand and invest big in India. Shen Qi, General Manager, ZCC-CT, discusses the company's key insights and future objectives for India.



Source: ZCC-CT

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Zhuzhou Cemented Carbide Cutting Tools was founded in 1954 as ZCC (Zhuzhou Cemented Carbide). The company is China's first cemented carbide maker. ZCC-CT was established in 2002 as an individual company, targeting more cemented carbide tool research and innovations.

"Over the past 20 years, ZCC-CT has made tremendous growth with our customers in both domestic and international markets, with a forty-fold increase in the company's revenue. We are now the largest tooling supplier in China, and aim to provide the most valuable cutting solutions at more affordable pricing," shares Qi.

Eyeing the overseas market

ZCC-CT joined the Minmetals Corporation family in 2010, which is also a Fortune Global 500 company that specializes in mining and metal products. "ZCC-CT can provide a unique advantage that no other tooling company can guarantee, which is to upstream the manufacturing process from raw Tungsten ore mining, powder metallurgy, and carbide alloy to supplying various types of cemented carbide tools," Qi explains. "This complete production chain can secure upstream material supply, ensuring all costs and quality remain stable."

"Our solutions have been serving many high-end manufacturing enterprises in Europe, including industries in automotive, energy production, railways, and many other key components manufacturing businesses. Our sales in Europe and North America have been steadily and rapidly growing over the years," shares Qi.

He reveals that almost one-third of ZCC-CT high-precision tools are now exported, and the company hopes to extend this to 40 or even 50 percent by contributing more to the numerous entities with strong economic growth. "Among them, India is a vastly growing economy and a huge manufacturing nation, which plays an important role in the global supply chain, and ZCC-CT plans to build a strong partnership and support its manufacturing," he says.

Supporting 'Make-in-India'

"As we work within the market, Indian customers are keen on high-quality products with the most cost-effective solutions, which exactly matches ZCC-CT's most-renowned strength in our services," mentions Qi. "Our products have been utilized by many Indian customers and used for a wide variety of productions, supporting their local manufacturing demand."

ZCC-CT's comprehensive product range can provide multiple selections and solutions that surpass customers' requests from different regions in the Indian market, demonstrating the firm's full strength in assisting local manufacturing. "Our new-generation tool grade, the YBS series, has been utilized by many of our customers as a perfect product to uphold the high-end turbine blade machining requests with a lowered-cost selection designed for our Indian customers," he elaborates.

To adapt to a wider range of Indian manufacturing demand, the company has launched the new ISO turning product series: -ZM and -ZMA geometries combined with YB6315 grade for steel materials and -ES, -EG, and -EH geometries combined with YB9315 grade for stainless steel materials. "These will soon become our top-selling products, and we will continue to bring out more cutting tools that are specifically designed for the Indian market," reveals Qi.

Source: ZCC-CT

"ZCC-CT aims to formally establish a branch company in India in the next 2-3 years, starting with setting up and registering a branch office at the earliest possible time. We'd look for further cost reduction on both freight and inventory, and improving efficiency on customs clarification through building our own warehouse in India in the near future.**"**

Shen Qi
General Manager
ZCC-CT

"To further explore the engineering demand in the local community, ZCC-CT is researching with local engineers and distributors/partners in Mumbai, Pune, and Delhi. Soon, we plan to expand our services with local partners in Chennai, Bangalore, Coimbatore, and Hyderabad. Together, we will build the best team for the 'Make-in-India' goal and a better outcome," he adds.

Catering to domestic sectors

Qi understands that there will be market differences and challenges. The company has already catered to Die & Mold, Energy, Automotive, Jewel-Crafting, and many other industries in the Indian market and aims to grow in these industries. "With our mature technology and proven applicable high-precision, premium-quality solid carbide products and customization services, we are working toward supporting Indian local key component manufacturing businesses in 3C industries," explains Qi.

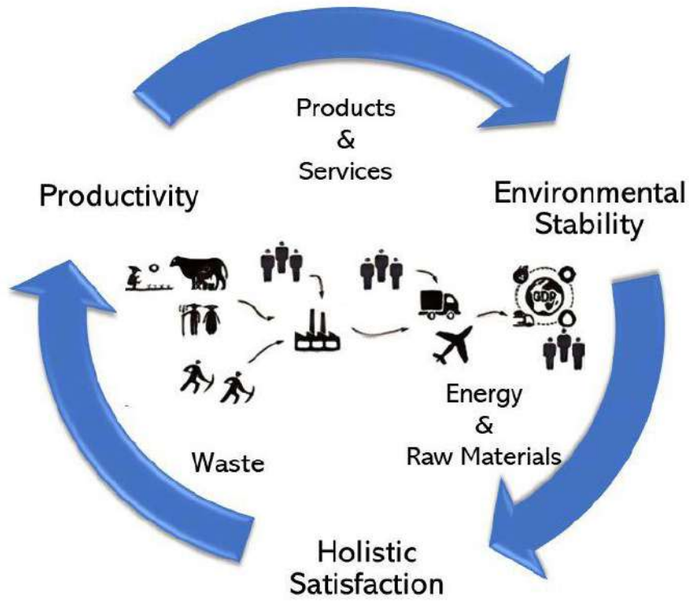
He admits that in recent years, the ZCC-CT technical team and specialists have not been able to offer onsite technical support to Indian engineers and its distributors due to the pandemic and being far from the local market. "ZCC-CT is still deficient in local tech support and after-sale services. We are determined to soon solve these problems. We will be managing key projects with our customers through more efficient methods, collaborating with our local distributors/partners to study and solve technical difficulties case by case, appointing our sales engineers in India, sending our technical team and specialists to the scene, and adding field application engineers. We will also organize regular online training seminars for our distributors and customers, solve technical difficulties on a real-time basis, and introduce ZCC-CT's latest new product series," he shares.

The company aims to formally establish a branch company in India in the next 2-3 years. "We would be looking for further cost reductions on both freight and inventory and improved efficiency on customs clarification through building our own warehouse in India in the near future. A local management structure, sales team, and service center for the branch company will be founded because we believe a local team would not only be more acquainted with the market and closer to the market but also be able to respond more swiftly, thus solving problems for customers," Qi concludes.

To further explore the engineering demand in the local community, ZCC-CT is researching with local engineers and distributors/partners in Mumbai, Pune, and Delhi. It plans to expand its services in Chennai, Bangalore, Coimbatore, and Hyderabad.

PRODUCTIVITY, A STATE OF MIND AND BEING

In the manufacturing context, productivity can mean profitability, improved output, lesser cost, or a better layout or work design. Here's knowing more ways to define it and how critical it is to the industry's and the nation's growth.



Source: Ace Micromatic Group

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Productivity, in simple terms, is getting more for less, and improvement in productivity is all about getting better at doing the right things and making it habitual. The quote 'Productivity is being able to do things that you were never able to do before' by Franz Kafka brings out the essence and perhaps is one of the best among the many quotes we have on productivity.

Productivity is normally put to use tactically in organizations for control things like budgets, performance, standard time, actual time, etc. Productivity in space could be a better layout of equipment to improve output. In the case of machines producing parts, it could be more parts, lesser cost per part. Concerning people, it could be a better work design to increase output or reduce fatigue, etc.

The essential part of all productivity improvements is identifying and eliminating waste in all forms, be it material, process, people, equipment, methods, space, or time. It is also normally understood that productivity is the key to profits, progress, and growth. That the practice of productivity in its truest form is critical for development and growth is fast gaining ground.

The many definitions of productivity

Conceptually, productivity can be looked at from many perspectives. Scientifically, it can be logically defined and observed empirically in experiments. As a measurement concept, it is a ratio of input resources to output results, but it should not be limited to merely its efficiency concept but should be comprehensively looked at from an effectiveness perspective, which is doing the right things efficiently to achieve outcomes. Productivity is also an objective concept used by organizations for strategic objectives like project planning, competition mapping, organizational improvement, etc. It is important that there be involvement across the enterprise and that the productivity goals are holistic.

We are in the machine tool (Turning, Milling, Grinding) Metal Cutting industry, and creating and enhancing capacity is our business. Our passion to help propagate the productive use of our machines has pushed us to also be actively involved in production monitoring and productivity solutions for close to two decades. While our major business is ready-to-use industry-standard machines, we also offer ready-to-produce metal cutting solutions with work holding, tooling, and automation. Importantly, we have put to use innovative technologies, including digital tools, long before Industry 4.0 or IoT were in vogue. These tools have worked and helped us and our customers be continuously more productive. They get more and more out of our machines, which makes them better suppliers to their customers, and they come back for more machines, leading to a holistic virtuous cycle.

Stronger together

We, at Ace Micromatic, truly believe and understand that productivity and its continual enhancement are critical and key to the economic growth and prosperity of India and the aim to become a hub for global manufacturing.

As our contribution, we are working with IMTMA and supporting the national productivity summit to build and strengthen a solid productivity platform across the manufacturing fraternity. This platform celebrates the heroes and heroines behind the efforts in the companies, be it in design, methods, process, or on the shop floors, and brings recognition to them and awards prize money, which nurtures the productivity movement. The sharing of the practices and the use of tools and techniques among the industry further widens the productivity movement and inspires the industry and all of us to come out as winners with bigger and better dreams that help give muscle to the manufacturing vision of the country.

Productivity is a comprehensive, holistic phenomenon encompassing the elements needed to improve products and services and, importantly, a concern to seek affluence that will give people tangible results and spiritual satisfaction. It is all about hungry minds and hearts aligned with concerned leadership without hierarchy.

Productivity is a comprehensive, holistic phenomenon encompassing the elements needed to improve products and services, and importantly, a concern to seek affluence that will give people tangible results and spiritual satisfaction.

SUCCESS THROUGH INNOVATION

A leading technology consulting firm with design strengths in electro-optic products and systems, RRP S4E Innovation Pvt Ltd has excelled despite the pandemic and the subsequent economic changes. Bolstered by Government initiatives and academic partnerships, the company finds itself better equipped to provide innovative, user-friendly, and cost-effective solutions to all consumer challenges.

Source: RRP S4E Innovation Pvt Ltd

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RRP S4E Innovation Pvt Ltd is the most innovative and fastest-growing company in the thermal space that found its footing with the introduction of the 'Make in India' initiative. "We are all aware that India is fully equipped to build and deliver components and modules, but the challenge has been to turn them into a final product. The 'Make in India' initiative is now the solution, as it allows us to acquire design knowledge by virtue of the initiative," says Rajendra Chodankar, Founder & CEO, RRP S4E Innovation Pvt Ltd.

"Our journey began in 1990, and the next three decades brought mixed fortunes, with challenges that gave us the courage to think big. One significant achievement was the setting up of a unique Nano Machining facility that let us produce mechanical components with over one-micron tolerance and a three-nanometer surface finish," he shares.

Understanding company products

The company's offerings are divided into two categories: Electro-optics and Healthcare. The Electro-optics domain's main products are:

- Day Sights, which are mounted on rifles with target detection of up to 250 m;
- Thermal sights with target detection of up to 2 km;
- Border Protection and Surveillance Systems for extended detection range up to 20 km during the day and 7 km at night;
- Handheld systems.

In Healthcare, the company has developed an Advanced Air Purifier System called Aerem 100. It is fully indigenized and

claimed to be highly effective in killing viruses and bacteria in the air and also disintegrating amino acid chains. The product has received approval from ICMR, TUV, CE, European, and UK Academic Labs.

"When we commenced our journey, it was exclusively for military and related applications, but today, the products are being deployed for multiple commercial applications," says Chodankar.

Commercial applications of electro-optics include Face Recognition, Integrated Highway and Toll Locations, Intruder Management Systems, Surveillance Monitoring in Commercial Malls and Public Places, etc.

In the military domain, he elaborates, "We produce sights that can be mounted or adapted to any rifle, which actually form the eye of the soldier. Our products cover detection range from 100-2,000 m. For long surveillance systems, our flagship product is the VIRAJ 28 Series, which can be deployed at borders for long-range detection both during the day (20 km) and at night (7 km). Our systems are typically deployed in the LWIR range (7-14 micron)."

The company has recently diversified by improving the software and its algorithms to deploy the product for drone detection. "We appear to have received some excellent results. Our systems are now configured with a tracking speed of 80 m/s, which is comparable to RF/Radar anti-drone systems," he reveals.

Regarding the company's Thermal Imaging Cameras, he explains that the camera works on the principle of the lens absorbing the heat of the target, which is then processed by the sensor, also known as the Thermal Core or Focal Plane Array (FPA). The core has image processing capabilities, and the image formed is then converted by the OLED into an image that can be viewed by the eyes.

The company's main products in the electro-optics domain are: Day Sights mounted on rifles with a target detection range of up to 250 m, Thermal Sights with a target detection range of up to 2 km, Border Protection and Surveillance Systems for extended detection ranges of up to 20 km during the day and 7 km at night, and Handheld Systems.

Source: RRP S4E Innovation Pvt Ltd

"We produce sights that can be mounted or adapted to any rifle. Our products' cover detection ranges from 100-2,000 m. For long surveillance systems, our flagship product is the VIRAJ 28 Series, which can be deployed at borders for long-range detection both during the day (20 km) and at night (7 km). Our systems are typically deployed in the LWIR range (7-14 micron)."

Rajendra Chodankar
Founder & CEO
RRP S4E Innovation Pvt Ltd

Source: RRP S4E Innovation Pvt Ltd

Electro-optics and its potential

Chodankar believes that the 3rd generation of Electro-optics is the future and that its market has the potential to reach US$ 1 billion by 2024-25. He notes that there have been many advances in image detection at extended distances, and the introduction of fusion systems allows users to see through a glass, which was previously restricted by thermal sights. According to him, Electro-optics is not just applicable to the military sector; most systems are currently being used in commercial applications in order to be cost-effective.

Pointing to the market's intense competition and the segment's quick development, he states, "The global military electro-optical and infrared systems market is projected to register a CAGR of 2.51 percent, reaching US$ 9,314.13 million by 2026. By platform, the air-based segment held the largest market share (54.26 percent) in 2020. The sea-based segment will have the highest CAGR (2.67 percent) during the forecast period." He claims that due to this segment's profitability with the latest technologies and the ability for players to share technology, new entrants are also entering it.

"Simultaneously, various design challenges, technological constraints, supply chain risks, the evolving global crisis, and unprecedented factors, like the advent of the COVID-19 pandemic, could affect the market negatively in the near future," he says. "Therefore, growing military budgets of countries across the globe, R&D in advanced infrared imaging technologies, developing sensors that can provide high-resolution

Taipei Int'l Machine Tool Show
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Taipei, Taiwan
One Show, Whole Ecosystem
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- Metal Cutting Machine Tools
- Parts, Components, Accessories
- Industrial Robots, Controllers & Drive Systems
- Sheet Metal, Tube and Wire Processing Machines
- Casting, Forging, Welding, Surface Treatment Equipment
- Cutting Tools & Tooling System
- Advanced Metalworking Technology NEW
- Additive Manufacturing NEW
- Future Manufacturing NEW
Core Events
- Dr. Net Zero
- Future Manufacturing Forum
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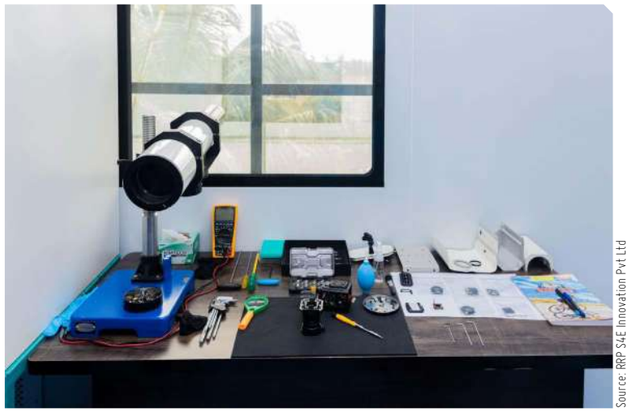
images, and the need for better sensors to enhance situational awareness of the military personnel in the battle space are some of the major driving factors of this market."



Source: RRP S4E Innovation Pvt Ltd

RRP S4E Innovation has developed an Advanced Air Purifier system, the Aerem100, which is fully indigenized and effective at killing all the viruses and bacteria in the air and also disintegrating amino acid chains.

Helping make significant progress

As per Chodankar, the Prime Minister's 'Make in India' strategy for Electro-optics is the best thing that could have happened to any entrepreneur. "We thank Hon'ble Prime Minister, Shri Narendra Modi, for having introduced the 'Make in India' initiative and deployed teams to ensure that full justice is done. The developments and products show the impact of 'AatmaNirbhar Bharat' and 'Make in India'." He claims that India is now exporting products in numerous sectors, due to Government policies under which MSME and other corporate houses can obtain Transfer of Technology (TOT) for designs.

Speaking on the collaboration with IIT, Chodankar outlines, "Our journey with IIT has been enriching and encouraging as it was a classic example of a viable Public Partnership Model." Coining it a mutual benefit gained during their journey to build a thermal core that could be deployed on a thermal site or a surveillance system, he reveals, "The sensor was imported, and IIT worked on the image processing capabilities, which have been their expertise and established beyond doubt. We developed the 640 × 480 core with a 17-micron pixel pitch in one more domain, wherein the contribution of IIT was significant: testing expertise and the infrastructure."

The company has a 100 percent 'Made in India' product in the reflex sights for daytime applications, which was also tested and tried by the user. However, the issue, he admits, is the construction of the thermal sensor, which restricts full implementation, but he confirms that the product may be developed in India in another three years. "We started the 'Made in India' journey at 10 percent and have now reached 60 percent in three years, which is quite impressive," he says. "For example, our Aerem 100 is 100 percent indigenous, demonstrating the benefits this platform has provided to entrepreneurs, MSMEs, and others."

Catering to the Indian Army and society

The company has spent over a year attempting to comprehend the requirements and challenges of the Indian Army and the Indian Government. "We built a product on a no-cost, no-commitment (NCNC) basis and had to change it a couple of times after extensive trials at various high levels," Chodankar says. "We were subsequently awarded the contract to supply 44 systems through a bidding process, but we were well placed because we had a fair idea of the application due to our previous journey."

As the applications gain popularity, the company improves and adapts the systems and upgrades the products to meet the detection ranges. "Our existing products can be deployed to detect targets in one day up to 20 km and 10 km at night, but the major problems have been target detections at 50 km, which is indeed a huge quantum jump in technology," he explains. "We're in touch with a couple of global technology providers and plan to have a product by 2023."

The startup also produced fever detection systems to fulfill its growing demand at the onslaught of COVID-19. This is where the electro-optical (EO) sensors played a significant role. With the development of the new software, the company was able to release the product in record time because the hardware was ready and all it needed was to deploy the software.

"Thermal cameras are the ideal solution for fever detection during this COVID-19 pandemic scenario. You can eliminate the risks involved in direct physical contact for recording temperature and ensure the safety of your people. The CCTV cameras are powered by advanced AI technology and body temperature measurement technology to maximize the efficiency of your security systems," he explains.

CELEBRATING SUCCESS WITH CUSTOMERS

Improving productivity for its customers and helping them win is Blaser Swisslube's main goal. The leading manufacturer of high-quality metalworking fluids not only ensures meeting this goal but also celebrates with its end-users their mutual success at the Blaser Productivity Trophy event. Highlights of the recent India edition of the award ceremony that was held in Chennai and more from the leaders at the helm...

Source: Blaser Swisslube

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Productivity, economic efficiency, and machining quality in the manufacturing process depend decisively on the choice of the right coolant. To make this connection visible, Blaser has launched the Blaser Productivity Trophy which aims to acknowledge and honor its customers' extraordinary cooperation and celebrate mutual success. "The 4th edition of the Productivity Trophy India was a great success. Over 120 participants accepted our invite, which makes us very proud," shares Marc Blaser, CEO, Blaser Swisslube AG.

The 2022 edition of the event comprised interesting speeches and a panel discussion about the opportunity of digitalization in the industry, a topic that is becoming more and more important and offers great potential for productivity increase. "As always, we highlighted, in the Liquid Tool Gallery, the achieved improvements together with our customers in terms of productivity, economic efficiency, and workpiece quality. Regarding the response to the event, we see that the customers were very much looking forward to attending a physical event again. The face-to-face exchange is needed and much appreciated," he adds.

Liquid Tool for enhancing productivity

Machining coolants are an important component of metalworking operations. They improve machinability, increase productivity, and extend tool life by cooling and lubricating the part and the cutting tool.

According to Punit Gupta, Managing Director, West Asia (India & SEA), Blaser Swisslube Solutions Pvt Ltd, the company's Liquid Tool Solution is its value proposition to its customers. "All of us at Blaser have a strong belief and we are convinced that it is the right way to move ahead. This belief becomes stronger when we see more and more customers getting benefits out of it," he adds.

When asked how Blaser keeps a tab on the performance of Blaser Swisslube coolants at its customers' site, he replies, "We are fully committed to providing customers with comprehensive solutions rather than merely products. It triggers the role of good maintenance and monitoring systems onsite by customers. We help customers by imparting the know-how and training to their people."

Blaser Swisslube is continuously investing in know-how and facilities – in India and globally. The recent investment in the Country Competence Centre in India (named CCC) is an example of the future-oriented journey of the coolant company. The CCC gives Blaser customers an opportunity to monitor their critical coolant parameters. The CCC is equipped with state-of-the-art laboratory equipment. It is also open for customers and partners for visits and training.

Source: Blaser Swisslube

"With the categories of Tool optimization and Productivity increase, we show that with a tailored coolant solution, the coolant can stay much longer in the tank without exchange. This pays to the account of sustainability and the environment, which is very important as we must take care of the environment."

Marc Blaser
CEO
Blaser Swisslube AG

Sansera Engineering Ltd
Award Category: Tool Optimization

POWER AT ITS MOST LIQUID

Objective: Tool Cost Reduction

Solution: Coolant B-Cool 755

Sansera is an engineering-led integrated manufacturer of complex and critical precision-engineered components across the Automotive and Non-automotive sectors. Its capabilities include manufacturing finished components weighing from 1.75 gm to 8,940 gm.

The production engineering team was looking for technological advancements in the market to best suit the company manufacturing processes and to bring down the overall cost. The Blaser specialists visited the Sansera facility and discussed the added values through the Liquid Tool approach. Blaser suggested testing its high-performance coolant B-Cool 755 formulation.

Over the course of one month, the test data was collected. This intense testing resulted in the optimization of tool cost to the tune of 20 percent along with better consistency. The calculations revealed that the investment paid off within a month and produced a net saving of nearly ₹3.0 million per year.

Towards a greener planet

For the Productivity Trophy 2022, the results in the following categories were evaluated: Sustainability, Tool optimization, Productivity increase, Total costs of ownership, Metalworking Fluid optimization, and Process optimization, with Sustainability being the addition this year.

"Sustainability has been the core foundation of the company since the beginning. In today's manufacturing world, it has become a global requirement for all manufacturing industries to contribute towards a greener planet. More than four decades ago, Blaser Swisslube introduced Blasocut Bio-Concept, a concept that works in perfect harmony with nature. The technology has been able to contribute to the robust process of machining, high productivity, and better machining quality. These emulsions have a unique way of maintaining the long-term bio-stability of metalworking fluid emulsions," explains Gupta.

"With the categories of Tool optimization and Productivity increase, we show that with a tailored coolant solution, the coolant can stay much longer in the tank without exchange. This pays to the account of sustainability and the environment, which is very important as we must take care of the environment," adds Blaser.

He gives an example of FIAT India Automobiles, the winner in the award category, at which the Blasocut 4000 Strong

Machining coolants are an important component of metalworking operations. They improve machinability, increase productivity, and extend tool life by cooling and lubricating the part and the cutting tool.

has been stable and running smoothly for 15 years now. In this case, he says, zero disposal in 15 years is a tremendous contribution towards a greener planet. "It has saved 1.5 million lt of coolant being disposed. In addition, it has also been a big monetary saving. Over this period, ₹36 million could be saved. Such contributions toward a greener planet are only achievable with mutual trust and a strong commitment from our customers and our side. Therefore, I am very proud that we have awarded a sixth category with such a great result. Congratulations to FIAT India Automobiles and our team in India for this great achievement," he notes.

The recent investment in the Country Competence Centre in India (CCC) is an example of the future-oriented journey of the coolant company. The CCC gives Blaser customers an opportunity to monitor their critical coolant parameters.

Knowing the process

With its unique mix of machining experts, customized service, and excellent products, Blaser Swisslube wants to turn the metalworking fluid into a key success factor – a Liquid Tool, says Blaser. "That means whatever material, application, or industry, we want to help our customers to fully capitalize on the potential of their machines and tools," he adds.

He then shares the process implemented by Blaser in analyzing the customers' requirements and handholding them to achieve maximum gains by using Blaser's metalworking fluids, "In our first step, we make a comprehensive analysis of our customers' current production process. We offer this analysis free of charge, as we are confident that we can generate added value for them."

In the next step, the company shares the status report and shows the improvement recommendations. "There we work with our customers to set specific goals and define how they can be achieved. In the third step, we start with the on-site testing. We test our recommended solution in the customer environment. So, our customers see the Blaser coolant in action and experience the improvements firsthand. Finally, we want to assure that the test results match the set goals. This includes on-site training and support also," Blaser adds.

Source: Blaser Swisslube

"Liquid Tool Solution is our value proposition to our customers. All of us at Blaser have a strong belief and we are convinced that it is the right way to move ahead. This belief becomes stronger when we see more and more customers getting benefits out of it."

Punit Gupta
Managing Director, West Asia (India & SEA)
Blaser Swisslube Solutions Pvt Ltd

R&D is crucial

Research and Development is very important to Blaser Swisslube to uphold its benchmarking lead. Its unique R&D facility at its Headquarters in Switzerland is where it tests its latest metalworking fluids and recreates the versatile machining operations of its customers and partners in a realistic way. More than 70 specialists in the laboratory spend every day working together in various disciplines: analysis, chemistry, microbiology, metallurgy, physics, and manufacturing technology.

"At present, research is carried out using four CNC milling machines and a state-of-the-art grinding machine. The latest high-precision measuring devices and sensors enable the data acquired to be interpreted correctly. So, at this in-house facility, our laboratory research team works hand in hand with our manufacturing experts to ensure that our latest metalworking fluids meet the expectations in the customer production halls. For this purpose, we have set up various performance tests in our Technology Center. Only when a new development has cleared all hurdles it is ready for the market," he explains.

"Thanks to our Technology Center, we gain a better understanding of the highly complex manufacturing processes and the interaction of chemistry, microbiology, and mechanics, so that we can continuously improve our cutting fluid developments," says Gupta.

Individual criteria like high-pressure stability, tool wear protection, and additives durability are systematically tested. There is a dedicated expert team, which is constantly looking at the machining of different materials at the center, which helps to judge the impact on productivity.

The Technology Center is equipped with the latest CNC machines as well as state-of-the-art CAD/CAM systems for optimally simulating and thoroughly understanding the customers' production situations.

Fiat India Automobiles Pvt Ltd
Award Category: Sustainability

PROTECTING THE ENVIRONMENT

Objective: Robust Coolant System

Solution: Blasocut 4000 Strong

Fiat India Automobiles Pvt Ltd was established as a joint venture between Fiat Chrysler Automotive and Tata Motors Ltd in 2007. In the same year, Fiat was looking for a reliable coolant partner for large central coolant systems to machine the engine block and head.

For machining these important engine components, the coolant is fed through large centralized coolant systems of 300,000 lt and 260,000 lt each for the engine block and the head.

Blasocut 4000 Strong, a coolant out of Blaser Swisslube's Blasocut line, is still stable and running smoothly for 15 years. The sustainable Blasocut Bio-Concept technology has contributed to achieving a robust machining process, high productivity, and better quality.

Zero disposal in 15 years—this contribution towards a greener planet is immense and unmeasurable. It has saved 1.5 million lt of coolant being disposed of. In addition, it has a monetary saving of ₹7.5 million towards disposal and zero refilling cost, amounting to a saving of ₹36 million in these 15 years.

JKS Precision Engineering Pvt Ltd
Award Category: Metalworking Fluid Optimization

ACHIEVING PRODUCTIVITY AND PROFITABILITY

Objective: To optimize coolant stability and sump life as well as improve tool life

Solution: Coolant Synergy 735

JKS Precision Engineering Pvt Ltd, established in 2012, is a manufacturer of CNC precision components for the Valve, Aerospace, and Medical industry as well as General Engineering. It has state-of-the-art machines, including HMC, VMC, CNC, and CNC automates, and is equipped with 36 CNC machines and CMM.

The company was experiencing coolant challenges like smell, foam, and operator skin itching. With this in mind, a meeting was set up with the expert team from Blaser. The goals were well defined, such as sump life improvement, coolant stability, tool life improvement, and fewer breakdowns.

Blaser suggested Synergy 735, a transparent coolant for a clear view of the machining process. It is free of critical substances such as bactericide, boron, and formaldehyde, making it safe for humans and the environment.

The results were overwhelming with the high-performance Synergy 735. JKS achieved significant improvement in the sump life, coolant stability, and tool life with even overall cost-per-component savings. This optimization achieved an annual saving of ₹2 million for the company's 36 CNC machines.

Aakar Foundry Pvt Ltd
Award Category: Productivity Increase

IN SEARCH OF A SAFE COOLANT

Objective: Productivity Improvement

Solution: Lasocut BC 20 SW

Aakar Foundry Pvt Ltd (Aakar) is a green-field project started in 2007. Today, the group has achieved a revenue of over ₹350 crore and its exports contribute to almost 35 percent of the group revenues. Aakar offers solutions right from prototype development to serial production through HPDC, LPDC, and GDC routes.

After a detailed on-site analysis, the Blaser team presented to the management at Aakar the potential improvements in productivity with the Liquid Tool. Blasocut is based on a unique Bio-Concept which makes it one of the safest formulations in the world for humans and the environment.

The results were promising. The high performance of Blasocut BC 20 SW made it possible to increase productivity across the board in the range of 5-15 percent. This allowed the management to optimize capacity planning.

With this positive experience from Blaser Swisslube, the Aakar team is highly delighted and this was another milestone in the journey of the value-added association of over five years, says Jitendra Lakhotia, CEO, Aakar Group.

JTEKT India Ltd
Award Category: Total Costs of Ownership

OWNING IT!

Objective: Total cost of ownership
Solution: Blasomill HD 15

JTEKT India Ltd (formerly known as Sona Koyo Steering Systems) is a part of JTEKT Corporation Japan and operates as part of JTEKT Group India. With activities focused on four major product technologies: bearings, steering systems, driveline components, and machine tools, JTEKT aims at meeting the high expectations of its customers and winning the trust of society.

JTKET was facing challenges in its production process and was looking for process security, minimum tool failure, as well as improved tool life for its broaching application, which is when it opted for Blasomill HD 15.

The tool costs have been reduced with an improvement in broach life by 17 percent. Annual savings on the tool cost of ₹1.4 million on one broaching machine was achieved. Broach life was also increased from 3,000 to 3,500 components.

The company's new products, particularly in the areas of Neat Oils and Water-miscible Metalworking Fluids including the latest B-Cool Motec 501, and B-Cool MC 610 are already available in the Indian market.

the-art CAD/CAM systems for optimally simulating and thoroughly understanding the customers' production situations.

Catering to Indian customers

Blaser Swisslube has successfully established itself in India over the last 20+ years as a leading technology company. "Our focus has always been to bring solutions that add to customers' competitiveness and productivity. Very high capabilities in R&D ensure that we do everything to maintain and improve our technology. New materials, technological innovations, and ever-improving machine performance constantly challenge our metalworking fluid development and we are happy to bring out innovation for our customers. We want to address the needs of the markets in the best possible way," notes Gupta.

The Product Portfolio is reviewed and adjusted every year. While developing new formulations, Blaser Swisslube always keeps its customers' needs at the center. "We take continuous feedback from the customers in the market, so that the right solution can be given to our customers," he adds.

The company's new products, particularly in the areas of Neat Oils and Water-miscible Metalworking Fluids including the latest B-Cool Motec 501, and B-Cool MC 610 are already available in the Indian market.

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ADVIK Hi-Tech Pvt Ltd (AHPL)
Award Category: Process Optimization

OPTIMIZING THE PROCESS

Objective: Process optimization (reduction in rejection, better surface finish, and no more bad odor)
Solution: Blasocut 2000 Universal

ADVIK Hi-Tech Pvt Ltd (AHPL) is one of India's leading automotive component manufacturers on a global scale. The ADVIK plant in Chakan experienced issues of size variation and poor surface finish, which was leading to the rejection of machined components. Additionally, there was a foul smell of coolant in the factory.

Overall, there was an urgent need to work on process security. The project started with great enthusiasm at ADVIK using the Blasocut formulation. Blasocut is based on a unique Bio-Concept which makes it one of the safest formulations in the world for humans and the environment.

The high performance of Blasocut 2000 Universal made it possible to improve surface finish and achieve process security. There was also a remarkable reduction of up to 95 percent in rejections. The surface finish achieved was superior across all the components. The challenge of foul smell was also eliminated, providing an improved work environment.

MEETING MARKET NEEDS

Mekhos Technology Services, an SME that provides assembly and testing solutions to customers for their industrialization needs, successfully met its client's specific needs, leading to improved productivity, reduced manpower, and increased savings.

Source: Mekhos Technology Services

Actuant Layout

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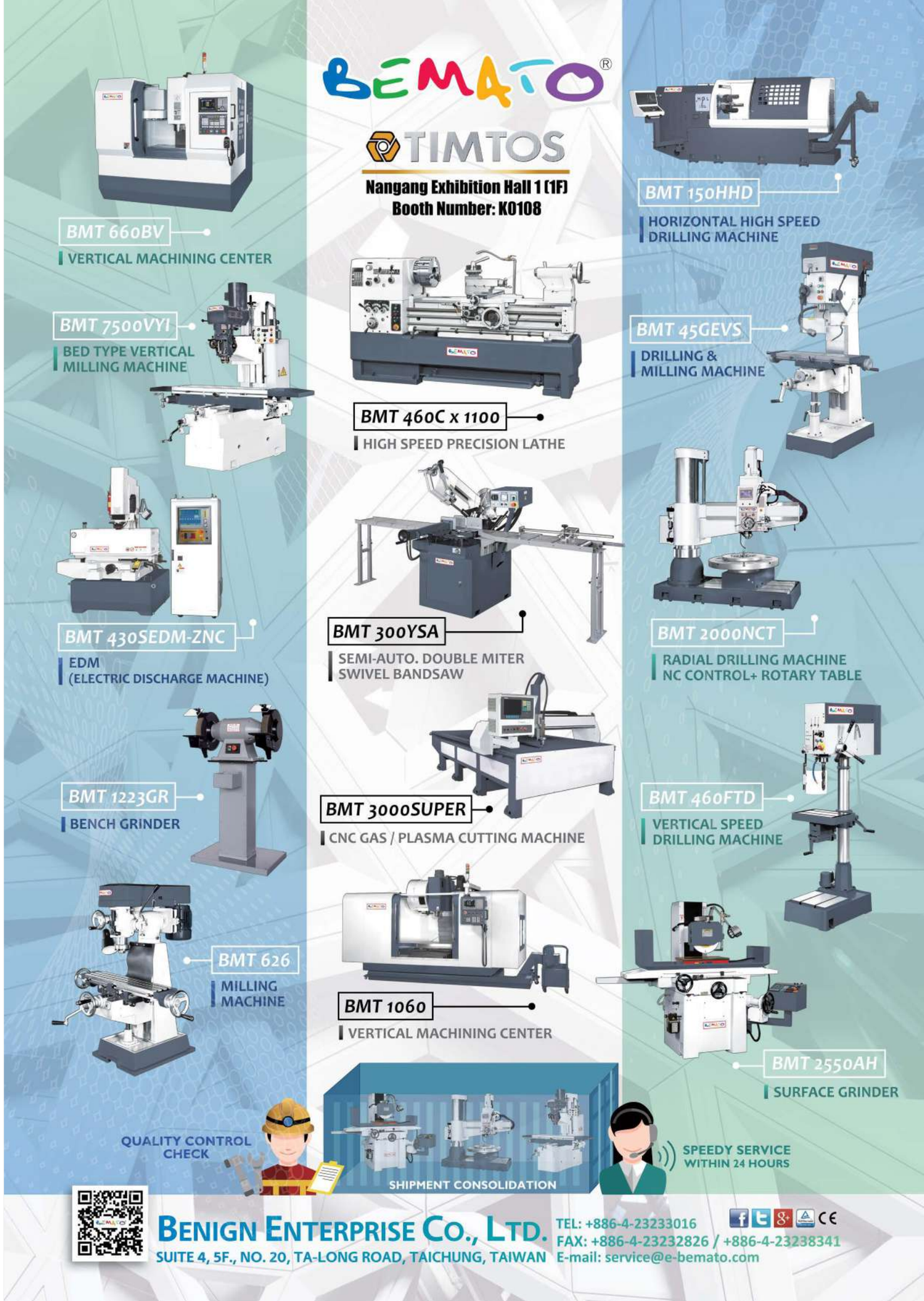
Mekhos Technology Services Pvt Ltd supplies automatic assembly lines, assembly machine technology, and automatic testing machines across a range of industries. Its solutions are custom designed to suit the product quality and productivity requirements of the customer. Founded in 2015, the company today is run by 140 tech enthusiasts whose innovative spirit has made it the National Productivity Championship Winner at the recently held Indian Machine Tool Manufacturers' Association's National Productivity Summit in Bangalore.

The following case study is what made it the winner. In this particular case, the customer was a manufacturer of Cabin Latch units for different OEMs at global locations. They produce multiple variants of these latches. The core function of the product remains the same, but the variants are different in terms of dimensional variances and child parts.

The requirement floated to Mekhos included an assembly and testing solution for the latch that must meet quality and productivity specifications. The objective was to create an assembly and testing line that would use only eight operators to assemble the latch unit, instead of the 28 that were being used. The existing line had its share of limitations, including the inability to handle newer variants within the existing machines, a high rejection rate, missing Poka-Yoke, and the inability to collect and process data. Each variant had a different set of child parts, assembly parameters, and operations. The mammoth task was to design a single assembly line that could take care of the assembly of all the variants, since having a separate machine for each variant was not a feasible option.

Three main assembly lines for the latch and one offline assembly line for the hydraulic cylinder were running at a cycle time of 72 sec/line three shifts in a day to produce the required output at an estimated OEE of 85 percent. Some of the problems faced included high rejection rates because of the lack of



Poka-Yoke and process control, which increased the per-piece cost of the output. Running the line in three shifts was expensive because of the extra wages paid to the night shift workers and other overheads involved. The changeover time from variant to variant was high, around 30 min, which significantly impacted productivity. Another main problem with the existing line was that the end-of-line testing machine was not capable of testing all the variants. Hence, the end-of-line testing consisted of separate machines, each to test one particular variant.

With these and other problems at hand, the new line had to be designed with decreased manpower which would run in only two shifts. It had to have all the required Poka-Yoke and end-of-line checks to reduce the rejections. The riveting process needed to be a closed-loop system to ensure better process control, and the changeover time needed to be less than 5 min.

With improved machine process capability and overall equipment efficiency, the total output was drastically increased. This meant what once took three shifts to manufacture, took only two. This had a direct impact on energy consumption and carbon footprint.

Trying out solutions

Multiple solutions were tried; process failure mode analysis, cycle time analysis, risk analysis, and man-machine movement analysis were performed. Based on the data, a final solution was accepted. The company started with process mapping. Process mapping for each variant was performed to study how a common process could be developed across all variants. Each variant was analyzed individually for the process-specific details and the child parts involved in it, marking the important process parameters to be achieved. Upon analysis of each variant, the data was assimilated, and all the processes across all variants were mapped. The distinguishing elements in each variant and the points of similarity were drawn to analyze how a smooth flow of man and material across variants can be achieved. Based on this study, the single-piece flow concept was stabilized by balancing the line for each model, which is used for the detailed cycle time study across all variants. This study also highlighted the difference in the process for each variant, which was further used during design to stabilize relevant Poka-Yoke in the line-specific variants.

Source: Mekhos Technology Services

Source: Mekhos Technology Services

"The requirement floated to Mekhos included an assembly and testing solution for the latch that must meet quality and productivity specifications. The objective was to create an assembly and testing line that would use only eight operators to assemble the latch unit, instead of the 28 that were being used."

Anurag Batsal
Director-Sales
Mekhos Technology Services

Based on the identified failure mode from the PFMEA of the customer, Poka-Yoke was stabilized in the line. Different layouts were tried, and analysis using the software was done to arrive at the most optimum layout. The automatic part of the machine was simulated using software and mathematical calculations to arrive at the cycle time of each section, along with software analysis, a physical model of the machines was developed, and manual time was simulated to confirm the presented cycle time of each variant.

An extensive cycle time study was performed for each activity for each variant per station. A man-machine diagram was plotted across variants. Based on the output generated, the productivity plan for the full line was generated. With the above analysis, the cycle time for each variant was generated against the requirement. Along with the mathematical calculations, a physical model of the machine was generated and manual time simulation was carried out to support the study.

The complete product and quality requirements were extensively studied, and based on that, a concept was developed for the production line. Some major innovative concepts, with a comparison with the old production line, are drawn out below.

Achieving goals

The machine was designed and made in India and shipped to the Netherlands in Europe. With improved machine process capability and overall equipment efficiency, the total output was drastically increased. This meant

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Sl. No.	Pointers	Old Concept	New concept
1	**Mode of Riveting in Latch:** There are a total of 8 rivets (Changes based on the variant selected) that need to be installed on the top and bottom plate	All riveting on the plate was done in a single stroke using an 80-tonne press.	Servo Gantry System is used to move the fixture to the required location, and one riveting is done at a time.
2	**Process input parameters for riveting**	There was no dedicated process input parameter control.	For each rivet, the pressing load and stroke are controlled.
3	**Grease Dispensing**	Manual greasing was done.	Volumetric controlled automatic greasing design is implemented so that quantity can be controlled and that grease dispensing feedback is possible.
4	**WIP**	The batch production concept is used in the machine, thus there is WIP at every station.	Single Piece Flow is used.
5	**Traceability**	No Poka-Yoke system is available.	The Laser marking machine inscribes a data matrix code with all process parameters.

The main idea behind this program was to improve the bottom line with the given revenue. Direct manpower in the production line was reduced by 71.4 percent, which resulted in a direct saving of ₹12.8 crore.

Source: Mekhos Technology Services

what once took three shifts to manufacture, took only two. This had a direct impact on energy consumption and carbon footprint. Further, since the process was optimized using automation, consumable waste was also significantly reduced. The main idea behind this program was to improve the bottom line with the given revenue. Direct manpower in the production line was reduced by 71.4 percent, which resulted in a direct saving of ₹12.8 crore. The rejection rate in the line was improved, resulting in a direct saving of ₹1.275 crore annually. Direct material consumption in the line was reduced in terms of grease, which resulted in a saving of ₹0.6370 crore. Tool life increased by five-fold, reducing the running cost of the line.

The client was able to generate substantial savings through the implementation of the assembly line and recover the investment made on the project in just eight months.

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OPTIMIZING DESIGN USE

With the aim of inspiring managers and leaders to design and innovate the next generation of products on a single business platform, Dassault Systèmes organized 3DEXPERIENCE Modeling & Simulation Conference MODSIM 2022 on November 24 in Bengaluru, with a focus on game-changing technology from CATIA and SIMULIA.

Source: Dassault Systèmes

MURALI SUNDARAM
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The product design process is at a breaking point now, and legacy processes are failing to meet tight and critical requirements. MODSIM—integrated modeling and simulation—ensures early design exploration. In this vein, Tarik Chaib, Chief Technology Officer, CATIA, Dassault Systèmes, discusses the platform and the significance of the 3DEXPERIENCE Modeling & Simulation Conference.

"Today, we seek to decrease production costs and ensure that, at the end of the day, we produce faster, cheaper, and greener, which is quite simple. We must integrate the model and simulation into a platform that will allow us to reduce time to market, boost productivity, develop a collaborative community of users, and eliminate physical testing," he states.

The digital 3DEXPERIENCE platform brings together continuous integrated modeling and simulation that breaks down silos to improve collaboration, minimize risk, maximize performance, supercharge designers, expedite sustainable innovation, and realize the value of unified CAD & CAE.

MODSIM 2022

Chaib shares the objective of hosting MODSIM 2022, "It is to provide our customers and attendees the opportunity to fully explore the benefits of moving to an integrated design and simulation approach. We wanted to showcase how the 3DEXPERIENCE platform provides advanced technologies and solutions for multidisciplinary design, modeling, multi-physics simulation, and optimization, and how the MODSIM environment can ensure a single source of truth for data and additionally maintain data compatibility at all times."

The conference featured keynote speakers from prominent OEMs who demonstrated the benefits of modeling and simulation and how it aids in future-proofing design methods. Furthermore, users who are transitioning to the MODSIM approach shared their perspectives and demonstrated industry workflows, putting MODSIM to the test.

He shares his views on how the conference empowers attendees to reap the benefits of moving to an integrated design and simulation approach. He says, "Through the 3DEXPERIENCE platform, modeling and simulation are tightly integrated into a unified experience called MODSIM. It enables companies to make computational testing with physics-based simulation a foundational part of their innovation process, resulting in less real-world testing and prototyping while lowering cost and reducing risk, which cannot be achieved with disconnected tools. As a result, little or no redesign is needed, physical certification testing is successful, and high-quality products can get to market faster."

Source: Dassault Systèmes

"The first priority for us is to make sure we build proximity and presence, meaning that we train our partners properly so they can serve the clients well. Our clients in India are spread over several sectors; a few examples include Mahindra & Mahindra, Ashok Leyland, VECV, Royal Enfield, Hero, Renault, Unominda, Sandhar, Aerospace PSUs, and Aditya Birla.**"**

Tarik Chaib
CTO, CATIA
Dassault Systèmes

Market penetration in India

Recognizing the enormous potential of emerging sectors and the Government's push, the Indian market is expanding its footprint in innovation. India Inc is laying the groundwork for future growth by embracing new technologies. Speaking on the deployment of its software in the Indian market, Chaib explains, "The first priority for us is to make sure we build proximity and presence, meaning that we train our partners properly so they can serve the clients well." Dassault Systèmes' clients in India are spread over several sectors. A few examples include Mahindra & Mahindra, Ashok Leyland, VECV, Royal Enfield, Hero, Renault, Unominda, Sandhar, Aerospace PSUs, and Aditya Birla.

Emphasizing R&D, he states, "Currently, Dassault Systèmes has R&D centers in Pune and Bengaluru, which are driving innovation for all 12 target industries. The capacity of the key Indian sectors to adopt the next-generation platforms is quite strong, as we have seen a significant increase over the past few years." He continues, "While the Automobile sector was the largest adopter of Dassault Systèmes' technology over the past four years, construction and general mechanics are the biggest adopters now. We are also making big strides in Aerospace, especially with the multiple ongoing investments in the competency center in Bangalore."

The digital approach

Many industries in India are undergoing a digital revolution. Chaib adds, "We are proud to work with companies across 12 different industries to help them innovate by implementing the MODSIM approach. The key industries that are leveraging the most from implementing modeling and simulation are Transportation & Mobility, Aerospace & Defence, Industrial Equipment, Construction, Cities & Territories, and Energy & Materials. In all of these industries, there is an imminent need for sustainability—encouraging green initiatives on the one hand and protecting the business from dynamic market changes on the other."

The MODSIM approach aids in the transformation of operations and the realization of the benefits of a more customer-centric and innovative approach to designing strategies and making quick decisions. It enables companies to adapt their manufacturing processes to suit the demands of a continually changing market. "Digital connectivity can empower businesses to design, develop, and deliver the products that consumer wants when they want it, and at a competitive price, making companies more resilient and flexible," he stresses. "Dassault Systèmes' 3DEXPERIENCE platform combines the virtual world of modeling and simulation with the real world of operations to provide a complete solution to value network stakeholders, including suppliers, manufacturers, logistics and transportation providers, service operators, and workforces."

Dassault Systèmes' 3DEXPERIENCE platform combines the virtual world of modeling and simulation with the real world of operations to provide a complete solution to value network stakeholders, including suppliers, manufacturers, logistics and transportation providers, service operators, and workforces.

Company Index

Aakar Foundry Pvt Ltd 60
Ace Micromatic Group 32, 52
ADVIK Hi-Tech Pvt Ltd (AHPL) 60
AFM Cluster 24
AMT – The Association For Manufacturing Technology 24
Blaser Swisslube AG 60
Blaser Swisslube Solutions Pvt Ltd 60
Carl Zeiss India (Bangalore) Pvt Ltd 32
CERATIZIT India Pvt Ltd 32
Chennai Metco Pvt Ltd 32
Dassault Systèmes 72
Eppinger Tooling Asia Pvt Ltd/ESA Eppinger GmbH 32
Fagor Automation 24
Fiat India Automobiles Pvt Ltd 60
Indian Machine Tool Manufacturers' Association (IMTMA) 08, 10, 14, 24
Japan Machine Tool Builders' Association (JMTBA) 24
Jidoka Technologies 20
JKS Precision Engineering Pvt Ltd 60
JTEKT India Ltd 42, 60
Jyoti CNC Automation Ltd 32
Mastercam India 32
Mekhos Technology Services Pvt Ltd 66
Micromatic Grinding Technologies Pvt Ltd (MGT) 42
Micromatic Machine Tools Pvt Ltd 42, 52
Myelin Foundry 38
Nimble Machines - A strategic business unit of UCAM Pvt Ltd 32
RRP S4E Innovation Pvt Ltd 54
RV Forms & Gears 18
Sansera Engineering Ltd 60
Stamp 'It Robotai & Solutions Pvt Ltd 32
Taiwan Association of Machinery Industry (TAMI) 24
Tata Motors Passenger Vehicles Ltd 46
VDW (German Machine Tool Builders' Association) 24
Zavenir Daubert India Pvt Ltd 32
Zhuzhou Cemented Carbide Cutting Tools (ZCC-CT) 50

Advertiser Index

ACMEE 2023 – www.acmee.in ..... 06 & 07
Beckhoff Automation Pvt Ltd – www.beckhoff.com/c60xx 15
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Ching Hung Machinery & Electric Industrial Co., Ltd – www.chmer.com 59
CHIRON India Machine Tools Pvt Ltd – www.chiron-group.com 11
DEES Hydraulic Industrial Co., Ltd – www.deesgroup.com.tw 55
DMG MORI – https://clx-450-tc.dmgmori.com 23
EPLAN Software and Services Pvt Ltd – www.eplan.in 45
FIBRO India Precision Products Pvt Ltd – www.fibro-india.com 21
Gedee Weiler Pvt Ltd – www.gdweiler.com 31
Hann Kuen Machinery & Hardware Co., Ltd – www.hardy-tw.com 41
IMTMA - ACE Micromatic Productivity Championship Awards 2023 – www.productivity.imtma.in 69
IMTMA – www.imtma.in 71
Jyoti CNC Automation Ltd – www.jyoti.co.in 03
Lakshmi Machine Works Ltd (LMW) – www.lmwcnc.com 05
Marposs India Pvt Ltd – www.marposs.com 29
Okuma India Pvt Ltd – www.okumaindia.com 37
Quaker Houghton – www.quakerhoughton.com 17
RV Forms & Gears LLP – www.rvformsandgears.com 75
Siemens – www.siemens.co.in/imtex 02
Taiwan Takisawa Technology Co., Ltd – www.takisawa.com.tw 53
TIMTOS 2023 – www.timtos.com.tw 57
Yamazaki Mazak India Pvt Ltd – www.mazak.in 76
Zavenir Daubert – www.zavenir.com 27
ZCC Cutting Tools Co., Ltd – www.eng.zccct.com 13

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