

# Industry Titans and their inspiring Leaderships

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FOR DETAILS







*“A long way  
to go...”*

### MANAGEMENT NOTE

## It's our 14<sup>th</sup> anniversary – Thank you!

With disruptive innovation here to stay, the manufacturing environment of the Indian industry is at its peak when it comes to job opportunities and taking technological advancements a step higher. Covering such developments all through, we are elated to share that, with this November issue, EM marks a magnificent milestone, hitting its 14th anniversary.

In a world where change is constant, EM's mission has been to inspire global research in manufacturing and entrepreneurship. Our impactful content, distinctive cover and expert curation continue to contribute to the evolving business landscape and technological revolution, making EM Magazine a beacon of innovation.

This anniversary issue is not just a celebration but a testimony to our commitment to excellence. We are delighted to feature Leadership Insights from some of the top industry leaders, offering profound wisdom as EM turns 14. As India stands at the peak of a revolution, our Cover Story delves into how industry giants have evolved and responded to the technological boom with their thought leadership.

In line with our unwavering dedication to manufacturing, we are thrilled to introduce a new column: 'Auto Components Manufacturing'. This feature will be a comprehensive exploration of the auto components industry, covering every facet, every innovation and every stride towards a better future.

Celebrating 14 years, EM Magazine expresses heartfelt gratitude to advertisers, contributors, advisory board members, partners and readers. We commit to sharing relevant content, aiding manufacturing and advancing technology. Wishing you a Happy Diwali and many more years of manufacturing excellence!

**Neha Basudkar Ghatge**

*Joint Editor*

[neha.basudkar@pi-india.in](mailto:neha.basudkar@pi-india.in)

As the world embraces the digital age, the manufacturing landscape undergoes a significant transformation across various sectors in our upcoming editions. Building on the positive reception of our recent digital innovations, such as the interactive flip magazine, we are expanding our outreach by providing easy access to valuable industry information through our new social media strategy. We are dedicated to keeping you informed and engaged in the ever-evolving manufacturing landscape.

Stay tuned on the latest trends, news and insights by connecting with us through our weekly podcast '*Morning Bytes*' and social media platform @EfficientManufacturing on LinkedIn. Join the conversation and share your insights at [www.pi-india.in](http://www.pi-india.in).

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## COVER STORY

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## 32

### COOLANTS AND LUBRICANTS

Optimising metalworking fluids in the safest way



All image courtesy: shutterstock



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**Arun Bhardwaj**

Editor, EM and A&D India

## Talk

*“The Make in India initiative is monumental for propelling our local industries in manufacturing”*

# Make in India shapes EV manufacturing

They say all things come at the right place and the right time. As far as manufacturing of EVs in India is concerned, it is gaining the momentum it needs. However, the EV industry is still in its early stages compared to big players like China and Germany. This can be changed if governmental policies like Make in India stay committed to achieving the manufacturing goals set for EVs.

## Where India stands

- **Manufacturing facilities:** Several domestic and international automakers wanted to set up EV manufacturing facilities in India. Companies like Tata Motors, Mahindra & Mahindra and Hyundai are collaborating to set up EV facilities. Some locations with phenomenal facilities are Bengaluru, Mumbai, Delhi, Gurugram and Pune.

- **Research and development:** India has seen increased research and development related to EV technology. Academic institutions, start-ups and established companies are working on developing indigenous EV solutions. India's EV industry has attracted massive investments of about \$6 billion in 2021, and is projected to attract \$20 billion by 2030.

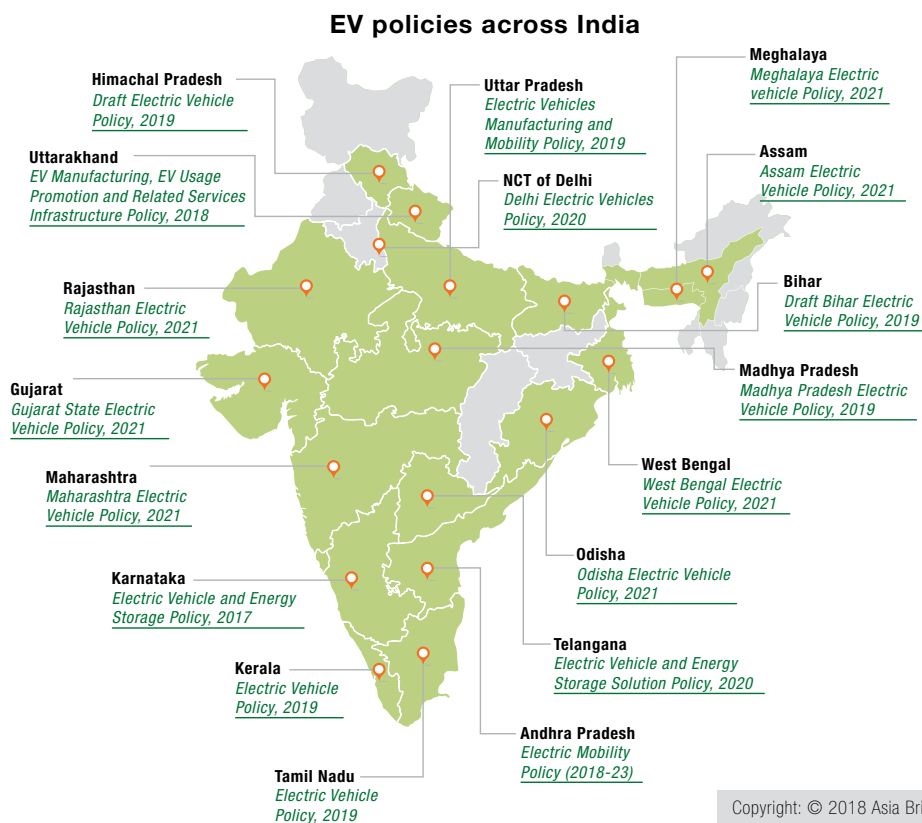
Despite this, the adoption of EVs is still facing challenges related to high up-front costs, range anxiety and availability of charging infrastructure. India is estimated to require 39 lakh charging stations, with a ratio of one station per 20 vehicles. The 'Make in India' policy can have a transformative impact on the EV manufacturing sector in India and attract domestic and foreign investments in EV manufacturing. The Indian government has launched many EV charging infrastructure initiatives for two-, three- and four-wheelers. Most notably, the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME) scheme provides incentives for EV adoption and charging infrastructure growth. Under this scheme, the Ministry of Heavy Industries has sanctioned the construction of 2,877 EV charging stations across multiple states and 1,576 stations across 16 highways and nine expressways. These major roads cover 10,275 kms across India; hence, providing sufficient charging stations along them will reduce range anxiety significantly.

By 2030, the government plans to increase renewable energy generation capacity to 500 GW, representing 50% of the total energy requirements. Government policies like Make in India subsidise installing fast-charging infrastructure across the country. Private



companies are also investing in the development of fast-charging technology, with many companies introducing fast-charging stations across the country. The government

has also allowed 100% Foreign Direct Investments in the EV-charging infrastructure sector, further encouraging private investment.



## Promoting India's EV Industry

1. The GST on electric cars, including two-, three- and four-wheelers, and chargers and charging stations has been reduced from 12% to 5% and 18% to 5%, respectively.
2. The Ministry of Power has released a notice on charging infrastructure requirements for private charging at homes and workplaces.
3. The Ministry of Road Transport and Highways (MoRTH) announced that battery-powered cars would be issued green licence plates and would be free from permission procedures.
4. MoRTH has also issued a letter recommending that states exclude EVs from road fees, hence cutting the initial cost of EVs.
5. The Technology Platform for Electric Mobility (TPM), which will be primarily funded by the Department of Heavy Industry (DHI), will develop technologies and products, provide a competitive advantage to some e-mobility technologies globally and sufficiently boost

industrial technological capabilities.

6. One of the biggest announcements in the Budget 2022 was the Battery Swapping Policy. Simply explained, a battery switching station allows an EV owner to rapidly change out a dead battery for a charged one.

## Conclusion

India's emphasis on charging infrastructure development and promoting renewable energy sources is in line with the needs of a healthy EV ecosystem. The government has launched projects to build a nationwide network of charging stations, making EVs more accessible and convenient for consumers. Furthermore, India's drive for renewable energy production, such as solar and wind power, assures a sustainable and clean supply of electricity for EV charging. India's concentrated efforts to promote EVs, together with its manufacturing capability, rising market and focus on charging infrastructure and renewable energy, position it as the next EV manufacturing powerhouse. □



## Udaipur Cement Works doubles its Clinker capacity to 3 million tonnes per annum

**Udaipur Cement Works**, a subsidiary of JK Lakshmi Cement, has taken a significant step in increasing its cement production with the expansion of its Clinker facility. The company announced the commissioning of its Clinkerisation Unit of 1.50 Million Tonnes Per Annum (MTPA) at Udaipur. With this, the company doubled its Clinker capacity from 1.50 MTPA to an impressive 3 MTPA. This strategic decision to expand reflects UCWL's long-term objectives to meet the evolving cement consumption patterns in its operational regions.

Shrivats Singhania, Director and CEO, Udaipur Cement Works, emphasised the importance of adapting to market dynamics, stating, "With this clinker capacity expansion, we are well-prepared to serve our customers and partners efficiently. I am delighted to share that our commitment to expansion remains unwavering, and, by the end of FY 23–24, our total cement capacity will more than double to 4.7 MTPA from the existing 2.2 MTPA".

## Altigreen partners with Exponent Energy and unveils an innovative electric three-wheeler

**Altigreen** has collaborated with Exponent Energy and launched a brand-new variant of its three-wheeler cargo EV, named the neEV Tez. The neEV Tez features an 8.2kWh e-pack and a proprietary battery by Exponent built using regular LFP cell chemistry. It delivers a 98-km range (ARA/Certified) and a city-drive range of 85 km. It charges from 0% to 100% in just 15 minutes at Exponent's e-pump charging network. The partnership aimed to make rapid charging a reality for electric vehicles on Indian roads. neEV Tez is the first product to emerge from this partnership, featuring Exponent's proprietary liquid-cooled battery that delivers an industry-first performance. Dr Amitabh Saran, Founder and CEO, Altigreen, said, "neEV Tez will ensure maximum utilisation of the vehicle owing to its long range and low charging time, thereby resulting in more trips on a single charge and a high earnings opportunity".



## LONGi enters strategic partnership with Zetwerk Manufacturing

**LONGi** has recently signed a groundbreaking cooperation agreement with Zetwerk. The partnership aims to further the collaboration on Commercial & Industrial (C&I) and open access markets in India. The collaboration brings together LONGi's expertise in solar technology and Zetwerk's robust manufacturing capabilities. By leveraging Zetwerk's on-demand manufacturing platform and LONGi's advanced solar solutions, this partnership aims to meet the growing demand for sustainable energy solutions and strive to make solar power more accessible and environmentally friendly for a brighter and greener future. Abhay Adya, Business Head, Renewables, Zetwerk, said, "With our strong focus on the solar industry, Zetwerk has been diligently developing its own execution and development capabilities. This strategic partnership with LONGi holds tremendous potential for achieving our shared objectives". Arijit Mitra, General Manager, India DGBU, LONGi, said, "With the decreasing cost of solar energy generation, more commercial and industrial enterprises will be able to see the increasing value of adopting solar energy as part of their energy solutions".



## Ashok Leyland inaugurates a 'Women-centric Cabin Trim Line' at Pantnagar plant

**Ashok Leyland** recently inaugurated a new 'Women-centric Cabin Trim Line' at its Pantnagar plant. To promote gender diversity and equity and to attract more women to the manufacturing industry, Ashok Leyland has set up this line, with women being the majority of the workforce. The defining feature of this initiative is its leadership structure, where women take charge in every aspect, spanning production, sourcing, quality assurance and production planning. The newly inaugurated line will address the growing demand for large-size cabins for commercial vehicles. This line has a capacity of assembling 56 cabins per shift and will be operating in two shifts. Ganesh Mani, Chief Operating Officer, Ashok Leyland, said, "The 'Women-centric Cabin Trim Line' exemplifies our commitment to building a more diverse manufacturing organisation that challenges conventions and stereotypes, particularly within the historically male-dominated manufacturing sector. This initiative will create opportunities for a more diverse workforce and foster an environment of equality".





## Continental leads pioneering research in sustainable mobility with partners

**Continental** announced that it has signed three MoUs with local and global partners to drive research in Singapore on making the mobility ecosystem more environment-friendly. The partnership between Continental, Nanyang Technological University, Singapore (NTU Singapore), and Volkswagen Group Innovation seeks to develop smart energy management systems to optimise EV charging. The collaboration with CEA and NTU Singapore will research new solutions to recycle electronic components from end-of-life vehicles. The MoU with NTU Singapore and Pylon City covers the study of smart charging systems and battery optimisation for EVs. Under this MoU, Continental and Pylon City will also aim to contribute to the development of national standards for outdoor charging infrastructure for Autonomous Mobile Robots (AMRs). Lo Kien Foh, President and CEO, Continental Automotive Singapore, said, "Leveraging each partner's capabilities and resources, we can pioneer innovative solutions to transform the automotive sector and improve its environmental standards, creating a more sustainable ecosystem for the future".



## L&T signs agreement with McPhy for electrolyser manufacturing

**Larsen & Toubro (L&T)**, has recently entered into an Electrolyzer Manufacturing Binding Agreement with McPhy Energy for a long-term partnership to explore the opportunities unfolding in the emerging Green Hydrogen market. Under this partnership, McPhy will grant an exclusive licence of its pressurised alkaline electrolyser technology to L&T for the manufacturing of electrolysers, including future product upgrades. L&T plans to set up a gigawatt-scale manufacturing facility for electrolysers based on McPhy technology in India to serve the domestic requirements as well as cater to the other selected geographies. Subramanian Sarma, Whole Time Director (Energy), L&T, said, "The energy industry is undergoing a tectonic shift with Green Hydrogen emerging

as a key fuel in the future energy basket. We are delighted to have signed this Agreement with McPhy, which will be a win-win partnership given L&T's strong presence across the entire value chain of manufacturing, EPC and services in the energy sector and McPhy's technology and research leadership in this sector".

## Tata Motors and Tata Power Renewable Energy expands on-site solar power capacity

**Tata Motors and Tata Power Renewable Energy** have entered into a Power Purchase Agreement (PPA) to develop a new 12 MWp on-site solar project at Tata Motors' Pune commercial vehicle manufacturing facility. A significant step towards attaining green manufacturing, the installation is collectively expected to generate 17.5 million units of electricity every year, which will meet nearly 17.2% of the annualised requirement, potentially mitigating over 12400 tonnes per kWh of carbon emissions each year. The solar project is to be commissioned within six months after the PPA gets signed and will be a significant contributor to Tata Motors' long-term ambitions. The PPA will include rooftop installations. This 12 MWp adds to the existing 8.73 MWp, summing to 20.73 MWp for Tata Motors across CVBU (Commercial vehicle) Pune. Over the next few years, the company plans to expand the solar capacity of its Pune plant to meet the growing demand for renewable energy.



## Omega Seiki Mobility collaborates with Honda Power Pack for swappable battery technology in India



**Omega Seiki Mobility and Honda Power Pack Energy India** have inked a significant MoU that heralds a new era in electric mobility. Under this collaborative agreement, Honda Power Pack Energy India will supply Omega Seiki Mobility with swappable batteries while also developing a widespread network of rapid interchange stations throughout Tier-1 cities across India. Battery swapping technology aims to alleviate range anxiety, leading to lower EV prices, marking a key move towards enhanced accessibility and user-friendliness in the Indian EV market. Uday Narang, Founder and Chairman, Omega Seiki Mobility, said, "It perfectly aligns with our vision of rapid, clean, and accessible electric transportation. This partnership is not just about mobility; it's about empowerment, innovation and a greener, more promising future for all of India".



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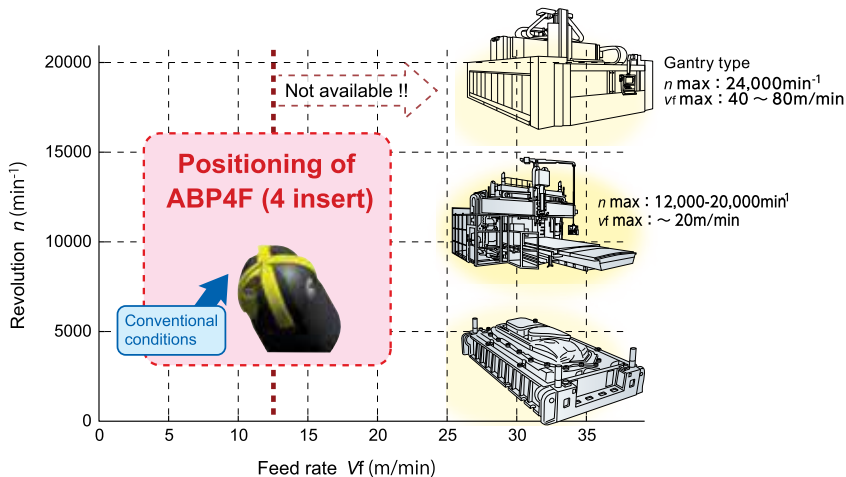


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### Example of large press die for automotive parts



### Processing advantage of 4-flutes end mill

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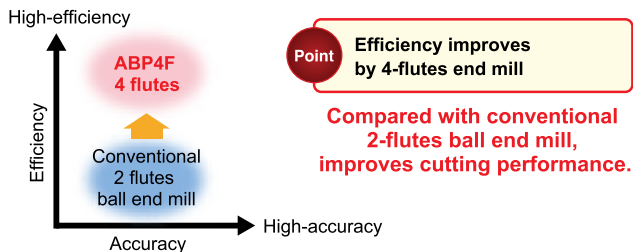
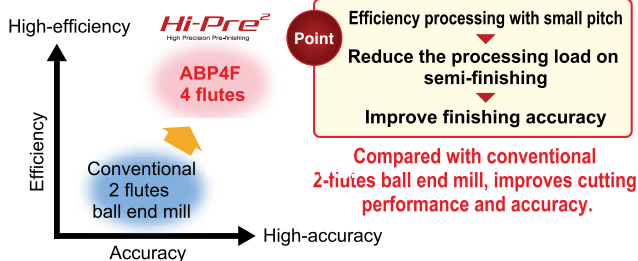


Figure Semi-Finishing



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# Industry Titans

## and their inspiring Leadership



An intriguing journey through industry leadership beckons the exceptional and visionary minds, orchestrating a symphony amidst the market's fierce competition. Leading through ever-evolving landscapes, pragmatic leaders hold the key. In our 14<sup>th</sup> anniversary issue, we proudly present interviews with industry giants, saluting their role in India's technological transformation and inspiring future leaders to elevate the nation.



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A portrait of Vinita Singhania, Vice Chairman and Managing Director of JK Lakshmi Cement. She is an elderly woman with dark hair, wearing a blue and white patterned sari, a pearl necklace, and a bindi. She is seated in a black leather chair, looking directly at the camera with a slight smile. Her hands are clasped in front of her.

# VINITA SINGHANIA

Vice Chairman and Managing Director,  
JK Lakshmi Cement



**Q. Looking back, how do you trace the evolution of the company over the past years? Can you share the most memorable milestone in your journey?**

» Over the years, JK Lakshmi Cement has evolved into a company that blends the core of its business with sustainable goals. We have intensified our capital footprint across six key verticals, with a steadfast focus on augmenting the value of our human capital through people-centric initiatives. We have also enhanced our manufacturing excellence, thereby strengthening our manufactured capital. Simultaneously, we are dedicated to fostering green growth, recognising the significance of preserving our natural capital. In addition, our commitment to community development ensures the growth of our social capital, while our relentless pursuit of innovation bolsters our intellectual capital. Ultimately, our endeavours are geared towards driving improvements in both our top-line as well as our bottom-line performance, reinforcing our financial capital.

As for the most memorable milestone in our journey, I would say that it is the successful blending of our core business with sustainable goals. This has allowed us to not only achieve financial success but also contribute to the betterment of society and the environment. We are proud of our commitment to responsible mining, manufacturing, and business operations, and we will continue to strive towards being future-ready while upholding our values and principles.

“The youth brings fresh perspectives, challenges tradition and drives innovation”

**Q. JK Lakshmi Cement has a rich legacy within the JK Organisation. How has this heritage shaped the company's business model and long-term plans?**

» JK Lakshmi Cement, with roots in the JK Organisation, upholds the highest standards in production for operational efficiency, long-term growth, and market presence. The JK Organisation's enduring dedication to responsible business practices has been seamlessly integrated into JK Lakshmi Cement's core values. Innovation drives the company, enhancing its standing in the industry and meeting evolving customer needs. Sustainability forms the bedrock of JK Lakshmi Cement's business philosophy, aiming for net-zero emissions by 2047. JK Lakshmi Cement strives to be a trusted brand, offering innovative building solutions, excellence and a top-notch stakeholder experience through human capital and technology.

**Q. The Indian cement sector is supposed to grow to 715—725Mt/yr in 2027. How is your company developing its strategy to achieve the same?**

» JK Lakshmi Cement is committed to fostering the Indian cement industry's growth and development amid its expected expansion to 715—725 million metric tonnes per year by 2027. We have devised a comprehensive strategy focusing on innovation, sustainability and customer-centricity to achieve this goal.

We are actively taking several strategic steps to achieve our goals. The company is setting up a project to expand clinker and cement capacity at UCWL, aiming to increase production to meet market demand. The company is also installing solar power plants at various locations, reducing power costs and promoting sustainable energy. Focusing on efficiency improvement, the company aims to become an industry leader in operations and cost reduction. In line with its commitment to sustainable growth, JK Lakshmi Cement is prioritising energy and water efficiencies, emission reduction and carbon neutrality. The expansion plans include reaching a capacity of 30 million tonnes by 2030 to meet rising market demand and enhance their industry ranking.

**Q. In a highly competitive industry, what unique strategies has JK Lakshmi Cement employed to maintain its focus on product quality, customer satisfaction and innovation?**

» JK Lakshmi Cement remains dedicated to product quality, customer satisfaction and innovation. The company fosters a culture of innovation and offers SMART building solutions, aiming to be a top-tier construction solutions provider. We have established robust systems and processes to engage with stakeholders, creating mutually beneficial relationships. JK Lakshmi Cement is striving to drive its business sustainably through focused action, collaboration, advocacy and thought leadership with a core focus, working on resource efficiency, emission reduction and achieving carbon neutrality. The company is committed to Science-based Target Initiatives and aims to meet all its electrical energy requirements through renewable energy by 2040, as committed to RE100. The company is also committed to doubling its energy productivity by 2040, based on the 2014–15 baseline, as part of the EP100. Their goal is to become a net-zero company by 2047. JK Lakshmi Cement also maintains its position as a low-cost cement producer, ensuring competitive prices and customer contentment.

**Q. How important do you think youth is for the empowerment of Indian industry?**

» Young people offer fresh perspectives and innovative thinking, challenging the status quo. Their tech-savviness and adaptability in the digital age can drive industry growth. Diverse backgrounds and experiences among the youth aid businesses in understanding and serving a varied customer base, boosting satisfaction and loyalty. JK Lakshmi Cement supports youth through initiatives like the Beyond Curriculum programme at Lakshmipat Singhania Academy, fostering life skills, team building, outdoor adventures, education and philanthropy. □

# KIRTI KABRA

Director, RR Global



**Q. What inspired RR Kabel to actively promote women leaders in the manufacturing sector? How does the company ensure a supportive and inclusive work environment for women in manufacturing roles?**

» At RR Kabel, we understand that 'diversity' is not merely a buzzword, but rather a key factor in the industrial sector's continued success and capacity for innovation. We are committed to actively promoting and elevating female leaders in order to unlock the vast potential of women in this field. Our dedication goes beyond words to deeds as we endeavour to foster a welcoming and inclusive workplace where women in production roles may flourish, grow and offer their distinctive perspectives to our collective pursuit of excellence.

# “Breaking stereotypes: Women leaders pave the way in manufacturing at RR Kabel”

**Q. Can you provide an overview of RR Kabel's business model and how it has evolved over the years?**

» RR Kabel's business model demonstrates our dedication to both innovation and customer-centricity. Over time, we evolved from being primarily a manufacturer of wires and cables to growing into a solutions provider. We've embraced technology developments and market trends, enabling us to provide a wide range of goods and services that meet the ever-changing requirements of our clients. Adaptability, tenacity and the unwavering pursuit of excellence have all been characteristics of our journey. Our basic values of quality, dependability and customer satisfaction remain central to everything we do as we progress, fuelling our growth and success in the wires and cables manufacturing industry.

**Q. What are the key pillars of RR Kabel's business strategy, particularly in the manufacturing sector, and how have they contributed to the company's success?**

» At RR Kabel, our business strategy in the manufacturing sector for wires and cables is built upon three key pillars: innovation, quality, and customer-centricity. Our commitment to innovation enables us to make continuous improvements and create cutting-edge solutions to satisfy our clients' changing needs. Every aspect of our business is anchored in quality, ensuring that our products transcend industry benchmarks. We prioritise client contentment above all else due to our ceaseless

focus on customer centricity, tailoring our services to their individual requirements. These pillars are what has brought us to the forefront of our sector and continue to serve as a key driving force for our expansion and achievement.

**Q. Technology is constantly evolving in the manufacturing industry. Can you share insights into RR Kabel's approach to adopting and integrating new technologies to stay ahead of the curve?**

»» At RR Kabel, we are aware that technology in the manufacturing sector is not merely a resource to be utilised, but also a significant competitive advantage. Our strategy for implementing and embracing new technologies is grounded in our dedication to innovation and to remaining at the forefront of our sector. We stay updated on technical developments and trends, looking for ways to improve our operations, goods and services. We ensure that we not only match, but surpass the expectations of our clients through embracing automation, digitalisation and cutting-edge production techniques. Our objective is not merely to keep up with change, but to lead it using our technological prowess to establish new benchmarks for excellence in the wires and cables sector.

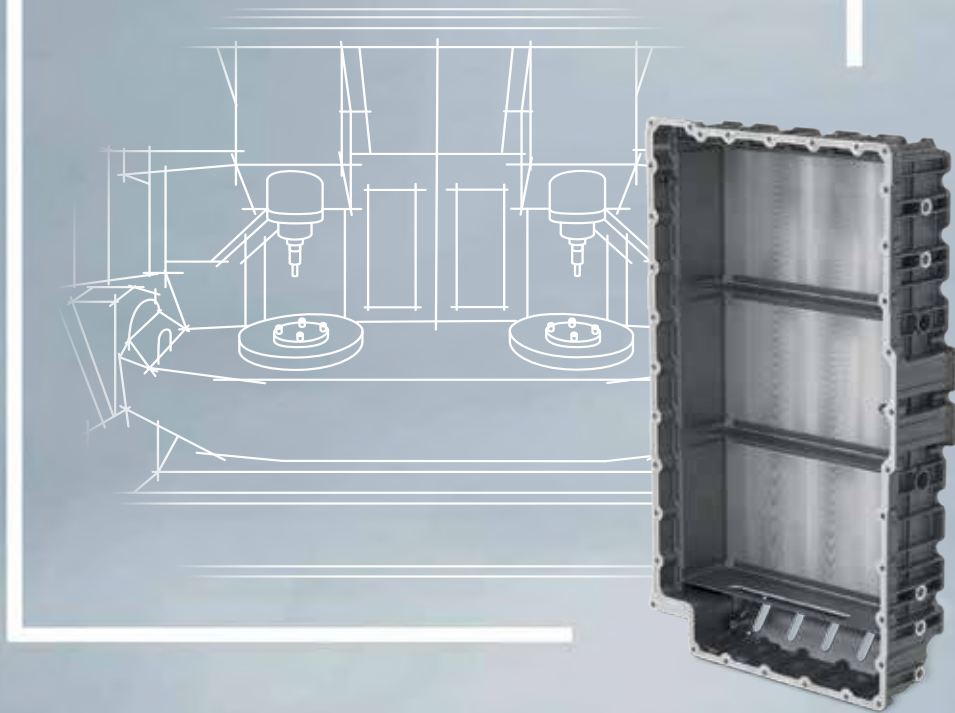
**Q. We've heard about RR Kabel's commitment to promoting women leaders in manufacturing. Can you elaborate on the company's broader workforce management and diversity initiatives?**

»» In addition to ensuring gender equality, RR Kabel is committed to diversity and workforce management. We believe that a varied and welcoming workplace is a source of ingenuity and creativity. Beyond supporting female executives in the industrial sector, we have carried out extensive diversity programmes that include every facet of our workforce. Regardless of gender, ethnicity or origin, we aggressively seek out talent from a variety of backgrounds, foster an inclusive workplace environment and offer excellent opportunities for career advancement. Our goal is to create a truly inclusive workplace that represents the diverse fabric of the communities we serve, where every person feels valued, empowered and inspired to offer their best.

**Q. RR Kabel has a global footprint. Can you provide an overview of the company's international operations and how they contribute to its overall growth and strategy?**

»» The far-reaching scope of RR Kabel's operations is evidence of our dedication to broadening horizons and addressing the needs of customers everywhere. Our overseas businesses are a significant factor in our overall growth strategies. We are able to harness global insights and trends by forging a strong presence in major markets, ensuring that our goods and services stay cutting-edge and competitive. We are committed to fostering fruitful local alliances while upholding our fundamental principles of excellence and dependability. This strategy strengthens our position as a dependable global leader in the wires and cables business by expanding our reach and deepening our grasp of a variety of customer needs. □

# AUTOMOTIVE



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A close-up portrait of Sulajja Motwani, a woman with dark, wavy hair, looking directly at the camera with a slight smile. She is wearing a dark top and a small earring. The background is a warm, out-of-focus orange and yellow.

# SULAJJA MOTWANI

Founder and CEO, Kinetic Green

**Q. With India becoming the global hotspot of the EV revolution, how would you define Green Mobility? How is this creating a difference in the environment?**

» Green Mobility is playing a significant role in India's transition towards a cleaner and more sustainable future. With India being one of the world's most polluted countries, it is crucial that we adopt eco-friendly solutions like Electric Vehicles (EVs) to combat the adverse effects of vehicular pollution. Green Mobility, through the adoption of EVs, has the potential to significantly reduce the emission of harmful pollutants in our environment.

EVs are inherently cleaner as they produce zero tailpipe emissions, unlike conventional fuel-based vehicles. By replacing traditional combustion engines with electric motors, we can significantly reduce CO<sub>2</sub> emissions and mitigate air pollution. This not only contributes to cleaner air and improved public health, but also helps in reduced transport cost for our population. Additionally, green mobility solutions may help resolve the issue of energy security by leveraging renewable energy sources. As India continues to invest in renewable energy infrastructure, such as solar and wind power, we have the opportunity to charge EVs using clean and sustainable energy sources for a 'well to wheel' clean transportation eco-system.

# "The future of EVs in India to revolutionise the automotive ecosystem"

**Q. How far have you reached when it comes to localising your EVs? What has been the primary challenge here and how did you address it?**

» At Kinetic Green, our primary focus has been on design and development of advanced yet affordable EVs with a Make in India focus. We believe in the importance of building a strong local manufacturing ecosystem, which not only promotes self-reliance but also contributes to job creation and economic growth. To address this challenge, we created an in-house collaboration model. Our group companies like Kinetic Engineering and Kinetic Communications designed and manufactured some of the technology-intensive parts for us. This helped us in localising the supply chain and ensuring high quality as well as reliability.

We have collaborated with other well-reputed local suppliers and technology partners to develop indigenous solutions. We invested in R&D and worked closely with our partners to design and manufacture components that meet our stringent quality standards while also being cost-effective. Government initiatives like Atmanirbhar Bharat and Make in India give immense opportunities for our manufacturers to source the components in India. Furthermore, we have focused on establishing a robust service and maintenance network across the country.

**Q. How does Kinetic Green ensure that its products are accessible to a wide range of customers, including those in rural or remote areas? Are there any initiatives in place to address the affordability and accessibility of EVs in India?**

» At Kinetic Green, our motto is 'Green Mobility for the masses', and we are committed to ensuring that our products are accessible to a wide range of customers, including those in rural or remote areas. We understand the importance of affordability and accessibility therefore, our products, such as Safar Smart and Safar Shakti, are designed specifically keeping in mind the needs and requirements of customers in these areas. Additionally, Kinetic Green has taken several initiatives to make our EVs more accessible to customers across India. We have established a robust network of dealerships and service centres in rural and remote areas. We have also tied up with financial institutions like IndusInd Bank, Tata Capital to name a few to provide attractive financing options for our customers and joined hands with ReadyAssist to provide Comprehensive Extended Warranty programme for electric two-wheeler range. Furthermore, affordability is ensured with our proprietary frugal engineering approach, similar to ISRO's mind-boggling ability to design the Chandrayaan with the much talked about Indian frugal engineering strengths!

**Q. What are Kinetic Green's plans for expanding its global presence? Are there any specific markets or regions the company is targeting for its EVs?**

» We believe that there is immense potential for EVs worldwide, and we are keen to contribute to the global shift towards sustainable transportation. We plan on expanding our footprint gradually, taking one step at a time to ensure a strategic and sustainable approach. While we are open to exploring various markets and regions, we are currently evaluating potential opportunities in markets where there is a growing demand for EVs and a favorable regulatory environment. Our upcoming launch of the E-Luna will be a testament to our commitment to expanding our product range and addressing diverse customer needs. Our goal is to make Kinetic Green a globally recognised brand for sustainable and affordable mobility. Our strong focus on affordability and reliability, combined with our commitment to sustainability, makes our EVs a viable option for customers in various global markets.

**Q. What are your thoughts on the automotive ecosystem in India and how do you foresee a cleaner and better tomorrow with EVs?**

» EVs are the future of mobility, and they hold immense potential to improve the environmental, social and economic landscape of our country. With EVs in India, we can drastically reduce our dependence on fossil fuels and mitigate the harmful air pollution caused by conventional vehicles. In a country like India, where air pollution is a major concern, the widespread adoption of EVs can significantly improve the quality of air we breathe and enhance public health.

Policies like FAME, PLI, State EV policies have provided assistance to both consumers and manufacturers. The government's focus on developing charging infrastructure across the country is commendable. I am optimistic about the future of EVs in India and their potential to revolutionise the automotive ecosystem. By working together with the government, industry stakeholders and the public, we can create a cleaner, greener and more sustainable tomorrow. □





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A portrait of Dr. Sudhir Mehta, a middle-aged man with short dark hair, a grey beard, and glasses. He is wearing a dark blue polo shirt and has his arms crossed. The background is a plain, light grey.

# DR SUDHIR MEHTA

Chairman and Managing Director,  
Pinnacle Industries

**Q. What are the key factors that have contributed to Pinnacle Industries' success in becoming India's largest integrated commercial vehicle seating and interiors company?**

» Pinnacle Industries and its success is a product of the opportunity that is India. With its diverse market, growing economy, skilled workforce and supportive government policies, India presents a conducive environment for businesses looking to establish or expand their manufacturing presence. We started in 1996, with manufacturing of seating systems for commercial vehicles, thereafter, venturing into automotive interiors and components, because we found that our customers were looking for kind of a one stop solution for all these areas. That is how we graduated from being a seat manufacturer to an integrated company offering end-to-end solutions for commercial vehicle OEMs across ICE & EV space.

Few years back, given our strong foothold and expertise in the seating systems and automotive interiors, we started our special application vehicle conversion business. Under specialty vehicles, we design, manufacture and supply customised vans for personal, business and special-purpose applications. Our tailored solutions include remodelling interiors and exteriors and providing an array of options to build vehicles for specific needs. We focus primarily on ambulances and healthcare/medical application vehicles. Currently, approximately 75% ambulances in India have at least one product from Pinnacle Industries.

“India offers a favorable environment for manufacturing expansion”

**Q. Pinnacle Industries recently rolled out an advanced seating system for the Vande Bharat Express Trains. How does it further contribute to your business?**

» We are very proud to be one of the only few suppliers for the Vande Bharat Trains' seating systems, and to have designed, engineered, developed, validated and supplied these seats from scratch in India. These trains are a testament to our country's growth and transformation, and we are extremely thrilled to be a part of it. This significant development reinforces our unwavering dedication to creating and delivering products that prioritise passenger safety, comfort and aesthetic appeal, but also highlights our optimism in designing and manufacturing innovative, cost-effective and durable world-class products for the railway industry and beyond.

We recognise the immense growth potential of the railway sector, both in India and globally. As new-age, high-speed trains gain prominence, the demand for safer, more comfortable and visually appealing seats becomes paramount. With each product we bring to the market, we strive to meet these expectations. We believe that our



**Q. What do you think about e-mobility going forward? How is your company's business aligning to this?**

new seating system for railway segment will provide an enhanced and enjoyable travel experience for passengers, setting new benchmarks in the industry. We are a proud Indian company and with the railway seating business, an industry typically dominated by established institutional or international players, we foresee great future growth potential. This opportunity drives us to work harder and continue delivering exceptional seating solutions that surpass expectations and contribute to the growth and success of the Indian Railways.

» The shift towards electric mobility is a once in a century opportunity for OEMs and components companies alike. With our unique expertise in the design, development, assembly and manufacturing facilities in Pithampur and Pune in the components segment for e-mobility applications, we are an exclusive destination for end-to-end EV component requirements and solutions. We produce and market certified precision EV components, including sheet metal and tubular pipe components, body parts and seats for major brands globally.

Our expertise in both design and manufacturing allows us to optimise modular solutions from a technical, commercial and production aspect, reducing the risk of multi-iteration design and enabling shortened development times. The EV ecosystem is building up fast with many start-ups and new-age manufacturers coming up in different parts of the country besides major OEM's making huge expansions in this segment.

**Q. How do you envision technology shaping the future of the commercial vehicle industry, and what steps is Pinnacle Industries taking to adapt to these changes?**

» The commercial vehicle industry, which accounts for about 4% of India's total domestic automotive production volumes, is expected to grow at a CAGR of about 8% by 2028. As a company, our focus has always been primarily on the quality and innovation. We have extremely robust research and development division that has enabled us to adapt to industry changes, creating new designs, materials and technologies specific to the needs of our customers. We work very closely with our customers and regularly collaborate with them to stay updated, evaluate and adapt to their product portfolios constantly.

**Q. Pinnacle Industries is a prominent player in India, but how do you plan to extend your global presence in the automotive and specialty vehicles market?**

» We have built a strong reputation and legacy in the Indian automotive industry over the years and now we plan to extend our footprints globally. Over the years, we have had various technical and strategic collaborations with leading and reputed global companies, and we look forward to propelling Pinnacle's leadership across all our business units in international markets.

Going forward, in the next three years, we expect exports to constitute 30% of our sales across each of our business unit, and we are confident to achieve so. This commitment not only aligns with our global expansion plans, but also enhances our reputation as a responsible and forward-thinking player in the automotive seating and components and specialty vehicles industries. □



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A portrait of Niranjan Kirloskar, a middle-aged man with dark hair and glasses, smiling. He is wearing a dark blue patterned blazer over a white shirt. The background is a blurred outdoor setting with trees.

# NIRANJAN KIRLOSKAR

Managing Director, Fleetguard Filters



**Q. Can you share Fleetguard Filters' journey since its inception in 1987 and its collaboration with Cummins Filtration USA? How has the company evolved in the automotive business over the years?**

» Since our inception in 1987, Fleetguard Filters (FFPL) has embarked on a remarkable journey of growth, innovation and commitment to quality. Founded as a joint venture with Cummins Filtration USA (now Atmus Filtration Technology), this partnership has been a cornerstone of our success. Over the years, our company has consistently evolved achieving significant milestones that underscore our dedication to excellence.

All our manufacturing facilities are IATF 16949 Certified, and our products are tested in NABL-accredited labs that continuously raise the bar in providing the best quality filtration products. Implementing the Theory of Constraints (TOC) management principles in 2007 enhanced our operational efficiency, and the ISO 14001 Certification in 2008 highlighted our focus on environmental responsibility and sustainability. From expanding our manufacturing capabilities and market presence to Pune in 1992 and establishing operations in various geographies like Hosur (2005), Sitarganj (2010) and Dharward (2016) to inaugurating advanced facilities like the one in Jamshedpur (2022), the trajectory of our growth is ever-increasing.

Achieving a remarkable turnover of ₹22 billion in 2023 signifies our on-going journey and the success of our collaboration with Cummins Filtration USA (Now Atmus Filtration Technology). As we move forward, we remain dedicated to advancing the automotive filtration industry, meeting the dynamic needs of our customers and contributing to a cleaner, more efficient and sustainable automotive sector.

“Advanced customer solutions, embracing constant technological progress”

**Q. How do you manage strategic decisions towards business success?**

» At FFPL, we believe in having sustained business growth now and in the future. The basis of our strategic decisions towards business is as follows: our business priorities are regularly evaluated internally, to ensure the set goals are achieved. We use various internal data tools and follow stringent processes for all our operations. We also leave enough scope to keep pushing the envelope, constantly innovating solutions that will always provide our customers with technologically advanced solutions. We also live by the Theory of Constraints (TOC) principles, which helps us optimise and streamline our resources and anticipate upcoming market needs to develop future-ready solutions. Ultimately, the end goal is to ensure our customer is always delighted and maintains a long, fruitful relationship with us.

**Q. The automotive industry has witnessed rapid technological advancements in recent years. How do you define the role of highly efficient filters in heavy-duty commercial vehicles?**

» Indeed, the automotive industry has witnessed rapid technological advancements. In fact, we have been pioneers in partnering to deliver many such advanced solutions setting new standards in the industry. At FFPL, we adhere to manufacturing filtration solutions that meet the most stringent requirements of filtration solutions. As the global standards get more demanding, our preparedness with constant innovation and R&D has always kept us ahead of the market curve and adaptable to the evolving market demands.

**Q. Can you throw some light on your company's diverse manufacturing capabilities? How does your business line set itself apart from the rest in the competition?**

» FFPL has a diverse manufacturing capability across multiple plants, producing various automotive and industrial products. The company operates multiple manufacturing facilities, each specialising in distinct aspects of various types of filter production and related components. These facilities collectively produce a comprehensive range of filter products. The range includes air, fuel, lube, hydraulic filters, air oil separators, crankcase ventilators, coolants and chemicals and automotive spares. Some of the segments we cater to are Automotive, Power Generation, Construction and Infrastructure, Mining, Industrial, Defence, Agriculture and many more.

The company differentiates itself by providing high-quality filtration solutions on time every time. We ensure the same by always being located in close proximity to the customer. This network allows the company to cater to a wide spectrum of customer demands and maintain a strong presence in the filtration industry.

**Q. Fleetguard Filters' impact is not limited to India; it has a global presence. Could you discuss the company's international operations and its efforts to cater to the filtration needs of diverse markets worldwide?**

» Certainly, our impact extends beyond India, as the company has a notable global presence. FFPL's international operations play a crucial role in addressing the filtration needs of diverse markets worldwide. FFPL's international reach allows it to serve customers in different sectors and regions, adapting its filtration solutions to meet specific requirements and environmental regulations. Some of the countries FFPL exports to are USA, Belgium, Singapore, France, South Korea, Brazil, China, Australia and South Africa via Cummins Filtration USA (now Atmus Filtration Technology).

**Q. Looking ahead, what are Fleetguard Filters' plans and aspirations? How does the company envision its role in shaping the future of filtration solutions in the automotive sector?**

» At FFPL, we manufacture high-quality filters in adherence to prescribed regulations. This, in turn, improves not only the efficiency of the engine but also significantly contributes to the reduction of pollution in the environment. Our R&D and test labs work diligently to be technically prepared for the ever-evolving new emission norms and cater to customers' stringent requirements with the shortest delivery lead time. Thus, the company's commitment to innovation and sustainability results in more efficient and eco-friendly filtration solutions, reducing emissions from industrial processes, vehicles and power plants, emphasising the crucial role of corporations in addressing this pressing global challenge. □



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# Optimising metalworking fluids in the safest way

Metalworking Fluids (MWF) can optimise machining performance, extend tool life and safeguard workpiece surfaces. Here is how you can use MWF to enhance your metalworking operations.



**Yatendra Kumar,**

Business Head,  
MotulTech India



**M**etalworking fluids, sometimes referred to as coolants, cutting oils, water-soluble oils or water-miscible oils, are used during the machining of metals to provide lubrication and cooling and to help carry away debris such as swarf and fine metal particles. They can also help in improving machining performance and prolong the life of the cutting tool, as well as provide corrosion protection for the surfaces of workpieces.

Metalworking (also known as metal processing) fluids also include corrosion preventives and cleaning chemicals, apart from cutting and forming oils, while other lubricating and greases are considered maintenance fluids. Each machining application is unique, and each of our clients has specific needs. MotulTech's offer for manufacturing industries encompasses a wide range of machining fluids. This range is designed to optimise performance and productivity concerning users and the environment.

## Challenges

The ethos behind formulation is to meet the most stringent requirements for hygiene and safety whilst retaining ease of maintenance. High-performance machining excellence of components with significant cost savings and productivity improvement. Process requirements and metallurgy of machining hot and cold components used in aerospace engines is a significant challenge, and MotulTech products overcome this challenge with its latest technology of differentiated additives.

Whether oil-based or water-based, metalworking fluids need to be resistant to changes in the environment like temperature and bacteria and remain safe to use for the operator. There are two types of metalworking fluids: neat oils and water-soluble oils. Water soluble oils are further divided into three categories—synthetic fluids, semi-synthetic fluids and emulsifiable or soluble oils; each solves a different problem or enhances a different aspect of the manufacturing process and comes with its limitations. The need for a new metalworking solution is often based on challenges, such as the foaming of fluid, bad odour due to microbial growth, face/skin irritation for the operators or unsatisfactory surface finish on the produced components. There are some

key questions to be asked to find out what the cause of poor performance is.

## Safety standards

To tackle these challenges effectively, users must embrace and adhere to a set of best practices. These practices include maintaining the quality of the metalworking fluid and implementing measures to control bacterial contamination. Users should also minimise skin exposure to the fluids, prevent or regulate airborne mists and conduct health



surveillance in areas with potential fluid or mist exposure. Furthermore, it is crucial to act upon the readings obtained in alignment with risk assessments related to metalworking and associated fluids. Ensuring that a responsible person carries out the necessary health surveillance is a minimum requirement. Effective sump fluid control is vital, and users should refrain from disposing of food, drink or debris in the sump.

Any signs of scum layers, excessive tramp oil or dirty and foul-smelling sump fluid should be reported promptly. Adhering to sound working practices while mixing fluids, cleaning, and topping up sumps is essential. Additionally, personal protective equipment should be stored in designated



areas, and the regular change of dirty overalls as well as the avoidance of taking them home is strongly recommended. Lastly, it is advisable to refrain from eating or drinking in areas where metalworking fluids are in use to maintain safety and hygiene standards.

### Wash fluids and washing machines

Water-mix wash fluids used to clean components after metalworking may also pose a health risk from skin contact with the wash fluids themselves or from breathing the mist from washing machines. When handling wash fluids, instructions for use should always be followed. If you breathe in mist from washing machines, you may suffer the same sorts of symptoms and diseases as you would experience from breathing in mist from metalworking machines. The same principles of risk assessment, prevention and control applied to metalworking fluids should be applied to water-mix wash fluids. Mist from washing machines should normally be kept within the machines or ventilated to a safe place. Visible mist from washing machines should be reported.

### Preparing working dilutions from MWF concentrate

- **MWF preparation and mixing:** Properly mixing the MWF is essential to ensure optimal quality and performance. It is crucial to follow the supplier's specific recommendations for each MWF. Using a mixing (dosing) unit is the preferred method for emulsion preparation, and it is advisable to seek guidance from the supplier. One must always have the necessary personal protective equipment ready, including protective overalls, gloves and safety glasses.

Additionally, refer to the supplier's Safety Data Sheet for information on handling hazards. When preparing the emulsion, be sure to add the MWF concentrate to water to create the emulsion correctly. Before using the

MWF, check that the pH and concentration fall within the recommended limits. Whenever possible, prepare the MWF in a designated and well-ventilated area to prevent inhaling volatile respiratory irritants, which can accumulate in sealed concentrate drums.

- **Water quality for MWF emulsions:** The quality of the water used to prepare the working emulsion is a critical factor for stability and performance. It is highly recommended to consult with the MWF supplier regarding specific water quality requirements, such as hardness and pH levels. To assess the suitability of your water source, consider testing it for bacteria, yeast or fungi, which can be done using tools like dipslides. If you opt for stored water instead of direct mains water, be aware that this may increase the risk of bacterial contamination in the MWF. To mitigate this risk, conduct weekly inspections of water storage tanks and water filtration equipment to ensure they remain clean and free from biofilm formation. As a best practice, maintain records of these regular checks to monitor water microbial quality.

### Conclusion

In conclusion, MWF plays a crucial role in the machining of metals, providing lubrication, cooling and debris removal. They contribute to improved machining performance, extended tool life and corrosion protection for workpiece surfaces. Our range of MWF products at MotulTech is designed to address the diverse needs of our clients while optimising both performance and environmental considerations. Choosing the right MWF and following best practices are crucial steps in ensuring the safety, quality and efficiency of metalworking processes. By adhering to these principles and continuously monitoring and optimising your MWF usage, you can enhance the performance of your machining operations while prioritising safety and environmental considerations. □







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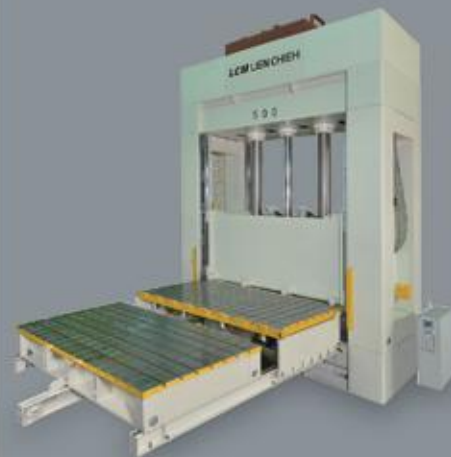
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# The Smart Tyre:

## An auto component revolution

Navigating the ever-evolving auto component landscape with a focus on sustainability and digitisation is critical for today's auto manufacturers. This article delves into the changing demands of Electric Vehicle (EV) tyre manufacturing and the profound impact of digitisation and sustainable practices in shaping the future of the tyre industry.



**Rajnish Damani,**  
Director Operations  
Bridgestone India



Auto manufacturers today are faced with a rapidly evolving ecosystem, driven as much by policy changes, as it is by customer preferences. Moreover, while the end products are changing to reflect these preferences, this has fundamentally led to the evolution of manufacturing as well. Two key trends that are here to stay are sustainability and digitisation. What's more fascinating is the fact that they go together and any progress on either front positively impacts the other. Talk about a win-win!

## The EV era

Manufacturers have to speedily upgrade their processes to cater to the rising demand for EV tyres. Presently, a prominent concern of Original Equipment Manufacturers (OEMs) is the tyre performance. Low rolling resistance and low noise are bare necessities to be considered while making this decision. Tyre makers have been aiming to perfect the golden trifecta of Tyre Life-Low RRC-Wet Braking and other aspects that often get bypassed while focussing on low RRC (rolling resistance co-efficient).

As tyre manufacturers look towards the supply requirements of the EV industry, they will also take a relook at the chemistry that goes behind tyre manufacturing, leading to a need to change compounding/mixer technology for low RRC. For EVs, the weight of the tyre is also important, but not at the cost of reducing the life of the tyre. It is here that tyre manufacturers' commitment to sustainability comes to the forefront. Tyres that give a healthy combination of using lesser raw material while still providing longer life contribute towards sustainability by having lesser stress on resources.

While the tyres are evolving to be more sustainable, the manufacturing processes are also headed in the same direction. To curb their carbon footprint, manufacturers can employ practices such as using renewable energy sources, the deployment of carbon neutral bio-mass fed boilers and replacing diesel powered forklifts on the shop floor with electric powered ones.

## The disruptive age of smart manufacturing

As with other spheres of industrial activity, Artificial Intelligence (AI) has made inroads in the tyre industry as well and is being incorporated to further enhance tyre life and safety of both the vehicle and those outside. A tyre is a complex chemical product incorporating natural and synthetic rubber polymers, carbon black, silica-based reinforcing agents, cross-linking agents and additives, steel and fabric. AI is helping the industry study the role and different combinations of raw materials, both natural and synthetic, in tyre longevity. AI-modelled structural and design changes in tyres are being extensively used to assess

the safety of the products.

AI is also contributing towards cost efficiencies in R&D with a reduction in both design time and prototype development. A virtually developed tyre helps cut down on tyre prototypes, which are huge in numbers. With virtual development, this number comes down to as low as 1/5th of its previous one, reducing the resources used as well.

The tyre industry is using a combination of Machine Learning (ML) algorithms, AI and prototypes that are virtually created to enhance product reliability, safety and give products optimally suited to the product design of OEs. Using ML, we find an important place in the production process, and its role will only grow in the future. Algorithms analyse and extract data on quality checks and predictive analytics. These are used to improve the manufacturing processes. Greater use of these in the future will also result in higher efficiencies, leading to a further decrease in manufacturing carbon footprints.



Another AI-based solution implemented on the shop floor is the Digital Twin technology. Digital Twin simulations allow technicians to get a hands-on learning experience, prior to working on the actual machines. It also enables tyre manufacturers to fasten training and learning processes. With Digital Twins, manufacturers can really help people get on board without needing to operate on machinery, thus also reducing the wastage of resources in the process. Digital Twins act as real machines that people can operate. The turnaround time for training and up-skilling has been reduced to half of its original value without impacting productivity, cycle time and wastage.

Robotics are an integral part of the manufacturing process in any industry. We are now seeing the advent of the Smart Factory. In those, automation covers areas such as smart material movement within the plant via automated guided vehicles, whereas digitisation helps in smart planning



and maintenance of machines. Machine maintenance includes oil, vibration, heat, predictive and current and voltage analysis. Predictions of what failures can be in future are built-in with smart machine maintenance. This basically means lesser down time leading to higher output using the available resources.

## Final reflections

Technological innovation, upgradation and adaption in the tyre industry are intrinsically linked for developments in the automobile industry. Tyre manufacturers have already started upgrading both technology and products to meet this challenge by introducing the smart tyre.

The manufacturing of these tyres necessitates the embedding of digital technology into the tyres during the manufacturing process thereby resulting to the installation of production equipment capable of embedding tires with radio frequency identification tags. The sensors in these tyres not only communicate with the vehicle on road conditions but also connect vehicles to a cloud-based system that fosters maximising the tyres' lifespan and minimising their carbon footprint. To conclude, current manufacturing trends in the tyre industry are aimed at sustainability, reducing the carbon footprint and producing safer and smarter tyres. As we proceed with further developments in technology, we ensure the development of safer, reliable auto components and their extended usage. □



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# How are ceramic solutions shaping the energy industry?

This article talks about the critical role of advanced ceramics in India's energy transition.



**Dr Shyam S Rao,**  
Corporate Technology  
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**T**he popularity of ceramics in a wide variety of industrial applications, ranging from lining industrial furnaces to covering space shuttles, is hardly surprising, given some of their inherent strengths, such as being good thermal insulators. Studies suggest that the global ceramics market is expected to reach \$219.12 billion by 2028, growing at a CAGR of 7.7%.

Similarly, in the energy industry, ceramics have always

been widely used, thanks to its unique properties, such as being hard, heat-resistant and corrosion-resistant.

## Generation, storage and distribution of energy

Ceramics are widely used in the generation, storage and distribution of energy. In power generation plants, ceramic coatings are used for wear resistance to protect the



plant equipment from corrosion. In storage, ceramics form an important part of batteries due to their excellent heat-resistant properties and ability to withstand high loads.

Lithium ion (Li-ion) batteries have ceramic cathodes. On the distribution end as well, switchgears in electric substations use metalised ceramics to house vacuum interrupters. Metalised ceramic cylinders can help manage electric power distribution. They are capable of withstanding mechanical and thermal fatigue, thereby enhancing the usable life of components.

In power plants, where pulverised fuel must be transported over long distances to reach the burner, the pipes must be lined with ceramic. This is especially true in the case of supercritical thermal power plants, which have been used increasingly in the last couple of decades. These plants require fine coal, which is corrosive and abrasive, to improve the burning efficiency. As transportation velocities and partition coefficients go up, the ability to transport the coal efficiently is becoming even more critical. In fact, this has led to the use of more specialised varieties of ceramics (e.g. Silicon Carbide) to coat wear-resistant sections such as outlets and nozzles, leading to better protection against higher velocities.

High-purity alumina ceramic tiles are useful in bulk material movement that involve sliding and shear interactions of abrasive materials that cause major equipment wearing. Evidently, ceramic tiles offer a cost-effective and reliable this issue. For certain applications, advanced technical ceramics can offer higher strength and corrosion resistance than traditional wear materials. In case of complex structures where ceramic tiles are difficult to install, ceramic coatings can be useful as a quick-fix sealing solution for wear applications.

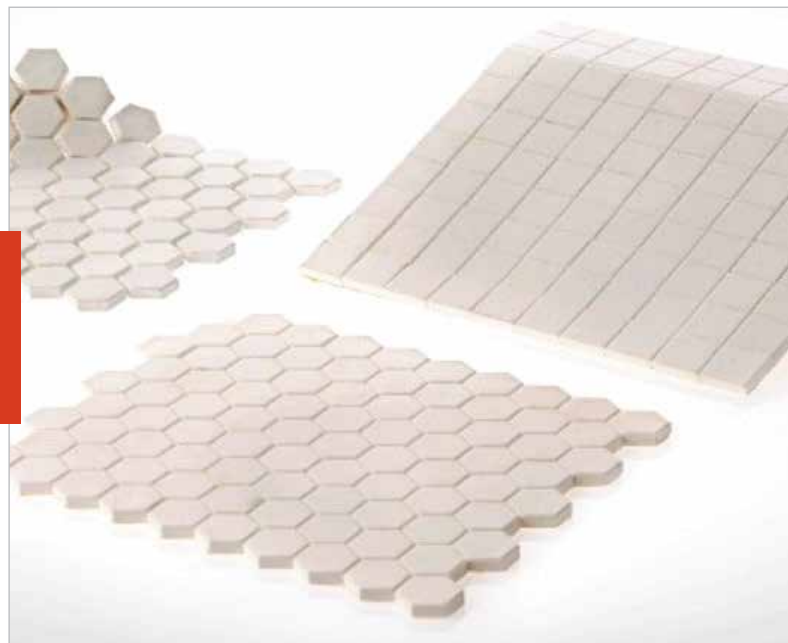
## Transition to novel clean energy sources

With growing awareness around climate change and the need for sustainability, the energy is currently in positive transition. Moreover, the Indian Government has committed to reaching energy independence by 2047 and attaining a net-zero economy by 2070. The energy ecosystem, for example, is focused on increasing the amount of clean, renewable energy at the generation stage, which also involves increased usage of battery storage involves shifts at many points.

In the case of solar power plants, silicon carbide powder is used to slice the silicon wafers used in solar cells. In battery energy storage systems, the widely used Li-ion batteries use ceramic cathodes. Thus, ceramics factor into both major areas of the energy ecosystem. Given the country's progressive transition to renewable energy and the growing practical application of batteries in manufacturing, electric automobiles and other everyday applications,

ceramics is projected to continue playing a significant role in the energy sector.

Characteristics such as extreme wear resistance, temperature resistance, and electrical insulation make advanced ceramics an interesting alternative to other materials for use in new-age energy production as well. India's National Green Hydrogen Mission promotes the use of hydrogen as a clean and renewable energy source in the country. As the nature of energy production evolves, the role of ceramics in the energy industry is also evolving.



In the case of Solid Oxide Fuel Cells (SOFC) such as Hydrogen Fuel Cells, which are highly efficient electrochemical devices that convert the chemical energy of hydrogen and oxygen into electricity, ceramics play an important role not only in the structural parts of the SOFC but also in the electrolyte itself. While alumina ceramics form the structural parts, zirconia ceramics are used as solid electrolytes. With the energy transition, the types of ceramics and their applications will continue to evolve.

## Manufacturing ecosystem for ceramics in India

Currently, a large majority of industrial ceramics manufactured in India are exported to cater to global requirements. However, India already has the manufacturing capabilities in industrial ceramics to enable its energy transition even with a 'Make in India' mindset. Companies have the capacity and scale as well as the backward integration of ceramic grains to allow for new ceramic applications to take shape in India's energy ecosystem. □



# Innovations altering the future of welding

The landscape of welding is undergoing a transition from traditional methods, materials and manual labour towards cutting-edge arc welding strategies. In this article, we explore the emerging trends in welding technology and their evolution.



**Sunanda Kumar Palit,**

Head, Strategy & Customer Experience, Ador Welding

**W**elding is a fundamental technique in various industries, including construction, manufacturing, automotive, aerospace and many others, where it is used to fabricate, repair or modify structures and components. The evolution in welding trends evident in the last few years extends past equipment and materials; it encompasses enhanced welding training and an increased emphasis on welding safety to foster a steady working environment and facilitate a hands-on experience. Here is a deeper dive into the development in welding technologies seen:

### Advanced metals in welding processes

In this dynamic era of welding, superior materials like titanium aluminide intermetallic, nickel aluminide intermetallic alloys, iron aluminide intermetallic alloys, Oxide Dispersion Strengthened (ODS) alloys, Metal Matrix Composites (MMCs), nickel-based superalloys and Al-alloys, including Al-Li alloys and Mg-alloys, demand advanced arc welding performance and processes. Welders operating with those advanced materials need to contend with precise heat input, minimal spattering, improved arc control and enhanced weld quality.

### Magnetic arc welding process

Magnetic arc welding (Magnetically Impelled Arc Butt welding (MIAB Welding)), harnesses a potent magnetic field generated by a magnetic coil acting as a stabilising force. This welding method shines when handling thick plates or operating inside restricted spaces, providing versatility across an extensive range of materials.

### Explosive welding

Explosive welding represents a solid-state welding process that leverages explosive energy to create a sturdy bond among two metals. This technique shines whilst welding distinct metals that prove challenging to weld using traditional methods. Moreover, it yields uniform, high-quality bonds with minimal distortion or residual stresses.

### Laser welding

Laser Beam Welding (LBW) stands as an effective and adaptable welding process that employs a focused beam of light to melt and unite metals. A high-powered laser generates a concentrated beam directed onto the weld joint, providing precise control over weld penetration and heat input. This process can be done without or with filler material, depending on the application's requirements.

### Hybrid welding

Hybrid welding combines more than one welding techniques, comprising of laser welding and Gas Tungsten Arc Welding (GTAW) or MIG welding, to synergise their strengths and mitigate their weaknesses. Different welding methods work in harmony, ensuing a precise and stable welding process. Laser welding can offer heat control and metal melting, whilst GTAW or GMAW provide additional filler material and weld pool control. Hybrid welding can thus be employed throughout a broader spectrum of materials and thicknesses, yielding high-quality welds with minimal distortion and porosity.

### Automation in the welding industry

Characterised with the aid of Cyber-Physical Systems (CPS), IoT, cloud computing, cognitive computing and Artificial Intelligence, Industry 4.0 is profoundly impacting the welding industry as well. New welding technologies, driven by AI and precise control, are opening doors in industries that demand top-notch weld quality for the latest and most intricate metals. The industry is set to witness similar strides in safety, quality as it continues to evolve.



### Robotic welding

Robotic welding historically requires huge investments in equipment and training, and has undergone splendid evolution. The advantages are production automation, cost reduction (albeit with high initial costs), consistent quality, decreased exposure to hazardous fumes and radiation, addressing the shortage of skilled welders via operator utilisation, superior flexibility and the prevention of repetitive strain injuries, among others.



## Welding cobots

Welding cobots or collaborative welding robots are designed to complement human welders during the welding process. Equipped with sensors and programming, these robots work in tandem with human welders without the need for safety barriers or enclosures. They help with repetitive or physically demanding aspects of welding, significantly enhancing safety and ergonomics. Advanced sensors allow cobots to detect nearby welders and halt operations to prevent injuries, a characteristic not found in traditional robot welding machines.



## Welding drones

Welding drones or Unmanned Aerial Vehicles (UAVs) are equipped with cameras, sensors and robotic arms to conduct welding duties and inspections. They excel in accessing hard-to-reach or hazardous locations where human welders face the greatest risks. Welding drones enhance safety in industries like oil and gas, where welding tasks are regularly performed in perilous or far-off settings.

## Tailored welder training

Tailored welding training is a personalised program designed to cater to the unique desires of an organisation or individual welder. This training aligns with the demands of the welding industry, presenting opportunities to enhance skills, increase efficiency and productivity and elevate the quality of work. Tailored training can be introduced through numerous means, including classroom instruction, hands-on training and online courses. Moreover, it can be conducted on-site or off-site, tailored to the requirements of the organisation or individual.

## VR/AR welder training

Virtual Reality (VR) and Augmented Reality (AR) welder training leverage state-of-the-art technology to simulate real-world welding scenarios. These immersive experiences allow welders to hone their skills in a controlled, safe environment under professional guidance. VR welder training includes wearing a virtual reality headset that recreates welding scenarios, offering a 360-degree view of the environment. In AR welder training, digital information is overlaid onto the real-world setting, offering instructions, guidance and feedback through mobile devices or smart glasses.

## Clean and safe welding environment

Recent advancements in welding technology, coupled with guidelines from organisations like the American Welding Society and OSHA standards, have paved the way for significant improvements in welder safety and environmental sustainability. These enhancements span various aspects, inclusive of welding processes, materials, equipment and an increased emphasis on training and education. Modern welding applications, such as laser and electron beam welding, function with reduced heat and emissions, resulting in a safer welding environment with diminished harmful particle and toxic gas emissions.

## Reducing emissions

The welding process, with its energy-intensive equipment and waste production, can contribute to Greenhouse Gas (GHG) emissions, exacerbating climate change. Measures and technological advancements designed to mitigate emissions include energy-efficient lighting, waste reduction programs, recycling initiatives, digital transformation, reduced water usage, the installation of solar panels, net-zero carbon plans and power factor correction.

## Conclusion

In conclusion, welding technology continues to evolve, promising a future characterised by heightened safety, superior quality and enhanced sustainability. As the industry progresses, new welding technologies, driven by automation, robotics, data analytics and precise control, are unlocking fresh possibilities for welding applications and the joining of advanced materials. The welding landscape is undergoing a transformative shift, guided by innovation and the pursuit of excellence. These innovations will propel the welding industry into uncharted territories, where science fiction becomes science fact. □



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JD1: High Speed Drill Tap Center



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# Revolutionising precision and efficiency with **CNC technology**

The world of manufacturing is undergoing a profound transformation with the latest developments in CNC (Computer Numerical Control) technology, a field constantly pushing the boundaries of precision, efficiency and productivity. This article explores the cutting-edge innovations in CNC technology that are reshaping the manufacturing landscape, from high-speed machining and multi-axis capabilities to adaptive machining, IoT integration and the incorporation of Artificial Intelligence and Machine Learning.



The ground-breaking technologies available today are driving changes in sectors like aerospace, automotive, medical devices and electronics manufacturing. Additionally, we'll delve into the game-changing role of automation in CNC machines, as robotics, pallet changers and in-process monitoring are taking precision manufacturing to new heights, ushering in an era of enhanced efficiency, reduced human error and elevated productivity. Here's a closer look at the latest developments and their influence on CNC machining:

- **High-speed machining:** One of the noteworthy advancements in CNC technology is high-speed machining. High-speed machining involves significantly increasing cutting speeds and feed rates while maintaining precision. This technology is made possible through improved machine dynamics, more robust tooling and advanced control algorithms. The result is reduced cycle times and improved surface finish, making it a game-changer in industries where time and precision are critical, such as aerospace and automotive manufacturing.

- **Multi-axis machining:** Modern CNC machines now offer multi-axis capabilities, enabling intricate and complex machining tasks. Traditional 3-axis machines are being complemented or replaced by 4, 5 or even more axes. Multi-axis machining allows for the production of highly intricate components in a single setup, reducing error margins and streamlining manufacturing processes. Industries like medical device, aerospace components manufacturing and precision engineering have seen significant benefits from this advancement.

- **Adaptive machining:** CNC technology has evolved to be smarter through adaptive machining. This technology uses real-time data and sensors to adjust cutting parameters dynamically. It can compensate for tool wear, material

variations and environmental factors, ensuring consistent part quality throughout the entire production run. This also helps the mould and die industry, where maintaining precision is paramount.

- **IoT integration:** The integration of CNC machines with the Internet of Things (IoT) has brought about a significant shift in the manufacturing landscape. Real-time monitoring and data analysis enable predictive maintenance, reducing machine downtime and optimising tool life. This technology has benefits across various industries, from automotive to electronics manufacturing, where downtime can be costly.

- **AI and ML:** Artificial Intelligence (AI) and Machine Learning (ML) are increasingly becoming integral components of CNC technology. These cutting-edge capabilities empower machines to autonomously learn from past experiences and fine-tune their processes for optimal performance. By leveraging historical data, CNC machines can adapt dynamically, resulting in significantly improved levels of efficiency and precision. Industries spanning from aerospace to medical manufacturing are harnessing the potential of AI-driven CNC technology to unlock unprecedented levels of automation and precision in their production processes.

## Industries benefiting from advancements

- **Aerospace:** The aerospace industry relies on CNC technology for precision components, and advancements like high-speed machining and multi-axis machining have revolutionised the manufacturing of complex aircraft parts.

- **Automotive:** The automotive sector benefits from reduced cycle times, and AI-driven CNC technology for quality control in engine and transmission component production.



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- **Medical devices:** Multi-axis machining and adaptive machining play a pivotal role in the manufacturing of intricate and precise medical implants and devices.

- **Electronics:** IoT integration and predictive maintenance have streamlined electronics manufacturing, reducing machine downtime and improving production efficiency.

### Automation transforming precision manufacturing

Automation in CNC machines is a game-changing advancement in the manufacturing industry, revolutionising how precision components are produced. These automated systems have brought about increased efficiency, reduced human error and enhanced productivity.

- **Integration of robotics:** One of the most notable aspects of automation in CNC machines is the integration of robotics. Robotic arms and systems are employed to load and unload workpieces, change tools and perform secondary operations such as deburring and inspection. This not only reduces manual labour but also ensures consistent and precise handling of components.

- **Pallet changers and pallet pool:** Pallet changers and workpiece handling systems are vital in automation. They enable the loading and unloading of workpieces, allowing for uninterrupted machining. Pallet changers can prepare the next workpiece while the machine is still processing the current one, minimising idle time. Pallet pool system in CNC machines is a valuable automation solution that optimises manufacturing operations. It enhances productivity, reduces

downtime and minimises the need for manual labour, ultimately contributing to cost-effective and efficient production processes in a variety of industries.

- **In-process monitoring and quality control:** Automation is not limited to the machining process itself but extends to in-process monitoring and quality control. Sensors and measurement devices can be integrated into machines to inspect workpieces as they are being processed. This real-time quality control helps identify and rectify any deviations from specifications immediately.

In conclusion, the latest developments in CNC technology are propelling manufacturing into a new era of precision and efficiency. With high-speed machining, multi-axis capabilities, adaptive machining, IoT integration and the infusion of Artificial Intelligence and Machine Learning, the possibilities for innovation in various industries are limitless. Aerospace, automotive, medical devices and electronics manufacturing are among the sectors reaping the benefits of these advancements, experiencing reduced cycle times, higher precision and streamlined processes. Moreover, the integration of automation in CNC machines, from robotics to pallet changers and in-process monitoring, is transforming the manufacturing landscape, ensuring consistent and precise production while minimising manual labour and human error. As CNC technology continues to evolve, the future of manufacturing looks promising, promising even greater levels of precision, efficiency and productivity across the board. □

*Courtesy: Lakshmi Machine Works*



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The A/C 2-Axis Single-Arm Type Spindle Head can be applied in large 5-axis gantry-type machining centres and large vertical lathes, catering to industries such as aerospace, shipbuilding and mould manufacturing. The product specifications include a Surround braking system and compatibility with various types of tool holders (e.g., BT40, HSK, CAPTO). The 2-Axis Single-Arm Type Spindle Head can find application in general manufacturing processes that require 5-axis machining capabilities. It can be used for machining a wide range of components across various industries, providing flexibility and efficient machining operations. Its design and features make it suitable for specific applications in various industries, such as:



A/C 2-Axis Single-Arm Type Spindle Head

- **Aerospace:** Achieve complex geometries and precise cuts in aerospace
- **Shipbuilding:** Be employed in gantry-type machining centres for shaping ship components, such as propeller blades, ship frames and engine mounts
- **Mould manufacturing:** Produce moulds with high accuracy and surface finish
- **Automotive:** Offer versatility and high-precision machining capabilities for engine components, transmission parts and chassis components

### Multi-Milling and Turning Rotary Spindle

Our Milling and Turning Rotary Spindle is designed with an extremely short 450mm spindle. It is equipped with CTS, CAPTO, HSK-T, and brake. This spindle is suitable for high-end machines such as 5-axis machining centres and mill-turn machining centres, catering to industries such as:



Multi-Milling and Turning Rotary Spindle

- **Aerospace:** Critical for components such as aircraft engine parts, landing gear and structural elements. Produce complex aerospace components with exceptional precision and efficiency.
- **Automotive Industry:** The automotive industry requires precision machining for various parts, including engine components, transmission parts and suspension systems. Utilised in 5-axis machining centres and mill-turn machines to manufacture automotive components accurately and efficiently.
- **General Engineering:** Suitable for general engineering applications where complex machining operations are required. Used in versatile 5-axis machining centres and mill-turn machines to produce components for various industries, including machinery, tooling and equipment manufacturing.

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- **General Manufacturing:** Employed in general manufacturing processes where vertical machining centres or milling & turning machines are utilised. Enables the production of a wide range of components,

such as parts for machinery, equipment, tools and consumer goods.

- **Automotive Industry:** Used in machining centres for producing engine components, transmission parts, chassis components and other automotive parts. Its high-speed capabilities and precision enable efficient machining of complex automotive components.
- **Aerospace Industry:** Requires high-precision machining for manufacturing critical components, including aircraft parts, turbine blades and structural elements. Can be utilised in vertical machining centres to achieve the precision and accuracy needed for aerospace applications.



Milling & Turning  
Direct Drive Spindle

- **Medical Industry:** Precision machining is crucial in the medical industry for manufacturing surgical instruments, orthopaedic implants, medical device components and other medical equipment. Can be used in vertical machining centres or milling & turning machines to produce intricate and precise medical components.
- **Electronics Industry:** High-precision machining for manufacturing electronic components, circuit boards, connectors and other electronic devices needed. Thus, this can be applied in vertical machining centres to achieve the required precision and surface finish for electronic components.

### B/C Rotary Spindle Head (5 axis/ Milling & Turning)

It is suitable for high-end machines such as 5-axis machining centres and small-sized mill-turn machines. It utilises a worm gear drive for robust and stable performance. It supports various tool holders, e.g. BT30, HSK40T, etc. All-around braking system and Coolant through the spindle. It finds application in various industries where complex and multi-axis machining operations are required. Here are some common industries and applications where the B/C Rotary Spindle Head is used:

- **General Manufacturing:** The B/C Rotary Spindle Head finds application in general manufacturing processes where 5-axis machining capabilities are required.

It can be used to machine various components for machinery, equipment, tools, and consumer goods. The multi-axis capabilities of the B/C Rotary Spindle Head provide versatility and flexibility in producing complex parts.



B/C Rotary Spindle Head  
(5 axis/ Milling & Turning)

- **Aerospace:** Employed in 5-axis machining centres to manufacture critical components, such as turbine blades, aircraft structural parts and complex aerospace parts. Its ability to perform simultaneous multi-axis machining enables the production of intricate geometries required in aerospace manufacturing.
- **Automotive:** Utilised in 5-axis machining centres for the automotive industry. Enables the machining of engine components, transmission parts, moulds and complex automotive parts with high precision and efficiency. The versatility and multi-axis capabilities contribute to the manufacturing of complex automotive components.
- **Medical:** In the medical industry, precision machining is vital for manufacturing surgical instruments, implants, and medical device components. Enables the production of intricate and precise medical components with complex geometries.
- **Defence:** This sector often requires complex and precise machining for components used in defence equipment, such as missile systems, armoured vehicles and weaponry. Thus, it is utilised in 5-axis machining centres to manufacture these critical defence components with multi-axis capabilities and high precision in this sector.

From the A/C 2-Axis Single-Arm Type Spindle Head to the B/C Rotary Spindle Head, each product showcases unrivalled precision, reliability and versatility. With MicroLab Precision Technology's unparalleled quality standard, experience the future of machining with our revolutionary spindle solutions. □

*Courtesy: Microlab Precision Technology Co*

# Intelligent manufacturing for **wires and cables**

The Indian wire and cable manufacturing industry finds its applications in industrial, construction, utilities and telecommunication markets. The industry has made headways with the advent of new-age technologies like Artificial Intelligence (AI) and Machine Learning (ML). Here is an assessment of their furtherance so far and the role that Industry 4.0 has played in it.



**Gary Bateman,**

Managing Director,  
LAPP India



The Indian wire and cable industry, a vital component of the manufacturing sector, has been undergoing a transformative journey in the era of Industry 4.0. One of the key aspects driving efficiency and reliability within this industry is the implementation of predictive and preventive maintenance strategies. These strategies leverage advanced technologies to ensure optimal performance, minimise downtime and enhance overall operational excellence.

### Industry 4.0 transformation

Predictive maintenance is an approach that utilises cutting-edge technologies such as the Internet of Things (IoT), Artificial Intelligence (AI) and data analytics to anticipate equipment failures before they occur. In the context of the wire and cable industry, where production machinery and equipment play a pivotal role, predictive maintenance has the potential to revolutionise the way maintenance is conducted. IoT-enabled sensors embedded within the machinery continually gather real-time data regarding various parameters such as temperature, vibration and operating conditions. These data points are then processed by AI algorithms that can identify patterns, anomalies and potential issues. By detecting deviations from the norm, maintenance teams can take pre-emptive action, thereby preventing unplanned downtime and production delays. For instance, if a cable extrusion machine begins to exhibit irregular vibrations, AI algorithms can analyse historical data and patterns to identify a possible impending bearing failure. Maintenance teams can then schedule a targeted intervention before the equipment breaks down, avoiding costly downtime and ensuring consistent production output.

### Predictive and Preventive Maintenance

While predictive maintenance focuses on real-time data analysis, preventive maintenance is a systematic approach that involves scheduled inspections, servicing and parts replacement. The goal is to prevent wear and tear from reaching a critical point and causing disruptions. In the wire and cable industry, this approach translates to prolonged equipment lifecycles and enhanced operational reliability. Regular servicing of cable insulation and extrusion machines, for example, can prevent issues like overheating or material inconsistency. This not only ensures the quality of the end product but also minimises the risk of breakdowns during critical production runs. Moreover, scheduled lubrication and calibration of equipment contribute to maintaining consistent performance levels, ultimately reducing the likelihood of defects and rework.

In the context of Industry 4.0, the integration of predictive and preventive maintenance goes hand in hand with the broader principles of automation and intelligent data utilisation. The wire and cable industry in India is experiencing a paradigm shift as automated production lines become commonplace, enabling higher precision and efficiency. These automated systems generate a wealth of operational data, which, when analysed, can provide insights into the health and performance of various equipment components. By employing machine learning algorithms, manufacturers can identify correlations between specific operating conditions and the onset of equipment issues. Maintenance schedules can be optimised, minimising downtime while extending the lifespan of machinery.



### Indian wire industry

Implementing predictive and preventive maintenance in the Indian wire and cable industry does come with its set of challenges. The integration of IoT devices and AI algorithms requires a significant upfront investment in terms of technology and personnel.

The adoption of these strategies under the umbrella of Industry 4.0 represents a leap forward in terms of efficiency, reliability and competitiveness. As the industry continues to evolve, collaboration between manufacturers, technology providers and research institutions will play a pivotal role in refining these strategies and customising them to the unique challenges of the Indian context. By embracing these transformative approaches, the wire and cable industry is poised to pave the way for a future where downtime is minimised, productivity is maximised and quality remains uncompromised. □



# DFM: Simulating the manufacturing environment

The article looks at DFM specifically from the perspective of adoption and application in an Industry 4.0 scenario



**Vivek Acharya**  
Industry Expert

**D**esign for Manufacture (DFM) is a set of principles and practices used in product design to optimise the manufacturing process. The goal of DFM is to design products that are not only functional and aesthetically pleasing but also easy and cost-effective to produce.

### Getting into a detailed design

In the older paradigm, product designs were focused on product functionality and cost optimisation. However, most companies soon realised that gains in the functionality and cost reduction were often more than offset by the increased cost of manufacture, assembly and maintenance. Hence, organisations started to feed information on the capabilities and capacities of key processes up the chain to enable designers build the manufacturing approach into a detailed design.

This could be in the form of tolerancing, surface roughness, hardness and multiple other factors. Although the factors that could be considered while designing a component in this manner could be practically endless in its variability and uncertainty, companies have taken a balanced approach to enable optimal manufacturability while avoiding decision paralysis. The challenge for the adoption of DFM lies not only in determining how far one should go in accommodating manufacturing considerations into a design but also with dealing with the highly volatile vendor and partner relationships which are critical in most manufacturing value chains.

### Customised components

A typical product can be broadly broken down into three types of components that would be required. Standard components that can be procured off the shelf. Customised components that require extensive processing often starting with basic raw materials. The third would be semi-customised components that require minor processing before being ready for assembly.

As the global manufacturing environment increasingly focuses manufacturing close to the point of consumption, the balance of the mix of these components will need to shift away from customised components. Customised components often require specialised tooling, jigs, fixture, measurement, testing and assembly equipment. These costs make their usage prohibitively expensive in a distributed manufacturing environment.

Many products today have been able to achieve a high degree of platform and component overlap reducing not just the inventory and development costs but also dropping the QC and maintenance costs at the same time. Products previously considered the domain of large capital-intensive

environments are now being invaded by leaner production units especially with the upcoming smart and adaptable platforms being developed which can support entire families of products rather than just exclusively one or two products as was previously the case.

A good example of this phenomenon are likely to be EVs, where a variety of body types can be mounted on the same platform to have sedans, hatchbacks, estates etc. being made on the same assembly line with the variations being adjusted without any significant modification.



### All about DFM principles

The foundations of this future will need to be based strongly in the intelligent use of DFM principles. Engineers will increasingly need to take a holistic view of the production order to design a product that can be manufactured across a wide range of manufacturing facilities across the globe. This may sometime lead to slightly sub-optimal user experience in some product categories. But the gains in efficiency, price, ease of maintenance and upgrade are likely to more than offset these perceived performance losses in a particular expectation.

The development of highly sophisticated design and manufacturing software which can simulate the manufacturing environments allows designers to bring the principle to life. Applications developed by most top modelling and simulation software coders have already achieved a level of user-friendliness and flexibility previously thought of as a distant dream. When combined with the state-of-the-art machine tools that can offer a fleet of processes at the users fingertips, this presents itself as a potent albeit expensive solution to the challenge.



DFM would also play a significant role in reducing the product development and launch cycle-time. As we have seen over the last few years, product development times have been shortening. However, development times combined with obsolescence risk is still a key risk factor for most companies when planning their portfolios. The sheer uncertainty and flux in the current geopolitical, energy and climate landscape has caused a constant stream of legal and other disruptions to occur. These disruptions can make well thought out and carefully executed plans to appear myopic in the blink of an eye. The flexibility offered by strong DFM application combined with flexible manufacturing can significantly reduce the risks associated with the development and launch of new products.



## Benefits of DFM

DFM offers an opportunity for companies to push the envelope on several key performance factors, such as:

- **Cost reduction:** Identifying and eliminating potential manufacturing issues early in the design phase.
- **Efficient resource utilisation:** Optimising designs for manufacturability helps minimise material waste, reduce energy consumption and improve resource utilisation.
- **Faster time-to-market:** DFM, integrated with Industry 4.0, enables rapid prototyping and real-time design iteration, allowing for quicker development and market entry.
- **Customisation and mass personalisation:** DFM supports the design of products that can be easily customised to meet specific customer needs while maintaining efficiency in production.
- **Enhanced quality and reliability:** DFM helps identify potential defects or weaknesses in the design, leading to improved product quality and reliability.
- **Data-driven decision-making:** Industry 4.0 provides a wealth of data on manufacturing processes and product performance. DFM leverages this data to make informed design decisions, optimising for both production efficiency and product quality.
- **Collaborative design:** DFM in Industry 4.0 encourages cross-functional collaboration, enabling design teams to work seamlessly with manufacturing, supply chain and quality control teams. This results in more well-rounded and manufacturable designs.
- **Flexibility and adaptability:** DFM allows the design of products that can be easily adapted to changing market demands, enabling manufacturers to respond quickly to customer needs and market trends.
- **Reduction of manufacturing errors:** DFM helps prevent errors in production by designing parts and assemblies that are easier to manufacture and assemble correctly the first time.
- **Sustainability:** DFM aligns with sustainability goals by designing eco-friendly products.
- **Predictive maintenance:** DFM can result in products that are easier to maintain and service. Thus, it is easier to reduce downtime and enhance overall product lifecycle management with IoT integration and real-time analysis for any predictive and preventative maintenance.
- **Improved supply chain integration:** DFM helps align product designs with the capabilities and constraints of the supply chain, optimising sourcing, production scheduling and transportation.
- **Cybersecurity:** In Industry 4.0, cybersecurity is essential. DFM includes security measures to protect sensitive design and manufacturing data from cyber threats, ensuring data integrity and intellectual property protection.
- **Real-time iteration and optimisation:** DFM integrated with Industry 4.0 allows for real-time design changes and optimisations based on data and feedback from the production process, contributing to continuous improvement.
- **Enhanced competitiveness:** By reducing costs, improving quality and enabling quick responses to market changes, DFM in Industry 4.0 helps manufacturers remain competitive in a rapidly evolving business environment.

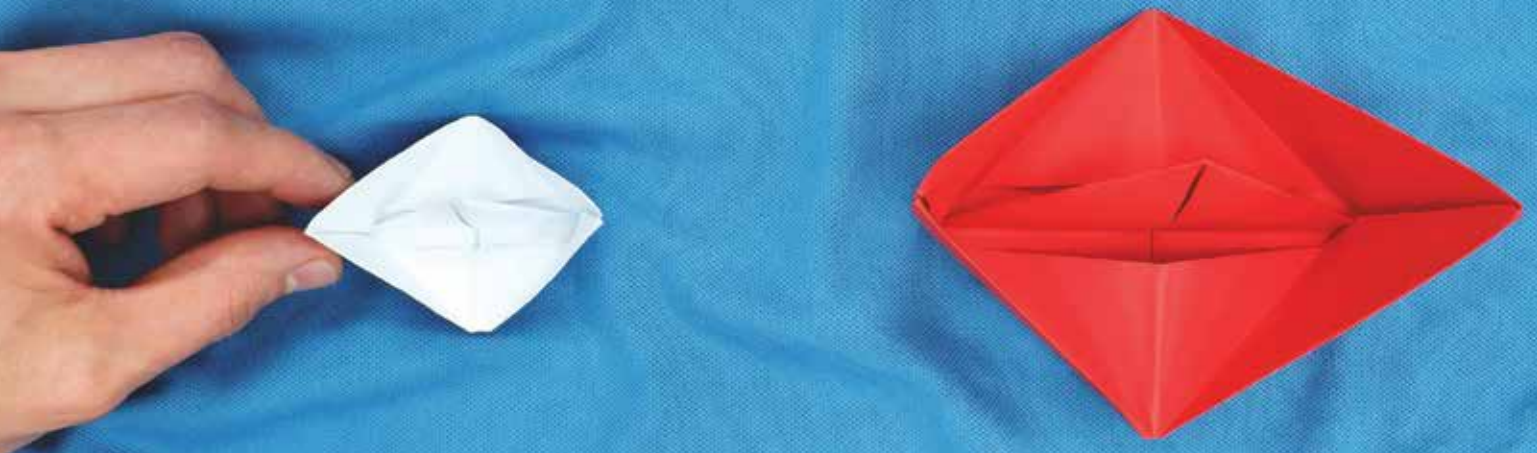
It is increasingly incumbent on manufacturers to whittle down waste in every form throughout the manufacturing process. In a highly globalised economy with the design, manufacture, assembly and deployment of the equipment spanning practically the entire globe in many cases, DFM is likely to continue its position as a key lever that companies have to optimise their process chains. □

# Unravelling the hurdles for MSMEs in India



**Dhanish Goyal,**  
Founder and CEO,  
Grownet

Micro, Small and Medium Enterprises (MSMEs) are the backbone of the Indian economy, playing a crucial role in job creation, fostering innovation and driving overall economic growth. Here is a brief overview of the challenges that MSMEs today face...



**M**SMEs make a significant contribution to the country's GDP and employment generation. However, despite their importance, MSMEs in India face numerous challenges that hinder their growth and sustainability, necessitating a more detailed exploration of each obstacle and potential solutions.

### Limited financial access

One of the primary challenges faced by MSMEs is limited financial access. Traditional lenders often perceive MSMEs as high-risk borrowers, resulting in a lack of credit availability. These businesses encounter difficulties in meeting collateral requirements, navigating complex loan procedures and contending with high-interest rates.



Consequently, MSMEs, particularly those in the informal sector, face significant challenges in investing in technology, infrastructure and skilled labour. Additionally, there is a lack of knowledge and information among MSMEs about the various loan instruments available and the importance of financial discipline.

To address this challenge, the Indian government has launched initiatives such as the Pradhan Mantri MUDRA Yojana and the Credit Guarantee Fund Trust for Micro and Small Enterprises. Through these initiatives, MSMEs have gained easier access to credit and loans without collateral. The Pradhan Mantri MUDRA Yojana offers loans up to a specific limit without the need for collateral, focusing on microenterprises. The Credit Guarantee Fund Trust for Micro and Small Enterprises provides guarantees to banks and financial institutions to encourage them to extend

credit to MSMEs. These initiatives have helped reduce the barriers to financial access and provided the necessary support for MSMEs to grow and thrive.

Furthermore, encouraging co-operation between established financial institutions and fintech companies can leverage technology to create cutting-edge financial products specifically designed to meet the needs of MSMEs. Fintech solutions such as digital lending platforms and online marketplaces enable MSMEs to access credit more conveniently and at competitive rates. These platforms utilise alternative data sources and innovative algorithms to assess creditworthiness, reducing the reliance on traditional collateral-based assessments. By embracing such technological advancements, MSMEs can overcome the limitations of traditional banking systems and access the funds necessary for expansion and development.

### Inadequate technology adoption

In addition to financial access, inadequate technology adoption poses another significant challenge for MSMEs. Many MSMEs in India continue to rely on outdated techniques and equipment, resulting in decreased productivity, inefficiency and reduced competitiveness. The high costs associated with technology acquisition, coupled with a lack of awareness about the benefits of digitisation, discourage MSMEs from adopting technological advancements. Moreover, MSMEs often lack the resources and capacity to invest in R&D or explore emerging technologies that could enhance their operations.

To address this challenge, government programmes like the Make in India programme and the Digital India campaign foster a supportive environment to encourage MSMEs to adopt modern technologies. The Make in India programme aims to transform India into a global manufacturing hub by promoting investment, enhancing skill development and facilitating technology acquisition. The Digital India campaign seeks to digitally empower citizens and businesses across the nation, creating a conducive ecosystem for the adoption of digital technologies.

In addition to government initiatives, establishing technology incubation centres can provide MSMEs with access to resources, mentoring and technical expertise. These centres serve as platforms for collaboration and knowledge sharing, allowing MSMEs to learn from industry experts and explore new technologies. Industry-academia collaborations play a vital role in this regard, enabling MSMEs to tap into the research capabilities of academic institutions and leverage their expertise in areas such as product development, process optimisation and technology integration.



Furthermore, holding workshops and training programmes can enhance MSMEs' understanding of the potential advantages of technology and improve their capacity to integrate it into their operations. These programmes can focus on topics like digital transformation, automation, data analytics and cybersecurity. Equipping MSMEs with the knowledge and skills needed to embrace technological advancements, they can enhance their competitiveness and productivity, paving the way for sustained and consistent growth and success.

## Limited market access

Limited market access and global competitiveness pose additional challenges for MSMEs in India. Many of these businesses struggle to expand their reach into new markets, both domestically and internationally, due to a lack of market intelligence, insufficient marketing resources and difficulties adhering to regulatory requirements. These factors limit their ability to grow their customer base, explore new opportunities and compete effectively in the global marketplace.

The Indian government has implemented initiatives to increase MSMEs' access to the market and enhance their competitiveness. For instance, the Udyog Aadhaar Memorandum simplifies the registration process for MSMEs, making it easier for them to participate in government procurement and access market opportunities. The Single Point Registration Scheme of the National Small Industries Corporation assists MSMEs in submitting bids for government contracts, providing them with valuable exposure and potential business opportunities.

Moreover, supporting cluster-based development can enable MSMEs to pool resources, collaborate and leverage collective strengths. Clusters bring together geographically concentrated businesses operating in the same sector or related industries. By fostering collaboration and knowledge sharing within clusters, MSMEs can enhance their market access, optimise their supply chains and improve their overall competitiveness.

## Shortage of skilled labour

Businesses often struggle to recruit and retain skilled workers, particularly in fields requiring technical expertise. The gap between industry requirements and the skills possessed by the workforce hinders the growth and development of MSMEs. The limited accessibility of appropriate vocational education and skill development programmes exacerbates this problem.

To address the skilled labour shortage, collaboration between businesses and educational institutions is crucial.

MSMEs can partner with universities and other higher education institutions to design programmes that align with business needs and equip students with the required skills. Collaborations between prominent industrial players and academic bodies can take various forms, including curriculum development, apprenticeship programmes, internships, research teams and guest lectures, enabling MSMEs to directly influence the skill development process, ensuring that recent graduates possess the necessary knowledge and competencies.



Government initiatives like the Pradhan Mantri Kaushal Vikas Yojana and the Skill India Mission aim to bridge the skill gap by offering training programs in various sectors, including those relevant to MSMEs. Additionally, by facilitating campus placements for MSMEs, skilled labour can be directly connected to these businesses according to their unique requirements.

## In summary...

MSMEs are integral to India's economic growth, innovation and job creation. However, they face several challenges that hinder their progress. By addressing the obstacles related to limited financial access, inadequate technology adoption, constrained market access and a skilled-labour shortage, India can strengthen its MSME sector and unlock its full potential. Coordinated efforts among government programmes, industry partnerships, educational institutions and policy measures are necessary to create a supportive environment for MSMEs. Empowering MSMEs will not only benefit these businesses but also contribute to the overall growth and prosperity of the country. By recognising and resolving these challenges, India can build a vibrant and resilient MSME sector that drives sustainable economic development for years to come. □

## HP pumps with fluid handling technology and versatile applications

**Kirloskar Brothers** recently announced the launch of their latest innovation, the ANIIKA-I and ANISA-I, 1 HP mini-series pumps. These state-of-the-art pumps mark a significant advancement in fluid handling technology, catering to the diverse needs of industries and households alike. The ANIIKA-I and



ANIIKA-I and ANISA-I, 1 HP mini-series pumps

ANISA-I pumps offer a host of key features that set them apart in the fluid management landscape. With a superior Cathodic Electro-deposited (CED) coating, these

pumps ensure unmatched corrosion resistance and durability in challenging environments. Operating seamlessly across a wide voltage range, they guarantee consistent performance, even in areas with fluctuating power supplies. Safety is prioritised through the integration of a Thermal Overload Protector, preventing overheating and ensuring long-lasting durability. Additionally, these pumps prioritise safety with robust casing and secure fittings, providing user and infrastructure protection. Moreover, the pump has the capacity to function with comparatively lower noise levels.

Kirloskar Brothers | Pune

## Water soluble fluid for magnesium & aluminium machining

**MotulTech India** recently released STABILIS 9827 MG which is a high-performance water-soluble mineral oil-based cooling lubricant suitable for machining magnesium, aluminum and their alloys such as 2024, 6061, 6082, 7075. The product is suitable for the processing of yellow metals. It can also be used for general machining of medium-duty steel alloys, as well as mild carbon steel and cast iron.



STABILIS 9827 MG

### Key benefits:

- Suitable for processing magnesium.
- Multi-metal machining emulsion.
- Water hardness stability up to 2600 ppm.
- Free of FRA and boric acid.
- pH-stable product emulsion.
- Polar lubricity enhancers make it possible to machine aluminium.
- Reduced tool wear

MotulTech India | Mumbai

## Xill-tec®: Powerful milling in a plug-and-play solution

**Walter** rounds off its range of solid carbide universal milling cutters. With the Xill-tec® MC230 and MC233 Advance milling cutters, Walter already introduced two ranges of solid carbide milling cutters that are powerful and can be used universally for all ISO materials from groups P, M, K, N and S, as



Xill-tec® MC230 & MC233 Advance

well as for all standard roughing and finishing applications and milling strategies. As part of a second launch stage, the Tübingen-based tool manufacturer is now rounding off its range with Xill-tec® two-edge and eight-edge milling cutters, offering diameters between 2 mm and 25 mm and cutting lengths from 1 to 5 × Dc. With these long cutting lengths, Walter is embracing the trend for dynamic milling as a standard application in the universal range.

One of its major advantages is that the entire tool length can be used, with accordingly high material removal rates. There are also various geometries, each developed for a particular application, material or machining strategy. The Xill-tec® MC230 Advance basic range also sees the addition of new Xill-tec® milling cutters from the MC233 Advance range. These are designed with chip breakers and are therefore suitable for high chip volumes.

Walter Tools India | Pune

## Large-style horizontal machining center

**Mac Cision** has introduced various large-style horizontal machining centers, including standard four-axis, five-axis and six-axis (five-linkage) horizontal machining centers with various 5-axis head functions. The company has over 20 years of experience in developing and researching the machining centre. Providing customers with the best quality service and technology is their business philosophy. The products of the company are mainly used for general machinery, petroleum machinery, vehicles, aerospace and other industries. They work for multi-machinings such as milling



Horizontal Machining centers

planes, bushing holes, internal and external end faces, drilling and tapping, and meet higher accuracy for processing cases and tubes. The features of the machines are high rigidity, high precision, high reliability, easy operation and high production efficiency. They are equipped with NC systems that satisfy the processing of various parts and achieve high-speed, flexible and modular production.

Mac Cision | Taiwan

## Innovation leader and expert in individual welding solutions

**Fronius** recently exhibited future-proof and profitable welding solutions for manual work, series production and automation under the motto 'Unleash your welding potential' at the SCHWEISSEN & SCHNEIDEN trade fair in Essen. The Austrian welding expert also presented its most recent digital welding products. These ensure that novice welders and professionals can work easily and safely and always achieve good-quality results.

- **Welducation Simulator:** This simulator uses Augmented Reality (AR) to provide apprentices with amazingly realistic training. It also offers a safe learning environment without heat, welding fumes or flash burns, and does not use any training material. The WeldCube Navigator, on the contrary, helps in reducing the complexity of the welding tasks in production. Step by step, it guides the welder through the work sequence for a component and uses appropriate default settings to ensure that the work steps are carried out correctly and in accordance with the standards. Rework and rejects are thus avoided, and efficiency is improved.

- **The TIG Experience Box visitor magnet:** TIG welding provides a solution for the top-tier welding process. With the TIG DynamicWire Welding Package for the iWave, even novices will easily achieve TIG seams like a pro in no time.

Harald Scherleitner, Director, Sales and Marketing, Perfect Welding, Fronius International GmbH, said, "This year, we presented our extensive automation portfolio at the trade fair for the first time. The highlight was the huge, robotic welding cell at the centre of our stand. The two



cobot cells and the FCW Smart circular seam welding system, in which the new iWave has been integrated for the first time, also attracted a lot of attention. Our automation solutions are able to deliver a tailor-made complete package from a single source, which greatly benefits our customers".

The Fronius Pathfinder programming and simulation software was also a highlight at the trade fair, which gives significant efficiency in manufacturing by programming welding processes offline. Welding specialists can prepare what is required next in manufacturing in parallel on the digital twin. The software even detects axis limits, calculates start and end points and approach paths and independently sets positioning points. With ArcView 2.0, the specialist welders then have a direct view of the arc and the welding quality during the welding process. This is made possible by serial camera shots that allow the arc to be monitored in real-time.

The extraction performance of the new mobile Exento extraction devices, LowVac and HighVac, could be judged at all the live welding stations. Many also tested how comfortable it feels to hold the ergonomically shaped and well-balanced high-performance torches or the new Exento fume extraction torch. Fronius showcased all its safety equipment, from the Bluetooth-enabled high-tech welding helmet with a fresh-air supply to the air-purifying respirator. In one of the daily live-stage presentations, experts explained the importance of welding fume prevention and employee health.

In addition to this, the welding technology supplier provided initial insights into the brand-new compact and mobile powerhouses for manual welding—the Fronius Artis, a TIG welding system, and Fronius Ignis, for manual arc welding.





# Highlights – December 2023



## » Industrial equipment

The industrial equipment market is a driving force behind manufacturing efficiency, providing the tools and machinery essential for various production processes. Advancements in materials, design and automation have fuelled this industry's growth, shaping the way factories operate. In our upcoming issue, we will delve into the industrial equipment sector, offering a comprehensive view of the latest developments and innovations that are transforming the landscape of discrete manufacturing.



## » Industrial cleaning

Industrial cleaning technology plays a crucial role in maintaining the integrity of manufacturing processes, from precision cleaning of components to ensuring a safe and hygienic working environment. This section will highlight the latest breakthroughs in industrial cleaning technology, providing valuable insights into how these advancements are streamlining production and contributing to sustainability goals.

## » Air quality inside the plant

Maintaining air quality within manufacturing plants is vital for both employee health and the longevity of equipment. In our upcoming issue, we will explore the technologies that are reshaping air quality control in industrial settings, showcasing their significance in creating safer and more productive work environments.



## » AI and Big Data in manufacturing

AI and Big Data are revolutionising manufacturing by optimising processes, predicting maintenance needs and enhancing quality control. These technologies are driving Industry 4.0, creating smart factories with data-driven decision-making. In a special feature, we will provide an in-depth exploration of how AI and Big Data are transforming the manufacturing landscape, making this an essential read for those looking to stay informed about the future of manufacturing processes.



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# Modular Swiss-Type Turning Holder

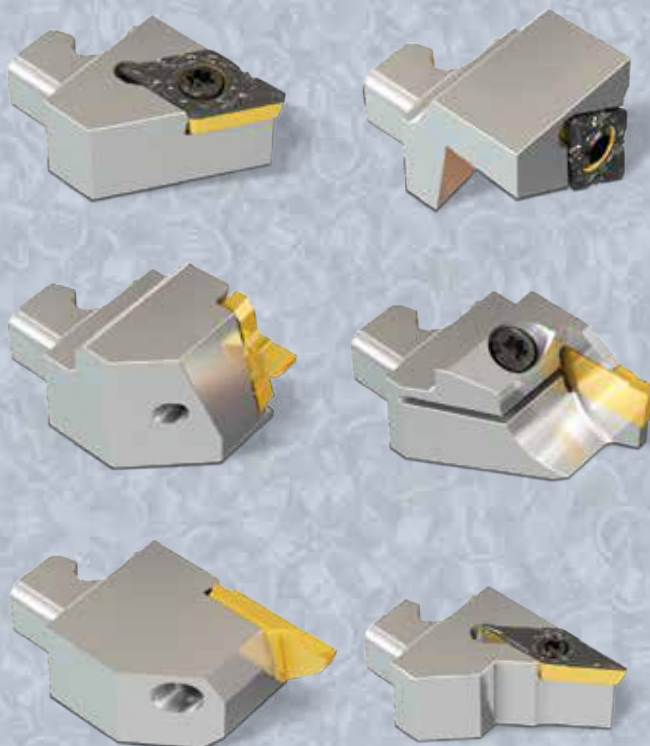
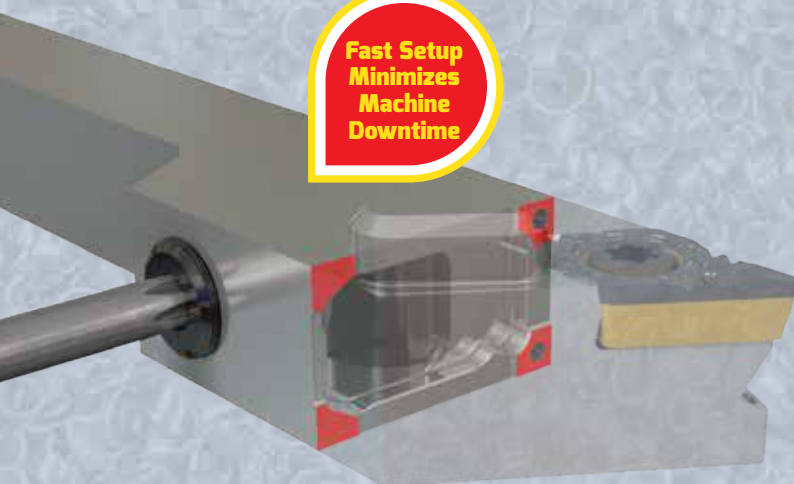
**NEOSWISS**  
INDEXABLE HEADS

New System for Swiss-Type  
Turning Machines with  
**Quick-Change Heads.**  
Features Minimum Setup Time.



**Rotary Wedge Mechanism**  
Designed to Amplify  
the Clamping Force for  
a Rigid Connection

**Fast Setup  
Minimizes  
Machine  
Downtime**



A Variety of **Right**  
and **Left** Heads  
Can Be Mounted on  
the **Same Shank**



# Tiger-tec® Gold Go for better, go for Gold.


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**For those who won't settle for anything but the best: Tiger-tec® Gold**

If you had to make a choice right now – between maximum tool life, uncompromising process reliability and optimum productivity – which one would you pick? Why not choose the freedom to never have to choose again. Stay true to your own high standards in every way. Choose Tigertec® Gold.

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