VOL 6, ISSUE 3 - SEPTEMBER-OCTOBER 2022

MODERN MANUFACTURING INDIA

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The Official Magazine of
Indian Machine Tool Manufacturers' Association

In Association with
Modern Machine Shop

SEMICONDUCTORS: TAPPING SUNRISE OPPORTUNITIES

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Productivity Summit 2022

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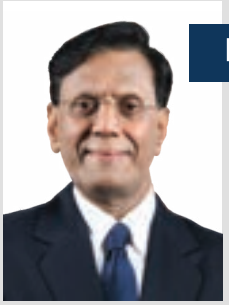
Key Take Aways

- Insightful plant visits to renowned manufacturing companies
- Learn and benchmark from best manufacturing practices
- Listen to keynote presentations from industry leaders
- Learn innovative approaches to address productivity challenges
- Exchange new ideas and concepts – Knowledge networking
- Ideal platform to interact and network with several manufacturing professionals
- Knowledge sharing sessions on best practices in Micro & Small Enterprises

Industry Leaders speak

Dr. Gopichand Katragadda

Founder & CEO
Myelin Foundry



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TVS Motor Company

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For details or any queries/clarifications during 'Online registration' process, contact
Abhishek, Mob: 9844294387, (abhishek@imtma.in) | Madan, Mob: 7899437625, (madan@imtma.in)

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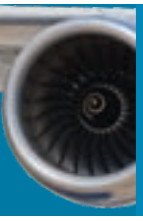

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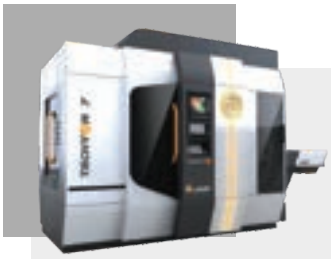

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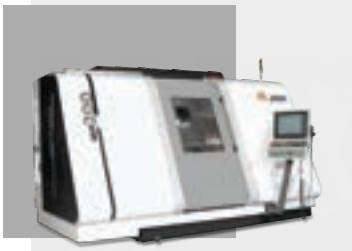

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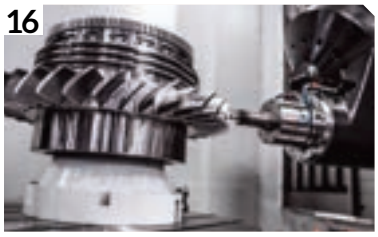

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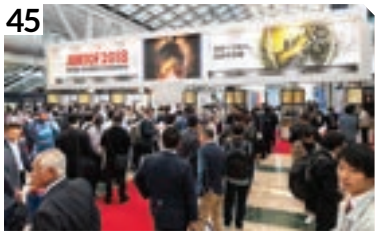

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DIRECTOR GENERAL, IMTMA

EDITORIAL
Editor-in-Chief
Soumi Mitra

Chief Copy Editor
Poonam Pednekar

Senior Sub-Editor
Sovan Tudu

Correspondent
Arunima Nath

Design
Magic Wand Media

SALES & MARKETING
Indian Machine Tool Manufacturers' Association (IMTMA)

Murali Sundaram, Magic Wand Media Inc
murali.sundaram@magicwandmedia.in

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TOWARDS THE NEXT LEVEL OF MACHINE TOOL GROWTH

Source: BFW

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

It gives me immense pleasure to connect with the readers of Modern Manufacturing India (MMI) magazine.

The Indian Machine Tool industry's half-yearly results for FY 2022-23 have been encouraging in terms of production, consumption, and exports. Order booking for the coming quarter looks promising. The primary drivers for this turnaround are auto sector performance, the non-impact of geo-political challenges, and industries exploring alternative sources to propel growth.

The Production Linked Incentives (PLI) schemes extended by the Union Government have brought in capital investments that have reinvigorated manufacturing. The year-on-year investments in capital expenditure are bringing business to the Machine Tool industry.

Industries are also working towards increasing their domestic market share through the localization of imports. In a rather positive development, industries are coming together as cohorts to build products and technologies in collaboration with academic institutions. I urge the manufacturing fraternity to work together and develop high-technology and high-value products.

Meanwhile, to champion the cause of productivity and enhance competitiveness in the Indian Manufacturing industry, Indian Machine Tool Manufacturers' Association (IMTMA) is organizing the 16th edition of National Productivity Summit 2022 on November 18-19, 2022, at Bangalore International Exhibition Centre (BIEC) in Bengaluru. The event will showcase best practices in manufacturing through inspiring keynotes, plant visits, and live case study presentations. Manufacturing industry professionals from various industry sectors are expected to participate in the event.

I am also pleased to share that IMTEX 2023, scheduled from January 19-25, 2023, at BIEC, Bengaluru, will have Tooltech and Digital Manufacturing as concurrent shows. The exhibition has garnered positive interest with over 850 exhibitors from 20 countries.

I hope to see you all at IMTEX 2023.

Happy reading.

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

Dear MMI Readers,

It gives me immense pleasure to present my first-ever Publisher's Note to the readers of Modern Manufacturing India (MMI) ever since I took over the reins of Indian Machine Tool Manufacturers' Association (IMTMA) as its Director General & Chief Executive Officer.

MMI is an ideal platform for the global machine tool and manufacturing fraternity to stay acquainted with the latest developments through well-curated articles. IMTMA has always made efforts to provide relevant information to Manufacturing industry stakeholders through MMI, and we will continue this endeavor through data-driven research and analysis in our decision-making in every sphere.

The manufacturing environment in the post-pandemic period is definitely encouraging, with industries exhibiting better growth in FY22 as against FY21. India has been working towards managing inflation and stabilizing the economy, but as we see with global economies being under pressure for various reasons, India too needs to brace up to meet the challenges ahead.

The manufacturing environment in the post-pandemic period is definitely encouraging, with industries exhibiting better growth in FY22 as against FY21.

In harnessing the potential to unlock and drive change, we bring you the current issue of MMI, which centers on the power of manufacturing with insightful articles on technologies that are driving businesses. Readers will also find an article on IMTEX that is coming back in its physical avatar after a long gap of four years.

I should certainly mention that the kind of support we have received from manufacturing communities worldwide has been overwhelming. We remain thankful and look forward to your continued support. I hope that readers find the contents of this magazine very useful, and if you have any suggestions for improvement in the future, please write back to us. I also extend my wishes to you and your family to have a great festive season.

Happy reading.

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www.chiron-group.com

SOUMI MITRA
Editor-in-Chief
Modern Manufacturing India
soumi.mitra@magicwandmedia.in

POWER OF **PERSISTENCE**

India is presently reaping the fruits of her persistence in inching closer to the 'Make in India' mission. Our pro-growth manufacturing trade and industrial policies and global rising frangible supply chains are the raison d'être to bring more international companies to the country. Large corporations are setting up shops in India to diversify their manufacturing base and expand their export sources.

In September, for the first time, India's monthly exports of mobile phones crossed ₹8,200 crore. Our electronics exports crossed US$16 billion in FY 2021-22, making us the sixth-largest exporter in the world. Mobile phones constitute the largest component of electronics exports from India, and are expected to contribute 50 percent of total electronic exports by next year.

The benefits of implementing the Production Linked Incentive (PLI) scheme are beginning to show. The government's objective is to broaden the electronic manufacturing space and attract global players to set up production bases in India. The aim is to make India a value creator in the supply and value chains rather than just being a commodity exporter. To this end, the Government has modified the ₹76,000 crore PLI scheme to accelerate investments in the Semiconductor industry and reduce reliance on imports.

Consequently, the burgeoning Electronic sector is slated to provide a plethora of business opportunities for the Indian Manufacturing sector. With all this growth happening, wouldn't it be fascinating to view up close what all we have come to manufacture and offer to the global market? Hence, the present MMI issue is created to provide a sneak peek into the extensive collection of products and technologies that awaits our manufacturing fraternity at IMTEX 2023 & Tooltech 2023 and Digital Manufacturing, making it a must-attend show for all those belonging to the industry.

> *"The competitor to be feared is one who never bothers about you at all but goes on making his own business better all the time."*
>
> *- Henry Ford.*

We urge you to be part of the face-to-face expo happening at Bangalore International Exhibition Center (BIEC) from January 19-25, 2023, and make the most of it.

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GEARING UP FOR THE NEXT GROWTH PHASE

At the 76th Annual General Meeting (AGM) of the Indian Machine Tool Manufacturers' Association (IMTMA), President Ravi Raghavan spoke about the encouraging signs of recovery in the Indian machine tool sector, the impetus by the Government, association activities, outlook, and future aspirations, and how these factors will combine to make India one of the top machine tool building nations.

Source: Magic Wand Media

L-R: Rajendra Rajamane, Vice-President, IMTMA; Prof (Dr) NR Bhanumurthy, Vice Chancellor, Dr. B. R. Ambedkar School of Economics University; Ravi Raghavan, President, IMTMA; and Jibak Dasgupta, DG & CEO, IMTMA, at the 76th AGM.

SOVAN TUDU
Sub-Editor
Magic Wand Media Inc
Sovan.tudu@magicwandmedia.in

IMTMA held its 76th Annual General Meeting (AGM) on September 28, 2022, at the Bangalore International Exhibition Centre (BIEC), Bengaluru. Ravi Raghavan, President, IMTMA; Prof (Dr) NR Bhanumurthy, Vice Chancellor, Dr. B. R. Ambedkar School of Economics University; Rajendra Rajamane, Vice President, IMTMA; Jibak Dasgupta, Director General & CEO, IMTMA; Past Presidents of IMTMA; Executive Committee Members of IMTMA; and Members of the Association were among the dignitaries in attendance.

Building lasting momentum

Dr Bhanumurthy spoke at length about the current situation of the Machine Tool industry in India and how the country's rapid economic development is being fueled by capital expenditures (CapEx). The good business performance of India's Machine Tool and Manufacturing sector in 2021-22 is expected to continue.

IMTMA has held the industry together by facilitating the Manufacturing industry's growth through various initiatives. "There's been a big indication of the positivity of the whole economic scenario, which indicates an economic expansion of the country," stressed Raghavan. "The industry has exhibited growth with greater resilience in FY22. The country has crossed US$400 billion in merchandise exports in 2021-2022, which is a big achievement for us as a country and is being looked upon by the global players as an alternate source for supply chains in different industrial verticals."

In FY 21-22, India was also a preferred investment destination with FDI equity inflows, recording a 76 percent rise, with the rise in FDI exceeding 23 percent in the post-COVID period. Good business traction has been established thanks to the Government's efforts to make India a manufacturing

powerhouse through a variety of policy measures.

Raghavan emphasized the Government's strategic initiatives, such as the domestic production of 209 defense items and reducing defense imports. The Machine Tool industry can now build increasingly sophisticated machinery and tools to meet demand, creating a multiplier effect on induced job growth. Claiming that the current capital goods market size was US$42.2 billion, he revealed, "According to a study we conducted last year for the Government, the Capital Goods sector will grow from US$40-US$43 billion to US$100 billion by 2026-27 and US$1 trillion by 2047. The Machine Tool industry will continue to play this role in the future."

Working towards a vision

"I'm confident that the executive committee, with the deep commitment, support, and earnest efforts of members, will lead IMTMA to greater achievements in the coming years," Raghavan stated, listing aspirations that the association can pursue collectively to make India a manufacturing leader.

He explained the Machine Tool industry's vision of becoming one of the top eight machine tool-building nations by leveraging world-class R&D and delivering innovative solutions and services to customers. "IMTMA and its members must constantly seek ways to increase the Manufacturing sector's contribution to about 25 percent of India's GDP. This is possible with a healthy and proactive Machine Tool industry," he added further. "Our industry must increasingly prioritize exports. This is an opportune time for us. All to change our mindset and go big."

Raghavan also assured that IMTMA would do everything possible to facilitate industry participation in this process. "Young new-generation entrepreneurs, such as UDAAN members, must take the lead. They must drive companies with a growth mindset and bring innovative solutions, pivotal products, and technologies that can revolutionize our industry and elevate us to a serious player in the global landscape. The IMTMA Secretariat will facilitate and support members on this journey," he concluded.

Milestones achieved in 2021-2022

- During the year 2021-22, IMTMA conducted a total of 316 programs, inclusive of 165 online training programs and 96 webinars for students and industry professionals.
- Apart from mega events like Symposium on Automation & Robotics 2021 (virtual event), National Productivity Summit 2021 (virtual event), and Machine Tool Industry Summit 2022 (in-person event), IMTMA also organized the flagship event IMTEX FORMING, Tooltech, and Digital Manufacturing, after a two-and-a-half-year hiatus.
- IMTMA's flagship event IMTEX FORMING, Tooltech, and Digital Manufacturing 2022 featured 350 exhibitors from 19 countries and evoked an overwhelming response from the manufacturing community.

Source: IMTMA

Industry stalwarts attending the session.

In FY 21-22, India was also a preferred investment destination with FDI equity inflows, recording a 76 percent rise, with the rise in FDI exceeding 23 percent in the post-COVID period.

Source: IMTMA

Prof (Dr) NR Bhanumurthy, Vice Chancellor, Dr. B. R. Ambedkar School of Economics University delivering the keynote at the event.

IMTEX 2023, TOOLTECH 2023 & DIGITAL MANUFACTURING 2023: SUCCESSFULLY ADDRESSING MANUFACTURING NEEDS

The flagship event for the Indian metal cutting industry IMTEX is back with a renewed spirit to once again offer its ideal platform for exploring industry trends and innovations, studying the ever-evolving market needs, connecting with like-minded people, and gaining insight from industry experts.

Source: IMTMA

After a long gap of four years, Indian Machine Tool Manufacturers' Association (IMTMA) is coming back with IMTEX, the keenly awaited exhibition on metal cutting machine tools and manufacturing technologies. IMTEX 2023 & Tooltech 2023, along with Digital Manufacturing, will be held at Bangalore International Exhibition Centre (BIEC), Bengaluru, from January 19–25, 2023.

Many other concurrent events, such as the International Seminar on Manufacturing Technologies, which will be held one day before IMTEX on January 18, 2023; i2 Academia Pavilion to familiarize academic institutions with the Manufacturing industry; a live demo on Industry 4.0 concepts; and the international buyer-seller meet, will make the exhibition even more exciting.

Making the manufacturing industry competitive

IMTEX, with a rich history of over 50 years, has always showcased paradigm shifts in technologies and trends in the Machine Tool industry. The exhibition has always provided a conducive environment for the manufacturing fraternity to meet and exchange ideas, shed light on the developments that will shape the industry's future, and discover solutions to all technology and business-related challenges. This industry-empowering platform has been a single destination where small and large companies could see the latest machines in a live format and experience current and emerging technologies. All global manufacturers of machine tools interested in doing business in India participate in the show. Interestingly, IMTEX is a watch-and-learn model show where everything is meticulously planned and executed. The members of IMTMA and the pioneers of IMTEX bring their vast experience gathered from international shows to make the exhibition memorable for all participants.

Source: IMTMA

Once at IMTEX, always at IMTEX

Often, leading exhibitions are organized by event or exhibition companies. However, IMTEX is one rare industrial show that is organized by an industry association IMTMA, at a purpose-built venue BIEC. The exhibition is conducted for the benefit of IMTMA member companies that are machine tool manufacturers or firms representing various industry sectors. IMTEX thus creates a homogenous ecosystem for the entire machine tool world by showcasing the transformation of the Machine Tool industry over the years in terms of quality, technology, and competitiveness. The show inspires manufacturers with such intensity that firms focusing on new products do so with definite budgets and unlimited effort. Companies, however, must be innovative and relevant since customers constantly look for something new and advanced. The exhibition's robust global stature is amply evident, as any country with a strong Machine Tool industry does not miss out on participating in IMTEX. IMTMA's mutual ties with international machine tool and trade associations ensure that many global countries are represented at IMTEX, either as participants or visiting delegates. Heads of organizations, leading industrialists, and professionals from various geographical regions throng IMTEX. Simultaneously, Indian machine tool manufacturers have always felt compelled to participate in IMTEX at any cost. The unspoken slogan has always been—'If you are not at IMTEX, then you are not in business'.

Ease of doing business

The futuristic outlook of IMTEX reflects in the way it is organized and the conduct of exhibitors and visitors. Quality improvement in services and systems is a continuous process. Being the best professionally managed exhibition in India, IMTEX has never cut corners or compromised on excellence. The trade fair offers business visitors a wholesome, enriching, and fruitful experience with best practices from the Exhibition industry being adopted every year during the show. IMTMA ensures its smooth running, right from the floor plan to truck entry and dismantling of exhibits. After each edition, feedback from exhibitors and visitors is evaluated, encouraging the Association to come back with a stronger IMTEX year-on-year.

Creating a new experience

IMTEX has always set high benchmarks. It has been a path breaker for the Machine Tool and Manufacturing industries. It has been a prestigious platform for participation, particularly for user industries. Good evidence of IMTEX's global recognition is that today, international industry associations and organizations are evincing an interest in investing in its next stage of growth. The show has always been a technology trade fair, and from where it stands today, it is certainly seen as a link between technology and high consumption-driven economic growth in India. Rightfully, IMTEX 2023 will have the coming together of new-age technologies under the Digital Manufacturing banner. It is going to be an exciting time for IMTMA with the twin-fold job of consolidating members and easing them into new technologies with due exposure, education, and training. The buzz of excitement at IMTEX 2023 will grow in intensity as January 2023 nears and every new technology finds its way into BIEC.

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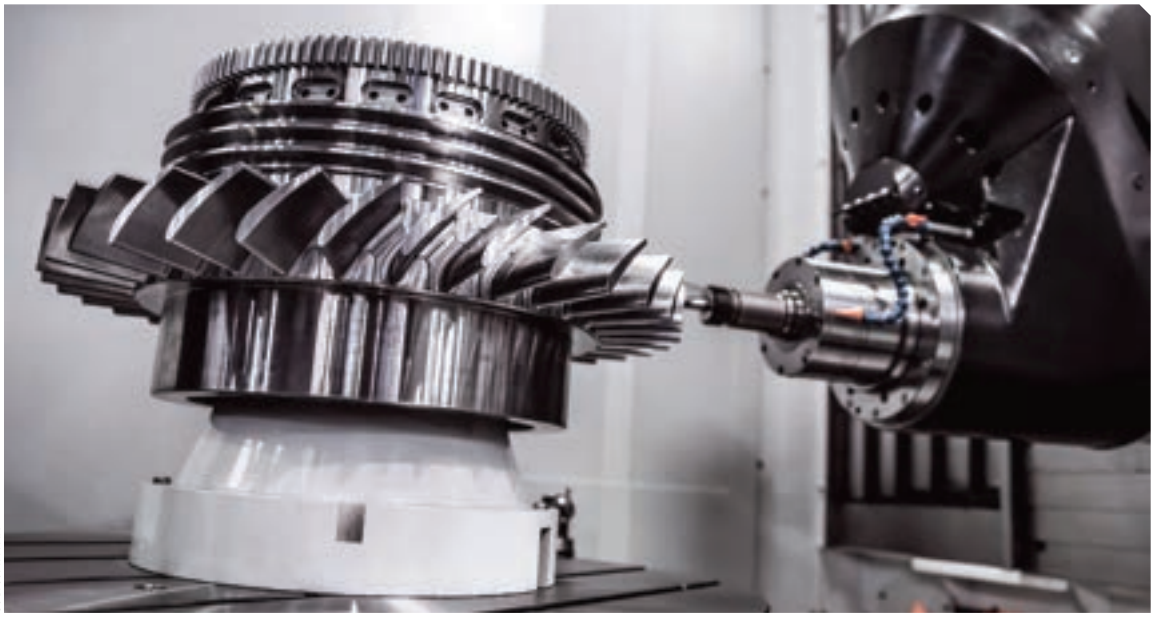


Source: IMTMA

WHERE IoT MEETS SUSTAINABILITY

Using smart technologies to reduce energy consumption isn't new for the manufacturing sector, but the challenges of implementing these technologies on-site have long been a barrier to adoption. Here is a little advice to the metal cutting industry on implementing smart factory solutions—both to reduce carbon and increase profits.

Source: Sandvik Coromant

The Groupe Speciale Mobile Association (GSMA) has urged industry leaders to scale up their use of smart technology in the race towards net-zero and predicts that doing so could contribute up to 40 percent of the required global emission reductions. In its research on the Internet of Things (IoT) and carbon reduction, the association estimated that in the manufacturing realm, 16 percent of the carbon reduction required to achieve net-zero could be achieved using smart manufacturing processes. That is the equivalent of 1.4 gigatonne of CO_2 or the emissions of 140 million cars.

Considering these extraordinary figures, one must ask: why, in an industry that first coined the phrase 'Industry 4.0' over a decade ago, have smart technologies not been universally deployed? In fact, it is reported that just 1 percent of the Manufacturing industry is currently using connected technology.

The most common barrier to smart technology adoption in manufacturing is a lack of understanding of how easily these tools can be implemented. Casting our minds back to the inception of Industry 4.0—a phrase originally used at Germany's Hannover Messe exhibition in 2011—smart factories were regarded as futuristic plants that would bear little resemblance to real manufacturing sites. Today, we understand that digitalization doesn't necessitate an entire plant overhaul and is more often achieved incrementally through scalable IoT technologies and big data.

Gaining data using IoT

Every manufacturing facility generates huge volumes of data each day, either knowingly or unknowingly. Without question, data is the most valuable asset in manufacturers' efforts to reduce carbon emissions. However, many manufacturers are not putting this asset to its best

JÖRGEN FRIESENDAHL
Global Offer Manager for Data Driven Machining
Sandvik Coromant

use. Without facility-wide data evidencing how much energy is being used and where, how can manufacturers begin their energy reduction journey?

A common misconception is that all equipment must be smart to successfully generate data. In reality, even facilities operating with decades-old legacy machinery have the potential to pull data from their production lines, and those in the industry know these plants are far more common than the futuristic smart factories imagined in Hannover in 2011. This may require a combination of sensors and intelligent software, depending on such factors as the age and original equipment manufacturer (OEM) of the equipment and the communications protocols used, but it is possible.

Gaining insight into a facility's energy consumption is key to identifying pain points. One might discover that minor tweaks to several parts of production can yield a significant carbon reduction. However, it's also possible that individual pieces of equipment offer the biggest room for improvement. Gaining data from these areas is crucial to reducing the energy used by individual machines, and various technologies enable manufacturers to do this.

One such solution is the CoroPlus® suite of products, part of the data-driven machining offer from Sandvik Coromant. The products are designed to help manufacturing organizations improve efficiency in metal cutting processes.

A core objective of CoroPlus® Process Control is to reduce consumption by reducing material waste. The tool monitors machines in real time and can trigger actions according to programmed protocols. Let's imagine that a predetermined problem occurs within the equipment. With CoroPlus® Process Control, this technology will automatically start a corrective action, such as stopping the machine from avoiding further waste. Moreover, conducting maintenance using this technology has been demonstrated to improve operational efficiency by as much as 89 percent.

Energy and economics

Considering the challenges and losses manufacturers have faced during the COVID-19 pandemic, is there a risk that reducing carbon emissions will become a secondary priority behind generating the profits needed to recover? Forty-nine percent of executives surveyed in the Accenture Commercial Aerospace Insight Report predict that it will take up to three years for the Aerospace Manufacturing sector to recover to 2019 levels. Similarly, the Automotive Manufacturing sector has experienced slumps in vehicle sales in almost every country.

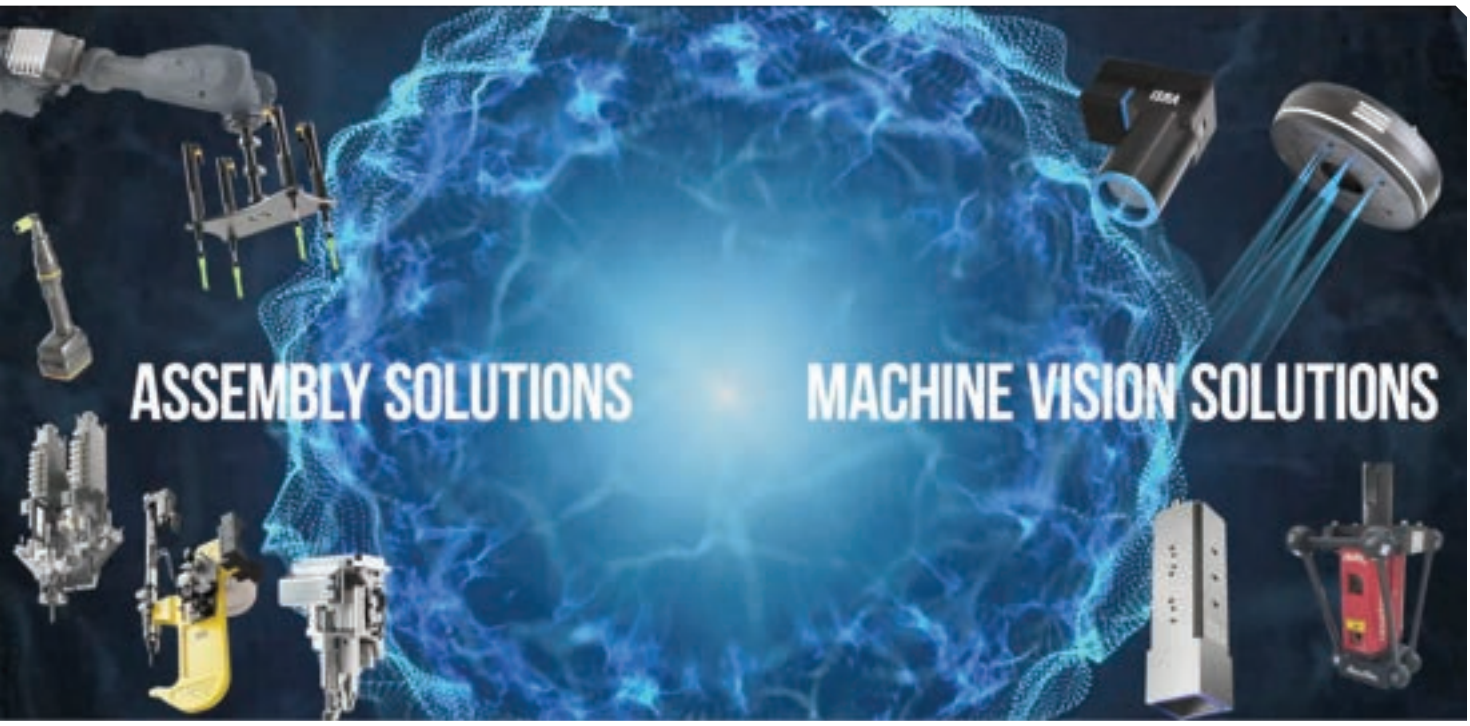
It is true and valid that manufacturing economics must always be considered when investing in new tools and machining processes. However, the right technologies can help increase profits and reduce energy use simultaneously.

CoroPlus® Machining Insights, for instance, has been developed to use real-time data to inform tool optimization and, therefore, performance and profit. In a metal cutting workshop, the technology can provide instant access to data about a specific machine in order to allow operators to monitor Overall Equipment Effectiveness (OEE) and performance. Ultimately, this oversight makes manufacturing workshops more efficient and profitable.

Over a decade has passed since the phrase 'Industry 4.0' was first coined, and it has since become ingrained in manufacturing's vocabulary. Yet, research suggests that, despite the impressive energy-saving opportunities this technology could facilitate, many manufacturers are failing to exploit these tools. To achieve the world's carbon emission goals, manufacturers must make a conscious effort to reduce energy consumption. At Sandvik Coromant, we want to ensure customers can successfully implement these tools for people, profit, and the planet.

Source: Sandvik Coromant

A core objective of CoroPlus® Process Control is to reduce consumption by reducing material waste. The tool monitors machines in real time and can trigger actions according to programmed protocols.



Source: Atlas Copco India

Graphical representation of battery assembly process and the technologies

TRANSFORMATION IS A JOURNEY

India is on the verge of a significant transformation, and the automotive industry is at the heart of this. With electric vehicles rapidly becoming the country's preferred mode of transportation, battery pack design and assembly is at the heart of this innovation journey.

K ARUNAGIRI
Head–Business Development eMobility (Motor Vehicle Industry)
Atlas Copco (India) Ltd

Batteries and their utilization in automobiles are not new. Still, they have been limited to being used for cranking a vehicle, and until the late 1950s, lead acid batteries were used for starting cars. With the varied applications of batteries deployed now, it would not be easy to imagine our surroundings without them.

There are several challenges innovators worldwide are working on to improve driving range, reduce cost, and enhance safety while racing against time. Some challenges include increasing energy density, improving battery balancing, increasing the number of cells, working with simulation on improving thermal management systems, and cell configuration, i.e., cylindrical, prismatic, or pouch type. Scaling up manufacturing with flexibility in operations opens another new set of challenges.

New-generation lithium-ion batteries

Lithium ions are transported back and forth between positive and negative electrodes of lithium-ion (Li-ion) batteries for energy storage and release. The positive electrode serves as the initial source of lithium in this technique, and the negative electrode serves as the host for lithium. They offer better energy density compared to a Nickel, Manganese, and Cobalt (NMC) or Lead Acid combination.

Graphite is utilized as a negative material, as well as graphite/silicon and lithium titanium oxides. In India, considering the current demands being met by imports, it becomes the most expensive part of an electric vehicle, which makes up 30-40 percent of its cost.

With the increased demand for Li-ion batteries, it is expected that India will need 120 GWh by 2030, according to government projections.

Lithium-Sulfur batteries

On a lithium-sulfur battery cell, metallic lithium is used as the negative electrode, while the positive electrode is of sulfur.

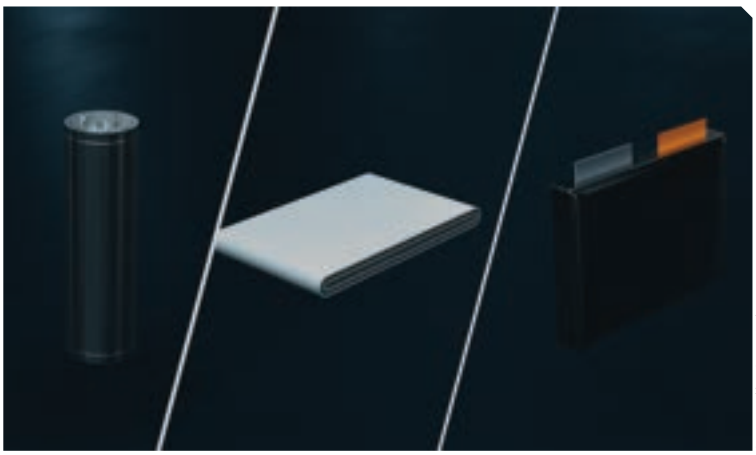
Lithium ions are kept in active materials that serve as stable host structures in Li-ion batteries during charge and discharge. The host structures in lithium-sulfur (Li-S) batteries are absent. The lithium anode is burned during discharging, while sulfur is converted into a number of different chemical compounds during charging.

In India, given their low weight and theoretically high capacity, lithium-sulfur batteries offer a possible substitute for traditional lithium-ion batteries. However, they now have a short battery life, which limits their utility. Now, thanks to a novel catalyst material, scientists can greatly extend the life of lithium-sulfur batteries, paving the way for their practical and commercial implementation in the not-too-distant future.

In India, lithium, along with NMC, also plays a role in the applications developed for low-voltage battery applications.

Solid-state batteries

In terms of technology, solid-state batteries constitute a paradigm shift. Ions flow across the liquid electrolyte of modern Li-ion batteries as they move from one electrode to another. In all-solid-state batteries, the liquid electrolyte is swapped out for a solid substance that permits lithium ions to move inside. Solid-state batteries get their name due to the absence of the liquid or gel electrolyte in modern lithium-ion batteries. They could provide more range, quicker charging periods, and a lesser danger of fire in electric vehicles than lithium-ion batteries. These are appealing advantages that have attracted significant investment from manufacturers in recent years. For next-generation battery systems, the solid-state battery is regarded as the best battery technology available.



Source: Atlas Copco India

Insert type of battery with chemistry of them shown with electrons flowing

Battery assembly process

While much effort is being put in today to find the right chemistry of battery needed for the application, the right assembly and saleable production methods also need to be considered with utmost importance.

There is an equal amount of innovation needed in finding the best manufacturing methods, considering the need for flexibility, automation, and saleable production methods being evaluated in the assembly of battery packs. Consumer demands today are changing, and cost-effective manufacturing methods pose enough challenges ahead of us.

With the industry working towards reaping the benefits of digitalization and leveraging the power of data, modern battery assembly needs joining technologies like Fastening, Adhesive dispensing, Cold forming methods like Self pierce riveting, and Flow drill fastening, combined with Vision Solutions for Quality Inspection that help provide the much-needed benefits of Industry 4.0.

It all points towards exciting times ahead.

In India, we are actively searching for the right chemistry and manufacturing process needed for our e-mobility solutions to suit our geographic conditions and driving needs.

SEMICONDUCTORS: TAPPING SUNRISE OPPORTUNITIES

Semiconductors are the heart and brain of all modern electronics and information and communications technology products. They are critical for almost all sectors of the economy now, ranging from automobiles, consumer electronics, communications, clean energy, defense, IT, etc.

Source: Magic Wand Media

REJI VARGHESE
Managing Director
RV Forms & Gears

"The development of IoT technology, advancements in smartphones, tech-driven modern-day automobiles, and multiple emerging cutting-edge technologies have significantly contributed to the importance of semiconductors in our digital world."

Anil Bharadwaj
Managing Director
Mazak India

"TRUMPF lasers play a fundamental role in the production of the latest generation of semicon chips. Applications of lasers in the Semiconductor industry enable manufacturing processes such as cutting and drilling silicon wafers, printed circuit boards, or entire electronics modules."

Pradeep Patil
Managing Director
TRUMPF India Pvt Ltd

"The digital future will continue to grow exponentially, and our company DMG Mori expects our highest-ever orders from the Semiconductor business in 2022. For machine makers, the advantage is that the machines for chip production are prone to wear and tear; hence, there is an enormous need for spare parts."

Bernd Dötterl
Sales Director, Semiconductor Industry
Deckel Maho Pfronten

The transistor, when it was first invented in 1947, was approximately the size of a large packet of cigarettes. Seventy-five years later, technology has evolved at such a rapid pace that today, a chip the size of a postage stamp can effectively contain the computing power of one billion transistors.

Professor N Ramesh Babu, V Balaraman Institute Chair and Professor of Mechanical Engineering, IIT-Madras, says, "Almost all consumer goods, capital goods, and engineering products are controlled by computers, either embedded or separate units. When we move on to smart manufacturing with the Internet of Things (IoT) and Internet of Services (IoS), the import of semiconductor-based devices like electronic chips comes at a high cost."

Anil Bharadwaj, Managing Director, Mazak India, opines, "The development of IoT technology, advancements in smartphones, tech-driven modern-day automobiles, and multiple emerging cutting-edge technologies have significantly contributed to the importance of semiconductors in our digital world. Additionally, 5G technology is expected to further contribute to the demand for semiconductors. Increased online traffic is also effectively bound to increase the role of semiconductors and semiconductor equipment in the near future."

He adds, "Between 2016 and 2021, internet users increased by 1.3 billion, and in the same period, internet speeds nearly doubled. This trajectory is expected to see exponential growth in the future, which calls for advances in semiconductor production. Even today, tens of millions of extremely small circuits are written on just a 1 cm x 1 cm (0.4 x 0.4 in) square semiconductor chip. As the number of circuits that can be written on a unit area is approaching its limit, manufacturing now calls for innovative solutions. Semiconductor manufacturers are now working to achieve 3D (multilayer) chips. 3D NAND flash memory is the most-advanced semiconductor today. It has a thickness of fewer than 10 µm (0.0004 in) and contains a 64-layer structure. It is believed that the structure will have more than 100 layers in the future. This worldwide trend is likely to influence India as well. In the next decade, we can expect to see advanced semiconductors opening newer avenues for their manufacturing."

India currently imports all chips, and its own consumption of semiconductors is expected to grow from US$24 billion currently to US$80 billion by 2026 and to US$110 billion by 2030.

However, the exponential demand globally has outstripped the supply, creating a global chip shortage. In India, the Automotive industry faced a huge backlog of orders, and cus-

India currently imports all chips, and its consumption of semiconductors is expected to grow from US$24 billion to US$80 billion by 2026 and US$110 billion by 2030.

Realizing the importance of the Semiconductor industry, the Government of India has announced a ₹76,000 crore Production Linked Incentive (PLI) Scheme to encourage semiconductor manufacture in India.

"DMG Mori has founded a Semiconductor Excellence Center in the year 2022 under the leadership of Bernd Dötterl (classical milling solutions) and Benedikt Brocks (ULTRASONIC solutions). That means we have specified people concentrating on solutions only for Semiconductor customers regarding machine adaptations, special options, technology cycles, and technology."

Jose Varghese
Director, Technology
DMG Mori India

"In the next 10 years, we will have quite a few semiconductors made in India and make some equipment in the country. They may not be state-of-the-art, but they will reduce our import bill significantly. As the ecosystem evolves, we will be progressing from part-time tool manufacturers and maintenance specialists to full-time tool designers."

Prasanth Sakhamuri
Director
ASM-HHV Engineering

"ASM and HHV have expertise in designing and manufacturing sub-systems, components, and providing field support. We decided to form this joint venture ASM-HHV Engineering to capitalize on over 60 years of experience in design, engineering, and manufacturing. Our JV is India's first for this sector."

Rabindra Srikantan
Board Member
ASM-HHV Engineering

tomers had to wait for months to get the delivery of cars. Other than the Automotive industry, sales in 169 sectors, including computers, mobile phones, and healthcare equipment, were affected by the global chip shortage. Realizing the importance of the Semiconductor industry, the Government of India has announced a ₹76,000 crore Production Linked Incentive (PLI) Scheme to encourage semiconductor manufacture in India.

In 2021, the Ministry of Electronics and Information Technology (MeitY) also launched the Design Linked Incentive (DLI) Scheme to incentivize Indian companies involved in semiconductor design and nurture and facilitate them to achieve a turnover of more than ₹1,500 crore in the next five years.

On the future of the semiconductor business in India, Prasanth Sakhamuri, Director, ASM-HHV Engineering, says, "Semiconductor manufacturing is still very nascent in India. To build semiconductors at any time, India should also be able to manage the production tools and build parts of the tools, if not the whole. Today, we lack the ecosystem for this critical capability. With the strong initiative taken by the Government to have semiconductor manufacturing in the country, we will soon get one- or two-generation old technology being installed. This will help start the build-up of the ecosystem, be it people, services, packaging, etc. The next stage will be to establish the capability to maintain and service the various tools and equipment. This will be the seed of a manufacturing program to develop equipment and fully understand the process. Equipment building without having a detailed understanding of the process is not meaningful. Process technology and equipment technology should go hand in hand. In the next ten years, we will have quite a few semiconductors made in India and make some equipment in the country. They may not be state-of-the-art, but they will reduce our import bill significantly. As the ecosystem evolves, we will be progressing from part-time tool manufacturers and maintenance specialists to full-time tool designers."

Premier educational and research institutions are also playing their part. Professor Babu says, "IIT-Madras, IISc, and a few other IITs have together developed a test bed for 5G technologies. The role of semiconductor devices and systems is crucial if 5G and 6G technologies have to be proliferated to benefit industries like capital goods, FMCG, engineering products, etc. by way of operated assisted manufacture, efficient manufacturing, decision making for smart manufacturing, etc."

Semiconductor equipment manufacture in India

Several Indian companies are now rushing to participate in what is considered a sunrise industry for India.

Rabindra Srikantan, Board Member of the recently-formed joint venture ASM-HHV Engineering, says, "ASM and HHV have expertise in designing and manufacturing sub-systems, components, and providing field support. We decided to form this joint venture ASM-HHV Engineering to capitalize on over 60 years of experience in design, engineering, and manufacturing. Our JV is India's first for this sector."

Sakhamuri adds, "Solar is one of the key focus areas in the Indian semiconductor space. It is receiving a significant amount of Government support for the semiconductor policy. The manufacturing of solar cells needs a lot of specialized production tools that are synergic with the capabilities of ASM-HHV. ASM-HHV will also be working towards developing and producing many pieces of equipment, sub-assemblies, and sub-systems required to support the establishment of amorphous silicon- and perovskite-based solar cell manufacturing capabilities. In addition, in the Semi space, we will also be working on supporting international companies in obsolescence management and sustaining processes that are not directly supported by the OEMs. We also have plans of establishing a full ecosystem which will be backbone support to the nascent semi industry in India and grow with it."

"Almost all consumable goods, capital goods, and engineering products are controlled by computers, either embedded or separate units. When we move on to smart manufacturing with the Internet of Things (IoT) and Internet of Services (IoS), the import of semiconductor-based devices like electronic chips places a high cost."

Professor N Ramesh Babu
V Balaraman Institute Chair Professor, Mechanical Engineering
IIT-Madras

Role of machine tools in the semiconductor industry

Modern-day CNC machines play a vital role in semiconductor machining, and high-precision machines enable manufacturers to maintain extremely tight tolerances on surface finishes, flatness, positional tolerances, etc. that semiconductor components and sub-assemblies require. There is also a wide range of materials that are exceptionally challenging to machine and manufacture.

There are a number of opportunities in the Semiconductor industry, both in India and globally, for the Machine Tool sector.

Bharadwaj says, "The vacuum-related units used in semiconductor manufacturing equipment need to have high durability in addition to functioning at a high level. Many of the parts used in such units are machined, and Mazak machine tools are deeply involved in the production process. A turbomolecular pump has an internal structure of many layers or turbine blades, similar to a jet engine, which has to withstand a rotation speed of tens of thousands of revolutions per minute. The turbine blade has a complicated shape, and its machining takes a long time. To machine it, the VARIAXIS and other 5-axis machining centers are effectively used. Vertical Machining Centers, such as the SVC with a high-speed linear motor-driven X-axis, are used to reduce the machining time.

He continues, "Mazak machine tools are also used to machine parts of the table position-

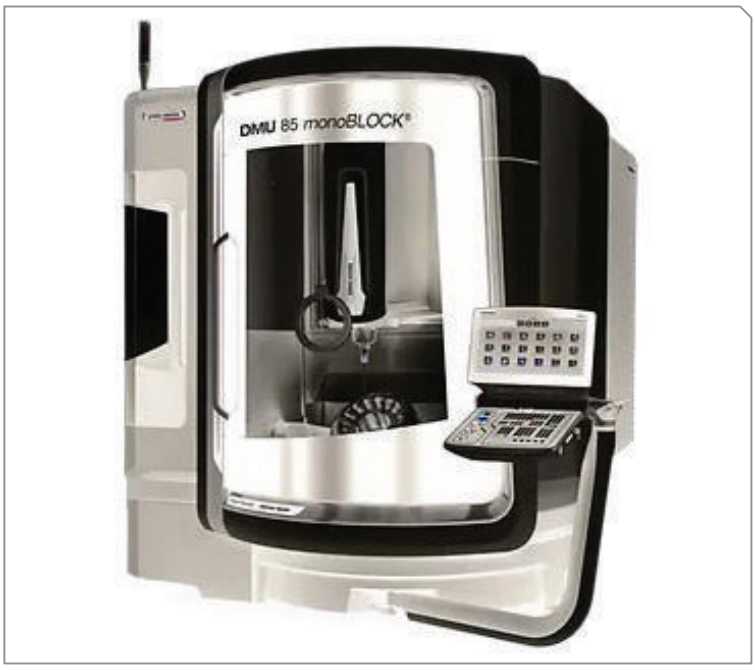
Source: Mazak India

In 2021, MeitY also launched the Design Linked Incentive (DLI) Scheme to incentivize Indian companies involved in semiconductor design and facilitate them to achieve a turnover of over ₹1,500 crore in the next five years.

ing units for wafers, transfer arms, and other units. In addition to metal cutting machine tools, the Mazak hybrid multi-tasking machine with friction stir welding technology, the FJV-60/80 FSW, can be used to machine backing plates (cooling boards), which contributes to the integration of the process phases."

Mazak products are effectively used to improve not only the machining efficiency of the individual machines but also the efficiency of the production process as a whole through the transformation of the plant into a smart factory. Furthermore, the products equipped with Mazak SMARTBOXTM and Smooth Monitor AX contribute to the strengthening of cybersecurity as well as the visualization and analysis of machine operation data. While semiconductors usually attract attention in many fields, the evolution of their manufacturing process deeply involves mechanical engineering and Mazak's reliable technology to continuously increase productivity.

Between 2016 and 2021, internet users increased by 1.3 billion, and in the same period, internet speeds nearly doubled. This trajectory is expected to see exponential growth in the future, which calls for advances in semiconductor production.

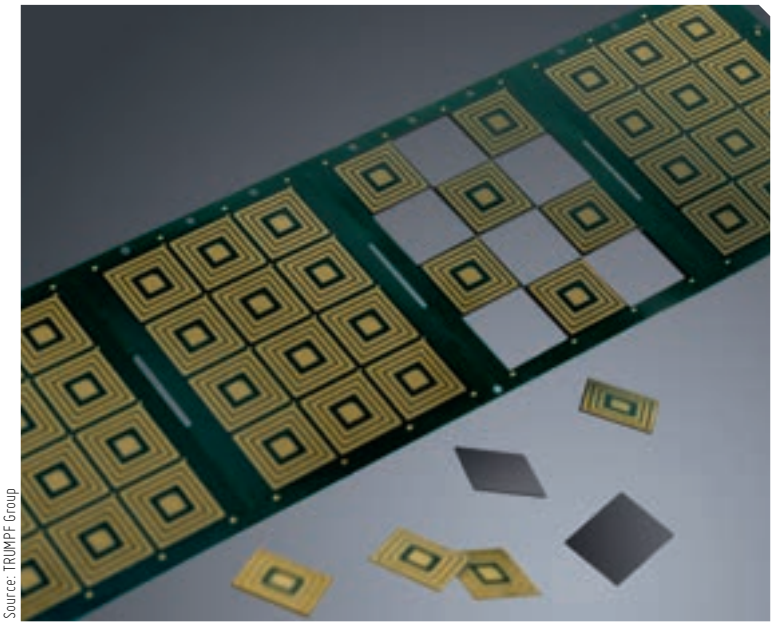


Source: DMG Mori

On Mazak's plans for India, Bharadwaj shares, "Mazak machines have continued to streamline semiconductor manufacturing the world over. Mazak India has been at the forefront of supplying advanced technological solutions to Indian customers. We have already started working with some of the big players in India and shall be supplying our multitasking machine along with HMC and Palletech systems for unmanned operations."

Bernd Dötterl, Sales Director - Semiconductor Industry, Deckel Maho Pfronten, says, "The digital future will continue to grow exponentially, and our company DMG Mori is expecting our highest-ever orders from the Semiconductor business in 2022. For machine makers, the advantage is that the machines for chip production are very prone to wear and tear, and therefore, in addition to the new machines, there is an enormous need for spare parts. We are already doing very well in the Semiconductor business and are preparing ourselves over the next one or two years for the next boom in new chip technologies."

On the plans for the Indian Semiconductor industry, Jose Varghese, Director – Technology, DMG Mori India, says, "DMG Mori has founded a Semiconductor Excellence Center in the year 2022 under the leadership of Bernd Dötterl



Source: TRUMPF Group

Laser cutting of matrix lead frames

(classical milling solutions) and Benedikt Brocks (ULTRASONIC solutions). That means we have specified people concentrating on solutions only for Semiconductor customers regarding machine adaptations, special options, technology cycles, and technology. We have a wide range of high-technology machines with a 600 mm to 6 m travel range. We also have multi-tasking machines for milling, turning, and grinding on one machining center."

Dötterl says, "DMG Mori has different levels of machine accuracies from standard to ultra-high accuracies up to 3 µm positioning accuracy. We also have ultrasonic solutions for machining advanced materials like Ceramic, Zerodur, and Quartz. Customization is also one of DMG Mori's strengths, and it is important to guide our customers regarding the right machining strategies, tools, fixtures, coolant solutions, and software applications. We also have multiple automation solutions to enable 24/7 production."

Lasers in the semiconductor industry

As semiconductors become faster, smaller, and more efficient, Laser Technology is also playing a big part in the Semiconductor industry.

Pradeep Patil, Managing Director, TRUMPF India, says, "A trend toward miniaturization and extremely large quantities of chips are two of the most important characteristics of the Electronics industry. As a result of its unprecedented precision and good automation potential, laser technology can provide industrial solutions to overcome these challenges. TRUMPF lasers play a fundamental role in the production of the latest generation of Semicon chips. Applications of lasers in the Semiconductor industry enable manufacturing processes such as cutting and drilling silicon wafers, printed circuit boards, or entire electronics modules. Also, high-frequency RF generators from TRUMPF Hüttinger provide reliable and precise process energy for coating and etching processes in the production of silicon wafers. TRUMPF lasers produce very high quantities of reproducible and high-quality products that are predestined for the Electronics industry. More than 1,000 ultrashort pulse lasers from TRUMPF work in the production facilities of global industry leaders around the clock, 365 days a year."

He adds, "TRUMPF provides a machine solution or an individual laser technology package depending on the area of application. In both cases, customers benefit from the TRUMPF Group's international service network. The development of micro-electronics, and therefore, the basis of today's computers, control systems, and smartphones, would be inconceivable without laser technology. Logic and storage chips have structures in the nanometer range and can only be produced using complex exposure processes with laser radiation. The conventional approach with UV laser radiation

As semiconductors become faster, smaller, and more efficient, laser technology is also playing a big part in the Semiconductor industry.

Vacuum Chamber Workpiece used in Semiconductor industry

Source: Mazak India

from excimer lasers is increasingly reaching its limits. In the future, it will only be possible to generate smaller structures with even shorter wavelengths up to 13.5 nanometers in the extreme ultraviolet range (EUV). They help to create a luminous plasma, which delivers extreme ultraviolet radiation (EUV) exposure to the substrate."

TRUMPF has developed an internationally unique CO_2 laser system in close cooperation with renowned partners—ASML, the largest manufacturer of lithography systems in the world. It has served as an integrator and delivered the components for droplet creation and the scanner. The EUV optics are being supplied by Zeiss. These components make it possible to process more than 100 substrates an hour, enough for series production. This makes EUV lithography not only technical but also a complete commercial success for chip manufacturers worldwide.

Patil says, "In the future, TRUMPF EUV laser technology will make its way into many high-performance chips. The plasma generators from TRUMPF Hüttinger play a fundamental role in manufacturing chips, as the quality of the power supply dictates the quality and precision of the plasma generated. This plasma is used in the next step for doping (ion implantation), deposition (PECVD, ALD), or removal (plasma etching) of different materials for the production of semiconductor chips. During this process, toxic environmental gases are generated, which are effectively cleaned by a special system in the TRUMPF Hüttinger generators, thus keeping the CO_2 footprint in the semiconductor production as low as possible. After exposure and the construction of the circuits on the silicon wafers, the separation into separate chips is the next challenge for the electronic process chain. In order to achieve the smallest possible kerfs and high-edge quality and to avoid damaging the sensitive chips due to thermal influences, ultrashort pulse lasers from TRUMPF are used for separation. These enable the material to be processed without unwanted heat influence and the highest precision as part of the laser processing. These lasers are also suitable for trimming sensitive modules (system-in-package), processing multi-material printed circuit boards, and drilling so-called microvias in silicon and glass. The industry also uses TRUMPF lasers for targeted layer ablation, cutting films, and marking."

For India, the strategic risk of being left behind in the semiconductor race in a tough geopolitical neighborhood is fraught with danger. The ability to fabricate chips will certainly give India the Aatmanirbhar quotient to power its economy and protect its borders.

The miracle of sunrise

Despite being the second-biggest maker of mobile phones and a multi-billion-dollar electronic goods market, India is an infant in the Semiconductor industry. We are severely handicapped by the vagaries of global supply chains, and our geopolitical equations have also dramatically changed in recent years, with China flexing its muscle globally. China and Pakistan are also working together to forward their own agendas. US Senator Ben Sasse of the US Senate Intelligence Committee says, "Modern wars are fought with semiconductors."

For India, the strategic risk of being left behind in the semiconductor race in a tough geopolitical neighborhood is fraught with danger. The ability to fabricate chips will certainly give India the Aatmanirbhar quotient to power its economy and protect its borders.

Witnessing a new dawn is one of the most exhilarating sights, and it brings with it new hope for new beginnings. There is a saying that we can only appreciate the miracle of a sunrise if we have waited in the darkness. India has waited far too long for this moment to arrive — a new sunrise beckons.

HANN KUEN MACHINERY

HARDY

TAIWAN EXCELLENCE 2017

Servo Type Drilling / Tapping Spindle Head Unit

Built-in Motor Facing Head Unit - Flange Type

Built-in Motor Drilling/Tapping Spindle with ATC and Center Coolant

TAIWAN EXCELLENCE 2020

Built-in Motor Spindle Unit

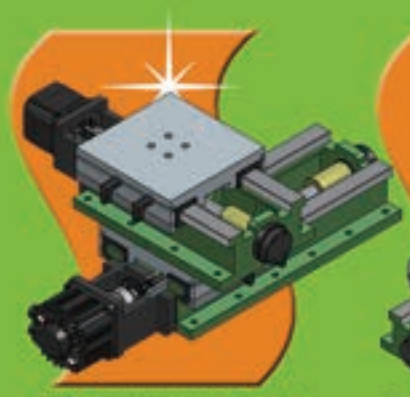
TAIWAN EXCELLENCE 2020

Boring/Milling Head Unit with ATC

Multi-Spindle Head

Servo Type Drilling / Tapping Spindle Head

Tapping Spindle Head



XY Servo Hardness Slide Unit

Servo Facing Head + Servo Ball Screw Slide Unit

XYZ Servo Slide Table + Milling Head

3-Jaw Chuck Spindle + Slide Unit

HARDY

HANN KUEN MACHINERY & HARDWARE CO., LTD.
NO. 22, Liou Shun Rd., East District, Taichung City 401, Taiwan
TEL:+886-4-2486-0602 FAX:+886-4-2486-0605
E-mail: hann.kuen@hardy.com.tw
https://www.hardy-tw.com Skype: hann.kuen

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CREATING NEW AVENUES

In this exclusive interview with Soumi Mitra, Editor-in-Chief, MMI, Dr John W Mitchell, President & CEO, IPC, talks about the association and its support to the Indian electronics manufacturing industry, how he views our industry's growth, IPC India's 10-year celebration, supply chain challenges, and ways to turn them into opportunities.

Source: IPC India

"We are excited about current manufacturing opportunities in India. The Indian Electronics industry is forecasted to grow to US$300 billion by 2026 from its current level of US$75 billion. India is poised to become a global manufacturing hub, exporting approximately US$120 billion by 2026. This market size explosion has been catalyzed by the COVID-19-led growth of digital consumption."

Dr John W Mitchell, President & CEO, IPC

SOUMI MITRA
Editor-in-Chief
Modern Manufacturing India
soumi.mitra@magicwandmedia.in

Kindly tell us about IPC's role as the voice of the global PCB industry.

Dr John W Mitchell: IPC is the global not-for-profit trade association that helps OEMs, EMS, PCB manufacturers, cable and wire harness manufacturers, advanced packaging companies, and Electronics industry suppliers build better electronics. IPC members strengthen their bottom line and build more reliable products through proven standards, certification, education and training, thought leadership, advocacy, innovative solutions, and industry intelligence. IPC represents all facets of the Electronics Manufacturing industry, including design, advanced packaging, printed board manufacturing, electronics assembly, and testing in over 70 countries, including India.

How do IPC's regional offices in Bengaluru and New Delhi help OEMs, Electronics Manufacturing Services (EMS) companies, PCB manufacturers, cable wire harness manufacturers, and electronics industry suppliers in India build 2010 electronics better through skill training and certification?

Dr Mitchell: IPC was incorporated in India in 2010. In the

past decade, IPC has supported the Indian Electronics Manufacturing industry through global standards, certification, education, and skills training. IPC's India office has certified over 11,000 professionals in the industry and has helped companies enhance their product quality and reliability. Numerous Indian SMEs, exporters, and PSUs are actively engaged in and utilize IPC products, services, and resources. IPC's members serve various vertical industries like Defense, Automotive, Healthcare, Aerospace, Telecom, ICT, Power, Railways, and Broadcasting. During the COVID-19 pandemic, when member companies were facing challenges in visiting our skills training center at Bengaluru, we launched virtual training for some of the certification programs, such as IPC-A-610 Acceptability of Electronics Assemblies. IPC India has a pool of instructors based out of Bengaluru, Chennai, Hyderabad, New Delhi, and Pune, and this has helped members engage with IPC resources.

How, according to you, is electronics manufacturing growth in India?

Dr Mitchell: We are excited about current manufacturing opportunities in India. The Indian Electronics industry is forecasted to grow to US$300 billion by 2026 from its current level of US$75 billion. India is poised to become a global manufacturing hub, exporting approximately US$120 billion by 2026. This market size explosion has been catalyzed by the COVID-19-led growth of digital consumption. Electronics manufacturers are also seeking diversification of global value chains, and it makes sense for India to be a focus area. The Government's 'Policy on Electronics' provides a roadmap to position India as a global hub of Electronics System Design & Manufacturing (ESDM) by encouraging and driving capabilities in the country for core component development, including chipsets, enabling an environment for the industry to compete globally. Production Linked Incentive (PLI) scheme will help boost large-scale domestic manufacturing. Electronics manufacturing clusters will enable a world-class electronics infrastructure. Electronics manufacturing has been growing quite significantly in India, and IPC would like to support the Government of India by providing resources that will help electronics manufacturers create better quality products, facilitated in part by a better-trained workforce.

Source: IPC India

"The Government's 'Policy on Electronics' provides a roadmap to position India as a global hub of Electronics System Design & Manufacturing (ESDM) by encouraging and driving capabilities in the country for core component development, including chipsets, enabling an environment for the industry to compete globally. Production linked incentive (PLI) scheme will help boost large-scale domestic manufacturing."

Dr John W Mitchell
President & CEO
IPC

As part of IPC India's 10-year celebration, a series of activities, including member networking events and skills challenge competitions throughout India, culminated in the inaugural Integrated Electronics Manufacturing & Interconnections (IEMI) events in Bengaluru and New Delhi. What were the two events focused on?

Dr Mitchell: As part of our 10-year celebration, IPC India organized the inaugural Integrated Electronics Manufacturing & Interconnections (IEMI) event in New Delhi on August 2 and Bengaluru on August 4. The

Source: IPC India

Electronics manufacturing has been growing quite significantly in India, and IPC would like to support the Government of India by providing resources that will help electronics manufacturers create better-quality products, facilitated in part by a better-trained workforce.

event in New Delhi focused on 'Emerging Tech, Industry 4.0 & Mobile Manufacturing' and the event in Bengaluru was dedicated to 'India – Emerging Aerospace Electronics Hub'.

India has emerged as the second-largest manufacturer of mobile handsets in the world in terms of volume, and we wanted to focus our IEMI events on emerging technologies and Industry 4.0. In New Delhi, we covered the Electronics sector opportunities in reference to the Government investment schemes that have led to the success of mobile manufacturing.

There are several Government and industry initiatives, and new R&D facilities and startups being established, driving innovation in new aerospace electronics technologies being developed in India. This has resulted in India rapidly expanding its global presence as an Aerospace industry hub. The city of Bengaluru is taking the lead in aerospace growth, and we felt it was important to discuss these opportunities with IEMI delegates.

It is important for the Government and industry to work together to create a 'roadmap' for new opportunities. IPC, in addition to training and certification opportunities, provides platforms and events such as IEMI for business networking and strategic partnership exploration.

One of the major attractions of IEMI was skill challenge competitions on hand soldering, wire harness, and PCB design. How many companies and professionals participated, and how were the winners acknowledged?

Dr Mitchell: For the first time, IPC India took hand soldering, wire harness, and PCB design skills challenge competitions directly to member companies so that the maximum number of employees could participate. More than 100 companies and over 1,500 employees were involved in the first round of competitions at different company locations in India from January through April this year. The three best competitors were chosen by each company for the semi-final round. Under the guidelines of expert judges, the events were observed either virtually or in person. IPC standards were followed in preparing the schematics for the competitions. From May to July, semifinal rounds took place at different locations in India and nearby countries, including Sri Lanka (Colombo) and the United Arab Emirates (Dubai), featuring winners from preliminary rounds. With support from other Electronics industry Associations (MCCIA, TELMA, ELCIA, SICCI, GEZIA, and ELCINA), IPC India successfully organized these events throughout India. The final round of the skills challenge competitions took place at the IEMI event in Bengaluru. Winners and runners-up participated in each semi-final round. At the awards presentation, winners and runners-up received a trophy, a certificate, and, in some cases, cash prizes. The winners and runners-up of the hand soldering competition will participate at the IPC World Hand Soldering Championship in Munich, Germany, on November 16-17, 2022, during electronica.

> "There are several Government and industry initiatives, and new R&D facilities and startups being established, driving innovation in new aerospace electronics technologies being developed in India. This has resulted in India rapidly expanding its global presence as an Aerospace industry hub."
>
> **Dr John W Mitchell**
> **President & CEO**
> **IPC**

Source: IPC India

Please share your thoughts on how supply chain challenges for the EMS industry can be addressed.

Dr Mitchell: Today, the EMS industry is hit with component and raw material source shortages, particularly for bare PCB boards. Trade wars with certain countries have brought these challenges to the forefront. The COVID-19 pandemic has also created a unique growth opportunity for India. Supply chain disruptions during the pandemic forced many countries and organizations to re-think their sourcing strategies and reduce dependency on one country for their supplies. The policy of 'Make in India' and the large OEMs' looking to 'buy from India' has helped the EMS industry's growth and solved supply chain issues. The Indian ESDM industry is focusing on PCB manufacturing within India, and large companies are looking at invest-

Source: IPC India

ment opportunities within the country. Supply chains should not be planned and managed with a single-dimensional focus on costs. The best supply chains are agile, adaptable to market changes and customer needs, and aligned with a company's interests.

What are the other challenges the industry faces, and is there a way to turn them into opportunities?

Dr Mitchell: What we are experiencing today is the new normal. Innovation at all levels, including product, technology, and business, giving rise to newer businesses that are challenging the incumbents. As there could be a re-alignment of global supply chains in the coming years, India is likely to benefit immensely from these strategic decisions and become a manufacturing powerhouse. A favorable business environment, liberal foreign direct investment norms, constantly improving 'ease of doing business' rankings, an enormous consumer base, and a rapidly improving digital infrastructure are some of the key factors that will drive investment in India in the coming years. A digital supply chain is one of the areas of focus for Indian companies.

The other challenge the industry faces is a dearth of skilled workforce and its retention. IPC is working with the industry to solve this by providing education, skills training, and certification. In 2021, IPC certified more than 1,00,000 electronics manufacturing workers globally. IPC India will be starting a new initiative for training students in their final year of engineering studies and students receiving diplomas in electronics assembly, making them ready for the industry. The first project will start in Mysore and will be replicated in other parts of India.

IPC India is associated with the Government of India's important missions like 'Make in India,' 'Digital India,' and 'Skill India.' Please elaborate on the same.

Dr Mitchell: In 2010, IPC established its India headquarters office in Bengaluru. From 2010 to 2021, IPC provided over 11,000 certifications for professionals involved in electronics manufacturing in India. Several Indian small and medium enterprises, exporters, and public sector units are actively engaged in IPC training and certification. We have noticed that a sizeable number of startups are sending their employees for IPC certification to help prepare them to work effectively with Indian OEMs. In the last few years, two of IPC's certification programs have been very popular: IPC-A-610 Acceptability of Electronics Assemblies and IPC Designer Certification. The Design and Manufacturing sector in India is predicted to reach US$220 billion by 2025. IPC plans to support the Government of India by providing resources that will help electronics manufacturers create better-quality products and enhance job skills.

IPC members are said to be excited about the printed circuit board assembly (PCBA) opportunities in India. How does India interest major manufacturers in the industry?

Dr Mitchell: PCB assembly is a critical piece of electronics manufacturing. PCBs are at the core of every electronic device. India's electronics manufacturing production is led by mobile phones, IT hardware (laptops, tablets), consumer electronics (TV and audio), industrial electronics, automotive electronics, electronic components, LED lighting, strategic electronics, wearables, hearables, and telecom equipment. It is important for the Government and industry to work together to create a 'roadmap' for new opportunities. IPC, in addition to training and certification opportunities, provides platforms and events such as IEMI for business networking and strategic partnership exploration. IPC India members have been invited through a special Government of India program to exhibit at the 'India Pavilion' at IPC APEX EXPO in San Diego, California, USA, on January 24-26, 2023. IPC APEX EXPO provides a great platform for IPC members in India to create new business opportunities.

IPC plans to support the Government of India by providing resources that will help electronics manufacturers create better-quality products and enhance job skills.

Source: Khushbu Honing Pvt Ltd

HONING THE CRAFT

For the past two decades, Khushbu Honing has been ceaselessly creating milestones for itself in the field of high-quality CNC honing machines. The company has retained its leadership position with a customer-centric approach and continuous quest for world-class quality.

POONAM PEDNEKAR
Chief Copy Editor
Magic Wand Media Inc
poonam.pednekar@magicwandmedia.in

An ISO 9001:2008 certified company, Khushbu Honing Pvt Ltd is a prominent name in the manufacturing and export of a comprehensive range of CNC single pass honing machines for various requirements. Extensively used by the industry's leading names, the company's state-of-the-art products are the outcome of continuous research and development.

The company has an in-house facility that corresponds with the entire assembly and operational requirements. The Group's business is represented by various companies that span these various segments. More than two decades of a robust, customer-focused approach and the continuous quest for world-class quality have enabled it to attain and sustain leadership in all its major lines of business.

While Khushbu Honing is focused on delivering high-quality CNC honing machines, Khushbu Engineers ensures that the finished products are regularly monitored and thoroughly tested for flawless quality, ensuring customer satisfaction. Furthermore, the company has laid down several quality-related norms in its unit and follows them rigorously to offer the best quality products to our clients.

"We ensure that we keep ourselves updated with the latest technological developments and innovations in the industry. Our dedication and deep study in the field of honing have facilitated us in providing the best solutions. Today, our range of products includes Manual Honing Machines, Auto Stroking Honing Machines, Hydraulic Vertical Honing Machines, and

CNC Single Pass Honing Machines," shares Ajeet Samani, CEO, Khushbu Honing Pvt Ltd.

Modest beginnings

It's interesting to map a company's growth path, analyze its ethics and philosophy, and gauge for yourself its impact on its success. "We started in 1988 with the manufacturing of Jigs and Fixtures. Soon after, we developed a Manual Horizontal Honing Machine and an Auto Stroking Horizontal Honing machine. In 1994, Khushbu Honing was established. In 2001, we participated in IMTEX to showcase our Hydraulic Vertical Honing Machines. Sensing the market demand for highly productive and highly accurate bore finishing needs, we developed a CNC Single Pass Honing Machine in 2004. It was a struggle getting the right tooling initially, but, eventually, we got good sources in the US for the same," reveals Samani through a snapshot of the company's journey.

The Kolhapur, Shiroli-based company has its manufacturing plant in Pune. Its current turnover is ₹5 crore, and the aim is to turn it into ₹6 crore by the next fiscal.

Products and their takers

Khushbu offers a wide range of Honing Machines like Manual Horizontal MH, Auto Stroking Horizontal AH, Single Spindle Vertical Honing (VH150, VH500-VH1500), and Multi Spindle Progressive Type Honing Machines (SP450, SP650, and SP850). "Our machines can be customized 100 percent," says Samani.

The company exports its products to Europe, Oman, China, and Turkey. Its major Indian and international customers include Sundaram Group, Hero, Tata, Ashok Leyland, Bajaj Motors, Indo-MIM, Sanjeev Auto, Indo Schottle, Hitech Gears, Godrej, POCLAIN Europe, and Eaton. Auto Components, Aerospace, Hydraulics, and Defense are some industries in which Khushbu's machines find their applications, of which Auto Components is a major revenue churner.

When asked how the company senses opportunities in the market, he says, "Normally, the RFQs come via the online medium, customer references, and exhibition participation."

Quality first

Quality being Khushbu's prime motto, it has adopted a 'No Compromise On Quality' attitude. All its products are designed and manufactured under expert supervision. "Our quality norms are at par with international standards to ensure delivery of high-value and highly productive CNC machines to our clients. We have adopted stringent quality checks in our production process, encompassing several stages of inspection before the final dispatch," Samani explains. "Inspection at every level of manufacturing, assembling, and testing makes it possible to maintain the quality. In case of any variation, employees are instructed to reject the part and start again," he adds.

Khushbu Honing will be at IMTEX 2023 to display its top-notch quality products and technologies.

Source: Khushbu Honing Pvt Ltd

"We ensure that we keep ourselves updated with the latest technological developments and innovations in the industry. Our dedication and deep study in the field of honing have facilitated us in providing the best solutions. Today, our range of products includes Manual Honing Machines, Auto stroking Honing Machines, Hydraulic Vertical Honing Machines, and CNC Single Pass Honing Machines."

Ajeet Samani
CEO
Khushbu Honing Pvt Ltd

Khushbu Honing's top-notch quality products and technologies will be on display at IMTEX 2023. Its Combination Honing machine is the new product being launched at the event. It will be a combination of Single Pass and Expansion Type Honing.

Source: Khushbu Honing Pvt Ltd

Source: Khushbu Honing Pvt Ltd

REACHING NEW HEIGHTS

With the aim to bring together domestic and global machine tool players under one roof and offer them a unique platform to showcase their latest innovations in products and technologies in the field of metal cutting, IMTMA is organizing its flagship IMTEX 2023 at BIEC, Bengaluru, from January 19 - 25, 2023. The expo will also host Tooltech 2023 and Digital Manufacturing as concurrent shows.

Source: IMTMA

POONAM PEDNEKAR
Chief Copy Editor
Magic Wand Media Inc
poonam.pednekar@magicwandmedia.in

Key Features

- Participation of 750+ exhibitors from 20+ countries
- Industry-specific trade delegations
- Seminars on Digital Manufacturing and Additive Manufacturing/3D Printing
- i2 Academia Pavilion with leading institutions from India presenting their R&D
- International Buyer-Seller Meet
- Exhibition in gross area of around 70,000 sq mt in 5 halls

An initiative of Indian Machine Tool Manufacturers' Association (IMTMA), IMTEX is a flagship event for the Indian metal cutting industry. Credited as one of South Asia's most influential trade fairs, it successfully hosts cutting-edge concurrent shows and engaging conferences to gain insight from researchers, scholars, policymakers, and decision-makers.

The mega event attracts visitors from a broad spectrum of manufacturing and ancillary industries, including key decision and policy-makers and industry captains keen to source the latest technologies and manufacturing solutions for their product lines. It also convenes industry experts to deliberate on the latest disruptions and innovations that can have a long-lasting impact on the industry.

Highly anticipated IMTEX 2023

The much-awaited IMTEX is finally back after a prolonged hiatus of four years. The event, which has a rich history of more than 50 years, ranks among the world's top ten shows in manufacturing. Held in an exhibit space of 70,000 sq mt, IMTEX 2023 will represent more than 750 exhibitors from over 20 countries and offer the most advanced solutions to the challenges faced by industries and the supply chain.

Exhibitors worldwide will feature advances such as multi-tasking machining centers, tools, accessories, robots, cobots, manufacturing software, 3D printing solutions, evolving Industry 4.0 concepts, and many more. OEMs, suppliers, manufacturers, sourcing agents, investors, researchers, academia, and students, among others, will be at the show to explore the wide range of products and technologies on display.

"IMTEX is an expression of a new India and represents what its Machine Tool industry is capable of. IMTMA has always made efforts to bring new industry segments to the show and help technologies reach a wider section of industries. This enables self-development and helps industries to manufacture products that can be accepted globally," says Jamshyd N Godrej, Chairman-Exhibitions, IMTMA.

Ravi Raghavan, President, IMTMA, concurs, "IMTEX 2023 is expected to be a highly focused show that will cover an exciting assemblage of new-age technologies that have assumed significance in the current manufacturing landscape."

The display of advances in digital technology in the form of live machines will enthrall visitors, feels Jibak Dasgupta, Director General & CEO, IMTMA. He adds, "IMTEX provides an ideal platform for a visitor to learn and implement automation quickly. Small and large firms can successfully build and enhance their brand at IMTEX."

Event features

IMTEX 2023, like its predecessors, is intended to be an all-around event. A Buyer-Seller Meet has been arranged that will forge a direct connection between exhibitors and buyers from domestic and international markets.

The i2 pavilion will offer a valuable opportunity for R&D and educational institutes to display their R&D capabilities in metalworking to the industry fraternity.

Seminars on digital manufacturing and additive manufacturing will have industry experts sharing their knowledge from their relevant fields on the latest industry trends and emerging technologies.

A sneak peek

IMTEX 2023 is back after a long hiatus of four years. That it has been missed by the industry is an understatement. The expo has long been a window to the relentless and innovative spirit of the Indian manufacturing industry and a converging point for the global players to share their inventiveness. Industry stakeholders are keen to once again be part of it and make up for the lost time.

The following is a round-up of a few cutting-edge products that will make their appearance in the upcoming edition of the show for the participants to have a closer look at them. Here's knowing their uniqueness to begin with...

Held in an exhibit space of 70,000 sq mt, IMTEX 2023 will represent more than 750 exhibitors from over 20 countries and offer the most advanced solutions to the challenges faced by industries and the supply chain.

CNC GRINDING SOLUTIONS

ANCA MOTION'S CYGRIND

ANCA Motion Pty Ltd
www.ancamotion.com

ANCA Motion's CyGrind Turnkey CNC solution combines supreme usability, robust computation, and a long heritage of engineering breakthroughs in a complete hardware and software package.

Intuitive operations

The CyGrind enables non-expert workers to handle operations from two-axis to complex multi-axis operations, such as camshaft grinding. Average users can create, configure, and execute jobs using a library of geometries, 3D visualization, and highly-intuitive prompts. Outside dxf files can also be imported.

High productivity

Within CyGrind, OptiGrind can cut cycle times by as much as 50 percent by smoothing out material removal rates. OptiGrind uses advanced motion control technology to calculate more data in the CNC control. Its latest version can process 300,000 blocks per minute.

Rich with features

CyGrind can accommodate multiple grinding wheels for a system. Different grinding wheels on the same work cell can perform various operations without changing wheels. It also supports in-process gauging, probing, and automated wheel dressing. It uses a geometry reference point to handle part positioning in a machine. The software supports automatic digitizing or manual referencing. For wheel dressing, CyGrind allows full flexibility with dressing and how frequently it occurs. The software supports up to three diamond dressers. MPG Feed can be used in forward as well as in reverse movement. It can be used with the Live Offset feature, applying axis offsets at any time to avoid potential collisions.

LinX® linear motors

When combined with ANCA Motion's LinX® tubular linear motors, CyGrind delivers superior surface finish at reduced cycle times, owing to LinX® motors' high speed and acceleration. Its innovative tubular structure lowers maintenance costs and provides more stable thermal performance. The linear motors have a proven track record in thousands of high-precision 5-axis grinding machines. ANCA Motion customizes hardware and software to the specific requirements of OEM customers. The company can offer a complete range of solutions, from turnkey automation control packages to individual products such as digital servo drives, motion controllers, soft PLCs, CNC, IO modules, motors, cables, and electrical cabinets.

ROTARY TABLES

FIBRO'S ROTARY TABLE FOR AUTOMATION SYSTEM

The compact FIBROTOR VR NC is designed for flexible positioning and is easily programmable as per customer needs, thereby making it an ideal solution in the assembly process. With the optimal sealing concept and high-performance data, the rotary table can also be used as a vertical tabletop (horizontal axis of rotation).

FIBROTOR VR NC works efficiently on a horizontal as well as a vertical rotation axis. The indexing accuracy of the table is ± 20 arcs per second and the repeatability of ± 5 arcs per second. The possible axial load-carrying capacity of the table is up to 17,500 kg. The permissible add-on fixture plate on the table is available up to a diameter of 8.8 m. Due to the availability of high torque more mass can move at a faster speed.

FIBRO India Precision Products Pvt Ltd
www.fibro-india.com

Advantages

Some of the advantages of the table include high quality, flexible positioning, and the capability to handle heavy loads. In addition, it is extremely easy to re-engineer due to a standardized height. The flexible mounting options for a wide variety of motor brands make the table easy to install. FIBRO's rotary tables for automation systems can be used as swiveling or positioning axes, as tool carriers, or used in several assembly applications. Other benefits include attractive delivery time, optimal price-performance ratio, improved technical specifications, and fit and forget.

HORIZONTAL MACHINING CENTERS

JTEKT'S AGILE FH5000 SERIES

TOYODA Micromatic Machinery India Pvt Ltd (a subsidiary of JTEKT Corporation, Japan)
www.jtekt.co.in/TOYODA-Micromatic-Machinery-India-Private-Ltd.aspx

This newest machine tool in the JTEKT product offerings is designed and manufactured to cater to several industries like Automotive, EV, Semiconductor, Construction, Agriculture, General/Precision Engineering, etc., and products like Robot Arms, Transmission Cases, Gear Cases, Hydraulic/Pneumatic Valves, Dies-Molds, Oil Pumps, etc.

Machine features

The machine tool boasts of more efficient machining of various parts (Spindle) 15,000 rpm (Acceleration: 0.5 sec); high torque: 530 N-m; largest axis-stroke (X: 800/900 mm, Y: 800 mm, Z: 880 mm) among its class; largest work envelope (Ø900 (dia) x 1100 (height)); max load on pallet: 1,000 kg; fastest table indexing: 0.7 sec (500 kg), 1 sec (1000 kg) with a DD Motor; high precision indexing with zero backlash and a high-resolution encoder.

Bed, Column, and Table are manufactured in-house for quality control. The machine can be programmed easily with a simple, safe, and connectable CNC-TOYOPUC Touch. It is equipped with a Touch Magazine Operation Panel as standard.

It features the Thermal Matrix design for error reduction. With a Double Center Trough, the chip disposal area is increased by 70 percent, resulting in a 50 percent reduction in chip collection time. The chip scatter area is minimized due to the optimized APC-cover design, eliminating the dead space and significantly reducing the flow of chip coolant.

The machine delivers high performance through smart, stable operation. There is better visualization of operations (Tool Status, Feed, Speed, Process Status) with TOYOPUC Touch.

Initiatives for carbon neutrality

JTEKT's products and technologies are directly or indirectly linked to environmental improvement and the customer's products and manufacturing processes. There is the adoption of energy-saving products and provision for energy visualization. The Sleep-IN and Wake-UP mode helps in power reduction during the non-cutting time.

VERTICAL MACHINING CENTERS

LMW'S HIGH-SPEED AND COMPACT VMC

LMW, Machine Tool Division is India's finest CNC machine manufacturing company known for its product quality, state-of-the-art manufacturing facility, and machining solutions with 55 products and 88 variants. LMW is displaying a moving column vertical machining center at IMTEX 2023.

Lakshmi Machine Works Ltd
www.lmwcnc.com

For high-volume production

The JG 50 is a high-productivity, compact, and high-speed moving column vertical machining center (VMC) that is poised to meet the high-volume and high-accuracy requirements of modern industry. The machine has been tested for components with stringent quality parameters and meets the high-volume production needs. It has a very high acceleration of greater than 1G and spindle speeds up to 16,000 rpm. The tool change takes only one second, saving significant time. This means that ideal movements or non-cutting time is reduced to the bare minimum through increased speeds and accelerations, thus increasing productivity substantially. The machine is also ultra-compact, which saves shop floor space.

LMW Machines are built with the company's expertise in designing and manufacturing precision products. They are engineered to meet various types of industry requirements as well as various materials. They can be very easily configured for any kind of machining.

LMW is not only a CNC manufacturer but offers integrated solutions for various industries such as Automobile, Oil & Gas, Value, Pumps, Textile, Die & Mold, General Engineering, Agriculture, etc. As a single-step solution provider, the company, with its value-added solutions like tooling, CNC programming, CAD/CAM, and IOT, helps the industry to meet its needs, including productivity, precision, and reliability. The products are designed in line with the company's commitment to delivering innovation and world-class excellence in all its products and services.

POWER SKIVING TOOLS

TUNGMEISTER FROM TUNGALOY

Tungaloy India Pvt Ltd
www.tungaloy.com/in/

Tungaloy, in association with its sister organization Ingersoll, offers a wide range of Skiving Tools, starting from module 0.8. It offers solid replaceable head skiving tools from module 3.0 up to module 12. Indexable skiving tools can be applied.

With a good range of tools on offer, Tungaloy's Power skiving tools make it easy for the customers to produce sample components and then ramp up the production at will, on their high-end machines, without losing out on machining time.

The development of gear skiving started at the beginning of the twentieth century. Although gear skiving promised great potential in terms of productivity and flexibility, it was not successful in practice and was forgotten. The technical possibilities of that time were not yet available in the areas of machine control and tool performance for this high-performance machining process. Thanks to enormous progress in both machine tools and tools, thanks to modern cutting materials and coatings, gear skiving is now suitable for serial production and promises to be an interesting alternative to the established machining processes such as hobbing and gear shaping.

In simple terms, gear skiving can be viewed as a combination of hobbing and gear shaping, combining some of the advantages of both machining processes. Primarily, these are the productivity of hobbing and the flexibility of gear shaping. Especially when machining internal gears compared to gear shaping, the gear skiving process scores with significantly higher productivity. Machining times for gear skiving are around 30 percent to 50 percent compared to the gear shaping process. In contrast to gear shaping, however, due to the inclined position of the tool in relation to the workpiece (cross-axis angle), gear skiving requires a machining path that is slightly larger than the width of the gearing to be produced. These additional paths are called approach and overrun distance. They increase as the cross-axis angle increases. Due to this necessary approach and overrun distances, gear skiving has few restrictions compared to gear shaping with very narrow internal gears and interfering contours.

LINEAR MOTION GUIDES

THK'S HSR LM GUIDE

As a pioneer in Linear Motion Technology, THK is the most sought-after brand in India and worldwide. To develop its business through full-scale globalization, the company has set up India's first manufacturing facility to produce linear motion products at Sricity, Andhra Pradesh. To bridge the gap between demand and supply for THK parts, the company will be producing the global standard model HSR LM Guide at this state-of-the-art manufacturing facility.

THK India Pvt Ltd
www.thk.com/?q=in

MAGNETIC SEPARATORS

U-TECH'S N'TRAP

U-Tech Associates
www.u-techindia.com

Magnetic Separators are products that filter out ferrous dust from the coolant in the metal cutting industry. U-Tech Magnetic Separators are designed to give the best efficiency with the lowest power consumption among competitors. U-Tech magnetic separators come in three different models, the main difference being the type and grade of magnets used. The magnets are selected based on the application it is being used for.

U-Tech Magnetic Separators come in ferrite, medium rare earth, and full rare earth models. While the ferrite magnets have a gauss value of 800 to 1000, medium rare earth comes with a gauss value of 2300 to 2500. The highest power magnetic separators employ full rare earth magnets with a gauss value of 4000. These full rare earth models are used for fine grinding applications and places where carbide/tungsten is ground.

The major advantages of U-Tech Magnetic Separator over competitors are:

- Only a 40W motor is used to power the drum, whereas competitors use 180W
- Positive drive for the gum roller for better squeezing of dust
- Special design where the magnets are stationary, and only the outer drum rotates
- Easy scrape design to remove dust efficiently.

These Magnetic Separators are available in capacities ranging from 50 LPM to 1000 LPM.

BECKHOFF HOLDS AUTOMATION UPDATE 2022 SEMINARS

The in-person events turned out to be impactful and were hailed as much-needed by the attendees. They provided insight into the recent developments in the company's products and technologies and offered a unique platform to network.

Beckhoff Automation Pvt Ltd recently conducted multi-city physical events to showcase and demonstrate the company's latest product and technology developments in the past two years. Another goal of these events was to meet with customers and reassure them that Beckhoff Germany and local offices were taking steps to solve the delivery crisis the industry was facing.

The cities where the events were conducted included Ahmedabad, Bengaluru, Chennai, Pune, and Mumbai. Despite uncertain weather conditions in the ongoing monsoon season in almost all the cities, customer turn-out and their enthusiasm to explore innovations in Automation technology was noteworthy.

Over 400 registrations were logged in, with over 300 attendees across the industry segments, business segments, and sizes in India. The event brought together practicing automation engineers from end users, manufacturers, R&D engineers, machine designers, control system experts, system integrators, and academics.

This was the first offline event since September 2019, and it turned out to be the most needed event of 2022, offering matchless networking opportunities to the participants.

The events began with an opening address by Jitendrakumar Kataria, Managing Director, Beckhoff Automation Pvt Ltd, followed by a series of presentations/videos on updates on Industrial PCs/Embedded PCs, IO products, TwinCAT products, and Motion products. This was further followed by XTS-XPlanar product updates, which culminated with MX-System and ATRO presentations.

The participants reviewed the AI-ML application demo for two machines—local and remote—as the most interesting. Other demos included AMI812x integrated servo drives, CX7000-compact PC-based PLC, IoT, precision weighing solutions, etc.

There were also live demonstrations of Beckhoff products. The company team explained the features that could benefit the attendees in their business. A question-answer session was conducted wherein experts were present to answer queries.

The participants reviewed the AI-ML application demo for two machines—local and remote—as the most interesting. Other demos included AMI812x integrated servo drives, CX7000-compact PC-based PLC, IoT, and precision weighing solutions.

Source: Beckhoff Automation Pvt Ltd

Source: IMTS 2022

Douglas K Woods, President, AMT — The Association For Manufacturing Technology (center) along with Lynn Osmond, President & CEO, Choose Chicago (left) and Dr Jochen Koekler, Chairman of the Managing Board, Deutsche Messe AG (right), welcomed the manufacturing industry to IMTS 2022.

IMTS 2022: TECHNOLOGIES THAT THRILLED!

The 34th edition of the International Manufacturing Technology Show (IMTS) 2022 took place in live format from September 12-17, 2022, at McCormick Place in America's windy city – Chicago. Sitting on the shore of Lake Michigan, the venue played a perfect host to this spectacular show, connecting people from different parts of the world.

SOUMI MITRA
Editor-in-Chief
Modern Manufacturing India
soumi.mitra@magicwandmedia.in

According to Douglas K Woods, President, AMT – The Association For Manufacturing Technology, the owner and producer of IMTS, though the excitement and electricity were seen in every aisle of the show, what was most gratifying for the industry was the scope of commerce taking place as visitors sought and found key technologies and productivity solutions to move their businesses forward.

IMTS 2022 stood true to its core theme: 'Digital Manufacturing. Implemented'. The show featured many impressive advanced technologies ready to be implemented immediately on shopfloors and affordably priced to make technologies accessible to SMEs and MSMEs. This edition aimed to encourage people to start improving productivity and profitability. In this context, Peter R Eelman, Chief Experience Officer, AMT, added, "The digital technologies and other new products at this show aren't just advanced: they are accessible, inclusive, and ready to be implemented by small- and medium-sized businesses regardless of their workforce composition."

Echoing similar sentiments, Tim Shinbara, Chief Technology Officer, AMT, shared, "The automation systems at IMTS focused on ease-of-deployment, iPhone-level programming simplicity, and affordability for small- and medium-sized businesses. Visitors could find new startup automation companies and spinoffs in every hall, and every one of them introduced solutions for high-mix, low-volume applications to help job shops address their workforce and productivity issues."

Source: Magic Wand Media

HELLER Machine Tools announced a strategic partnership with TITANS of CNC, Inc. whereby TITANS of CNC will install two 5-axis machining centers in its Texas facility and deliver innovative educational materials to the machining industry.

Source: IMTS 2022

FANUC attracted visitors' attention with a demonstration of a heavy payload industrial robot that can easily swing a car around.

Source: IMTS 2022

Richard Browning, Founder, Gravity Industries, flying his patented Jet Suit over McCormick Square. The suit uses many 3D-printed components.

Impressive footfall

As per the record of the IMTS organizers, this edition of the show attracted 7,647 visitors to its educational and networking events. The IMTS Women Make Manufacturing Move specialty program attracted more than 1,213 people, representing 400 companies and 52 countries, to its three events.

The inaugural IMTS Investor Forum, powered by AMT, featured curated tours on additive manufacturing, digital technology, machining, and automation and was designed to help the investment community understand the opportunities in manufacturing.

Human connections with cobots

Ed Nichols, CEO, Hannover Fairs USA, shared, "The show is a leading knowledge and networking event focused on Industry 4.0, AI, robotics, automation technology, logistics IT, and industrial software."

"After a four-year gap due to the pandemic, we were happy to bring back HANNOVER MESSE USA as a co-located show with IMTS 2022. While personal emotion is not commonly associated with trade shows, this year really reinforced how much exhibitors and attendees appreciated reconnecting. Everyone expressed gratitude and grace for their support in coming to HANNOVER MESSE USA and IMTS," he added.

On the one hand, IMTS 2022 celebrated the power of human connection; on the other, it was a massive show of a thousand robots. The exhibitors integrated robots, cobots, and other automated functions into machining centers, welding systems, tooling centers, workholding pallets, inspection systems, and more.

Technologies showcased

According to the show organizer, the top five product categories that dominated IMTS 2022 were: Turning and Lathes, Machining Centers, Milling, Drilling, or Boring Machines, Tools and Tooling, and General Automation.

Mazak unveiled its SYNCREX Swiss-type automatic lathe. Okuma exhibited its GENOS M560V-5AX, which offers high-precision 5-axis machining, for the first time. On display were automation solutions combined with the flexibility of a collaborative robot (cobot) and an autonomous vehicle that can drive around a shop and tend to multiple machines without human intervention. To name a few, Staubli Robotics introduced the new HelMo mobile robot system equipped with multi-couplings a tool-changing system, and a tool station. Nachi Robotic Systems demonstrated a CZ10 cobot arm mounted on an EffiBOT autonomous mobile robot, simulating machine tending work.

Many companies, such as HP, Desktop Metal, and Jeol EBM, showcased new printers at IMTS 2022.

Visitors from a gamut of industries

Major visitors and delegates at IMTS 2022 were from Machine Shops and Contract Manufac-

IMTS 2022 achieved a total registration of 86,307, including 11,715 students, and featured 1.21 million sq ft of exhibit space representing 1,816 exhibitors and 1,603 booths.

Source: IMTMA

The top brass of IMTMA met the leaders of global machine tool builders' associations at IMTS 2022.

Source: TAITRA

Taiwan Machine Tool Builders, along with Trade Bureau of the Ministry of Economic Affairs, Precision Machinery Research and Development Center (PMC) and TAITRA, at IMTS 2022.

Source: MWM

Japan Machine Tool Builders' Association top executives at IMTS 2022 post press meet on JIMTOF 2022.

Source: MWM

Bantam Tools launched a new desktop CNC machine — the Bantam Tools Explorer™ CNC Milling Machine at IMTS 2022.

The Smartforce Student Summit at IMTS 2022 presented 24,000 sq ft of interactive experiences, its most extensive floor plan to date, with technology and dozens of education-to-career pathways on display.

turers, Metalworking Machinery and Equipment including Metalworking and Fabrication, Aerospace (Aircraft, Space, and Missiles), Automotive & Transportation, and Industrial Machinery (Assembly, Textile, Food Processing, and Material Handling).

Face-to-face shows back in full swing

IMTS 2022 witnessed the presence of machine tool builders from across the world. The global machine tool community congregated under one roof to talk about shows that would take place on their home turf.

To this end, the top brass of Indian Machine Tool Manufacturers' Association (IMTMA) addressed select media at the show, highlighting the potential business opportunities in the Indian market and emphasizing the contribution IMTEX 2023 can make to the growth story. Ravi Raghavan, President, IMTMA, stated that the phenomenal 50-year-old IMTEX show is back after a gap of four years with more vigor, innovation, and myriad technologies that would make manufacturing smarter. IMTEX 2023 & Tooltech 2023 will take place from January 19-25, 2023, at Bangalore International Exhibition Center.

Talking about the sunshine sectors that are putting India on the global map, he shared that India is strongly gaining its foothold in mobile manufacturing as well as electronic manufacturing space.

With JIMTOF 2022 around the corner, Japan Machine Tool Builders' Association (JMBTA) organized a press conference to familiarize the audience with the show and the advanced technologies that will be displayed at Tokyo Big Sight from November 8-13, 2022.

Around 50 brands of intelligent machine tools and components from Taiwan participated in IMTS 2022. In order to promote TMTS 2023 and TIMTOS 2023, the Smart Machinery department of the Trade Bureau of the Ministry of Economic Affairs, Precision Machinery Research and Development Center (PMC), and Taiwan External Trade Development Council (TAITRA), along with five leading Taiwan machine builders, hosted a press meet.

Next dates announced

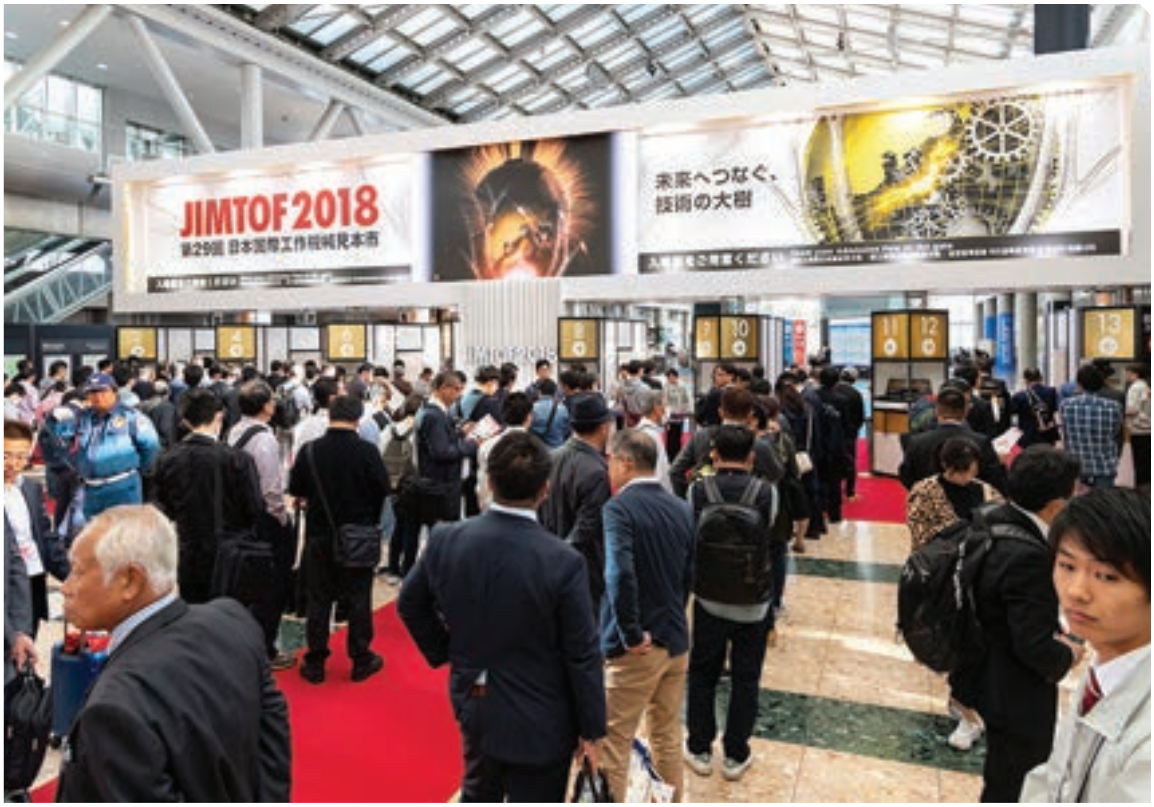
IMTS 2024 will take place from September 9-14, 2024, at McCormick Place, Chicago, bringing in more eye-catching technologies for the manufacturing community.

Source: Magic Wand Media

Ravi Raghavan, President, IMTMA (center); Rajendra Rajamane, Vice President, IMTMA (4th from left); Bryce Ellis, Vice President, Gardener Business Media (3rd from left); Guru Prasath, Executive Director, IMTMA (3rd from left); Dayanand M, Director, Corporate Communications, IMTMA (2nd from left); along with Arun Mahajan, General Manager, AMT (4th from left) and Vikram Salunke, Managing Director, Accurate Gauging & Instruments Pvt Ltd (3rd from right top), post media conference at IMTS 2022.

FOR A BRIGHTER TOMORROW

With the view to promoting industry and trade through international transactions and technical exchanges, the Japan Machine Tool Builders' Association and Tokyo Big Sight Inc. are teaming up to host the 31st Japan International Machine Tool Fair, JIMTOF 2022, at Tokyo Big Sight for the first time in four years, from November 8-13, 2022.



Source: Japan Machine Tool Builders' Association

One of the world's largest international technology exhibitions, JIMTOF, has been held biennially for over 50 years since 1962. It marks its 60th anniversary in 2022 with the theme 'Open the door to the future - Meet the technologies moving the world forward'.

JIMTOF 2022 will use all the venues at Tokyo Big Sight (Tokyo International Exhibition Center), which has an indoor exhibition space of 118,540 sqm, including the new South Exhibition Hall, which will host a special event themed 'Additive Manufacturing Area in JIMTOF 2022'. The event will also have lectures, seminars, and talk sessions.

MURALI SUNDARAM
Correspondent
Magic Wand Media Inc
murali.sundaram@magicwandmedia.in

Exhibition scale and exhibitor brief

The exhibition will feature the largest-ever scale of exhibits presented by over 1,000 companies. It will present 861 exhibitors and a record-breaking total of 5,610 booths. Domestic exhibitors (788 in 5,360 booths) and international exhibitors (73 in 250 booths) will be organized into product categories. The exhibition scale of the Additive Manufacturing (AM) area includes 53 exhibitors in 166 booths.

The event is supported by Ministry of Economy, Trade and Industry; Tokyo Metropolitan Government; and The Japan Chamber of Commerce and Industry. Some of the cooperating organizations include Japan Machine Tool Importers' Association, Japan Forming Machinery Association, Japan Precision Machine Association, Japan

Source: Japan Machine Tool Builders' Association

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Cutting & Wear-resistant Tool Association, Japan Machine Accessory Association, Japan Precision Measuring Instruments Manufacturers Association, Japan Grinding Wheel Association, Industrial Diamond Association of Japan, Japan Optical Measuring Instruments Manufacturers' Association, Japan Fluid Power Association, Japan Testing Machinery Association, and Japan Gear Manufacturers' Association.

Machine tools (Metal cutting, Metal forming), Machine tool accessories, Tools for machines (Cutting tool & wear-resistant tool), Diamond and CBN tools, Grinding wheels and abrasives, Gears and Gear Devices, Oil/water hydraulic and pneumatic machinery, Precision measuring machines and instruments, Optical measuring instruments, Testing machinery, Controller and related software (CAD/CAM, etc.), and other associated machinery and equipment, raw materials, technologies, and publications are among the exhibitor profile of the exhibition.

Participating companies

Many major corporations worldwide will exhibit at the event, anticipating increased international transactions and technical exchanges of machine tools and their ancillary equipment. AMADA Co. Ltd, Blum-Novotest K.K., Bystronic Japan Ltd, Carl Zeiss Co. Ltd, CGTech Inc., EMUGE-FRANKEN K.K., ExxonMobil Japan G.K., FANUC CORPORATION, ISCAR Japan Ltd, Murata Machinery Ltd, REGO-FIX Japan K.K., TaeguTec Japan Ltd, and Taiwan External Trade Development Council are among them.

Advanced Manufacturing Technology Institute (AMTI), Kanazawa University, Dassault Systemes K.K., DMG MORI Co., Ltd, Mitsubishi Electric Corporation, Solidworks Japan K.K. and Tokyo Metropolitan Industrial Technology Research Institute will exhibit at the Special Event 'Additive Manufacturing Area in JIMTOF 2022'.

Keynote addresses and lectures

At JIMTOF 2022, Masamichi Okada, President, Primearth EV Energy Co., Ltd, will deliver the Keynote Speech titled 'Monozukuri – The Frontier of a Carbon-Neutral Era'. Takanori Isobe, Associate Professor, Graduate School of Information Science, University of Hyogo, will present his views on 'Cryptography of the 6G era'. 'Simulation-empowered manufacturing in the Fugaku era – The present status and future

Source: Japan Machine Tool Builders' Association

Source: Japan Machine Tool Builders' Association

perspectives of large-scale fluid flow simulations-' is what Chisachi Kato, Center Director & Professor, Institute of Industrial Science, The University of Tokyo, Center for Innovative Simulation Software, has chosen as the topic of his Special Lecture. The last two days will have Seminars for Students titled 'Top Seminar by Machine Tool Manufacturers for Students' and 'Introductory Seminar 'for Students' on the Manufacturing Industry'.

Furthermore, IMEC 2022, the 19th International Machine Tool Engineers' Conference, will comprise two sessions—the 'Oral Session' where various lecturers from Japan and abroad will present lectures on the most recent technological trends, and the 'Poster Session' will show the results of machine tool research by universities and research institutes in Japan and overseas in the poster format.

Other event specials

The 'Special Event' of JIMTOF 2022 will bring AM/3D printing-related products and technologies together. In addition to the 'Exhibit Area', a 'Special Seminar Venue' will be set up where more than 15 lectures on AM/3D printing and a workshop by the exhibitors will be held. There will also be a Keynote Speech by Tatsuaki Furumoto, Professor, AMTI, Kanazawa University, entitled 'Toward the innovation of 'mono-zukuri' using a metal-based additive manufacturing'.

The 'Special Exhibit' at the event will introduce the advanced technologies of the industry-leading machine tool manufacturers and explore the 'Monozukuri' factory of the future. Japan-made products with the highest market share, created by state-of-the-art machine tools manufactured in the factory, will be displayed across the board, demonstrating the roadmap to the 'Future of Monozukuri'.

JIMTOF 2022 will include a 'Special Display' of IHI's jet engine technology, which is important in the global Aviation industry. Each engine relies on its superior technical capabilities, which are supported by history and tradition. The exhibition will also improve digital content by offering an online catalog for collecting pre- and post-event information, an online exhibitor channel for publishing exhibitors' webinars and product introduction videos, and a matching system for more efficient business opportunities.

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Source: Japan Machine Tool Builders' Association

PARTNERING FOR GROWTH

Weiss GmbH and Weiss India team, along with German Engineering Federation (VDMA), hosted a Media Round Table interaction on the theme 'Weiss in India – WIN 2.0' on October 12, 2022, at Sheraton Grand Gateway Hotel, Bangalore. Excerpts from the event that discussed future plans of Weiss Group in India…

Source: Weiss India

Weiss Automation Solution India Pvt Ltd, the Indian subsidiary of Weiss GmbH, the German-based, world's leading manufacturer of Automation Solutions, has housed under one roof Weiss APAC regional HQ, India Sales Office, and the Engineering Knowledge Centre since setting up its new campus in Chakan Pune in March 2020. Weiss Group has increased its investments and operations in the region as part of its growth plan and strategy for the Indian and Asia Pacific markets.

"We have now increased our global footprint as a result of business, but we have always done so with the intention of better understanding, learning more about, and engaging with the markets in which we operate. India, in my opinion, is currently a very interesting market for us and one that we want to pursue," stated Uwe Weiss, CEO, Weiss GmbH at the Bangalore Media Round Table interaction. According to him, India is the foundation for the company's access to the APAC region, and the entire region will see exciting future development.

Other dignitaries present for one-to-one media interaction were Ingo Nenninger, Group CFO; Sanjeebit Choudhury, Vice President – Asia Pacific, CEO, Weiss India; Friedrich Birgelen, Deputy Consul General, German Consulate in Bangalore; and influential industry leaders from the Automation sector.

Opportunities in Indian Market

According to the International Monetary Fund (IMF) report, India is expected to grow at a 6.8 percent rate this fiscal year and at a 6.1 percent rate in 2023, putting India far ahead of the US, China, Germany, Japan, and the UK, among other major economies around the world. As a result, confidence in India has grown. "In short, the IMF concludes that the worst is yet to come, and 2023 will feel like a recession for many people," said Birgelen.

He shared snippets of good news, sensing an opportunity in the

MURALI SUNDARAM
Correspondent
Magic Wand Media Inc
murali.sundaram@magicwandmedia.in

crisis, particularly in the trade relationship between India and Germany. First, the Asia Pacific region's emerging economies, including India, have proven to be crisis resistant; second, growth in Asia and Pacific is expected to be moderate amid an uncertain global environment; and finally, the level of automation in Indian industry is low, creating a massive opportunity for growth. "The All India Council for Robotics and Automation estimates yearly growth of 10 percent," he explained. "The PLI scheme, which stands for Production Link Incentives, is a US$27 billion program by the Indian Government to incentivize those who contribute to the optimization of some Indian industries."

Also required to look beyond China because of supply chain problems and geopolitical issues, Germany is looking to India as an alternative, as well as for skilled labor and talent intake.

Relying on India's growth

Weiss India has even more to look to leverage and find applications in the critical segment as India becomes the world's fourth-largest vehicle market. Stating that the Indian market is highly competitive, that quality and precision will be essential for automotive and components, and that the indexing function is fundamental to any discrete manufacturing, Choudhury mentioned, "India is such a vast country, both in terms of size and industry. So we want to really engage. We have been talking about expanding the bucket by educating people and experimenting with them through partners because automation will continue to advance, and the automotive market will grow."

Even though the Automotive sector accounts for half of the company's revenue, Choudhury noted that the majority of the company's revenue comes from other sectors, which have been boosted by Government initiatives such as Atmanirbhar Bharat, Make in India, and the PLI Scheme. "The six sectors, important to us after the 14 sectors of the PLI scheme, include Automotive, Auto Components, Electronics, Telecom, Healthcare or Pharma, and Electric Vehicle Ecosystem. These segments account for 90 percent of our business," he revealed.

On India's electric vehicle (EV) market, Weiss remarked, "Many companies see it as a market trend, so big OEMs have massive product launch programs to attract customers. This creates many business opportunities. We might see different parts of engines, fuels, or EV alternatives, but the underlying factor will be mobility and car connectivity."

Source: Weiss India

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Uwe Weiss
CEO
Weiss GmbH

Source: Weiss India

"The lead factory in India will localize the product, but primarily for the APAC region to handle supply chain disruption. We need to be as close to the value chain as possible. There are a lot of western value chains that we can remove and serve the market with a much shorter lead time."

Sanjeebit Choudhury
VP, Asia Pacific
CEO, WEISS India

The global sourcing center

Pune, India, is designated as one of Weiss World's four 'Lead Factories'. Weiss has now established the 'Solution Factory' and 'Global Sourcing Centre' at the Weiss Campus in Chakan, Pune. "The lead factory in India will localize the product, but primarily for the APAC region to handle supply chain disruption," Choudhury asserted. "We need to be as close to the value chain as possible. There are a lot of Western value chains that we can remove and serve the market with a much shorter lead time."

"'Made in Weiss' is our philosophy. It makes no difference where you produce; Weiss quality is required. By establishing a global sourcing center and having SMEs certified by a global company, not just for supplying to India, it provides a much better platform for attracting people and motivating SMEs. Furthermore, the quality level expectations will differ from those of India, and on an economic scale, we will be able to negotiate a better deal," he added.

According to the International Monetary Fund (IMF) report, India is expected to grow at a 6.8 percent rate this fiscal year and at a 6.1 percent rate in 2023, putting India far ahead of the US, China, Germany, Japan, and the UK, among other major economies around the world. As a result, confidence in India has grown.

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MF 11, SIDCO Industrial Estate, Guindy,
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Call +91 77570 53326 or email us on
marketing@rvformsandgears.com
www.rvformsandgears.com