

RISE OF MICROFACTORY DEFINING MANUFACTURING EXCELLENCE



EM - Interview

Sudhir Gurtoo,
Managing Director,
Leadec India (p. 14)



EM - Interview

Markus Hucko,
Chief Operations Officer,
Leadec Group (p. 14)

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Servo Mechanical & Servo Hydraulic Tandem Line

Tonnage: 2,400 ton~1,000 ton | Bolster Area: 5,000 x 2,500 mm



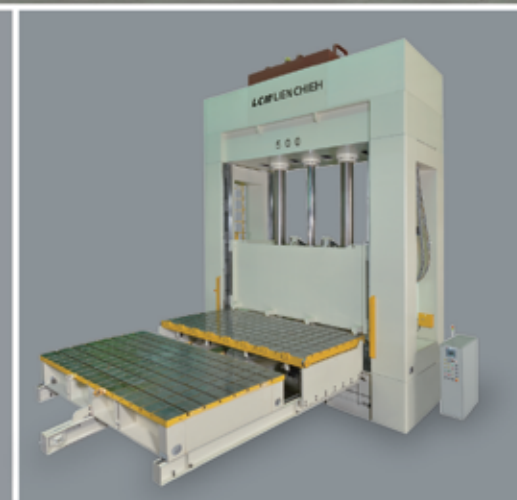
Forging Presses

Tonnage: 12,000 ton
Bolster Area: 2,700 x 2,500 mm



Tryout Presses

Tonnage: 3,000 ton
Bolster Area: 4,600 x 2,750 mm



Die Spotting Presses

Tonnage: 500 ton
Bolster Area: 5,000 x 2,500 mm



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YOURSELF

2

QUALIFY

1. Select a title that is most appropriate for your position

- ☐ 01. Corporate / General Management
- ☐ 02. Director, Supervisor
- ☐ 03. Group Leader, Project Leader
- ☐ 04. Manager, Specialist
- ☐ 05. Engineer, Technocrat
- ☐ 06. Other

2. Select a title that describes your principle job function

- ☐ 01. Management
- ☐ 02. IT
- ☐ 03. Safety & Security
- ☐ 04. Risk Management, Accident Management
- ☐ 05. R&D
- ☐ 06. Design Engineering (Plant Engineering)
- ☐ 07. Project Planning, Production Planning
- ☐ 08. Laboratory, Test, Field Service
- ☐ 09. Explosion Protection, Fire Prevention
- ☐ 10. Manufacturing, Production
- ☐ 11. Quality Assurance
- ☐ 12. Reliability, Evaluation, Services
- ☐ 13. Energy & Environment Technology
- ☐ 14. Facility Management
- ☐ 15. Sales, Marketing
- ☐ 16. Purchasing
- ☐ 17. Warehouse, Transportation, Logistics
- ☐ 18. Consulting / Advisory
- ☐ 19. Education
- ☐ 20. Other

3. Select the industry which best describes your company's primary business activity

- ☐ 01. Industrial Machinery
- ☐ 02. Electrical & Electronics equipment
- ☐ 03. Communication & Information Technology
- ☐ 04. Power & Energy
- ☐ 05. Automotive Manufacturing
- ☐ 06. Steel / Metal
- ☐ 07. Optics & Precision Mechanics
- ☐ 08. Chemical & Pharmaceutical Industry
- ☐ 09. Bio- & Environmental Technology
- ☐ 10. Mining, Oil, Gas
- ☐ 11. Wood, Paper, Printing
- ☐ 12. Food & Beverage
- ☐ 13. Textile, Leather
- ☐ 14. Building Automation
- ☐ 15. Technical Consulting, Engg. & related services
- ☐ 16. Machine Tools
- ☐ 17. Plastics & Polymers
- ☐ 18. Construction
- ☐ 19. University, Education
- ☐ 20. Other

4. What is the approximate number of employees in your company?

- ☐ 1 to 9
- ☐ 10 to 19
- ☐ 20 to 49
- ☐ 50 to 99
- ☐ 100 to 199
- ☐ 200 to 499
- ☐ 500 to 999
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- ☐ 3,000 & more

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“Data Analytics is key in manufacturing”

MANAGEMENT NOTE

Shifting to automation-driven manufacturing

Over the years in the manufacturing space, India has traditionally focused on domestic production and consumption while keeping abreast the Atmanirbhar Bharat vision of the Indian government. However, challenges faced by the Indian industry include a price-sensitive market, underdeveloped infrastructure, supply chains, labour-intensive processes, and expensive technological aid. There was a time when the manufacturing industry was slow to embrace technology, but today it is an age of rapidly evolving business scenarios, ever-changing market demands, and changing customer behaviour patterns.

A typical manufacturing ecosystem involves complex business processes that are carried out by multiple stakeholders. Our Cover Story this issue explains how Microfactory are more compact than conventional factories and how this manufacturing concept maximises capacity and quality while lowering costs through minimal investment and operational manpower. When it comes to manufacturing analytics, the usage of data applications on manufacturing processes helps optimise production processes. Technologies like 3D Printing and data-generated practises help bring down costs and raw material consumption, but also take time. While addressing such areas, other features in our issue walk through the know-how to improve production planning, supply chain optimisation, production quality, and maintenance. To know more, check out our EM April issue, which talks about role of industrial wearables, the need for traceability in industrial manufacturing, and addressing indoor air quality challenges in manufacturing facilities.

Covering such advanced concepts, EM will continue capturing and circulating relevant content, facilitating manufacturing enterprises, and identifying and applying technology upscaling strategies to transition their businesses forward towards a successful 2023.

Team EM

“

With great delight and pride, we extend our warmest greetings and heartfelt wishes to our esteemed associates, customers, and partners for a prosperous and triumphant business financial year ahead.

The waves of success have been crashing at our doorstep, as we witness a spectacular surge in traffic flow across the globe on our recently launched website. Our business partners are reaping the benefits of this platform, with an unprecedented level of visibility. Our weekly industry update podcast, “Morning Bytes with Anushka,” has generated an overwhelming response from the industry. The messages of appreciation and suggestions from our readers across the globe have spurred us to strive harder and soar higher in our digital initiatives.

To further enhance visibility of our customers’ products and services, we have designed combined packages of our various services, including our widely circulated print magazine and digital platform. Our sales team is ready to provide all the details and information you need to make the most of this opportunity.

As we move forward, we remain committed to delivering excellence in all our endeavors and setting new standards of success.

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How to improve
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INDUSTRIAL WEARABLES

Boosting operational output
with Industrial Wearables



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TRACEABILITY IN MANUFACTURING

Building Traceability in Manufacturing



Cover image courtesy: shutterstock



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The article talks about addressing indoor air quality challenges in manufacturing facilities

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35 Boosting operational output with Industrial Wearables

This feature elucidates the transformative potential of industrial wearables empowering enterprises to retain their competitiveness in a rapidly changing and intricate environment for businesses of all scales

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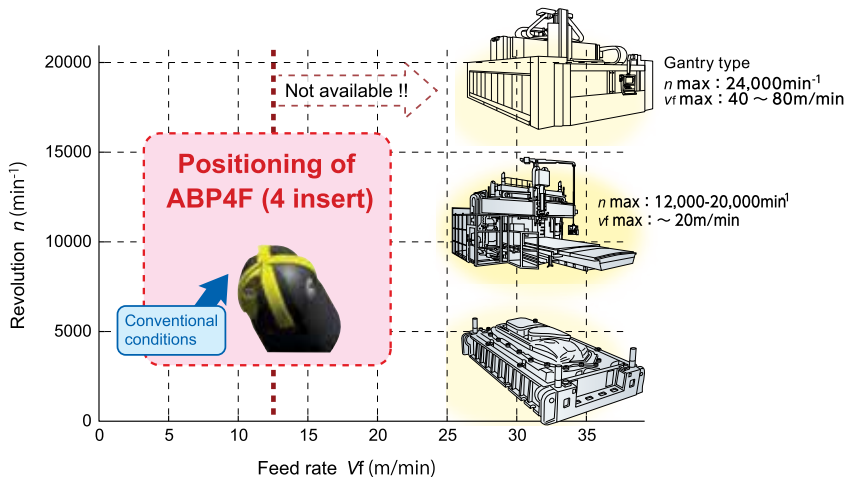
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Example of large press die for automotive parts



Processing advantage of 4-flutes end mill

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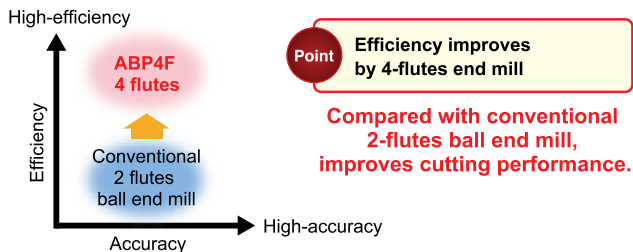
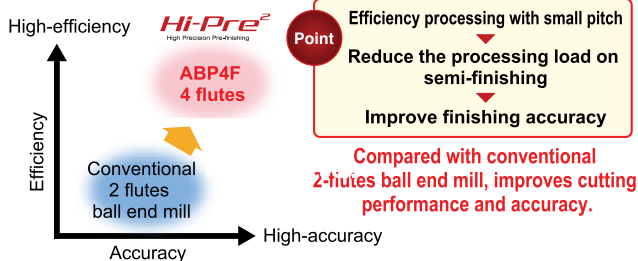


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YOUR GLOBAL CRAFTSMAN STUDIO

Dr Nautam Bhagwanlal Bhatt



In an era where India is seeking to transform its rich legacy of involvement in modern science into a stronghold in the emerging global knowledge economy, paying homage to the trailblazers of this tradition seems not only fitting but essential. Dr Nautam Bhagwanlal Bhatt, being one such pioneer, deserves recognition for his invaluable contribution.

Dr Bhatt was an Indian physicist born in Jamnagar, Gujarat, on April 10, 1909, and completed his undergraduate education in Ahmedabad.

His major contributions to science and technology are:

1. Development and deployment of the VT Fuse for the Department of Defence in the mid-1960s.
2. Numerous significant research endeavours were undertaken by Defence Laboratories under his leadership and active participation, including the creation of semiconductor-grade silicon, the production and application of solar cells, and the manufacturing of semiconductor lasers and Helium-Neon.
3. He established the Solid State Physics Laboratory in Delhi and was its founding Director.
4. He established the Central Electronics Engineering Research Institute (CEERI), Pilani.
5. He founded the Electrical Communications Engineering Department at the Indian Institute of Science, Bangalore.
6. He was a founding member of the Institution of Electronics and Telecommunication Engineers (IETE).

As an undergraduate, he departed from Gujarat to pursue a M.Sc. in Physics under the tutelage of the renowned C.V. Raman at the Indian Institute of Science (IISc) in Bangalore. After a year of teaching at Samaldas College in Bhavnagar, he secured a fellowship from the Maharaja of Bhavnagar to attend the Massachusetts Institute of Technology, where he obtained his doctorate in Science in 1939. Under the guidance of his advisor, the eminent theoretical physicist Professor Philip Morse, he conducted groundbreaking research on the application of wave theory to architectural acoustics.

After completing his studies, Nautam Bhatt came back to

India and devoted a significant portion of the 1940s to serving as a faculty member at the Indian Institute of Science (IISc). During this time, he not only rose to become the first acting head of the newly established Department of Electrical Communications Engineering.

Following India's independence in 1947, he became a part of the Defence Science Organisation in 1949, where he continued to work until his retirement. He established the Defence Science Laboratory in Delhi. Subsequently, he returned to Delhi to set up a Radar research unit, which eventually evolved into the Defence Research Development Laboratory in Hyderabad, under the leadership of President Abdul Kalam. From 1962 until his retirement in 1969, he was the founding Director of the Solid State Physics Laboratory in Delhi.

Under his guidance and active participation, the Defence Laboratories undertook numerous significant research initiatives, such as the development of semiconductor-grade silicon, the production and implementation of solar cells, and the manufacturing of semiconductor lasers and Helium-Neon. He also supervised several other projects related to semiconductor devices. Some of his own projects, including the development and deployment of the VT Fuse for the Department of Defence during the mid-1960s in response to India's security requirements, were classified. In recognition of his accomplishments, he was conferred the Padma Shri by the President of India, Dr Zakir Hussain, on Republic Day, January 26, 1969. Significantly, the presentation ceremony was held on Bhatt's 60th birthday.

Despite being compelled to retire due to rules, he persevered in his enthusiastic pursuit of science, engineering, and acoustics. In recognition of his outstanding service, he was presented with the Distinguished Service Honor Award of the Institution of Telecommunication Engineers in 2003. He passed away on July 6, 2005, at his residence. Despite his exceptional contributions that still serve as a source of inspiration and guidance for modern-day physics research in India, the name of this revered Padma Shri physicist often goes unnoticed on the roster of top Indian scientists.



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CUMI inks MoU with DRDO's RCI Laboratory for Ceramic Radome Technology

Carborundum Universal Limited (CUMI), recently announced that it has signed a Licensing Agreement for Transfer of Technology (LAToT) with DRDO's Research Centre Imarat (RCI) Laboratory for technology to manufacture 'Ceramic Radomes (GELCAST Process) Technology' used in missile systems. The LAToT was handed over at AERO INDIA 2023 in Bengaluru on February 15, 2023 in the presence of Defence Minister, Rajnath Singh. Ceramic Radome Technology is considered a state-of-the-art missile technology worldwide. RCI is a premier laboratory of Dr APJ Abdul Kalam Missile Complex. Subbu Venkatachalam, Head of Marketing, CUMI, stated, "India's growing prowess in the defence manufacturing sector, is a major goal of the 'Aatmanirbhar Bharat' initiative. With our strong legacy of being in the material sciences industry for almost 70 years, CUMI is honoured to play a part in shaping India's destiny by contributing to a strong and self-reliant defence sector. Our operations are completely made in India, from mineral sourcing and processing to research and testing; CUMI is completely localised with 100% end-to-end integration in the country."

JK Lakshmi Cement becomes the fourth global cement company to pledge 100% renewable energy by 2040

JK Lakshmi Cement, has joined RE100, a global corporate renewable energy initiative to ensure meeting 100% of electricity demand through renewable sources. In a major move to make its production process carbon-free and contribute to creating a sustainable future, the company has committed to meeting this target by 2040. With this step, the company has become the fourth cement firm globally to join the initiative, which demonstrates its unflinching commitment towards the environment and sustainability. The company has also joined EP100, a global corporate energy efficiency initiative that brings together over 120 energy smart businesses committed to measuring and reporting on energy efficiency improvements. Commenting on the move, Arun Shukla, President & Director, JK Lakshmi Cement, said, "Adopting environmentally conscious behavior is an inevitability to fight the climate menace and prevent degradation of our environment. With this initiative to be a part of RE100 and EP100, we are just accelerating our actions towards our commitment to a safe environment and a sustainable future."



ITALIAN TECH in India: Italian Know-How for India's Energy Transition and Manufacturing Growth

ITALIAN TECH in India, a one-of-a-kind platform, recently showcased a selection of Italian technologies and innovations manufactured in India across four sectors, including automotive and auto components, machinery and manufacturing, agriculture and food technologies, engineering, infrastructure, buildings, and construction, which was held at the Embassy of Italy, New Delhi. The event in New Delhi was inaugurated by Antonio Tajani, Italy's Deputy Prime Minister, Minister of Foreign Affairs, International Cooperation; Piyush Goyal, India's Minister of Commerce and Industry, India; Vincenzo de Luca, Ambassador of Italy-India; Amit Roy, IICCI President; and Claudio Maffioletti, CEO Secretary General of IICCI.



With an aim to highlight the significant contribution of Italian know-how to India's economic and technological growth in terms of investment, job creation, innovation, technological advancement, and skill development, the ITALIAN TECH exhibition took place at the Auto Cluster Exhibition Center in Pune, Maharashtra from March 17 to 19, 2023. It was inaugurated by Alessandro De Masi, Consulate General of Italy - Mumbai; Sadashiv Survase, Joint Director, Industries, Government of Maharashtra; Brijesh Chalil, Head of Treasury, Markets, and Sales, AXIS Bank; Amit Roy, IICCI President; and Claudio Maffioletti, CEO and Secretary General of IICCI.

The exhibition featured activities, seminars, and round tables with high-level representatives from both Italian, Indian institutions and associations. The exhibition successfully promoted greater cooperation between Italy and India in the manufacturing sector, providing a unique opportunity for Italian companies to showcase their capabilities and for Indian companies to explore potential collaborations and partnerships. The path forward is to work with various European stakeholders to increase awareness and support market penetration of advanced manufacturing, Industry 4.0, and Artificial Intelligence in India. The show attracted a diverse range of visitors from various industries and sectors. The event saw a significant turnout of around 57 companies, 780 professionals, 393 students, and 17 media, interested in exploring latest Italian technologies and innovations in the manufacturing sector. The visitor database included top-level executives, decision-makers, and industry experts from companies across India. The exhibition provided an ideal platform for networking, learning, and exploring new business opportunities.



Honeywell releases its Environmental Sustainability Index

Honeywell, recently released its 1Q 2023 Environmental Sustainability Index, a quarterly indicator of key trends pertaining to global efforts in climate change mitigation and other sustainability initiatives. The global study, which surveyed more than 750 business leaders involved in the sustainability process, revealed that nearly 98% of organisations have been at least somewhat or extremely successful in achieving at least one or more sustainability goals over the past 12 months. When it comes to meeting their goals by 2030, there is an increased level of optimism quarter over quarter across all sustainability categories. Darius Adamczyk, Chairman and CEO, Honeywell, said, "Despite challenging macroeconomic conditions, organisations remain committed to the fight against climate change and their sustainability goals. While data shows an increased sense of optimism towards reaching goals. With over 60% of our annual revenue stemming from solutions that contribute to ESG-oriented outcomes and approximately 60% of our R&D spending being directed towards ESG-oriented innovation, we have deep experience and expertise to help organisations around the world reach their sustainability targets even in a tougher economic environment."



Vedanta Aluminium and Dalmia Cement partner for manufacturing low-carbon cement

Vedanta Aluminium, has recently entered into a long-term partnership with Dalmia Cement for supply of industrial wastes such as fly ash and spent pot lining for manufacturing of low-carbon cement. Under this partnership, Vedanta's mega-aluminium smelter at Jharsuguda will transport around 20 rakes of fly ash per month for five years to Dalmia Cement's manufacturing units in Odisha, Chhattisgarh, Meghalaya, Assam, and supply SPL for three years to the company's plant at Rajgangpur, Odisha. Speaking about the partnership with Dalmia Cement, Sunil Gupta, CEO, Vedanta, Jharsuguda said, "Given the nature of the industry, a large-scale aluminium producer like Vedanta is a long-term reliable circular-economy partner for the cement industry. Strategic collaborations such as this will provide multiple benefits

in terms of enhanced quality, sustainability, and cost benefits to cement manufacturing while also helping us with effective waste management. Our waste-to-wealth initiatives are designed to develop thriving value-chains for converting our by-products into resources for complementary industries and is a significant step forward in our journey towards becoming a leader in sustainable development."

"TIMTOS 2023 Triumphs: Celebrating another year of Innovation and Industry Excellence!

Taipei International Machine Tool Show, widely known as TIMTOS, which was held from March 6 to 11 at Taipei Nangang Exhibition Centre, successfully concluded, attracting over 45,000 on-site visitors, including nearly 6,000 international visitors from more than 100 countries. Among them, were delegations from Turkey, Vietnam, Indonesia, Spain, and Algeria. The top five countries with the highest turnout were Japan, Malaysia, India, South Korea, and Thailand. The online exhibition will continue to run until April 6 and has already reached 7,000 visitors from nearly 15 countries.

This edition of TIMTOS has been hailed as a tremendous success by such major exhibitors as HIWIN, FFG, TTGroup, GOODWAY, KEYARROW, KMC, TAKISAWA, HEIDENHAIN, SOCO, and many more. These exhibitors had optimistic remarks about the event as they collectively expressed, "Far beyond our expectations," "We've taken enough orders at TIMTOS to keep the whole year busy," and "TIMTOS 2023 is even more dynamic than the pre-pandemic times,". Many business deals were made during the show hours. Exhibitors, including GOODWAY, KMC, WELE, Quick Jet, UNIFY, and Delta Electronics, were delighted with the considerable orders secured on-site. FEMCO, a comprehensive steel manufacturing company, has also won orders from many Southeast Asian countries. The Lead Procurement Engineer from Haas Automation in the United States witnessed that the Taiwan manufacturers were producing new-generation parts, with more options than before.

The line-up of events, including the Future Manufacturing Forum, ESG Seminars, Maker Workshop, Insights Talk, Marine and Offshore Machinery Seminar, and Metalworking Ecosystem Guided Tours, accommodated roughly 1,000 attendees. For those unable to attend in person, show highlights, which were easily accessible through the "Manufacturers Win Podcast" and the co-branded online video coverage presented by Modern Machine Shop, "Media Eye on TIMTOS 2023," has already enjoyed more than 20,000 views and listens. TIMTOS is the perfect venue for international visitors keen to connect with excellent machine tool players, especially in light of the acceleration of digital transformation worldwide and the global trend towards net zero. It is scheduled to return in March 2025.





“Delivering the right machine tools for the Indian market”

...says **Ravjeet Bomrah**, Managing Director, Ravjeet Engineering Specialties. In an interaction with Sanjay Jadhav, he talks about the current market demands and whereabouts of the Indian automobile industry. Excerpts...

Can you brief us on the current market scenario for the Indian gear chamfering and deburring industry?

The precision gear market in India has been experiencing exponential growth. According to analysts, the market is estimated to reach \$684 million by 2025, growing at a CAGR of 6.4% from 2020 to 2025. The rising demand from several application industries, particularly automobile, robotics, aerospace, and military, is expected to simulate this market growth. In conjunction with this, rapidly increasing demand for automation at manufacturing facilities will further catapult this market growth to new heights.

How is your company working towards meeting the ambitious 2030 milestone forecasted for the Indian automobile industry?

Dedicated to delivering products of superior quality, we have made major investments in manufacturing equipment to effortlessly deliver the tooling and the right machine tool. Our company's presence in the market is known to all top automobile gear manufacturing industries in India. We look forward to increasing our turnover to double by 2030. According to a market survey, EV sales penetration is 30% for private automobiles, 70% for commercial vehicles, and 80% for two and three-wheelers. To achieve the set target, we have worked on R&D and developed some new machine tools that are not available in the Indian market.

What are the customer challenges you face when it comes to chamfering and honing? How do you address such concerns?

The major challenges we face are convincing customers of the standard chamfer angle and width that can be achieved on that particular gear, and due to changes in norms and tighter tolerances on gear chamfer angle and width, customers require better solutions and the best technical support. Customers who look into the market for cheaper solutions face this problem and come back to us. We, as a manufacturer, give them complete technical support and guidance to achieve the right results and better tool life. We have also developed internal and external honing wheels for the Indian automobile industry and other gear manufacturers from Korea and the USA.

With sustainable solutions being crucial and most talked about currently, how is your company working to make its solutions sustainable?

The key to a sustainable solution is understanding the growing demand in the gear manufacturing industry for gear teeth profile machining. We work on R&D to develop new machines. We provide better solutions by understanding the customer's requirements and giving him the right product, which is sustainable and user-friendly. Our recent development of an internal spline hard broaching machine is a perfect example of a sustainable solution, and we are the only company in India that can offer this solution.

What is the vision for your company in 2023?

Our vision is to progress in terms of developing new solutions for the gear-cutting industry. Tie-up with other machine manufacturers for tooling solutions that Ravjeet can provide and to grow market share in terms of machine and tooling sales.



“EV adoption will move from the Embryonic stage to the Growth stage in India”

...signifies **Jugal Shahdadpuri**, Director, Bombay PowerCo. In an interview with Neha Basudkar Ghate he discusses how the Electric Vehicle (EV) sector will soon have an evolved market and that there is tremendous potential for deploying charging infrastructure for both personal and commercial EVs across the country. Excerpts...

How did you come up with the idea for Bombay PowerCo, and what inspired you to enter the EV industry?

It was towards the end of 2019 when I realised the rise of the EV sector and significance of the appropriate charging infrastructure. EVs were just about to penetrate the Indian market, and the government was beginning to introduce fiscal and non-fiscal benefits for industry players. Being strongly drawn towards principles and operational strategies of manufacturing companies, I always manifested setting up a manufacturing business of my own after completing my education in Finance, and Bombay PowerCo has been the product of my manufacturing gusto and opportunity timing in entering the EV space.

In your opinion, what are some of the most exciting recent developments in the EV charging industry, and how do you see these developments impacting the industry in the coming years?

The introduction stage of EV adoption in India has typically outperformed strategic projections. The progressive shift from low voltage to high voltage battery packs for EVs, standardisation of the e4W charger connector design, the introduction of IoT-based systems have largely been instrumental in developing EV Charging technologies so far. Additionally, the individual state government policies, FAME 1 and FAME 2 policies, CERC guidelines, etc. have greatly stimulated the adoption of EVs and the setting up of EVCI.

What are the common challenges that EV owners face when it comes to charging, and how does the company help its customers overcome these challenges?

It is evident that not less than 60% of EV charging shall happen overnight in one's parking lot using an AC slow charger and that a DC fast charger shall only be opted for in times of urgent battery top-ups in order to maintain optimum health of your Li-ion EV battery. For this arrangement to materialise, Bombay PowerCo is committed to deploying the best bundle of software and hardware solutions and to educate masses to make EV charging simple, hassle-free, and just another task of the day.

What do you see as the biggest opportunities and challenges facing Bombay PowerCo in the next five years?

One of the biggest challenges in manufacturing remains the reliance on imported (typically Chinese) components, which reduces our cost-effectiveness against their produce. The future does seem bright now that the Indian Government is pushing for indigenous development of technology and production of components, however, the gestation period will still be challenging.

Opportunities: Given the size of the EV adoption market in India, there is tremendous potential for deploying charging infrastructure for both personal and commercial EVs across the country. The national target of 40% non-fossil fuel vehicles by 2030 opens a plethora of opportunities for EVCI deployment across the country. In addition, there is immense scope for exporting Indian produce to other countries given the FTAs and other export incentives offered by our government.

“Leveraging technology breakthrough of India in automation”

Neha Basudkar Ghate, in conversation with Sudhir Gurtoo, Managing Director, Leadec India; Markus Hucko, Chief Operations Officer, Leadec Group and Dr Bernd Voelpel, Global Head of Smart Factory Group, Leadec Beteiligungen GmbH, shares their thoughts on the business lines and automation potential of Leadec India.

Excerpts from the interview...

Can you brief us on the industry landscape when it comes to the Indian market for Leadec India?

Gurtoo – We started way back in 2010 in India, and are headquartered in Stuttgart, Germany. In India, we started with an Automotive plant, and interestingly, we’re still working there. But in terms of the industry landscape, we are very well entrenched in automotive, and there are about 70 clients or customers in India now. Out of that, I would say half would be automotive or the suppliers of automotive. Leadec India provides services and Automation/ projects in Manufacturing Industry. We have verticals in Plant and Utility Maintenance; Logistics crating; production support and Projects & Automation.

We are also in the construction equipment industry, and in this sector, we have around 10 to 12 plants. We are also in the pharmaceutical and steel sectors, and our goal is to try and go beyond traditional arenas and cover as much as we can. In the last 10 years, we have grown at about 20 % to 25 % at CAGR. The outsourcing demand after COVID is increasing, especially by the OEMs.

When it comes to factory lifecycle, what are Leadec’s most successful transformations that you have managed in the past few years?

Hucko – In recent years, especially in our biggest customer group, which is the automotive industry, the move from internal combustion engine to the electrical drivetrain has perhaps been the most important transformation that we are currently undergoing. Companies are trying out new processes and new ways of working, and service providers have good opportunities to help our customers transform themselves.

We have helped customers build up new production facilities for EVs, develop new battery plans, industrialise

processes, produce batteries, and handle logistics around them. This is perhaps in recent years the most important and successful transformation that we have been through.

How does Leadec Group prioritise customer satisfaction and ensure that its services meet the specific needs of clients?

Hucko - I believe this is our biggest strength. We are present at more than 300 sites around the globe, serving our customers physically on-site, understanding specific production processes at those sites, and adjusting our services to those production processes. Then we try to learn from that and bring those processes into our global standards and procedures to solve our customer-related issues. We have maintained a standard process to meet specific needs of clients at a certain level and have proven that we have the ability to adjust to the specific needs of the customers, which is something that our customers also value.

How can today's highly productive solutions address current manufacturing challenges such as productivity improvement, cost reduction, efficient processes, etc.?

Hucko - From my perspective, we addressed the topic of digitalisation. On one hand, we have the monitoring of the machines in real-time, which gives us insights about the condition, and certain parameters of certain equipment, which puts us in the situation of being able to predict when a machine is going to break and proactively fix the problems and solve them. We can reduce time by planning, but we can also utilise our people more efficiently because we can better plan the service activities we have to do. For that, we introduced a digitised service delivery process where we use a field service system to plan our resources and utilise those people in the best way.

I believe this leads to cost reduction and performance improvement. But I think even more important is that in today's world, in every country where we are rendering our services, there is a scarcity of skilled people. This is a problem for the manufacturing industry, and that gives us the duty to utilise our people in the best possible way. I think our digitalisation efforts have helped us build systems and processes that ensure we do the job in a more effective way.

Gurtoo - India has huge opportunities to offer the globe. To give an example of what we have already exercised in an automotive plant nearby as a pilot project. We have placed running sensors on motors and pumps, and they pick up data and put it on the dashboard. This helps us pick up early failure warnings before the pumps fail and reduces future downtime that might occur otherwise. This is how highly productive solutions address current manufacturing challenges.

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The future factory ecosystem is going to change drastically, AI will take over and there will be less number of people. The Plant manager might be sitting far away, acting on all the alerts remotely
— **Gurtoo**



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We believe that India has a very strong capability around software development and the development of IoT use cases therefore we can add value to our customers by tapping the right potential and deploying digital solutions

— **Hucko**

How does Leadec Group approach sustainability to reduce its environmental impact, both in its operations and services?

Hucko - When it comes to sustainability and reducing carbon footprints, we look at it from two perspectives. First, how can we improve our processes and utilise as few resources as possible. And the second perspective is crucial, in terms of how we can help our customers reduce their carbon footprint. Therefore, we establish factory solutions that create separate services within existing services with an aim to focus strongly on helping our customers become greener and reduce their carbon footprint during the process of energy consumption.

How is Leadec India embracing digitalisation? When it comes to the factory ecosystem, how do you foresee the factory of the future?

Gurtoo - The factory of the future is going to be very different. The number of people would be less in such a future factory; there will be a lot of dashboards all over the place; and AI would be commonly used. So, the future is going to change drastically, and we are preparing for the same. We are developing applications, and these apps will give data from across machines in production, which will run the production tomorrow and change the way we work today. And this will be an amazing example of automation. The plant manager need not be physically present in the factory and might be sitting far away, acting on all the alerts remotely.

What are your upcoming plans for the company when it comes to expansion, a diverse portfolio, and strategies concerned?

Hucko - We have been on a customer diversification journey in recent years, and for the last five years, we were very much focused on the automotive industry. However, we saw the value of our services in other industries as well, therefore we extended our offerings into other industries, so they already refer to what was done in India and what we did across the globe. In the meantime, 50% of our order intake lies outside the automotive industry, which does not mean that the automotive industry turnover went down, but rather went up, which is the case. So, we have grown over the last year—even during the crisis period.

What is manufacturing success all about in today's competitive world, especially against the backdrop of the ups and downs of the economy?

Gurtoo - When it comes to my perspective on the competitive world and the industry facing economic ups and downs, I determine manufacturing success rates by two to three basic checks. I would do this to decide whether this

manufacturing industry is successful or still dwindling. First, I'll look at the capacity, so let's see if a plant has 100% capacity; then, it should run at least at 70% to 80% utilisation capacity, otherwise, to me, it is not yet a success. Second is the product, and do we innovate the processes in the manufacturing plant? And for the third parameter, I'll look at the company representatives and employees' morale, are they working as a team or just dragging their feet walking into the gate and getting out in the evening and just collecting the salaries and so on. On these three parameters, I'll judge the success of a manufacturing plant.

Dr Voelpel - I believe technology helps a lot also in this domain because the better you can forecast, the better you can react and act later on. If you know when something is going to break, you can manage your inventory, you can plan people, so I'm referring to competition monitoring and prediction in the whole data analytics concept, which will help to rate more flexibly the volatile environments that come with the prices.

How do you see the role of technology changing over the years, when it comes to growth strategies in the automation sector? How do you ensure to maintain technical competence within your R&D?

Dr Voelpel - Technology is indeed driving change in the industry. There is connectivity, cloud technology, data science, Artificial Intelligence, and Machine Learning. All these are new and breakthrough developments that have been made, and that's driving change. What is more important, though, I find, is not that its driving change but that its driving value. There was a recent study, that quantified the value of industrial IoT. Industrial IoT is just one of many areas, like smart cities, healthcare, retail, and others. Industrial IoT is by far the biggest value-changing segment.

Now, what exactly does the change come with? For example, we had the automation pyramid, for years. There are standard methods for running and making factories efficient, but technology is changing this. The automation pyramid is breaking up. You will see more value networks than value chains. Companies like us sit at the centre of these networks. We are a neutral service specialist for our customers. We can help them through this change, and that comes with opportunities not only for us but also for our customers working with us.

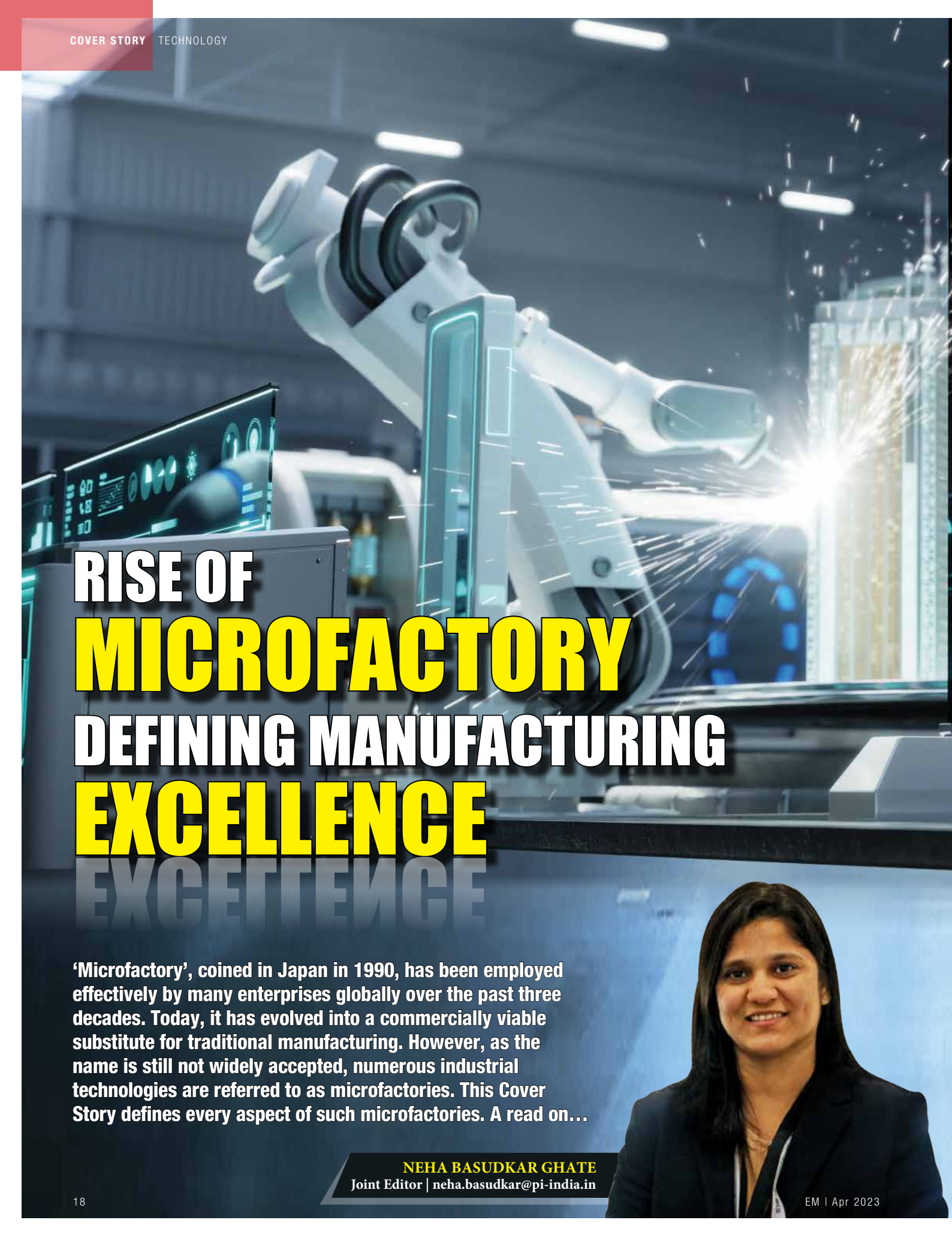
The changes in technology are quite comprehensive. Technology changes like data science, Machine Learning, and cloud technologies are in the game now and we are going in this direction. Already today, all of our IT infrastructure is cloud-based. We have built our own IoT cloud solution, because we are in the game. We can connect to our major OEMs because they also have their own cloud solutions. It is about seamless, flexible, safe, and secure connectivity and the exchange of data that becomes more important, and we are ready for this.

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Technology is driving change in the industry. What is more important, though, I find, is not that it's driving change but that it's driving value. Companies like us sit at the centre of the value networks

— **Dr Voelpel**

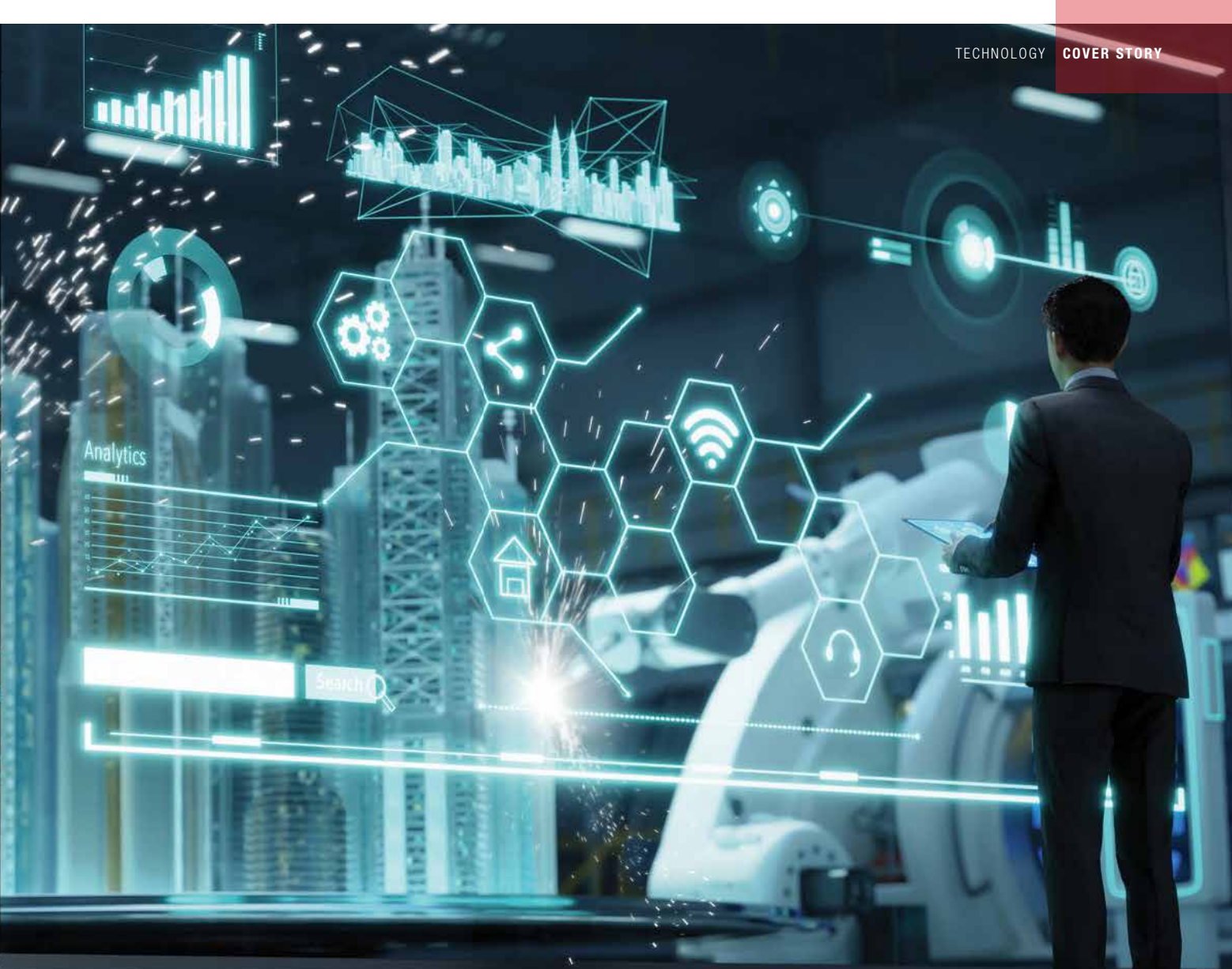




RISE OF MICROFACTORY DEFINING MANUFACTURING EXCELLENCE

‘Microfactory’, coined in Japan in 1990, has been employed effectively by many enterprises globally over the past three decades. Today, it has evolved into a commercially viable substitute for traditional manufacturing. However, as the name is still not widely accepted, numerous industrial technologies are referred to as microfactories. This Cover Story defines every aspect of such microfactories. A read on...

NEHA BASUDKAR GHATE
Joint Editor | neha.basudkar@pi-india.in



The idea of a microfactory is not standard. It is a manufacturing term with a broad definition. It is a manufacturing, assembly, or production facility that produces small quantities of goods in a space that is more compact than conventional factories. To maximise capacity and quality while lowering costs through minimal investment and operational manpower, microfactories are often highly automated and robotised.

The key benefits of the microfactory are the enormous resource savings in terms of time, space, energy, and materials. They require less equipment and capacity than traditional factories, reducing initial investment, ramp-up time, and operational costs radically.

Because of their decreased dimensions, most microfactories are used for small-batch manufacturers of a wide range of items rather than conventional mass production. The manufactured goods often have a tiny form factor and are light in weight.

Automatic machine tools, CNC tools, robotic arms,

assembly systems, quality inspection systems, material feeders, guides, waste elimination and collection systems, packaging and marking applications, and solutions for monitoring tool performance are just a few features that make up microfactory configurations.

Birth of the Microfactory concept

The Mechanical Engineer Laboratory (MEL) of Japan initially introduced the idea of a Microfactory in 1990. After that, MEL spent almost a decade working on a project to reduce the size of manufacturing systems and machine tools. In 1996, MEL created a micro lathe no larger than a human palm.

This prompted MEL to develop a working prototype of a complete manufacturing facility, which ultimately led to the development of the first desktop fabrication machine for the manufacturing of microball bearings in 1999.



Microfactory vs Conventional Manufacturing Model

Traditional factories and microfactories are founded on fundamentally different ideas. To achieve economies of scale and mass production, the traditional manufacturing idea promotes the construction of a sizable facility. Yet, to make items available to customers, this model requires an extensive and expensive distribution network.

Microfactory, on the other hand, challenges this idea by establishing numerous tiny, high-tech manufacturing facilities nearby clients, which can serve as retail establishments offering a personalised product. The sales approaches used by these two models also differ from one another. Unlike the Microfactory concept, which manufactures products only after receiving confirmed orders from the customer, which creates a pull from the market, the traditional manufacturing model first produces products in large quantities before pushing them to the market through various distribution channels.

Uniform design vs customised design

As items are produced conventionally for mass manufacturing, any modifications to the product's design result in a considerable increase in the cost of replacing dies and tooling. A typical Microfactory system is exceedingly adaptable, allowing for the cost-free or extremely low-cost adjustment of product design. Microfactories are perfect for producing items in small numbers with various designs and specifications.

Also, businesses don't need to maintain an inventory of manufactured goods because they build each unique product and sell it right away. The conventional approach emphasises the necessity of pushing things onto the market for sale and believes in mass-producing standard products. Also, it requires a lot of room to store the goods, which results in an increase in costs.

Microfactory deployment scenarios

There are many reasons why manufacturers set up an automated microfactory, however, the following sections introduce the three key deployment scenarios that are most suited for a microfactory.

■ **Locally produced:** Moving production close to the most significant markets is a component of local manufacturing strategy. Local manufacturing is a strategy used by manufacturers to cut expenses associated with the supply chain, inventories, business risks, and time to market. A completely automated Microfactory reduces the initial investment, risks, and operational costs for producers, making it a crucial enabler for local production.

■ **Bringing manufacturing home:** Reshoring manufacturing includes relocating the manufacturer's current offshore production to the manufacturer's home nation. Tax incentives, quality improvement, shortened lead times, lower inventory, quicker delivery times, qualified labour, and improved intellectual property protection are some of the advantages of reshoring. Locally produced goods have lower transportation costs and no import taxes,

which boost their profitability. Manufacturers can restart production in their nation with the help of a Microfactory.

■ **Manufacturing using a right-shoring strategy:** In most situations, reshoring entire production back to the home nation is challenging and expensive. Manufacturers can use right shoring methods to move only specific manufacturing components to the best locations for their operations. The global coronavirus pandemic has raised awareness of local manufacturing, right shoring and reshoring.

Advantages and motivators

Microfactories can produce tailored items with high return on investment. As such, it won't be long before manufacturing firms switch from employing larger manufacturing facilities to more compact, flexible, and automated microfactories. According to some analysts, the manufacturing industry is poised to adopt the Microfactory concept, and over the next ten years, the industry will see growth of several new microfactories.

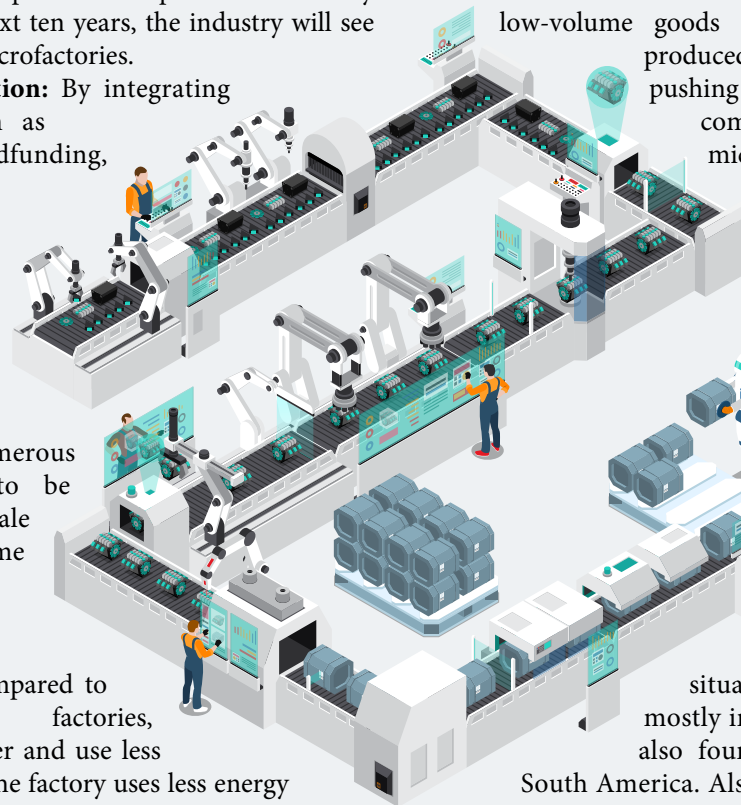
■ **Enhanced Innovation:** By integrating several processes, such as crowdsourcing and crowdfunding, microfactories are adaptable and highly automated factories that enable lean production and accelerate the rate of innovation. Microfactories allow numerous tests and iterations to be carried out on a small scale without affecting the time and cost because they are a small, automated setup.

■ **Reduced costs:** Compared to conventional large factories, microfactories are smaller and use less floor space. As a result, the factory uses less energy and raw materials, which results in less waste and pollution. This ensures cost savings by having a beneficial influence on the factory's operating energy, environmental energy, and processing energy. While production is highly automated with the help of robots and artificial intelligence, microfactories also reduce labour expenses.

■ **Enables mass customisation/personalisation:** In both industrial and commercial sectors of the manufacturing industry, customisation and personalisation of products are emerging as new trends. The ability to produce high-mix,

KNOWING HOW MICROMANUFACTURING WORKS

- **High levels of automation:** The majority of procedures in microfactories are meant to be completed through automated production.
- **Cellular configuration:** Microfactories are designed in a cellular or modular fashion, allowing a component to move among different stations in any order needed, supporting increased customisation options. This contrasts with the traditional linear production line, where a piece progresses through a series of processes.
- **More design flexibility:** Compared to higher-volume facilities with strict design restrictions, microfactories contain technology and setups that permit high levels of customisation.
- **Hyperlocal production:** Microfactories can be implemented in almost any type of facility without the need for brand-new buildouts or intensive retrofitting, making them a crucial component of creating a smart factory. As a result, they may typically be located much closer to clients than conventional factories, which helps to stabilise the supply chain, boost reliability, and cut costs.



low-volume goods that can be tailored and produced on demand is what is pushing manufacturers towards compact production spaces like microfactories.

Future of manufacturing - Microfactory

Over time, manufacturing technologies have seen substantial change. To achieve economies of scale, most products are currently produced in enormous facilities. Most of these factories are situated in low-cost regions, mostly in Asia, with a small number also found in Eastern Europe and South America. Also, there are more and more demands for locally produced goods all over the world. Several more recent, technologically advanced businesses have already begun to invest in this idea, and some well-known market participants have expressed a strong interest in setting up multiple microfactories. Some analysts assert that microfactories may be a solution to shifting consumer dynamics that will overcome constraints of low-cost sourcing locations. Finally, microfactories may be the best defence against the looming threat of a new wave of global protectionism. □



Building Traceability in Manufacturing

The need for traceability in Industrial Manufacturing is growing rapidly. As a result, it has become an essential component of modern production processes. A read on...



Sanjay Jadhav
Assistant Editor
sanjay.jadhav@pi-india.in

Traceability is a comprehensive idea that pertains to the act of recognising an object or work item and obtaining any information regarding it at any point during its existence. This is accomplished by assigning a distinct identification label or symbol to an object and documenting its data and movements from inception to disposal. However, the implementation of this straightforward concept is frequently hindered by the complexity of the product, which can make it difficult to execute.

Paper-based methods of traceability have been used for several centuries. The digitisation of food product traceability, however, began in the 1950s when barcodes were invented. Recently, adoption of Industry 4.0 technologies has led to an increased preference for digital traceability across all industries. Traceability is now recognised as an essential tool for managing risk in various industries, such as food, medical, electronics, and automotive. Although it has been mainly prevalent in the food industry, other sectors are also embracing this management tool as compliance and quality have become more significant concerns.

Why is traceability important in manufacturing?

Traceability is essential in industrial manufacturing for several reasons. Firstly, it enables manufacturers to track and record every step of a product's lifecycle, from raw materials to the finished product. This information is critical in maintaining quality control, preventing defects and recalls, and ensuring compliance with regulatory requirements.

Secondly, traceability allows manufacturers to identify and address quality control issues early on in the production process, reducing the likelihood of defects and recalls. By maintaining detailed records of the production process, manufacturers can quickly identify the source of any issues and take corrective action. Lastly, traceability is becoming increasingly important in industries subject to strict regulations, such as food, pharmaceuticals, and automotive manufacturing. By ensuring compliance with regulatory requirements, manufacturers can avoid fines, legal action, and damage to their reputation.

Traceability has significant economic benefits. By enabling manufacturers to optimise their processes and identify areas where efficiency can be improved, it can help reduce costs associated with defects, recalls, and waste.

Below we look at the benefits in details:

1. Ensuring compliance

Traceability is critical in industrial manufacturing for several reasons. Firstly, it helps ensure compliance with regulations and industry standards. Many products and materials are subject to strict regulations and must be traced to ensure that they meet required standards. Traceability also helps manufacturers meet their quality control objectives. By tracking products and materials throughout the manufacturing process, manufacturers can identify and address issues that may compromise product quality.

2. Supporting supply chain management

Traceability is also essential for effective supply chain management. By tracking products and materials, manufacturers can identify and resolve issues with suppliers, such as delays in delivery, quality issues, and other problems. This helps to reduce the risk of supply chain disruptions and improve efficiency.

3. Improving quality levels

Traceability enables manufacturers to identify the root cause of defects and quality issues. By tracing products and materials, manufacturers can identify the specific process or component that caused the issue, enabling them to take corrective action to prevent similar issues in the future.

4. Providing transparency to consumers

When it comes to the consumers' side, traceability is becoming increasingly important as consumers are becoming more aware of the products they purchase and are demanding greater transparency from manufacturers. Traceability allows manufacturers to provide consumers with detailed information about the products they purchase, including their origin, manufacturing process, and quality standards.

Implementing traceability in industrial manufacturing

Implementing traceability in industrial manufacturing requires a systematic approach that involves the following steps:

Defining the scope: The first step in implementing traceability is to define the scope of the system. This involves identifying products or materials that will be tracked and the information that will be recorded.

Selecting the technology: The next step is to select the technology that will be used to implement the traceability system. This can include barcode scanning, RFID or other technologies.

Establishing data capture points: Once the technology has been selected, the next step is to establish data capture points. These are locations where information about the product or material will be recorded. This can include raw material suppliers, production processes, and distribution centres.

Developing data management processes: The data captured by the traceability system must be managed effectively. This involves developing processes for data collection, storage, and analysis.

Integrating with existing systems: Traceability systems must be integrated with existing systems, such as inventory management and quality control systems.

Training employees: Finally, employees must be trained to facilitate the traceability system to ensure that it is used effectively.

Designing traceability framework

Traceability framework design refers to the process of designing and implementing a traceability system for tracking products or materials throughout the supply chain. The purpose of such a system is to enable identification of the origin, processing history and destination of a product or material, which can be critical for quality control, regulatory compliance, and risk management. The design of a traceability framework in industrial manufacturing should consider various factors, such as complexity of the supply chain, regulatory requirements, and cost of implementing and maintaining the system. The system should be designed to be flexible, scalable and adaptable to changing business needs.

Effective traceability framework design can offer several benefits to industrial manufacturers, including improved quality control, enhanced supply chain visibility, increased efficiency, and greater regulatory compliance. By tracking products or materials throughout the supply chain, industrial manufacturers can identify and address potential issues before they become major problems and improve customer



Traceability enables manufacturers identify the root cause of defects and quality issues

satisfaction by providing greater transparency in the production process.

What is Forward Traceability?

Forward Traceability in industrial manufacturing, also refers to as downstream traceability, involves the ability to track components and raw materials throughout the supply chain to the finished product and end consumer. This can be particularly relevant in industries such as automotive and electronics, where manufacturers may know who is using the product and where it is being used. While in some cases the traceability information may only extend to where the product was sold, it remains an important tool for ensuring quality control and can be valuable for products that carry warranties. Additionally, Forward Traceability can play a role in developing brand loyalty and future marketing efforts.

What is Backward Traceability?

Backward Traceability in industrial manufacturing, also known as Upstream Traceability, involves the ability to trace history of materials and components used in the manufacturing process back to their source. This includes identifying the supplier of the materials or components, as well as any associated testing or inspection records. Backward traceability is important for ensuring that materials and components meet quality standards and comply with regulatory requirements, and for identifying any issues or defects that may have occurred upstream in the supply chain. Backward traceability can also be useful in the event of a

product recall or safety issue, as it allows manufacturers to quickly identify and address any potential issues with materials or components.

What is Internal Traceability?

Internal Traceability in industrial manufacturing involves tracking and recording the movement of materials, components, and finished products within a company's manufacturing processes. This includes monitoring location of materials and products within the manufacturing facility, as well as tracking use of materials and components in the production process. Internal traceability is important for ensuring efficient production processes and identifying issues or bottlenecks that may arise during production. Additionally, internal traceability can be useful for quality control purposes, as it allows manufacturers to identify and address issues or defects that may occur during the production process. Internal traceability can be achieved through various methods, such as barcode scanning, RFID tagging, or manual recording.

Future calling

The future of traceability in industrial manufacturing is likely to be shaped by a combination of regulatory requirements, technological advancements, and changing consumer preferences. As supply chains become more complex and globalised, the need for robust and reliable traceability systems will continue to grow, and companies that invest in these systems are likely to have a competitive advantage in the marketplace. □



Enhancing machine tool performance with Industrial Bearings

As Industry 4.0 gains further ground in manufacturing across the globe, the machine tool sector will play an important role. With equipment design and manufacturing processes based on a combination of mechanical engineering technologies and digital control technology, the sector is at the forefront of this Industrial Revolution.



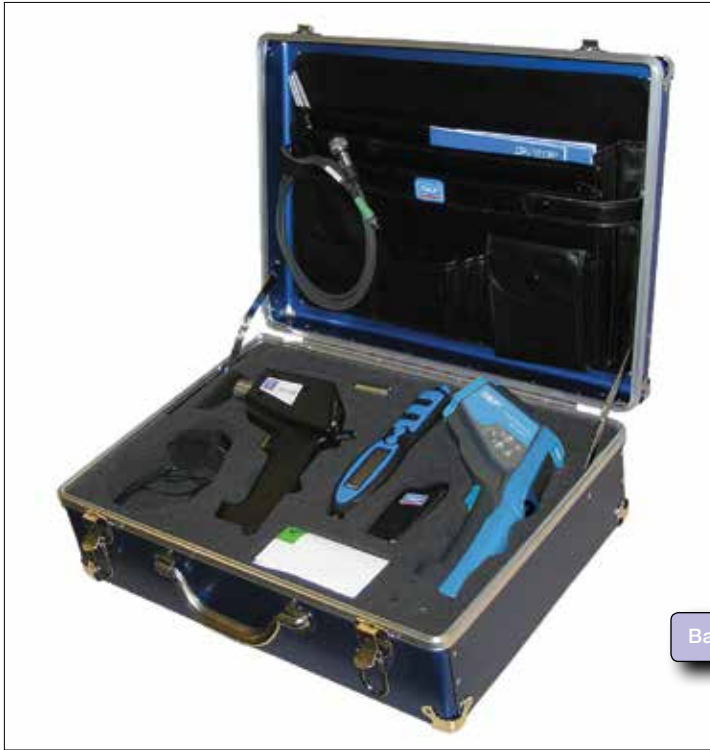
Sujeeth Pai
Director,
Industrial Market,
SKF India

The machine tool sector is of strategic importance to the manufacturing industry. With focus on efficiency, realisation of production potential, and sustainability, the optimisation of Overall Equipment Effectiveness (OEE) has become more important than ever before. Bearings and lubrication solutions play an essential role throughout motion systems, whether in the motor, the encoder, the actuator, or elsewhere.

Bearings provide support and stability while converting sliding friction into rolling friction, allowing the system to position the load with less torque and increased speed. Selection of the right bearing can reduce power consumption, increase system lifetime, and enhance overall system performance. Smart lubrication systems, on the other hand, ensure that machine uptime isn't a concern by protecting bearings in harsh operating conditions.

Achieving higher efficiency levels

Industry 4.0 is combining pioneering technologies and industrial processes to create intelligent and clean solutions for achieving higher efficiency levels. Companies across sectors are working on their processes to align with the evolving trends, remain profitable, and achieve sustainable growth. The company is leveraging Industry 4.0 and allied digital technologies in line with its initiatives to 'digitalise the full value chain' and drive operational efficiencies in its manufacturing operations. The company's 'Future Factory' is bringing in visibility and traceability of materials for better planning and scheduling, generating insights from process data to ensure quality products, thereby, reducing scrap. With a focus on fully digital operations, the company is



Basic Condition Monitoring Kit

paving the way for digital monitoring, proactive analysis and action.

General equipment and machinery products are designed and developed using comprehensive mechanics, fluid flow, thermodynamics, electronics, mathematics, and material science. The standard for technical products is regularly examined through various innovations. Product cycles are becoming much shorter, and technology is evolving faster than before. More precise calculation methods, constantly increasing processing power, and improved technological foregrounds such as material technology, stability, and tribology have mobilised reserve capacities. With the machine tool industry fast evolving, efficiency levels will further improve.

Machine tools have an illustrious history in manufacturing industries around the world. Today, machine tools rely on various specialised components that allow them to operate smoothly and efficiently with higher tolerance levels. High-quality precision bearings are essential for the accuracy and reliability of machining equipment, as they are responsible for directing and enhancing spindle movement. With machine uptime a key parameter for business continuity, the emphasis is on optimising overall equipment effectiveness.

Quieter operations

When more silent operation in machine tool applications is desired, this design can be used for high-capacity and high-speed designs for grease-lubricated spindles. These bearings

can offer several advantages, including reduced noise and vibration, easier mounting and reduced installation time, and improved load sharing. Typical applications for such bearings are grease-lubricated spindles for high-speed machining centres (horizontal and vertical), high-speed PCB drilling, high-speed glass grinding, external and surface grinding machines, milling machines, boring machines, tapping machines, and high-performance turning centres.

Super-precision double-row cylindrical bearings

High-precision double-row cylindrical roller bearings are optimised for high-load and high-capacity applications (turning/lathes). These bearings feature a low cross-sectional height, high load-carrying capacity, high rigidity, and high-speed capability. They are particularly well suited for machine tool spindles where the bearing arrangement must accommodate heavy radial loads and high speeds, while providing a high degree of stiffness.

Components used in the machinery industry are increasingly designed for continuous loads at the limits of materials and technology. This places extreme demands on lubrication. Challenges can include ingress of cutting fluid, contamination, and humidity from machining, temperature and heat control. The reliability of these components depends on precise, demand-based lubrication. And it's crucial to make it work. Improper lubrication—too much, too little, the wrong type, or contaminated lubricant—



accounts for up to 36 percent of premature bearing failures. And beyond bearings, lubrication contributes to the reliable operation of chains, cutting tools, linear guides, and more. The advantages of using the right lubrication solutions include increased productivity, reduced total cost of ownership, and a safer, healthier, and more environmental friendly workplace.

Addressing machine failures

In addition to selecting the right bearing and lubrication solution, manufacturers also need to focus on detecting impending machine failures. By monitoring critical equipment in the plant, companies can optimise performance, minimise costly unplanned downtime, and ensure the quality of machined parts. The operating conditions of a spindle unit and other key parts in the cutting environment can be very demanding. Key parameters to keep its track includes, vibrations, speed, temperature, load, humidity, and pressure for cooling water. By measuring and interpreting critical operating data, users can get early signs of bearing failures. Problems can be detected before they impact product quality or cause unplanned downtime. This makes it possible to move from

time-based maintenance to condition-based maintenance, connected to a certain vibration level or pattern.

Every bearing has a certain service life potential, so a sound maintenance strategy is equally important to maximise bearing performance and reliability. Research has shown that, for various reasons, not every bearing achieves it. Important stages that have a major impact on a bearing's

service life can be recognised during the bearing's lifecycle. These stages are mounting, lubrication, alignment, basic condition monitoring, and dismantling. The stages in a bearing life cycle are extremely important for achieving the maximum service life of the bearing. By applying the right maintenance practises and using the correct tools, companies can considerably extend their

bearing's service life and increase plant productivity and efficiency. Sustainability has also taken centre stage, and manufacturers across sectors must address their impact on the environment. Machine tool industries can play an important role in reducing carbon emissions across the value chain. By using remanufactured industrial bearings, the industry can reduce its overall consumption of natural resources and carbon emissions, thereby transitioning to net-zero growth. □





How to improve indoor air quality in manufacturing facilities?

The article talks about addressing indoor air quality challenges in manufacturing facilities

The air exchange rate with the outdoors is an important factor in determining indoor air pollutant concentrations. In addition, several other factors affect indoor air quality, including the air exchange rate, outdoor climate, weather conditions, occupant activities, and, to some extent, pollutants from manufacturing activities. Indoor air pollution has been

investigated concurrently with outdoor air pollution. When outdoor air is polluted, ventilation transports pollutants from outdoor to the indoor environment. Indoor air pollution problems can arise from a single source or from any combination of factors. Most indoor air pollution comes from sources inside the building, such as:

Types of indoor air pollutants

Asbestos	Lead
Bacteria and viruses	Mold and dampness
Building and painting products	Vehicular pollutants
Carbon monoxide	Particulate matter [PM1, PM2.5, PM10]
Cleaning supplies and household chemicals	Stubble burning
Dust	Construction activities
Floods and water damage	Secondhand smoke
Formaldehyde	Volatile Organic Compounds (VOCs)



A picture showing operations in a pharma company

Particulate Matter [PM₁, PM_{2.5}, PM₁₀] impact on respiratory system

Health risks associated with Particulate Matter (PM) equal to or smaller than 1, 2.5 and 10 microns (μm) in diameter (PM₁, PM_{2.5}, PM₁₀ respectively) are of particular public health relevance. Both PM_{2.5} and PM₁₀ are capable of penetrating deep into the lungs, but PM_{2.5} can even enter the bloodstream, primarily resulting in cardiovascular and respiratory impacts, and also affecting other organs. PM is primarily generated by fuel combustion in different sectors, including transportation, energy, households, industry, and agriculture. Indoor Air Quality (IAQ) is a major concern for manufacturing plants, businesses, schools, and workers because it can impact health, comfort, well-being, and productivity of the building's occupants.

Importance of IAQ in manufacturing facilities

IAQ problems are not limited to the house. There are a lot of indoor office buildings, industrial buildings, and commercial buildings that contribute significantly to air pollution. Radon, biological contaminants, aerosols, moisture intrusion and dampness, presence of outside air pollutants, and presence of internally generated contaminants like the use of cleaning and disinfecting supplies and aerosol products, off-gassing from materials in the building, and use of mechanical equipment are all factors that contribute to many common IAQ problems.

Indoor air quality is the combination of three factors: personal, industrial, and environmental. The amount of clean, fresh air that enters and leaves an area can be improved by removing contaminants. This can be achieved through proper design and construction of buildings, ventilation systems, and air ducts. In addition to these measures, other measures include cleaning building surfaces and storing materials properly to avoid accumulation of dust particles, moisture, and other biological contaminants. The quality of air in a building depends on its ventilation system, which consists of mechanical room fans, dampers, filters, and evaporative coolers. The most

commonly required ISO standards that are applicable for all kinds of Manufacturing Industries are listed below:

- ISO 9001 Standard: Quality Management System
- ISO 14001 Standard: Environmental Management System
- ISO 45001 Standard: Occupational Health and Safety Management System
- ISO 50001 Standard: Energy Management System

The manufacturing process in India has the potential to drive economic growth and job creation this decade.

Why good IAQ is required?

As per the Economic Survey Reports, estimated employment in the manufacturing sector in India was ₹ 5.7 crore in 2017–18 and ₹ 6.12 crore in 2018–19, which further increased to ₹ 6.24 crore in 2019–20. Moreover, India has potential to become a global manufacturing hub by 2030. Good IAQ is the most important component for the enormous number of workers in manufacturing companies. The manufacturing facilities' indoor air quality is an optimal indoor requirement that ensures health, comfort, and well-being of workers and includes minimum air pollutants. IAQ varies according to air temperature, relative humidity, air speed, and chemicals at the workplace.

Good indoor air quality management practises can make a big difference. However, some factors, like reactions to indoor air contaminants among highly susceptible individuals, or quality of the outside air, may not be within anyone's immediate control. It is also important to remember that any building, no matter how well operated, may experience periods of unacceptable indoor air quality due to equipment breakdown, inadequate maintenance, or, in some cases, actions of building occupants.

Poor IAQ symptoms are headaches, coughing, sneezing, eye irritation, dizziness, nausea, exhaustion, cardiovascular, respiratory or sinus congestion, etc.

1. Automotive industry

Automobile manufacturers and related industries, known to be highly affected by indoor air pollution, are continuously



Indoor air quality is the combination of three factors: personal, industrial, and environmental

challenged by these health issues. In an automotive assembly plant, exposure to indoor air pollutants is probably one of the most dangerous health hazards for workers. Workers involved in auto body assembly are potentially exposed to a multitude of air contaminants. During structural assembly, activities such as sanding, grinding, coating, surface treatment, & welding generate aerosols that are released into the worker's breathing zone.

The quality of the overall process will also benefit from clean indoor air by reducing suspended dust that might affect operations or products where any small dust particle can result in huge damage. Automobile industry indoor air quality challenges

- Avoiding the contamination of surface preparation and finishing on dust-covered floors
- Transferring huge workpieces to designated painting and coating rooms using pricey cranes
- Prevention of fire or sparks caused by flammable dust
- Accelerating the drying process without using quick-drying ingredients

2. Pharmaceutical industry

Within the pharmaceutical industry, strict requirements on air purity levels are necessary because of direct effect that airborne contamination has on the quality of pharmaceutical products. Anything that could come into direct contact with a pharmaceutical product is a potential source of contamination. Especially for aseptically prepared parenteral medicines (such as injectables and infusions), no contamination can be accepted, otherwise, severe harm or life-threatening health risks to the patient can result.

List of air pollutants:

- Biological contaminants
- Bioaerosols
- Dust [dry and wet sut]
- Volatile organic compounds (VOCs) etc

3. Food and beverage industry

In the food and beverage industry, a hygienic production

environment is essential for smooth processes as well as compliance with statutory requirements.

With controlled and monitored air quality (temperature, humidity, and particle concentration), product contamination can be reliably minimised. In addition, clean air contributes to the protection and comfort of the employees.

To protect consumers against ailments, most industrialised countries have initiated strict regulations and laws governing hygiene that must be adhered to during the preparation, processing, manufacturing, packaging, storage, transportation, distribution, handling, and sale or supply of food and beverage products.

The Food and Drug Administration (FDA) has identified indoor air pollution as a critical factor in food safety. The agency has set Maximum Allowable Concentrations (MAC) for many noxious contaminants, including particulates, Volatile Organic Compounds (VOCs), and gases. Food and beverage manufacturing operations must be vigilant about these limits and take appropriate measures to reduce indoor air pollution risks.

Good IAQ benefits in the Food and Beverage industry:

- Limit the cross-contamination
- Increases the susceptibility to corrosion challenges
- Minimises the downtime challenges and product loss
- Gain operational efficiencies
- Comply with food safety standards
- Maximise operational excellence & extend product shelf life

4. Microelectronics industry

Fine particulate and Airborne Molecular Contamination (AMC) need to be carefully controlled for high-yield, low-reject semiconductor manufacturing.

Sources of AMC include:

- Chemical off-gassing
- Exhaust fumes from other industries and processes
- Vehicle exhaust fumes
- Seasonal factors



An aerial view of an industrial plant

Failures due to AMC are classified as:

- Mechanical effects, including obstruction of cooling airflow, interference of moving or optical parts, and deformation of surfaces.
- Chemical effects include corrosion of electrical components, due to dust comprised of sulphur and chlorine bearing salts.
- Electrical effects include impedance changes and electronic circuit conductor bridging.

IAQ control methods:

There are three main control methods used to decrease intensity of indoor air pollutants:

1. Source Management

It includes eliminating pollutants by using more sustainable or renewable raw materials and adopting recycling processes.

2. Engineering Controls

Local exhaust: In order to effectively remove highly concentrated pollutants, local exhaust techniques like fume hoods, dust collectors [dry and wet dust collectors], and ventilation systems are the best solutions.

- **General Ventilation:** It is a measure that controls air pollutants in the usual amount when it is correctly constructed, operated, and maintained. By regulating the temperature and relative humidity levels, spreading enough air to fulfil the needs of ventilation for building habitats, and reducing and removing odours and other pollutants, a well-designed and functioning Heating, Ventilation, and Air Conditioning (HVAC) system ensures comfort.

- **Air Cleaning:** Maintaining good indoor air quality requires attention to the building's Heating, HVAC system; design and layout of the space; and pollutant source management. HVAC systems include equipments used to ventilate, heat, and cool the

building; to move air around the building (ductwork); and to filter and clean the air. These systems can have a significant impact on how pollutants are distributed and removed. HVAC systems can even act as sources of pollutants in some cases, such as when ventilation air filters become contaminated with dirt and/or moisture and when microbial growth results from stagnant water in drip pans or uncontrolled moisture inside air ducts.

3. Management Controls

Working Chart: By employing charts, managers may dramatically reduce the amount of exposure to contaminants in their facilities. They can do the following for instance, reduce or eliminate the amount of time one worker is exposed to a contaminant (in other words, programme the maintenance or cleaning work in the absence of inhabitants). Reduce usage of chemicals around or by workers, as well as their exposure to chemicals (limit the number of chemicals used by workers for maintenance or cleaning activities during the activity). Take control of the environment where physical, electrical, heat, chemicals, biohazards, and airborne particulate matter, are used (conduct maintenance on moving equipment in a maintenance workshop or place equipment, such as printers, and copy machines, in a separate room) while wearing appropriate Personal Protective Equipment (PPE) such as clothing, helmets, goggles, or other garments.

- **Training:** It's crucial to educate employees about indoor air quality. Workers must be informed on the causes and effects of pollutants that are under their control as well as how ventilation system works properly. Employers can issue warnings and/or implement actions to reduce individual exposure.

- **Cleaning:** Cleaning procedures should include limiting entry of dirt into the environment (using walking doormats), cleaning it when it enters the workplace, removing litter, storing food appropriately, and using the least amount of cleaning agents. □

Courtesy: AAF India



Images courtesy: shutterstock

Shaping the future of Filter Manufacturing in India

The automotive sector has witnessed exponential growth in recent years, mostly due to growing demands and applications of modern-age technologies to make vehicles more and more advanced. This has also prompted significant growth in the automotive filter market globally.



Manav Kapur,
Executive Director,
Steelbird International

The global automotive market is projected to grow up to around \$28,791 million by 2024, from just \$22,024 million in 2017 – a staggering Compound Annual Growth Rate (CAGR) of 3.9% from 2018 to 2024.

Making vehicles efficient with automotive filters

In simple terms, automotive filters are used to help the engine of a vehicle operate in a smooth manner; thereby, enhancing overall service life of the automobile. The primary function of automotive filters is to eliminate solid dirt

particles like dust, pollen, and other unwanted airborne particles that might result in low fuel consumption and carbon emission, hence affecting the overall performance of the vehicle. Most four-wheelers generally have four main filters: the cabin filter, oil filter, fuel filter, and air filter, which need to be replaced from time to time to avoid any negative impact on the mechanics.

The cabin filter is used to clean the air coming inside a car through heating and air conditioning. Its primary objective is to enable the driver and passengers to breathe fresh air, avoid safety and visibility issues, and increase the life of a car's A/C

Automotive filters are used to help the engine of vehicles operate smoothly



heating system. The air filters in a vehicle prevent any insects, dust, particles, sand, or debris from entering the engine, thereby, ensuring a good mixture of air and fuel to support the performance of the vehicle. Air filters facilitate better car performance, save fuel, and avoid black smoke.

An oil filter in a vehicle ensures a steady flow of oil by removing dirt, oxidised oil, and metallic particles, which may appear in the motor oil due to engine wear. Replacing the oil filter at regular intervals can reduce engine wear and avoid soiling new oil. Fuel filters are used to remove impurities like dust, rust, and grit contained in the fuel, thereby safeguarding the fuel injectors and enhancing the longevity of the car engine. The fuel filter maintains the performance of the engine and keeps the car parts in good condition.

Government policies accelerating the Indian automotive filter growth

Apart from growing automobile sales, expanding vehicle fleet size, and increasing purchasing power of consumers in the country, there have been several government initiatives, policy changes, and stringent emission regulations that are projected to drive market growth of automotive filters in the foreseeable future. Numerous initiatives taken by the centre and state

governments, like the National Automotive Testing and R&D Infrastructure Project (NATRiP), the Focus Market Scheme (FMS), the Automotive Mission Plan 2016-2026, the National Electric Mobility Mission Plan (NEMMP) 2020, and 'Make in India' programme, have had a significant impact on the growth of the automotive filters market in recent years.

Impact of COVID-19

The outbreak of the unprecedented pandemic disrupted operations of businesses across all industries, and the automotive ecosystem was no exception, with production facilities coming to a halt. The disruption also had a major impact on the automotive filter market, as its growth is directly proportional to the manufacturing of vehicles. Also, fluctuations in the price of the raw material and the high cost of filter media, like advanced carbon and electrostatic, restricted the Original Equipment Manufacturers' (OEMs') to install the filters in every vehicle segment because of their higher cost than the conventional filters. However, despite the challenges faced during pandemic, the automotive filter market recovered quickly as soon as operations shifted towards normalcy, mostly due to higher demands and facilitating government policies.



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Filters are used to remove impurities thereby safeguarding the fuel injectors and enhancing longevity of car engines

Drivers behind the growth of automotive filters

• Increasing vehicle production

Though the automotive sector witnessed a major decline in vehicle production due to the unprecedented pandemic, there has been a steady recovery since the early quarters of the financial year 2021. The increase in the production of vehicles has resulted in the sharp growth of the automotive filter market too. Also, increasing awareness of air cabin quality and rising environmental concerns have been key drivers for the growth of the automotive filter market. Technological advancements in the filter media types and replacement cycles of the filters as per the requirements of a vehicle have also bolstered the consumption of automotive filters.

• Advancements in filter media/technology

One of the core components of a filter, in filter media, is used to capture any unwanted and foreign particles. Filter media and technology majorly comprise cellulose, synthetics, glass fiber, activated carbon, and the technological advancements in the filter media types offer automotive filter manufacturers a huge opportunity for growth. While most vehicles' air intake filters are usually made up of the high-cost cellulose media, synthetic media types are gradually gaining popularity and are expected to dominate the market space in the coming years, mostly because of technological advancements over cellulose media.

Key growth restraints

1. Rise in adoption of Battery Electric Vehicles (BEVs)

With rising awareness of the Sustainable Development Goals (SDGs), customer behaviour has been changing, and the automotive industry has been going through a major transformation. Many consumers these days are getting more inclined towards purchasing a battery-electric/plug-in vehicle, primarily because these vehicles do not consume fuels such as petrol, diesel, and gasoline. Also, battery electric vehicles involve low maintenance costs and reduce overall expenses, making them a popular choice for consumers. Since the battery electric vehicle does not involve the consumption of any kind of fuel or oil, it eliminates the need for oil and fuel filters, thereby adversely affecting market growth.

2. Non-replaceable filters

Though the non-replaceable filters can be washed and used for a long period, cleaning such filters involves a special kit, which can be cost-effective for owners in the long run. The non-replaceable filters are expected to have a major impact on the filter aftermarket in the coming years, as various filters like air and cabin filters do not require to be changed throughout the entire lifespan of a vehicle. While the size of the non-replaceable filter market is significantly small, at present it is expected to make decent growth in the coming years owing to the various advantages they offer, such as zero replacements and cost savings over conventional filters. □



IMAGE COURTESY: shutterstock

Boosting operational output with Industrial Wearables

By highlighting the significance of appropriate investment and support, the article elucidates the transformative potential of industrial wearables for businesses of all scales. These wearables can be a game-changer, empowering enterprises to retain their competitiveness in a rapidly changing and intricate environment.



Sanjay Jadhav
Assistant Editor
sanjay.jadhav@pi-india.in

Industrial wearables refer to specialised devices and gadgets designed to enhance safety, efficiency and productivity of workers in industrial settings. These wearables are equipped with sensors, software, and communication technologies to collect and transmit data in real-time, providing workers and managers with valuable insights into their performance and working conditions. The global industrial wearables market size is expected to reach \$8.40 billion by 2027, up from \$3.79 billion in 2019, growing at a CAGR of 12.4% from 2020 to 2027.

scenarios or industry verticals. These wearables can assist workers in completing specific tasks or measure health parameters when working in hazardous environments. Furthermore, besides performing a specific function for the wearer, the devices can be integrated with enterprise systems. For example, connecting wearables worn by employees in dangerous environments to employee welfare programmes can help monitor and provide evidence of employee well-being, ultimately reducing health insurance costs.

How do industrial wearables help?

Unlike consumer wearables, that are typically general in purpose, industrial wearables are usually designed for specific

Adding business value

The decreasing cost of components and improvements in functionality driven by consumer sector advancements have led



Wearables are equipped with sensors, software, and communication technologies to collect and transmit data in real-time

to growing prevalence of industrial wearables. These devices have been implemented to enhance productivity, promote safety, expedite communication, facilitate training, and enable remote experts to collaborate on technical issues.

For instance, in terms of increasing plant efficiency, monitoring employee movements enables optimisation and redesign of processes. With regards to safety improvement, wearable devices can detect injuries, falls, or hazardous gases and notify employees or management when a safety risk is present.

Wearables also help to prevent injury by monitoring worker rotation to minimise fatigue and repetitive stress. In terms of communication, industrial wearables can be used to send safety alerts, text messages, and data feeds to employees who are unable to use mobile phones or computers. While training new employees, wearable technology can act as a training aid, and remote expert systems enable trainers to guide new hires or provide reminders and instructions. Wearables also enable remote experts to provide guidance and advice to on-site staff, bringing specialised expertise to remote facilities almost instantly.

Currently available devices

Head-mounted wearables integrate mobile computing, video input, work instructions, remote expert access, and other features that assist operators in completing their tasks. Despite their high cost and inconvenience due to weight, these systems are projected to become commonplaces in specific operating environments as their form factor improves.

Hands-free wristwear allows industrial workers to access live data, documents, work procedures, videos, and remote expert connections while working in the plant or field. These devices come in varying sizes, from watch-like to small smartphone-sized, with larger form factors enabling the transmission of richer information. Augmented Reality glasses

have significant potential to train workers and facilitate guided maintenance or operations in several industrial settings, such as factories, warehouses and construction sites.

Data transmission

A multitude of wearable monitoring devices employ a low-range RF signal to transmit data, and they usually connect to IoT cloud solutions through an IoT gateway or mobile application. Wearable devices transmit both processed and unprocessed data incessantly and must operate continuously regardless of internet availability, presenting technological obstacles relating to data volume and offline processing.

Challenges

One of the common challenges of industrial wearables is managing power consumption for devices with limited battery space and extended operational requirements. Additionally, the form factor of wearables can present communication issues as they must convey data audibly, via light indicators, or on a small screen, which can lead to misunderstandings. It is crucial to provide concise, actionable intelligence in a manner that is easily understandable for the user.

Adoption of wearable devices can also be hindered by workplace culture, particularly among early adopters. To prevent pushback from employees due to privacy concerns, the purpose of the wearable device must be communicated clearly.

Another challenge is cybersecurity, as the proliferation of endpoints connected to enterprise systems increases the risk of data breaches. Hackers can exploit wearables to gain access to other systems when operational data is transmitted. The adoption of Bring-Your-Own-Device (BYOD) policies can exacerbate these cybersecurity issues, as enterprises must balance



Wearable devices transmit both processed and unprocessed data incessantly and must operate continuously regardless of internet availability

the benefits of BYOD with the potential security risks associated with allowing wearables and camera-equipped smartphones.

Ensuring that wearables meet accessibility requirements is crucial, given the limited interface options. Variable lighting conditions can complicate visual interfaces, while voice interfaces may fail due to vocal accents or impaired speech. As a result, users must be trained to correctly interpret inbound signals and formulate outbound messages.

Transformation in store

Industrial wearables are set to transform the way we work, increasing efficiency, improving safety, and enabling new levels of productivity. As the technology improves and costs come down, we can expect to see a proliferation of wearables in industrial settings. With the benefits that they bring, it is not surprising that organisations are investing heavily in wearable technology. However, as we have seen, there are also significant challenges that must be addressed. Battery life and form factors remain key issues that must be overcome. Wearables must be designed to be easily used and understood by workers in high-pressure environments. In addition, data management, privacy, and cybersecurity must be addressed to ensure that wearables are safe and secure to use in enterprise settings.

Overall, the potential benefits of industrial wearables are significant. These devices have the potential to increase productivity, improve safety, and enable new levels of efficiency. As technology continues to evolve, we can expect to see new and innovative applications emerge, transform the way we work.

Application benefit areas

One area where we can expect to see significant growth is in

the field of Augmented Reality (AR) wearables. AR technology has the potential to revolutionise how we work, providing workers with real-time information and guidance that can help them to perform tasks more efficiently and effectively. AR wearables are already being used in a variety of industrial settings, from manufacturing and logistics to construction and mining.

Another area where we can expect to see significant growth is in the field of health and safety wearables. These devices have the potential to transform how we manage worker health and safety, enabling us to monitor workers in real-time and detect potential risks before they become a problem. This could help to prevent accidents and reduce the risk of long-term health problems for workers. In addition to these applications, we can also expect to see new and innovative wearables emerge in the coming years, as companies continue to invest in wearable technology. From smart glasses to smart clothing, the possibilities are endless, and the potential benefits are significant.

Enhancing productivity with industrial wearables

However, with any new technology, there are also risks and challenges that must be addressed. Data management, privacy, and cybersecurity remain key concerns and must be addressed if wearable technology is to be widely adopted in enterprise settings. Battery life and form factor are also important considerations, as wearables must be designed to be easily used and understood by workers in high-pressure environments.

Overall, industrial wearables have the potential to transform the way we work, enabling new levels of productivity, efficiency, and safety. As technology continues to evolve, we can expect to see new and innovative applications emerge, transforming the way we work and improving the lives of workers around the world. □

New generation turning

Dormer Pramet, recently launched a new generation turning, Pramet T9415 offering one of the highest levels of productivity and versatility in the market. The Pramet T9415 is the most advanced MT-CVD grade. This fourth-generation grade covers a broad application range, replacing the previous T9310 and T9315. In addition, it also partly overlaps with grade T9325, giving T9415 one of the widest ranges of applications in steel turning. With a 30% thicker coating



T9415 MT-CVD_C0138

than the previous generation, Pramet T9415 significantly improves tool durability by increasing resistance to wear, and it offers higher productivity by allowing for higher cutting speeds. Additionally, a new post-treatment process improves the toughness and stability of the cutting edge, resulting in improved reliability in interrupted cuts and unstable conditions, but the T9415 is still suitable for high cutting speeds. Using the latest technologies, Pramet T9415 inserts have optimised cutting-edge geometry, which reduces cutting forces and enhances performance. Along with saving energy, the inserts are manufactured using the latest production technologies and raw materials, which support sustainability.

Dormer Pramet | Pune

Actuating tool for stator drilling

MAPAL, recently developed a complex four-bladed actuating tool to round off its solution portfolio for stator drilling. This highly productive machining process is used for series production of stator housings for electric motors. The solution offers productivity and precision as well as short cycle times with a process of three steps: pre-machining, semi-finishing, and fine machining, at machining diameters of more than 220 mm and with an HSK100 connection. A sophisticated actuating tool is part of the solution. Oliver Müller, Customer Service Specialist, MAPAL Centre of Competence for Actuating Tools, said, "With an actuating tool, the internal machining of the bore can be handled by a machining centre, which means turning is no longer necessary." The actuating tool achieves more flexibility by ensuring both fast machining of varying contour trains in the bore as well as precision down to the micrometre. The drawbar compensates for wear and tear directly during machining. For even shorter cycle times, the actuating tool is designed as a combination tool. In addition to machining the stator bore, steel bushings are pre-machined with four carbide inserts.



Complex four-bladed actuating tool

MAPAL | Coimbatore

Ophthalmic coaters for ophthalmic lenses

Hind High Vacuum (HHV), announced the launch of its range of 'Made in India' Ophthalmic coaters, under the OPTICOAT platform of coaters, for ophthalmic lenses. The first model, 'OPTICOAT 600' is perfectly sized to be suitable for small and mid-sized prescription labs. The next sizes, 'OPTICOAT 1100' and 'OPTICOAT 1400' are designed to support the larger producers of lenses in the country. The machines, developed entirely at HHV's facility at Bengaluru, are state of art and are built with high-quality stainless steel vacuum chambers with electropolished surfaces and with remote accessibility for software



OPTICOAT 600

maintenance and upgrades. They are facilitated for easy loading and unloading of lens batches, and have a powerful pumping system for faster pumping down to process pressure, they also include many pre-programmed recipes and a user-friendly touchscreen interface. The demand for ophthalmic lenses has been steadily increasing due to the growing number of people requiring vision correction. The global ophthalmic lens market is expected to grow at a CAGR of 5.5% between 2021 and 2026.

Hind High Vacuum | Bengaluru

Revolutionise manufacturing and encourage sustainability

Mitsubishi Electric, recently launched the all-new M800V and M80V series of Computerised Numerical Controllers (CNCs) with state-of-the-art solutions to revolutionise smart manufacturing in India. The company has used innovative technologies in the new product range to bring the era of smart and advanced manufacturing to the country. CNCs are electro-mechanic devices that use computer programming for the Machine Tool industry. These CNC machines are widely used for manufacturing processes. Keeping in



M800V & M80V series of Computerised Numerical Controllers (CNCs)

mind the era of remote access and control post the pandemic, the new M800V and M80V features the industry's first CNC with built-in wireless LAN that allows you to work efficiently without any constraints of time and space. The control functions in M800V and M80V have been designed in such a way that the machine can do various 'things' at high speed and with high accuracy. This all-new product range holds the tendency to reshape the Machine Tools industry and keeping abreast of manufacturers' needs and the advancement of 'time', efficiently optimises manufacturing from the perspective of 'things' and 'time'.

Mitsubishi Electric | Haryana

Motor offering optimum energy consumption performance

NORD, recently launched IE5 motors, which are in combination with a frequency inverter that has a constant torque over a wide speed range and provides high overload capacities. The number of drive variants in a system can thus be significantly reduced. This streamlines production, logistics, storage, and service processes, minimises administrative costs, and reduces the Total Cost of Ownership (TCO). IE5+ motors achieve an efficiency of up to 95%.



IE5 motors

Permanent magnet synchronous motors and offer optimum energy consumption performance even in partial load and partial speed ranges. Versions and sizes:

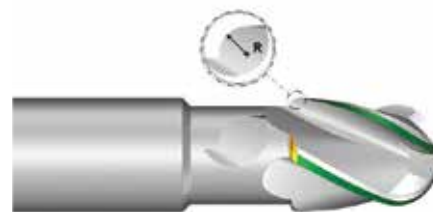
- Ventilated version with particularly high overload capacity and robustness for intralogistics applications
- Smooth surface version for the food and pharmaceutical industries, optionally with corrosion-resistant nsd tuPH surface treatment
- Size 71 for power ranges from 0.35 to 2.2 kW
- Size 90 for power ranges from 1.1 to 4 kW

IE5+ motors are compatible with the NORD modular system and can be mounted to all of the manufacturer's gear units. The advantage is the flexible attachment via direct mounting, NEMA or IEC - the motors can be optionally equipped with an integrated encoder or a mechanical brake.

NORD Drivesystems | Pune

Grinding software for flexibility

NUM, has recently released Version 5.0.0 of NUMROTO, which provides CNC grinding machine users with an unprecedented level of flexibility. It is likely to be of special interest to tool manufacturers seeking to increase their productivity of precision drills, subland step drills, end mills, and form tools. This new grinding software includes a host of new



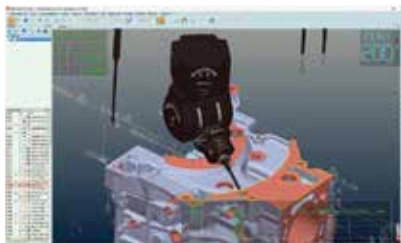
Version 5.0.0 of NUMROTO

functions to further accelerate the productivity of tool grinding machines. It is likely to be of special interest to tool manufacturers seeking to increase the productivity of precision drills, subland step drills, end mills, and form tools. The new version of the software allows much more detailed definitions of user administration rights, to help improve machine management and better protect valuable machining data. NUMROTO 5.0.0 introduces two new functions for machining drills and step drills, and no less than seven new functions for end mill production. When using a peripheral grinding wheel for chamfer relief of a drill, the inside or outside edge of the wheel can be selected.

NUM | Switzerland

3D inspection solutions

Renishaw and Metrologic Group, have signed a new strategic agreement by releasing Renishaw's REVO® 5-axis CMM scanning systems, PH20 5-axis touch-trigger systems, and the Equator™ shopfloor gauging system, powered by Metrologic's X4 software platform. This will provide full integration of world-class metrology solutions with the X4 software platform. This association allows the end-user to bring



Metrolog X4 & REVO® 5-axis measurement system

3D measurements close to the production line with the perfect combination of Metrolog X4 and Renishaw's Equator system. Also, with the 5-axis technology combined with the ease of programming of Metrologic Group software, manufacturers can increase their CMM productivity at unmatched measurement speed, improve part quality, and reduce scrap. Victor Escobar, President, Renishaw SAS, said, "The integration of Renishaw's industry-leading measurement technologies with Metrolog X4 will allow both existing and new users of Metrolog software to reap the benefits of accurate, high-speed, multi-sensor CMM measurement and fast, flexible shopfloor gauging."

Renishaw Metrology Systems | Pune

Taps line to provide versatility and cost-effective solutions

Seco, has expanded its range of tapping solutions with the launch of T32 and T34 in thread cutting taps and T33 in forming taps. The three performance levels allow manufacturers to cost-effectively match the right tap to their particular application. The combination of superior base materials, advanced coatings, and special edge preparations means that these Seco taps generate precision threads while providing excellent chip evacuation, shorter setup times, and longer tool life. At the base, level are universal general-purpose type taps. The second T34 mid-level range consists of higher-performance taps that work well in a variety of workpiece materials, making them especially well-suited for high-mix/low-volume production environments with constantly changing parts and materials. The top performance level is achieved with material-specific thread cutting and forming taps, such as those optimised for steel or other advanced materials. The main benefits of matching the right tap to the application include an extended tool life that is consistent and predictable to reduce the risk of unexpected tap breakage and scrapping parts after hours of machining have been invested.



New thread cutting and forming taps product line

Seco | Pune

Highlights – May 2023



» E-mobility

In the manufacturing sector, e-mobility is essential because it provides substantial advantages in terms of sustainability, efficiency, and cost savings. Electric Vehicle (EV) adoption in the sector lowers carbon emissions, aids businesses in achieving their environmental objectives, and eventually lowers costs. E-mobility can help businesses cut costs and increase operational productivity. Because they use less energy to run and can reduce fuel costs for businesses, EVs are frequently more energy-efficient than conventional vehicles. This article would feature about the upcoming trends of e-mobility in the manufacturing sector, contributing towards efficient production processes.



» Robotics and Industrial Automation

As businesses look to increase efficiency and output while lowering costs, the use of robotics and industrial automation in manufacturing has been steadily growing in recent years. Some of the key trends in this area include, collaborative robotics, Artificial Intelligence, etc. This piece will explore the possibilities of the upcoming technologies in the robotics and industrial automation area.

» Automotive lightweighting

Automotive lightweighting is the process of creating lighter-weight cars and trucks while preserving or even enhancing their structural integrity and safety features. Advanced elements like carbon fibre, aluminium, magnesium, and high-strength steel can be used to accomplish this. Due to the rising demand for vehicles that are ecologically friendly and have low fuel consumption, lightweighting has gained significant attention in the automotive industry. The article will shed light on the futuristic lightweighting technologies that are driving growth in the manufacturing industry.



» Batter swapping battery technology for e-mobility

In order for electric transportation to be developed and adopted, battery technology is essential. The driving range, performance, and price of electric cars are all directly impacted by the effectiveness and dependability of the batteries. The piece highlight some of the essential features of battery technology for an efficient e-mobility function.



IMPRINT

Publisher & Director

Dhiraj Bhalerao
Contact: +91 9820211816
dhiraj.bhalerao@pi-india.in

Editor

Arun Bhardwaj
editor@pi-india.in

Joint Editor

Neha Basudkar Ghate
neha.basudkar@pi-india.in

Assistant Editor

Sanjay Jadhav
sanjay.jadhav@pi-india.in

Digital Content Developer

Anushka Vani
anushka.vani@pi-india.in

Design and Layout

Somnath Jadhav
somnath.jadhav@pi-india.in

Overseas Partner

Ringier Trade Media Ltd
China, Taiwan & South-East Asia
Tel: +852 2369 - 8788
mchhay@ringier.com.hk

Editorial & Business Office

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