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INDIA 2022

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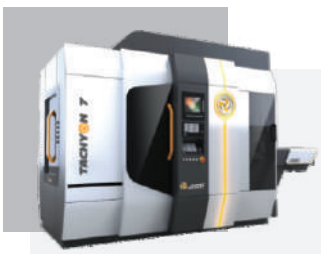

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The automotive industry has evolved in the last decade and the future holds so much more

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What does the future hold?

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A&D INDIA AUTOMATION & DIGITISATION

EM EFFICIENT MANUFACTURING

"COVID-19 has presented a reset for the industry; the industry has to strive not only to be innovative but also sustainable for long-term growth and contribution"

Reset, collaborate, take off!

In 2009, when we published the first issue of EM, the world was just coming out of the throes of the 2008 financial crisis. And today, as we approach our 12th anniversary, we are witnessing a possible end of an unsparing pandemic.

Now that COVID has presented a reset for the industry, experts are expecting manufacturing to take off again. While the fourth industrial revolution was just a discussion back in 2009, we saw it turn into a pillar that kept the industry going when the pandemic struck. According to Fortune Business Insight, the Industry 4.0 market will see a CAGR of 16.4% between 2021-2028 and grow from a $116.14 billion market in 2021 to $337.10 billion in 2028. As we step into the future of manufacturing, the industry has to not only strive to be innovative but also sustainable for long-term growth and contribution to India's economy.

Today, as EM completes 12 years of bringing to you information on the best of what the industry has to offer, we would like to extend our heartiest thanks to all those who supported us in the journey to our success – our advertisers, contributors, advisory board members, partners and most importantly, our readers. While India is at the cusp of transformation, our anniversary edition Cover Story is a take on how India's secondary sectors – manufacturing and energy – are resetting themselves in 2022 and its contribution to the growth of India's dream of becoming a superpower. In the story, we bring responses from prominent industry people from the automotive, renewable energy and aerospace & defence sectors.

Just like the manufacturing industry, we, too, plan on resetting ourselves to be a part of the onward and upward journey of the sector. Our EM's November edition comes packed with thought-provoking conversations, insightful articles and interesting stories on new technologies. I hope you will find the content informative and interesting!

Please do write to us with your comments and feedback!

Anvita Pillai
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AUTOMOTIVE MANUFACTURING

Implementing efficient engineering in automotive manufacturing

COMMENTS & COMMENTARY

Raghavendra Mirji,
SENIOR VICE PRESIDENT & HEAD,
POWER INFRA, RENEWABLE ENERGY &
BUSDUCT BUSINESS,
GODREJ & BOYCE

The energy sector is one of the most crucial infrastructure components for the economic growth and welfare of nations. While the transmission sector showed steady growth over the past years, barring the exception of the pandemic in FY 2020-21, the power sector has witnessed some ups. With further investment plans, the sector is said to experience promising growth in the future. Amendments on policy reforms like the Electricity Act amendments & the tariff policy will improve the sector enormously. Here are some significant trends that will act as a growth driver for the energy sector:

- **Development in technology:** Despite various issues in the power sector, like power cuts, network issues, loss, etc, the sector has seen a massive transformation in the time of need. The wake of the pandemic has proved to be a force of emerging technological developments with the implementation of smart technologies like an evolved grid system, smart metering, going digital for systems for smart & efficient work and building a new process for smooth processing.
- **Focus on amendments in policy:** While there are many fantastic policies like UDAY, Power of All, UJALA, and a few others that changed the industry viewpoint, newer policy reforms, like digital mechanisms, electricity amendment bill, are set to bring a massive change in the sector. The government has started implementing the reform initiatives like privatisation of DISCOMs in union territories in anticipation of dynamic results.
- **Green energy:** India aims at increasing its RE share to 40% of the total generation by 2030. Renewable energy is the trend with new capacity additions of 500 GW by 2030. There are many steps taken to make less hazardous plans for nature; for example, the demand for EVs is increasing rapidly, which will eventually increase the demand for power consumption.
- **Foreign investments:** Looking at the past few years of slow growth in addition to the pandemic, the government pushed its boundaries to accelerate growth by allowing private participation. This step is huge and success in the business may also attract foreign investments, which will boost the growth.

"LOOKING AT THE SLOW GROWTH IN RE, THE GOVERNMENT PUSHED ITS BOUNDARIES TO ACCELERATE GROWTH BY ALLOWING PRIVATE PARTICIPATION"

Just as the power sector in India is diversified sourcing from conventional to non-conventional sources, the electricity demand has massively increased. This has given rise to the demand for renewable energy sources in the last five years. Solar energy and wind energy are on the top in contributing to the total energy consumption.

The future of power and renewable energy is bright because of the advancements and efforts to improve quality and efficiency. Though innovative advancements have been proposed, there is a lot of scope for more. Right from opportunities for power in railways to using modernised technology in renewable energy, we have a lot of new developments to look forward to. New plans for the smart city across the nation have bought many opportunities to innovate. The makers are also looking for nature-friendly options to create energy. For instance, using non-conventional sources of energy with advanced technology is remarkable. Therefore, we can expect a noticeable double-digit growth in the energy sector. □


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6 HIGHLIGHTS

MoUs, events, collaboration: a lot has happened in the manufacturing sector this past month. Among other things, the USA became the 101st member country of ISA, and Crown Goup entered into a partnership with Spherea. Meanwhile, Schaeffler has developed new technologies for industrialisation of hydrogen production and Hitachi energy advanced its mission for clean, reliable energy in India. Lastly, Roboze equipped its 3D printer with B&R's automation solution, and Markforged introduced its new 3D printer & proprietary materials.

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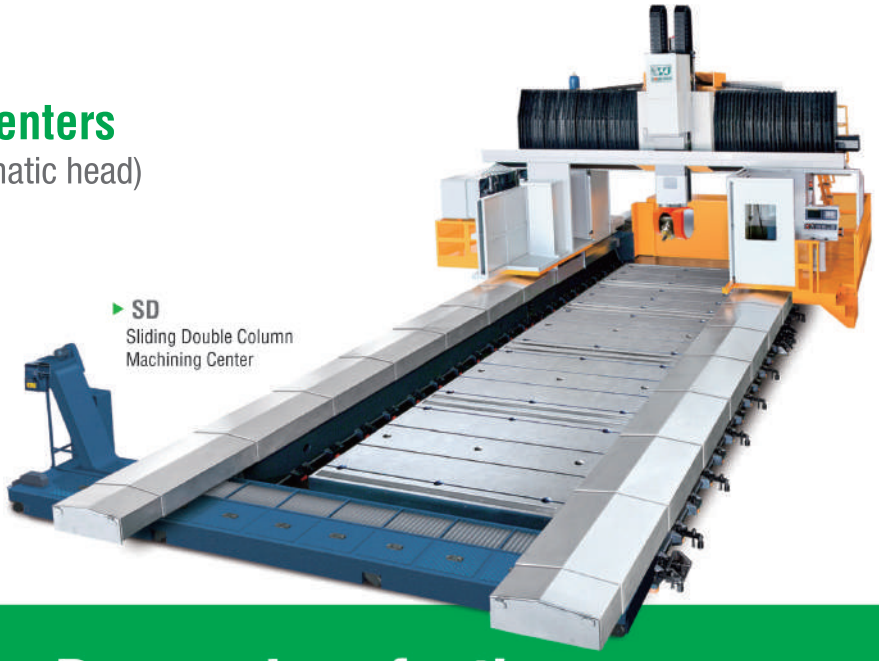

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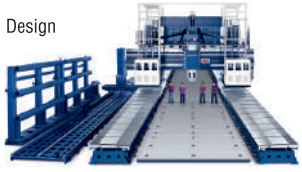

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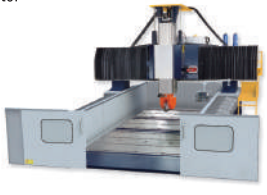

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International Solar Alliance has the USA as its 101st member country

In a big boost to accelerate global adoption of solar energy, John Kerry, US Special Presidential Envoy for Climate recently announced at the UNFCCC COP26 that the USA has joined the International Solar Alliance (ISA) as a member country.

Read more: https://bit.ly/3oFwGjV

1

Crown Group partners with Spherea for joint development & deployment

As part of the MoU, the entities will jointly develop and market various solutions for the Indian Airforce and Navy under the 'Make in India' framework.

Read more: https://bit.ly/31V7deu

2

Schaeffler develops technologies for the industrialisation

The sub-project 'Stack Scale up – Industrializing PEM Electrolysis' of the H2Giga hydrogen flagship project aims to develop new, scalable technologies & production processes for PEM-low-temperature electrolysis stacks.

Read more: https://bit.ly/31LAlPG

3

Hitachi Energy power technology will advance to bring reliable & clean power

Powering the hydroelectric project in J&K constituting a 548 feet tall concrete-face rockfill dam is expected to enhance the region's power generation capacity

Read more: https://bit.ly/3kvZ4n2

4

Roboze with an advanced B&R automation solution equips 3D Printing

Roboze has equipped its 3D printer, ARGO 500, with an advanced B&R automation solution. It reduces lead time and lowers the cost of creating custom metal replacement components used under extreme conditions in industries.

Read more: https://bit.ly/3n9J4sB

5

Markforged introduces FX20 and ULTEM™ 9085 filament

The new 3D printer and proprietary materials increase Markforged's addressable market for bigger, faster, stronger and heat resistant parts

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Why Gen Z is an asset to the manufacturing industry

Juili Eklahare, Assistant Editor

The manufacturing industry is in a challenging phase and manufacturers must produce a work atmosphere which appeals to, involves and preserves the future workforce. Generation Z, which includes people born after 1996, is set to make up the majority of the workforce for the next 30 years. According to a recent survey by Parsable, Gen Z's view of the manufacturing industry has become more optimistic because of COVID-19.

As we all must know, 'The Great Resignation' is happening for real, and is having long-term effects on organisations far and wide. Where Gen Z is at a point of stepping into the workforce in multitudes, manufacturers cannot afford to miss the chance to draw this high-demand talent. What's more, Gen Z will be the least affected by the skills gap; in fact, it will play a principal part in closing the gap. It has also been shown that the millennial generation is less fascinated by the manufacturing sector than Gen Z. Millennials have a general insight that manufacturing is outdated, while Gen Z happens to believe that the industry is 'cool'.

Gen Z (which is the digital generation) workers are important to the manufacturing industry's capability to prosper in the post-pandemic economy. By being more appreciative of and taking on their strengths, manufacturers can generate top performers, providing exciting career prospects and enhancing output all through the complete organisation and presenting companies a competitive plus in a teeming talent marketplace.

This generation grew up with technology, away from paper, scrolling through Instagram & TikTok. Therefore, manufacturing companies need to augment their hiring and training with virtual platforms. They should allow Gen Z to share their technical abilities with older workers, which can also generate new peer networks. Manufacturers can bring about mentorship and job shadowing programmes for Gen Z employees to work beside older generations of qualified workers. This will boost the passage of know-how, while driving the motivations of the boomer workforce (who like teaching) and Gen Z (who have the thirst to learn).

Gen Z is more at ease with and expects fast digital change and innovation in the workplace, which is beneficial to the company & manufacturing industry alike. They not only know technology but depend on it. Industry 4.0 is not just about technology, it is also about efficiency leveraged through technology. While manufacturing gets closer to digital, AI and IoT, it is essential to use these to make Gen Z more suitable for the workforce.

The potential in Gen Z is vast and the manufacturing sector is all the time more bringing in stirring technology-enabled roles, which is apt for this tech savvy generation. It is vital for India's manufacturing sector to address the collective challenge of Industry 4.0 and Gen Z and change it into an extraordinary scope.

INDIA 2022

Contribution of secondary sectors in building the country

India is at the threshold of transformation as it recuperates from the side effect of the pandemic. EM's 12th anniversary Cover Story brings to fore its discussion with industry stalwarts from aerospace & defence, automotive and renewable energy sectors, on how these secondary sectors are going to be the game changers and how it plans on providing an impetus to India's trillion-dollar dream.

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"India becoming an aerospace hub is inevitable, but the question remains, when?"

"Demand for cost optimisation and digital solutions will be the key growth drivers"

Kaushal Jadia,
Senior VP and Global Head – Transportation (A&D and Rail) Business, Cyient

The pandemic period has been a particularly odd time. How has the A&D sector fared in the past year in your opinion? As an example, can you elaborate on how your organisation adapted to the industry low falls?
In many ways, the pandemic accelerated trends that we had already seen developing. However, with the A&D sector being risk-averse, the technologies that enabled these goals were nascent and yet to be proven at scale, so there was reluctance for widespread adoption. However, the pandemic sending shockwaves through the system, highlighted a need to control costs and better manage supply chains. Cyient recognised these demands early on and invested and restructured to better take advantage of the shift in demand.

There is a forecast of India becoming the global aerospace hub. Your opinion? How can the government aid company, such as yours, in the journey?
India becoming an aerospace hub is inevitable, but the question remains, when? Given the impacts of COVID on world travel, we believe that the government should look beyond large scale, global travel and seek to support growth in more regional operations, tangential markets (eg, urban air mobility) and provide incentives to small- & mid-sized Indian firms to better compete for components and systems for the next generation of aircraft that will be developed over the next decade.

Unmanned aircrafts are a hot topic both from India's commercial & defence (government) perspective. Does your organisation plan on venturing into this segment? If yes, what strategies do you plan to put in place to compete with pre-existing players?
As UAS becomes more widely used in the military, the technological differentiation is less on the aircraft itself and more on the payloads and components the platform carries. The key for unmanned military systems is reducing size, weight, power and cost (SWaP-C). The focus is less on the platform and more on what it carries as the aircraft itself is becoming more commoditised over time. The Urban Air Mobility market is very exciting, and we see a role to play in structural design, power systems, avionics, software development, aftermarket support, certification and test & evaluation.

There are a lot of start-ups entering India's A&D segment. How can industry majors and start-ups collaborate to ensure India becomes the A&D hub for the globe?
It is unlikely that India will become THE hub for A&D, but it is certainly on its way to becoming A hub for A&D. The industry can learn from its peers abroad, for example, the US & European governments have set the tone by investing in technology incubation through programmes, like the Defense Innovation Unit, AFWERX, In-Q-Tel, Defence & Security Accelerator & Station F, by partnering with the industry to develop a network of technology start-ups that are then integrated into the industrial landscape. In India, these initiatives are either underfunded or sometimes prone to state/regional initiatives that may lack a country-wide vision for the future.

What does India in 2022 look like for the A&D sector, according to you? What strategies are instilled to ensure your organisation is a contributor to the Indian economy?
For commercial aerospace, the global market is expected to rebound, which will help across the board. Specific to India, the new demand for cost optimisation and the appetite for more digital solutions will be key drivers for growth. The firms that are quicker to scale and implement their solutions will have greater long-term success. We have already seen a significant adoption of our digital solutions and have built a digital business unit within Cyient to adapt and deliver with greater speed to the increased market demand. The path to success is less about new strategies and more about greater adoption, building scale and removing risk from customer's operations. □

"Collaboration across the entire value chain is a critical success factor for A&D"

"Adoption of low-risk, high-impact technologies have been accelerated with the pandemic"

Ravikiran Pothukuchi,
Director,
Dassault Systemes

The pandemic period has been a particularly odd time. How has the A&D sector fared in the past year, in your opinion? As an example, can you elaborate on how your organisation adapted to the low falls in the industry?

COVID-19 led to a dramatic reduction in passenger traffic, however, the sector is expected to recover slowly hereon, though travel demand may not return to pre–COVID-19 levels before 2024. As for the defence sector, it will continue to remain stable as most countries, despite the pandemic, have not significantly reduced their defence budgets.

As for us, we saw accelerated interest in new design, collaboration, and visualisation technologies during the pandemic across infrastructure, space companies, government and defence PSUs and railways.

There is a forecast of India becoming the global aerospace hub. Your opinion? How can the government aid company, such as yours, in the journey?

India will become the global aerospace hub soon, and the recent wins by some of the Indian aerospace companies in collaboration with global OEMs endorse this trend. Plus, with the Make in India and Digital India initiatives, many companies in this sector are leveraging the new age technologies in 3D design, engineering, simulation and manufacturing domains. We are closely working with several government bodies, including state governments, to create an infrastructure where these technologies can be accessible to MSMEs, start-ups, students and the workforce.

Unmanned aircraft are a hot topic both from India's commercial & defence (government) perspective. Does your organisation plan on venturing into this segment? If yes, what strategies do you plan to put in place to compete with pre-existing players?

Electric aircraft technology is certainly emerging as a critical force against some of the biggest environmental and humanitarian challenges our society faces today. With new technologies, unmanned aircraft or drones have become cheaper, more expendable and provide faster remote access to a particular area without compromising human safety.

Dassault Systèmes provides 3D design and engineering solutions to drone manufacturers and is working with pioneers to use our services to design and build the aircraft of tomorrow. One such is General Aeronautics which developed drones for large-scale sanitisation and monitoring of COVID-19 hotspots across India.

There are a lot of start-ups entering India's A&D segment. How can industry majors and start-ups collaborate to ensure India becomes the A&D hub for the globe?

Start-ups and MSMEs are definitely entering the A&D segment across the entire value chain. So, collaboration across the entire value chain is a critical success factor for becoming a global hub. The question that comes to our mind is how this can be accomplished. We had the experience of contributing to setting up a Digital collaboration hub for the European A&D industry, namely BoostAerospace. Our defence corridors may replicate a similar collaboration hub to enable collaborating innovation through the entire industry value chain.

What does India in 2022 look like for the A&D sector, according to you? What strategies need to be instilled to ensure your organisation is a contributor to the Indian economy?

Companies have strengthened their commitment towards sustainability, which would be a differentiating factor in 2022 and beyond. We see companies taking measures on three pillars of people, planet and profit to achieve sustainable manufacturing, create value for all and grow as a thriving business.

We are assisting businesses in meeting their sustainability goals. We continue to provide our cloud-based solutions to start-ups, providing benefits such as less CAPEX, enhanced security of design and CAD data for firms, flexibility at lower cost, and always up-to-date information irrespective of physical location constraints. □

"Self-reliance is the first step to become a global A&D hub"

"A&D space needs a lot more start-ups before turning into an A&D power in the world"

Wing Commander MVN Sai
(Retd, Indian Air Force),
Executive Director – Defence,
Grene Robotics

The pandemic period has been a particularly odd time. How has the A&D sector fared in the past year, in your opinion? As an example, can you elaborate on how your organisation adapted to the industry low falls?
The past year has brought in a lot of new challenges for all sectors, including aerospace & defence. Of specific importance are limited mobility of personnel and limited imports. Fortunately, the sector has higher growth potential due to threats from external forces as well our resolve as a country to go 'Aatmanirbhar'.

Grene is connected globally and has been operating remotely for the past four to five years, so adaptation has not been an issue. We are also experiencing the demand slowly growing back on track, and hopefully, it will improve in the next FY.

There is a forecast of India becoming the global aerospace hub. Your opinion? How can the government aid company, such as yours, in the journey?
Self-reliance in the A&D space is the first step. The government has already put dozens of technologies in the non-import category. But we believe more can be done. Our A&D industry is largely driven by the ancient thought process of TOT and absolute ownership of IP. The need is to create new technology unicorns in the country. Innovators such as us need to queue up in the corridors of defence research agencies and PSUs enter into the sector. There needs to be a level playing field.

Unmanned aircraft are a hot topic both from India's commercial & defence (government) perspective. Does your organisation plan on venturing into this segment? If yes, what strategies do you plan to put in place to compete with pre-existing players?
Unmanned aircraft have great potential to disrupt the role of aircraft and, to a lesser extent, other surveillance assets. The use of drones for logistics and incendiary material delivery is being established. We have been delving into the surveillance space and intend to use a very wide variety of drone assets as a part of our C4ISRT offerings.

There is huge potential for these applications ranging from border protection to forest conservation, as an integrated part of our solution offering.

There are a lot of start-ups entering India's A&D segment. How can industry majors and start-ups collaborate to ensure India becomes the A&D hub for the globe?
India is just beginning to understand that a lot of dedicated start-ups, with a 15-20 year vision, will need to be nurtured. The A&D space needs a lot more start-ups before it can be turned into an A&D power in the world.

For this to happen, registration and protection of IP will need to be simplified. In today's business set-up in ten A&D spaces, anyone who gets the order demands transfer of IP from collaborators. This needs to stop. The PSUs can assume the role of SIs and solution providers and collaborate with technology start-ups on a more even basis. The Israeli model is the way to go. The government and end-users must also scrutinise this aspect if we truly need the A&D industry to grow.

What does India in 2022 look like for the A&D sector, according to you? What strategies need to be instilled to ensure your organisation is a contributor to the Indian economy?
There have been delivery backlogs over the past two years. Plus, the fact that more items will come under the import ban by 2025 provides the Indian industry with an opportunity for tremendous growth. The government needs to balance the requirement vs delivery in the A&D segment to accommodate the learning curve of the Indian industry.

We, currently, are focused on being the overarching wheel for many emerging technologies in the C4 ISRT space. We are constantly bringing more elements under the Grene Defense OS platform, be it in drones, revolutionary radar and common tech or Artificial Intelligence-powered autonomous systems. Last-mile C4I and connected soldier are two of our focus areas for 2022. □

"Start-ups & MSMEs play an important role in A&D manufacturing"

"Technological leapfrogging led overmatch and sustainability will be the focus for defence and aerospace in 2022"

Ramesh Kumar Sankarannair,
AGM Marketing,
Godrej Aerospace

The pandemic period has been a particularly odd time. How has the A&D sector fared in the past year, in your opinion? As an example, can you elaborate on how your organisation adapted to the industry low falls?
In the commercial aviation sector, since travelling patterns were disrupted due to the pandemic, there was a disruption in the aircraft production due to low demand. The demand for spare parts was also low since aircraft maintenance was minimal. This affected the complete supply chain and sourcing schedules of the OEMs by over 40% last year. In the domestic defence and space segment, although the production pace may have been affected due to the lockdown, the demand was largely unaffected.

Although the reduced sourcing from the commercial aircraft segment impacted us, a healthy bank of orders from the domestic defence and space segment enabled us to see through this challenging period.

There is a forecast of India becoming the global aerospace hub. Your opinion? How can the government aid company, such as yours, in the journey?
The Government of India has been promoting indigenous design, development and manufacturing of systems for A&D. The GoI can begin with aiding the research that will bridge the gap between design and manufacturing capability with the rest of the world. There is also a need to invest in manufacturing strategic materials and electronics items for the A&D sector. It should also invest in developing Indian standards and specifications to evolve.

Unmanned aircraft are a hot topic both from India's commercial & defence (government) perspective. Does your organisation plan on venturing into this segment? If yes, what strategies do you plan to put in place to compete with pre-existing players?
Unmanned aircraft as systems are becoming more sophisticated and find application in both civil and defence purposes. The Indian Armed Forces have been operating UAVs for over a decade now. However, India's present holdings of UAVs to meet the expectation of battlefield requirements for the future presents tremendous business opportunities to the Indian A&D sector. We are also evaluating the opportunities and how we can contribute to their development and manufacturing.

There are a lot of start-ups entering India's A&D segment. How can industry majors and start-ups collaborate to ensure India becomes the A&D hub for the globe?
Indian start-ups and MSMEs have a very important role to play in aerospace and defence manufacturing. About 80% of the parts and subassemblies for the domestic defence sector are being manufactured by MSMEs and start-ups. Considering this, industry majors can collaborate with start-ups to experiment with new concepts, try for disruption and once developed for domestic end-users, they can be exported.

Godrej Aerospace has been interacting with many academia & start-ups for innovation in defence manufacturing technologies, like light-weighting and forming of aerospace alloys to near shape and cut down on costly raw materials and their machining time.

What does India in 2022 look like for the A&D sector, according to you? What strategies need to be instilled to ensure your organisation is a contributor to the Indian economy?
In 2022, sustainability will remain a key focus area for commercial aviation while technological leapfrogging led overmatch shall become the core focus for defence in India. Technological advancements and evolution on the supply side will stimulate demand growth in the A&D sector. The atmanirbhar initiative in A&D presents many opportunities for the private sector and encourages participation in indigenous design, development and manufacturing. To meet the requirements of the A&D sector in focused areas will be key for Godrej Aerospace. □

"Relook at incentives for aerospace to get technology available in the west"

"In defence, it is important to shorten buying sales cycle time"

Pavan Ranga,
Founder & CEO,
Rangsons Aerospace

The pandemic period has been a particularly odd time. How has the A&D sector fared in the past year, in your opinion? As an example, can you elaborate on how your organisation adapted to the industry low falls?
In the commercial aviation, we saw a sharp fall in orders over the last two years. What we have successfully done is, we have established new relations with aerospace majors from around the world like GE, Honeywell, UTC and others and one trend we saw was that the smaller companies in Europe and the US were really struggling to financially stay afloat. So, we managed to get a lot of that business transferred to us and also the anti-China sentiment helped us transition newer business here.

On the defence side, we have not seen a big shift either upwards or downwards in terms of demand in the defence sector. The pandemic hasn't affected our defence work and is going as per plan because most of our defence projects are in tie-up with the Indian Ministry of Defence (MoD).

There is a forecast of India becoming the global aerospace hub. Your opinion? How can the government aid company, such as yours, in the journey?
There is no doubt that India will become one of the global aerospace hubs because an aerospace hub is first driven by the market. Although there has been a significant growth in air travel over the last 10 years, there is a lot of growth yet to be seen. The government can help in several way: The government needs to build more airports which can take not just turbo props but single line aircraft like A-220 and Boeing 737 to grow the air traffic and to develop a robust civil aerospace industry. It should also relook at the incentives for aerospace to get technology which is available in the west.

Unmanned aircrafts are a hot topic both from India's commercial & defence (government) perspective. Does your organisation plan on venturing into this segment? If yes, what strategies do you plan to put in place to compete with pre-existing players?
At Rangson's, we very clear about what our business is. We do not have plans to make UAVs as we are already working with several companies who manufacture UAVs and provide them with our solutions. We have products that are tailored to these UAV companies. So, we will be an active player in it and provide systems that are required for successfully flying UAVs.

There are a lot of start-ups entering India's A&D segment. How can industry majors and start-ups collaborate to ensure India becomes the A&D hub for the globe?
The biggest challenge in A&D in terms of start-up ecosystem is that when a start-up tries to develop a new product or solution, the qualification timeline of it is lengthy. I believe the ecosystem should come together and figure out how to shorten the qualification cycle without compromising on safety. In addition, incubation centres for start-ups will help it accelerate its time-to-market to bring out new solutions. Lastly, industry majors also need to collaborate with start-ups.

What does India in 2022 look like for the A&D sector to you? What strategies need to be instilled to ensure your organisation is a contributor to the Indian economy?
For commercial aviation, 2022 will be the first year in the last three years where we will see some significant uptake in global air, with vaccination proving to be successful. As far as defence is concerned, the biggest challenge continues to be our defence acquisition formalities because tendering system is the major bottle neck in moving fast. While we understand the challenges the MoD faces, it is very important for us to shorten the buying sales cycle times.

At Rangsons, we are trying to create an eco-system where new product technology is developed with the range of our products. For us almost 80% of our revenue comes from product sales and not from services not manufacturing or design services. □

"Make in India is a logical requirement for a populous nation in a troubled neighbourhood"

"India has a 'whole of government' approach to manufacture drones"

Lt General (Retd) V G Khandare,
PVSM, AVSM, SM,
Former Military Advisor,
National Security Council Secretariat

The pandemic has been a particularly odd time. How has the Aerospace & Defence (A&D) sector fared in the past year, in your opinion? Can you elaborate on some of the notable tech developments in the Indian (A&D) sector this year so far?
The pandemic was severe. Adherence to WHO's COVID-19 norms led to lockdowns and 'work from home', adversely impacting production, especially in hardware production sectors. Company managements suffered financially due to continued salaries despite lockdowns and losses due to non-production, but that has not dented the national resolve; defence production sector is firm and now on the upswing.

The Indian army recently developed a technology that can recognise PLA and their vehicles deployed at LAC. Could you elaborate more on the technology?
The capability to recognise PLA weapon systems vehicles, aircraft, field fortifications and habitat is intrinsic to the Indian military. The kind of detection & recognition technology being used is contemporary to that used by leading militaries globally. There is a constant R&D endeavour to improve the imagery resolution, all-weather day & night capability, increase revisit periodicity of the imaging platforms, enhance data processing speeds & accuracies, along with compatible human resources skills. It is a comprehensive approach to enhance capabilities and capacities to acquire niche technology.

Unmanned aircraft are a hot topic both from India's commercial & defence (government) perspective. Can you divulge a bit on how the Indian defence sector plans to bring more drones into play?
Drones have civil & military applications meant for development & security. India has a 'whole of government' approach to manufacture drones indigenously and import a carefully chosen variety of drones for specific goals. The Indian R&D sector, start-ups, innovators and manufacturers are capable of designing, developing & producing drones of a certain kind. Some strategic partnerships with like-minded friendly nations are obvious for advanced applications.

In a recent interview, Dr Vijay Kumar Saraswat mentioned that we have started building ingenious computing systems in defence. Can you detail what would these supercomputers hold and how they will help Indian defence?
In the security sector, India faces challenges of 'new wars with new challenges'. Accordingly, India is gearing up for Network Centre Warfare which is a result of the Electro Magnate Spectrum Warfare and the cyber warfare threats. The 'unrestricted warfare' with attacks from adversaries have to be thwarted in military and civil domains. Indian endeavours to develop and utilise indigenous computing systems to insulate national vulnerabilities is a logical step. This would help the Indian military as also non-military vital assets, which includes its population from all kinds of visible & invisible, direct & indirect, kinetic & non-kinetic and linear & non-linear attacks.

What does India in 2022 look like for the A&D sector, according to you? What strategies need to be instilled to ensure 'Make in India' is encouraged while growing the sector?
The year 2022 would be another milestone in the nation's journey towards growth, prosperity, development & security, thus enabling India to claim its justified place in the comity of nations. 'Make in India' is a logical requirement for a populous nation in a troubled neighbourhood. Strategic leveraging and blackmail during difficult times can be prevented with a self-sufficient ecosystem. The lower cost of production in India due to its skilled population, low allied expenditures and a huge market will ensure 'Make in India' a success. Indian manufacturers in the defence & aerospace sector have the challenge to produce quality products at internationally competitive pricing to match demands as per users timelines and ensure post-sales support of high quality & reliability. □

"We need policies to support domestic R&D"

> "Focus on 'Make in India' rather than 'Assemble in India' and build India's own unique solutions because cut paste from Europe or US models isn't going to work"
>
> **Navid Talib,**
> *Manufacturing Operations Head,*
> *Honda Cars India*

Do you think India is the next automotive superpower? What role do SMEs have to play in this?
India's rapid economic growth is boosting its automobile industry. Continuous growth at current rates would make India the third biggest automobile market in the world by 2025, in terms of volumes. The future of the industry is very bright and is expected to grow further in the next 10 years, especially as India challenges the EV penetration. To reap the benefit of this growth prospect, the industry needs to keep pace with global standards and competition. This will help Indian SMEs to survive the rapidly changing competitive environment. SMEs in auto-components are growing at the fastest rate within the SME category of industries. There is a boom phase post COVID-19 in this sector due to high demand from global automobile manufacturers and also the after-effects of changing global political equations.

Automotive is one of the core sectors of the Indian economy. How are the automotive companies in India setting the trajectory for India's overall growth? What are the imperatives for the industry?
The Indian automotive sector has become significantly more attractive in the past two to three years, as evidenced by the number of investment announcements from global automotive companies. This attractiveness is partly driven by the economic imperative of what is going on globally i.e. growth has slowed down in the US and European markets, while Asia Pacific is gaining increasingly more attention.

There is an urgent need to improve the quality of business environment in India which can be created through a joint contribution of both the government and the industry.

How can India become influential in terms of EVs with robust vehicles and changes in the ecosystem?
The first step to building robust EVs (vehicles and components) is recognising the unique needs of the Indian geography. India needs to be a visionary leader in the still nascent yet rapidly evolving field of electric mobility. Creating the right framework and policies are of utmost importance in institutionalising change. We need policies to support domestic R&D in areas where India is different from the rest of the world – either through tax breaks, import subsidies on raw materials or upfront incentives. We must realise that all new technologies have lengthy gestation periods and therefore, it is important for policies to consider large scale funding for R&D or assurance against future policy swings.

The mobility landscape will fundamentally transform over the next 10 to 15 years, with the ACES (autonomous driving, connected cars, electrified vehicles and shared mobility) trends. What opportunities does this evolving landscape present to the Indian automotive industry? How does it help it gain a competitive advantage?
The development of electrified, autonomous, connected and shared technology will lead to a clear increase in the rate of innovation within the automotive industry. The urge to remain connected has seen a steady increase and the pandemic has only increased our propensity to stay digitally connected. The changing market scenario offers an opportunity for incumbent auto-component players to forge technology tie-ups and localise the manufacturing of key electronics components.

What does India in 2022 look like for the automotive sector, according to you? What strategies have to be instilled to ensure your organisation is a key contributor to the Indian economy?
The highlight of the revival and growth in 2022 would be the shift of focus to EVs. The Indian consumer market is now ready to dive into the electric automobile space. To contribute towards the Indian economy, two key strategies need to be worked upon – rethink the business and move fast. Focus on 'Make in India' rather than 'Assemble in India' and build India's own unique solutions because cut paste from Europe or US models isn't going to work. With ACES clearly being the future, it is high time to prepare the organisation to embrace a partnership model that involves non-traditional partners, as technology solution providers and automotive worlds start to explore the unexplored. □

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"The Indian automobile sector is standing on the cusp of a revolution"

> "It may be time for us to go a step further and offer features that haven't been seen in petrol or diesel-based vehicles"
>
> **Gunjan Malhotra,**
> *Director,*
> *Komaki Electric Vehicle Division*

Do you think India is the next automotive superpower? What role do SMEs have to play in this?
I think India has tremendous potential to become an automotive superpower. The demand for automobiles – especially EVs – is growing day by day. This surge in demand is great for the growth of the auto sector and allows SMEs to enter the market. SMEs are the backbone of the Indian economy, and not only can they help bridge the demand-supply gap but they can also make us 'self-reliant'.

Automotive is one of the core sectors of the Indian economy. How are the automotive companies in India setting the trajectory for India's overall growth? What are the imperatives for the industry?
The automobile industry contributes to 6.4% of India's GDP, 35% of manufacturing GDP, provides over 8 million jobs directly (OEMs, suppliers & dealers) & around 30 million more in the value chain. If we look at the last 10 years, it has invited a total investment of $35 billion. It also generates export revenue of $27 billion – approximately 8% of the total merchandise exports from India. Many people are getting interested in owning a hassle-free, eco-friendly, economical vehicle. Needless to say, the future of the automobile industry is electric, and the manufacturers who want a stake in the future should keep their focus on it.

How can India become influential in terms of EVs with robust vehicles and changes in the ecosystem?
Indian climatic conditions and terrain are among the most unforgiving when you compare them with other countries. To create a vehicle that can withstand such conditions, the manufacturer has to focus on delivering excellent build quality and performance. Now that customers have become tech-savvy as well, they want all the new features in their vehicles, which is another thing manufacturers have to consider. Given the fact that Indians are obsessed with mileage and rightly so, we have to create compact yet powerful batteries that can last long without having to charge often.

The mobility landscape will fundamentally transform over the next 10 to 15 years, with the ACES (autonomous driving, connected cars, electrified vehicles and shared mobility) trends. What opportunities does this evolving landscape present to the Indian automotive industry? How does it help it gain a competitive advantage?
When we're talking about ACES, the possibilities are endless. Autonomous driving and connected cars can significantly reduce road accidents, which would be a major win. Electric vehicles are not only helping us to tighten the leash on air pollution but they are extremely economical as well. This is a major plus point for Indian customers, given how petrol prices are rising day by day.

The Indian automobile sector is standing on the cusp of a revolution that has the potential to change the landscape of the transportation industry and we are fortunate to be living in this transition phase. These are technologies of the future, and by investing in them now, automobile manufacturers in India can cement their position in the brave new world that awaits us.

What does India in 2022 look like for the automotive sector, according to you? What strategies have to be instilled to ensure your organisation is a key contributor to the Indian economy?
Undoubtedly, we will see a whole lot of electric vehicles on the road – both two-wheelers and four-wheelers. Also, given the fact that the government is paying attention to building a nationwide EV charging infrastructure, more and more people will get encouraged to invest in EVs.

What we need to ensure is that we deliver on our promise of offering unparalleled mileage without sacrificing power, style or features. In fact, it may be time for us to go a step further and offer features that haven't been seen in petrol or diesel-based vehicles. □

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"The future of the mobility sector is definitely ACES"

> "Today, only about 2% of new vehicles sold globally are EVs which gives a huge opportunity for India to innovate inside and outside the country"
>
> **Arindam Lahiri,**
> *CEO,*
> *Automotive Skills Development Council (ASDC)*

Do you think India is the next automotive superpower? What role do SMEs have to play in this?

India is expected to be the world's third-largest automotive market in terms of volume by 2026 and is currently valued at $118 billion. Despite the ongoing pandemic, the Indian auto sector has stood its ground and faced the challenges posed by the pandemic head-on. With the recent announcements made by the government on the scrappage policy, product-linked incentives etc, the industry has received a much-needed impetus. These announcements have also benefitted SMEs directly or indirectly.

The SMEs involved in the automotive supply chain play an important role in the growth and expansion of the Indian auto-components industry, which contributes 25.6% to the manufacturing GDP and 3.8% to the national GDP, besides providing indirect employment to over 1.5 million people.

Automotive is one of the core sectors of the Indian economy. How are the automotive companies in India setting the trajectory for India's overall growth? What are the imperatives for the industry?

The automobile industry is a vital player in India's vision to become a $5 trillion economy. Leapfrogging from BS IV to BS VI standards, mandatory airbags in passenger vehicles, anti-lock braking system (ABS), rear parking sensors, front occupant seatbelt reminders and a mandatory speed alert system to all new models are a few disruptions that have made companies sensitive towards consumers.

Consequently, our exports have risen to the international market. For instance, despite the COVID disruptions, India was the top country of origin for vehicle imports into South Africa. The path-breaking vehicle scrappage policy is another feather in the cap of India's automotive sector and has boosted sales for automotive and allied industries.

How can India become influential in terms of EVs with robust vehicles and changes in the ecosystem?

The first step to building robust EV penetration is identifying the Indian geography. Furthermore, India is an extremely price-sensitive market, and hence, there needs to be a clear focus on creating the right balance between performance & price.

The mobility landscape will fundamentally transform over the next 10 to 15 years, with the ACES (autonomous driving, connected cars, electrified vehicles and shared mobility) trends. What opportunities does this evolving landscape present to the Indian automotive industry? How does it help it gain a competitive advantage?

The evolving landscape presents a perfect opportunity for Indian automakers to lead the disruptive changes occurring across segments. Today, only about 2% of new vehicles sold globally are EVs which gives a huge opportunity for India to innovate inside and outside the country by making hubs that can help supply complete products or components worldwide. With the growing number of EV manufacturers domestically, the industry is creating a huge opportunity for automotive suppliers on building a strong position in the global EV supply chain. Manufacturers are now signing MoUs with the GoI to ramp up charging and battery swapping infrastructure to ramp up EV penetration.

What does India in 2022 look like for the automotive sector, according to you? What strategies have to be instilled to ensure your organisation is a key contributor to the Indian economy?

The future of the mobility sector is definitely ACES. I believe that established and trusted OEMs may have an advantage as ACES trends accelerate because customers view them favourably. There have been rising trends where consumers now prefer end-to-end connectivity.

As a sector skills council for the automotive industry in India, ASDC plans to ensure an inclusive seamless supply chain of skilled manpower for the industry. ASDC will also initiate specific projects in partnership with industry and institutional partners to encourage diversity in the workforce. We expect apprenticeship programs will play a pivotal role in creating a strong pipeline of trained manpower. □

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"Indians need to engage more in R&D"

> "India is known to have brains, thus we need to leverage and deploy this asset in active EV research and come up with low cost solutions"
>
> **Sudhir Gurtoo,**
> *Managing Director,*
> *Leadec*

Do you think India is the next automotive superpower? What role do SMEs have to play in this?

India sure is well positioned on the launch pad. To get into the automotive superpower cyber space, our launch vehicle will need some more innovative support. As long as it was an ICE technology game, as was in the recent past, we would have started our countdown for the blast by now. Unfortunately, with the game shifting to EVs, our launch has taken a pause. Much now depends on EV technology. A good push will hurtle us into the superpower league.

SMEs will need to play a major supportive role for our EV launch success. Going forward, I believe OEMs will tend to outsource more. Small and medium enterprises will thus, get bigger opportunities to support EV parts and manufacturing services. SMEs, on their part, will need to invest in new technologies to get more standardised.

Automotive is one of the core sectors of the Indian economy. How are the automotive companies in India setting the trajectory for India's overall growth? What are the imperatives for the industry?

We know how Indian automotive companies are shifting the focus from combustion to electric. They are also in the mode of adopting and inducting Industry 4.0 into their growth process. This change will drive and force others to change. SMEs will need to induct and support Industry 4.0 technology. Customers will need to adapt to new EV charging developments, app / bot-based interactions versus the familiar customer care voices. These are all game changers. With a large technological savvy manpower base, India sure stands to reap rewards in the coming decade.

How can India become influential in terms of EVs with robust vehicles and changes in the ecosystem?

My belief is that EV technology needs to evolve further to help reduce vehicle cost and increase battery life as also battery running / replacement cost. This will help boost EV sales, especially in the highly cost-conscious Indian mind. India is known to have brains, thus we need to leverage and deploy this asset in active EV research and come up with low cost solutions. On the other hand, the government needs to engage in preparing and ensuring that EV charging infrastructure is plentifully available to support this upcoming growth.

The mobility landscape will fundamentally transform over the next 10 to 15 years, with the ACES (autonomous driving, connected cars, electrified vehicles and shared mobility) trends. What opportunities does this evolving landscape present to the Indian automotive industry? How does it help it gain a competitive advantage?

Indians need to engage more in R&D. We mostly depend on others for technology development. This is one place where we need change. India could well take the driver's seat for designing the future technology and products, be it EVs, Industry 4.0 products or services, autonomous vehicles etc. This opportunity is up for grabs. It is a well-known fact that the designer always gets a head-start. To verify, you needn't look far but at our hand-held apple phones. Indians, too, can build a competitive advantage by shifting focus to R&D now – for new products required in the next few decades.

What does India in 2022 look like for the automotive sector, according to you? What strategies have to be instilled to ensure your organisation is a key contributor to the Indian economy?

In 1996, I recall my moment of pride when we successfully rolled out a German product, an Opel Astra, from a plant in Gujarat. Then, Astra was far ahead in technology versus other cars on the Indian road. Since then, the environment has totally changed. Competition is immense. Superior technology of the 90s is now standard technology of the 2020s. In 2022, most MNC car brands we know have made their presence felt on Indian roads. And new successful brands, like Tesla, are at the harbour, waiting to drive in. For this particular year, 2022, of course, the chips are down. Production numbers, thus, will remain constrained in the short-term till more chips reach the conveyor belts. SUVs are more in demand. Sedans are getting back pedalled. Our long-term story, though, is intact. The future does belong to India. □

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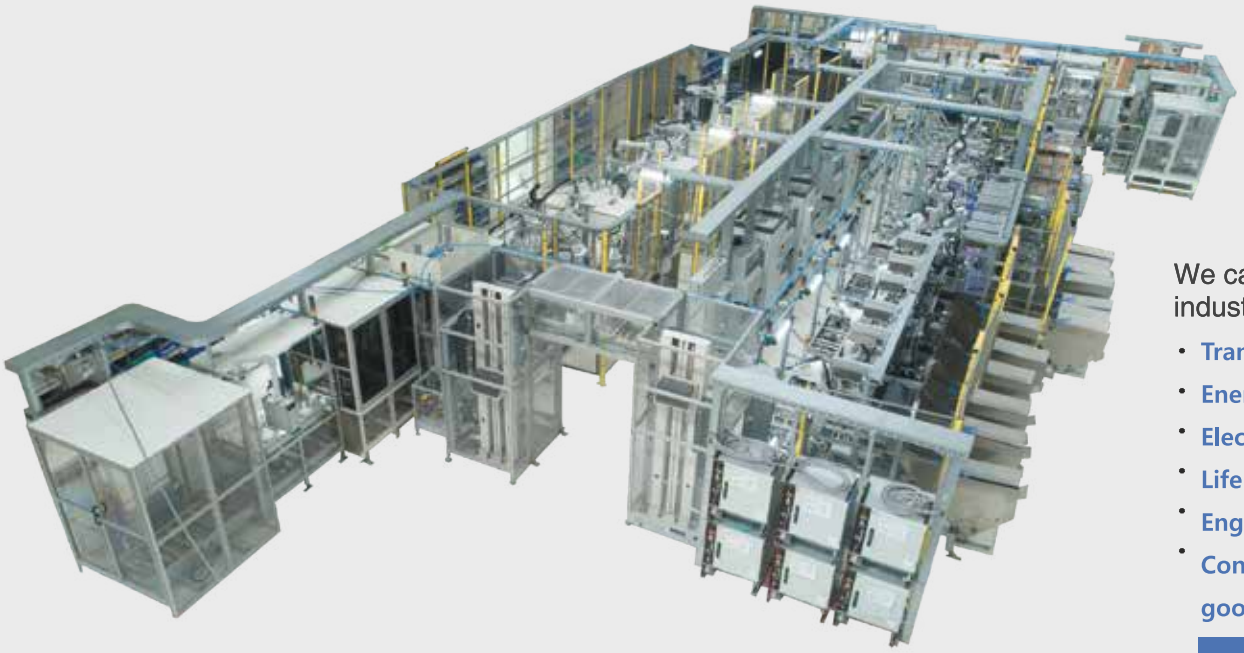

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"The government has been proactively driving the RE sector"

"Energy shortages will be taken care of with the advent of power exchanges"

Vamsi Gaddam,
Joint Managing Director,
Visaka Industries

COVID has seen a growing acceptance for the RE sector in India. How has the RE sector fared in the last year, in your opinion? Could you elaborate on how the last year has been for your business in particular?

The RE sector in India was adversely impacted by COVID-19. The resultant lockdown hit imports from China, where almost 80% of solar cells and modules were manufactured. Again, with the RE sector being attached to the power grid, a drop in consumption meant restrictions put on power generation, thus adversely impacting the RE producers. The pandemic also impacted investments in the RE sector, making it even more vulnerable to a lack of funds.

Our business, spearheaded by ATUM, the world's first electricity-generating roof, was also impacted. However, we have managed to bounce back on the back of strong sales, and we continue to see strong demand from enterprises and the B2B sector.

The government has set agenda to achieve 450 GW RE by 2030. What should be the target achieved by the next year to ensure we are on the mark? Can you delve a bit into the plan of action instilled by your company to ensure your contribution?

We think that the target is achievable, and the government should be able to meet its target of 450 GW RE by 2030. This is because consumers are beginning to understand RE and its commercial advantages in the long run. This can be widely seen in the slew of RE products, such as cars, bikes, scooters and charging stations, which have been launched in the last few months.

At Visaka, we continue to focus on RE-related products. Apart from ATUM Solar Roof, we have also launched ATUM Charge, our 100% green, solar-powered EV charging stations. We are well on our way to installing ATUM Charge stations across cities in India.

How can the government offer a helping hand to companies to ensure that India lets go off the dependency on fossil fuel and starts utilising its RE sources?

The government has been proactive in driving the RE sector. Whether it is FAME-2 or other policies implemented, we believe that the Indian RE sector will play a significant role in the coming years. It will help to augment our capabilities in manufacturing components, batteries, solar cells, etc., so that dependence on other countries/markets is minimised.

We believe that there should be a concerted effort to develop a national EV charging infrastructure, support R&D related to RE and provide ample subsidies to companies introducing products and services related to the RE sector.

The government recently released a new set of rules to protect green energy investment allowing RE generators to sell power in power exchange. How does this impact the RE businesses in India for the coming year?

It augers well. Substantial peak and energy shortages prevail in the country. This is due to inadequacies in generation, transmission & distribution which will now be taken care of with the advent of power exchanges. RE generators are no longer at the mercy of the grid but have the autonomy to sell their power in exchanges. This will lead to a fair exchange fair and market-driven pricing, which will encourage other enterprises to enter the RE sector.

What does India in 2022 look like for the RE sector, according to you? What strategies have to be instilled to ensure your organisation is a key contributor to the Indian economy.

COVID was a hiccup, but we are of the firm opinion that the RE sector in India will continue to grow and flourish as it has the support of the government, and many sizeable enterprises are very keen to enter the sector. We are looking at reaching out to various parts of the country and ensuring that we are introducing new and innovative products that will boost RE use. □

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"The country is firmly on course to build a robust RE infrastructure"

"The government will need to place an onus on managing power grids more efficiently"

Sachidanand Upadhyay,
Founder,
Lord's Mark Industries

COVID has seen a growing acceptance for the RE sector in India. How has the RE sector fared in the last year, in your opinion? Could you elaborate on how the last year has been for your business in particular?
The COVID-19 outbreak has been a game-changer for the renewable energy sector in India. Policymakers in India have realised the importance of aggressively expanding RE projects to power the country's industrial growth and economic expansion. Notwithstanding the accelerated transition towards RE in the country, the sector has failed to perform optimally in terms of the execution of projects rewarded in the last year. Capacity expansion activities and new investment inflows reiterated that India continued to be a key investment destination for green energy investors.

The government has set an agenda to achieve 450 GW RE by 2030. What should be the target achieved by the next year to ensure we are on the mark? Can you delve a bit into the plan of action instilled by your company to ensure your contribution?
The Ministry of New and Renewable Energy (MNRE) has stated that India is committed to achieving 450 GW of installed RE capacity by 2030. With global investors foreseeing a massive potential in India's RE sector and an increasing number of corporate players entering the sector aggressively, the country is firmly on course to build a robust RE infrastructure. We aim to help the country meet its RE targets by setting up 2 GW of installed RE capacity by 2025. Lord's is also in plans to acquire smaller green energy projects on a pure Power Purchase Agreement (PPA) basis to achieve the target of 20 GW of installed RE capacity by 2030.

How can the government offer a helping hand to companies to ensure that India lets go off of the dependency on fossil fuel and starts utilising its RE sources?
In order to create a more dynamic and user-friendly RE ecosystem, the government will need to place an onus on managing power grids more efficiently to improve their capacity for power absorption. This will help reduce the variability in renewable energy generation and address the challenges of its intermittency. The government will also need to offer financial incentives to MSMEs and other businesses to enhance their equity participation in major power projects and empower them to set up a vibrant RE ecosystem in the country.

The government recently released a new set of rules to protect green energy investment allowing RE generators to sell power in power exchange. How does this impact the RE businesses in India for the coming year?
Enacting a new set of rules to protect green energy investment was meant to redress investor grievances. The rules will have a positive impact on the RE business in India, allowing RE generators to sell power in the power exchange will be key to maintaining demand-supply equilibrium in the energy market. It will provide RE generators with easy access to buyers of power and facilitate seamless transactions between them. At the same time, how individual companies harness the efficiencies of power exchanges will depend on their individual policy and vision.

What does India in 2022 look like for the RE sector, according to you? What strategies have to be instilled to ensure your organisation is a key contributor to the Indian economy?
The renewable energy sector in the country is scaling an exponentially high growth curve. A buoyant outlook and increasing investment activity by FDI players in 2022 is foreseen in addition to the entry of more organised players in the sector. However, it is anticipated that the financial year 2023 will be a landmark year in the country's RE sector with large-scale project executions and huge growth potential. A firm government thrust on mitigating climate changes and economising RE tariffs will ensure that India becomes a dominant player on the global green energy stage. □

"2022 might be a golden year for renewable energy"

> "Power-to-power exchange increases the economic viability of company for RE generators and developers"
>
> **Mayur Mishra,**
> *CEO & Co-founder ,*
> *Corrit Energy & Infra*

COVID has seen a growing acceptance for the RE sector in India. How has the RE sector fared in the last year, in your opinion? Could you elaborate on how the last year has been for your business in particular?

A saving-centric mindset has emerged ever since the pandemic hit us. As a result, we've seen a shift in perspective, where people are also keen to curb recurring expenses, such as electricity. With more people working remotely, monthly electricity bills saw a steep spike, encouraging people to move to more sustainable alternatives like solar. While the upfront cost is somewhat on the higher side, the installation tends to pay for itself in four years and saves money for its entire lifecycle up to 25 years. Our company has seen a growth of over 200% in queries post the second wave of COVID-19.

The government has set an agenda to achieve 450 GW RE by 2030. What should be the target achieved by the next year to ensure we are on the mark. Can you delve into the plan of action instilled by your company to ensure your contribution?

At Expo 2020 Dubai, the Ministry of New and Renewable Energy set the target of 450 GW RE by 2030. Given India's inclination to steadily transition to green energy sources and policies supporting this endeavour, India is already ahead of its set goal by achieving the above-enclosed target by 40% in 2020. India intends to commission over 220 GW in solar plants by 2022 and is well in-course to achieve 450 GW by 2030. Furthermore, 73 GW is expected to come from hydro plants. Currently, three out of the five largest solar parks in the world are from India. Corrit aims to commission around 500 MW of solar power plants by 2025.

How can the government offer a helping hand to companies to ensure that India lets go off the dependency on fossil fuel and starts utilising its RE sources?

There is a huge support from both public and private entities to reduce the country's energy dependence on fossil fuels. If India continues on its set path and largely moves away from non-renewable energy sources, we can save up to $90 billion in imports by 2030. Therefore, several government benefits like tax credits, subsidies, grants and loans are already present to promote renewable energy sources. The government is also offering benefits like 'accelerated depreciation' for commercial users and subsidies to 'residential consumers' in addition to net metering at all places. Where we need more push is raising awareness among tier 2 and tier 3 city customers, as well as offering financial support.

The government recently released a new set of rules to protect green energy investment allowing RE generators to sell power in power exchange. How does this impact the RE businesses in India for the coming year?

The new rules set by the government befit both consumers and stakeholders. We believe that this could be a move in the right direction if utilised efficiently. Selling renewable energy power-to-power exchange increases the economic viability of the company for renewable energy generators and developers. Developers that invest large amounts of money in solar parks must be provided with a return on every unit generated, and the policies only serve to accelerate the sector's expansion. This has the potential to significantly contribute to the GDP of the country along with ensuring the welfare of everyone involved.

What does India in 2022 look like for the RE sector, according to you? What strategies have to be instilled to ensure your organisation is a key contributor to the Indian economy?

2022 might be a golden year for the renewable energy sector, with major players, such as Adani and Reliance, investing heavily in the sector. The government should also have a unified policy for all states, and net metering should be implemented nationally rather than only in a few states. Corrit plans to expand its position in EPC and O&M across India to participate in the renewable energy revolution. We even plan to establish solar power plants in tier 2 and tier 3 cities, which is going to give rise to India's economy. □

"India needs to have a repowering policy in place"

"If all stakeholders don't come together, the 450 GW RE target will remain a dream"

Dr PKC Bose,

Vice Chairman & Managing Director, Enercon WindEnergy

COVID has seen a growing acceptance for the RE sector in India. How has the RE sector fared in the last year, in your opinion? Could you elaborate on how the last year has been for your business in particular?

Well, due to COVID-19, the entire business sector has suffered, and we were not an exception. However, the best thing that happened in our case was we could hire over 120 people virtually. The entire process, right from induction to training, everything happened digitally, which was surely not the best way, but we had no choice. Our generator plant, despite the COVID-19 challenges, could go on stream and start trail production in Erode, Tamil Nadu. Our tower plant in Trichy, Tamil Nadu, is also progressing well besides our blade plant in Nellore, Andhra Pradesh.

The government has set agenda to achieve 450 GW RE by 2030. What should be the target achieved by the next year to ensure we are on the mark? Can you delve a bit into the plan of action instilled by your company to ensure your contribution?

Indeed, this is a very aggressive plan for sure. If all stakeholders don't come together, this target will remain a dream. But there is sure possibility to attain the same, by way of collaborating, cooperating and communicating effectively by all stakeholders which include the policy and regulatory decision-makers. 100 GW out of 450 GW will be wind alone, and the current installed capacity is close to 40 GW. Plus, by adding another 100 GW by 2030, India should gear up for nearly 11 GW per year, commissioning only by 2030 we can achieve 100 GW wind power. As far as we are concerned, we will be part of the econ system strongly as an OEM.

How can the government offer a helping hand to companies to ensure that India lets go off of the dependency on fossil fuel and starts utilising its RE sources?

If the respective ministry comes out with regulatory systems and guidelines, it will be quite easy to attain the target and goals to be a renewable energy nation. However, as I mentioned above, a strong and cohesive approach has to be in place first by all stakeholders else it will be a hard task for sure. For instance, India does not have a repowering policy and the best wind sites are still occupied by the smallest turbines. If we have a repowering policy in place, these old and smallest turbines can be replaced with high, efficient and large turbines, which itself will quadruplicate the production of power.

The government recently released a new set of rules to protect green energy investment allowing RE generators to sell power in power exchange. How does this impact the RE businesses in India for the coming year?

The new set of rules to protect green energy investment allowing RE generators to sell power in power exchange, in my personal opinion, does not really impact; it only adds value.

What does India in 2022 look like for the RE sector, according to you? What strategies have to be instilled to ensure your organisation is a key contributor to the Indian economy?

As far as we are concerned, our focus and concentration are to export from India as India is our global export hub. For India, we will have an India specific turbine in the near future but surely not in 2022. □

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Implementing efficient engineering in automotive manufacturing

A major transformation awaits the automotive industry as the world is in a crossover stage today with the merging of various megatrends and technologies. Validation of designs early in the automotive manufacturing process is possible with simulation. Implementing simulation early in the design stage allows swift, multiplicative design for all manufacturing processes. The article talks about how, to cut through complexity, simulation is pertinent and how efficient engineering can be implemented in all aspects of automotive manufacturing.

Rafiq Somani,
Area Vice President –
India and South Asia Pacific,
Ansys

The mobility and transportation experience of the future demands substantially higher levels of quality, reliability and durability while being scalable, cost-effective and competitively differentiated. One aspect of product design and simulation, which is often disregarded, is manufacturability. Can a design on a screen exactly match what is manufactured? It's also possible that certain part detail execution is impossible in the preferred method of manufacturing. Inconsistencies between the virtual and physical prototypes are a huge problem in the product development process. To cut through complexity, to virtually test thousands of operating scenarios and to uncover hard-to-find, potentially disastrous problems early on, simulation is pertinent.

Efficient engineering can be implemented in all aspects of automotive manufacturing including Material Intelligence Management (MIM), dyes, painting, anti-corrosion, battery manufacturing, sheet metal, BIW and forming. Each of these has been highlighted below to showcase this.

MIM

Every industry feels increasing pressure to launch breakthrough products that outperform competitors. For many design applications that require strong yet lightweight materials, layered composites are ideal. Even so, faster, more frequent product introductions and new technologies cannot compromise ultimate product quality, reliability and speed to market.

Implementing a global, consistent, 'gold source' view & management of materials information across divisions is pertinent for automotive companies and so is the elimination of disparate materials toolsets that are difficult & expensive to cross-reference, maintain and upgrade. They aim to enable MBSE practice by integrating material with PLM.

To do this, there is a need for an intelligent material database that hosts material information authorised by OEM & suppliers material experts, which is the single source of truth and accessible by all engineering stakeholders. This portal must have access with multi-level user privileges, managing complex workflows of material approvals & updates and CAD/CAE/PLM connectivity, including flexible integration (native & 3rd party solutions) with various engineering platforms. Simulation can do this. With reduced rework & duplicate material tests, enhanced material attribute fidelity & traceability, improved engineering productivity & first-time quality and reduced re-tooling & warranty recall, MIM can also lead to an average cost avoidance at OEM/supplier customers of $10-$15 million/year. It also brings about a digital thread to trace material information across the enterprise.

Dyes

Reducing product development time & costs and improving productivity by increasing the speed of the extrusion line is crucial in manufacturing. This can be done by profile extrusion with a dual cavity die, and the balancing of coextrusion dies process parameters. With high fidelity and automated workflow, the product development costs will reduce by approximately 50%, including the cost of material, die manufacturing, operator time and loss of production while testing. The dual cavity die approach can save 20 prototypes and is a cost-effective production. The product quality of the coextrusion die can also be increased with fast & easy geometry handling and high fidelity, which in turn increases production with 3x faster screw speeds with maintained stability. This also leads to higher product quality by achieving greatly improved control limits on both thickness and homogeneity of extruded layers.

Painting

Entrapped air pockets during ED-tank travel, especially inner cavities of pillars, sills, hood and door panels, can be identified and also uniform paint contact time can be achieved by electro-deposition coating, which is e-dipping. Minimising liquid paint residues carried over to successive treatment processes of cleaning and oven drying is also needed. Simulation can handle dirty (body-in-white) BIW CAD and fast transient multiphase simulation. This can identify potentially 'zero' thickness of paint regions caused by entrapped air pockets and reduce prototype testing by including bleeding holes to remove potential entrapped air pockets early in the design cycle.

Simulation tools can help predict and plan the same in parallel with car design. Multiphase fluid flow, electrostatics, particle tracking, wall film modelling, conjugate heat transfer and radiation, in other words, the physics behind car paint shop, can be modelled and tuned for perfection. By calibrating bulk properties of paint against paint shop test, one can visualise the e-coat thickness on inner cavities, where the physical process requires the teardown of the BIW. The reach of electric potential on inner cavities can be identified and remedial actions can be taken early in the design cycle. One can also test various BIW motion speeds to achieve minimum threshold and uniformity of paint thickness deposition. Thus, there is the optimisation of the residence time of BIW and improved productivity and optimisation of the anode placement to meet the coat thickness criteria while minimising power consumption.

Anti-corrosion of vehicles

Another problem area in automotive is corrosion, and simulation can assist in virtual durability testing, & new material research and optimal anti-corrosion treatment can be applied to the vehicle body by advanced complex physics: considerations related to corrosion, including electrochemistry, ion diffusion, anti-corrosion treatment such as coatings. Porous model can be used to include the effect of anti-corrosion treatment, electric potential calculation including electrochemistry and improved performance with high speed/fast test compared to actual measurement (HPC). There are numerous benefits like testing in a variety of environments, time reduction compared to actual measurement (test time scale is 'months', simulation is 'hours') & OEMs can perform many more cases than actual measurements and compare actual measurement and simulation results.

Electrode coating in battery manufacturing

Improving electrode coating quality in battery manufacturing by gaining insights into critical process parameters & operating maps of electrode slot-die coating is another crucial aspect of auto manufacturing, as is improving cell quality & safety by ensuring coating uniformity to meet the design specification. Advanced physics simulation flow solver with conjugate heat transfer

Simulation tools for manufacturers can evaluate product feasibility and optimise the manufacturing process

capability & non-Newtonian material models can use electrode coating. And this can help in well-maintained coating uniformity by optimising slot-die geometry & coating process parameters and reduced downtime by virtual tuning slot-die coating machine.

Sheet metal

Digital assembly of BIW structures and chassis components can lead to reduced physical tryouts or tests. This can avoid late process and stamping tooling/assembly jig changes and natively share models & attributes with safety engineering. High fidelity can help process-dependent stamping subassembly and BIW assembly in the virtual world long before the actual build. Computer simulations can accurately predict wrinkles, split, margin, flush and assembly spring back and material properties variations. Full process modelling includes features for component stamping to assembly jig, transfer, clamping, joining with thermal effect & assembly dimension. This can save four weeks in the product design cycle by reducing physical assembly building, tryouts & testing, geometric dimensioning & tolerancing (GD&T) countermeasures development. It can also reduce the risk of expensive stamping and assembly retooling changes, estimated at $10 million, saving over the lifetime of a model year.

BIW

Reducing vehicle weight while maintaining the same or higher performance, reducing noise, vibration & harshness BIW parts/structures and chassis components, maintaining the same manufacturing process to include stamping die, welding & assembly, e-coat and paint system and reducing late stamping die changes are crucial aspects in manufacturing and can be done by digital engineering of laminated steel stamping. High fidelity simulation in the virtual world can reduce steel usage, bring down vehicle weight up to 35% compared with monolithic steel and aluminium, increase MPG and save $1 million per vehicle programme. It can also reduce physical stamping die tryout and costly changes long before the actual die construction and save $100K per part/die set and $400K per vehicle platform.

Forming

Engineers often spend a lot of time designing and redesigning. Sheet metal forming simulation can help manufacturers detect errors, identify the most appropriate materials and determine the most efficient & cost-effective machining process to use. Simulation can deliver tremendous detail about the design, including identifying structural weaknesses where the metal might wrinkle, tear or buckle. Forming can meet the metal stamping needs of the industry, from the biggest manufacturers and suppliers to the smallest die shops.

An all-in-one forming simulation software that is built to digitally design and validate every step of the sheet metal forming process with speed and accuracy can help validate metal sheet forming with a single tool. This software simulates all metal stamping tasks through an end-to-end workflow that allows one to perform the entire die process in a single platform with the fastest solve time. One can achieve optimal performance and enhance productivity by reducing die cuts and redesign. It is a comprehensive platform to meet all metal stamping needs with the ability to monitor each stage with pre-sets, including feasibility, formability and spring back. Thus, manufacturing and process engineers will streamline their workflows and achieve consistent solutions every time.

Creating innovative, manufacturable products

Simulation tools for manufacturers can not only evaluate product feasibility and optimise the manufacturing process through SDfM but can also run virtual try-outs for many traditional and also Additive Manufacturing processes. Implementing simulation early in the design stage allows engineers to create innovative, manufacturable products beginning at the earliest stage of production. □

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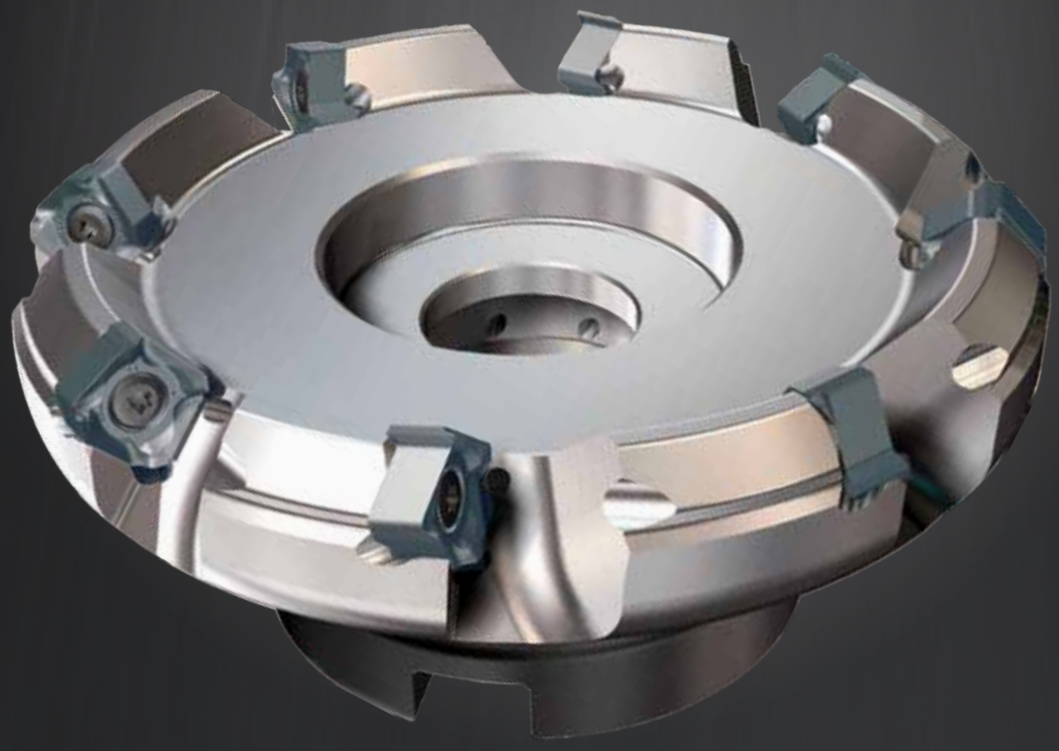

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Success Story: Superior lubrication for enhanced performance

For manufacturers, reducing unwanted breakdowns and ensuring greater profitability are key priorities – to achieve these goals, choosing superior lubrication solutions along with ensuring quality care can make a remarkable difference.

Industrialization has introduced great variation in the manufacturing process – whether in use of equipment, choice of method or nature of investment. Nonetheless, across sub-sectors of manufacturing, there is pervasive use of precise equipment and specialist tools. Just as investing in the most advanced machinery is important, manufacturers must also ensure good equipment health and perpetuity with minimal damage. Here, the choice of lubrication solution can make a big difference in extending machine life and ensuring quality performance.

With 150 years of experience in lubrication innovation, Mobil™ Lubricants has made rich investments in research and development to formulate the most advanced solutions and services. Mobil also partners closely with businesses and its association with Unicast Autotech Pvt. Ltd. is one such instance of customer counselling.

Association with Unicast Autotech

Unicast Autotech Pvt. Ltd. is a leading manufacturer and supplier of automobile parts and accessories, based out of Narsapur, Karnataka. The company runs on 39 CNC, turning & milling centres that were being lubricated with a market general soluble cutting fluid. However, contrary to expectations, the equipment was experiencing higher consumption while regularly discharging unwanted foul odour. The increased lubrication requirement was resulting in dipping productivity while the stench caused inconvenience in conducting regular activities on the shop floor.

To seek advice and improve prevailing conditions, Unicast

The Mobilcut™ Series consists of high-performance water miscible metal removal fluids

Autotech approached the Field Engineering Services (FES) team at Mobil. The FES team conducted thorough studies and investigations to ascertain the most appropriate solution. Thereafter, based on requirement, consumption pattern, and metallurgy of the machine, the FES team recommended the use of Mobilcut™ 250 – a high performance, versatile, semi-synthetic, water-soluble metalworking fluid that can be used on aluminum alloys, steel alloys and other metals for turning, drilling, milling, tapping, reaming and grinding operations.

With the switch, Unicast Autotech witnessed immediate results by registering savings of ₹3,90,000 per annum, oil cost reduction of 8% and tool cost reduction of 7%. It also resulted in improved surface finish and an odour-free shop floor. Besides, the company also experienced a reduction in top-up by 19% and an increase in sump life by four months.

Innovation at Mobil

Solutions by Mobil Lubricants have been developed across years of focused research and innovation. Duly, these products cater to specific industrial needs across a variety of sectors. The Mobilcut™ Series consists of high-performance water miscible metal removal fluids. Formulated with leading edge base oils, additives and emulsifiers, this series of non-chlorinated products provides dependable performance in a wide array of metal removal processes. Low-maintenance and inherently stable, these products are designed for the modern machine shop where long service life, excellent machining performance, health and safety, and environmental concerns are important factors for increased productivity. The Mobilcut 250, a part of the series, is a high performance semi-synthetic fluid formulated to enhance performance when machining aluminum and aluminum alloys and where low staining potential is important on sensitive components. Containing high levels of lubricity agents, it provides high machining performance of carbon, alloy steels and yellow metals. It may also be used on a wide variety of ferrous materials where a more versatile fluid is required.

For manufacturers, reducing unwanted breakdowns and ensuring greater profitability are key priorities. Choosing superior lubrication solutions along with ensuring quality care will aid this goal with assured machine health and continuous long-term performance. □

For more information visit www.mobil.in/business

(Exxon Mobil Corporation has numerous affiliates, many with names that include ExxonMobil, Exxon, Esso and Mobil. For convenience and simplicity, those terms and references to 'corporation', 'company', 'ExxonMobil', 'EM', and other similar terms are used for convenience and may refer to one or more specific affiliates or affiliate groups.)

The significance of rolling bearings in an evolving EV market

The increase in penetration of electric and hybrid vehicles has emphasised the significance of advance technologies in rolling bearings. Moreover, the high speed of the electric motors used in EV & HEV powertrains asks for the use of customised bearings. This article talks about the right electrification bearing strategy, EV bearings in the Industry 4.0 era & the effect of COVID-19 on the electric bearings industry.

Dr Maruti Khaire,
Head – Electrification and Special Projects,
SKF India

We have been seeing an unprecedented transformation in the automotive industry in the last few years, from ICE engine vehicles to electrification of vehicles. While this is basically being driven from the western world, we no longer see that action lagging in India. Having said that, if we take 2021 as the base year and try to look at the outlook for 2030, then we expect about a 40% CAGR base for electrification in India. If we look at current electric vehicle bearings, the bearings required are standard bearings. Purely from the electric vehicle perspective, it is going to be the same 40% CAGR but on top of whatever the ICE vehicle growth is going to be. And that's how the electric bearing market is going to grow.

Current trends in electric bearings industry

The current technology trends in the Electric Vehicle bearings industry are as follows –

1. Lower friction bearings
2. Electric insulations or conduction
3. High-speed bearings
4. Low friction greases
5. Weight reduction

Encoder bearing unit

The right electrification bearing strategy

Electrification bearings are, of course, different from ICE engine bearings; in ICE engine bearings, we typically have noise suppression and a lot of noise tolerance that comes from the engine, whereas in electric vehicle bearings, we need to have specifications around noise vibrations, which have to be stringent. Secondly, it should be an electric conduction compatible bearing and it has to be a power-dense bearing. The electric vehicle powertrain is becoming compact and the vehicle weight has to be as lightweight as possible, because we'll be putting a battery into the vehicle. Therefore, in order to facilitate that, we need to have bearings which have a higher load carrying capacity per unit area. Besides, the bearings need to be maintenance-free, as it is difficult and complex to do the maintenance in addition expectation of EV to have higher up-time.

These are the fundamental requirements for electric vehicle bearings. Hence, companies have to build their strategy around this. When we talk about portfolio building for electric vehicles, the portfolio must be aligned to these basic drivers. It's not necessary to create everything new in a portfolio; one can enhance the current electric vehicle bearings portfolio as well. Plus, we also need to think if we want to go for steel rollers or non-metallic rollers like ceramic bearings, etc. Hence, the strategy has to be aligned with what is required by the powertrain and not from a volume perspective.

The barriers & driving factors

When we talk about bearings in electric vehicles, we divide them into two parts – near-term and long-term. Taking the near-term part into consideration, if we look at the current electric vehicles getting into the market, the volumes are very small. So, that is one of the barriers for making customised bearings for electric vehicles. What's more, customers are also more aware and try to adopt the bearings which are coming off-the-shelf for them. They are looking for off-the-shelf bearings selection so that their development time will be smaller and they will be able to address the application bearings within a short time and lower cost.

But there are driving factors too – that is the larger portfolio. People are looking for off-the-shelf selection of bearings; they don't want to develop or customise bearings. Hence, they expect that a catalogue is wide-ranged so that they can pick it up from there itself and put it to their use.

Electric vehicle bearings in the Industry 4.0 era

Industry 4.0, as it turns out, complements that which is required by the electric vehicle bearings. If we go 10 years back, bearing noise was not a topic of discussion most of the time, unless it was a peculiar noise. But as our powertrains have become more silent, bearings noise is becoming a special consideration. Hence, we cannot achieve the stringent specification of bearings by using conventional manufacturing practices. And thus, Industry 4.0 helps to achieve these stringent specifications.

The effect of COVID-19 on the electric bearings industry

While COVID-19 has had a negative impact on a majority of industries across the world, it has, in fact, had a positive effect on the electric vehicle bearings industry. The electric vehicle sales in the later part of 2019 and in 2020 went down. However, in the second part of 2021, we have seen a good momentum in the sale of electric vehicles from what it was in 2020. Tata Motors alone has sold in excess of a thousand vehicles in a month. So, when the electric vehicles sales gets boosted, so does the electric bearings market. □

Images courtesy: shutterstock

Immersive technologies: A 'reality' revolution in manufacturing?

The benefits of immersive technologies such as AR and VR have been actively discussed across various platforms for the last couple of years. It is assumed that these technologies can fire up the manufacturing industry to ensure India's GDP reaches the $5 trillion mark, but how does it amp up the manufacturing industries from its old, instilled ways? The article elaborates on the applications of AR and VR in various strata of the manufacturing sector and how it can help it grow out of time-consuming, redundant cycles of functioning.

Mohit Gulyani,
Senior Director,
Manufacturing- as- a-Service Vertical, Moglix

The 'Make in India' project has established a high benchmark of transforming India into a $5 trillion economy by boosting the manufacturing sector's growth to more than 12% per year, creating 100 million additional manufacturing jobs in the economy by 2022 and increasing the manufacturing sector's contribution to GDP from 16% to 25% by 2025. Integral to achieving this vision will be the upward movement of Indian manufacturing to higher echelons of quality, innovation and value addition. The adoption of immersive technologies like Augmented and Virtual Reality can enable Indian manufacturers to make this happen.

Key growth drivers of immersive technologies

One of the major lacunae that have continued to constrain the growth of Indian manufacturers is the deficit of design and drawing capabilities. Virtual Reality (VR) and Augmented Reality (AR) are ready for commercial use, and

People are prototyping virtually and in 'interactive 3D' using AR and VR because that helps the thought process and helps reduce failures, if any, in the prototyping phase

some of the most promising applications for these technologies are in industrial manufacturing and design. When it comes to AR and VR, early adopters in the manufacturing business are thinking creatively. As they look to the future, they are considering how to leverage potentially disruptive technology to improve worker safety, accelerate new product development, cut training costs and boost productivity, to mention a few applications.

Prototyping and product design: We can see the use of AR and VR in designing complex and critical systems that will become the manufacturing processes of the future. People are prototyping virtually and in 'interactive 3D' using AR and VR because that helps the thought process and helps reduce failures, if any, in the prototyping phase. The term trial and error stemmed from the prototyping philosophy of building, failing and repairing what did not work. These steps can be emulated in virtual environments, resulting in a lower wastage of raw materials. Of course, it doesn't replace the actual prototype, but it certainly helps come closer to the final product with fewer failures and in a faster timeline.

AR and VR will enable superior value engineering, a much more detailed value analysis, better sourcing and strategic supplier capability mapping since having a more detailed view on what needs to be sourced and how. This helps plan production efficiencies and improve supply chain management as well. For larger projects, especially in heavy engineering and construction, this helps save a lot of time, effort and money.

Product development: The next logical step from product design is the actual development of the product. Using VR or AR in this process helps identify any flaws using a technique called digital twinning. In manufacturing, a digital twin is a virtual replica of the as-designed, as-built and as-maintained physical product, complemented by real-time operational business intelligence based on a physical product, operational processes or machinery settings. This same process can help build as well as maintain these products remotely or virtually. Advanced virtual simulation technology is now an essential component of the digital twin. Comprehensive simulation platforms can continuously model and evaluate the functionality of a product design, allowing designers to validate their concepts as they go.

Training and upskilling: Numerous studies show a decrease in the number of individuals available for industrial positions, as well as a widening skill gap. According to a 2015 Deloitte report, 2 million of the 3.5 million open manufacturing positions in the United States would go unfulfilled over the next decade due to a shortage of trained labour. AR and VR may accelerate new employee onboarding and increase worker productivity by providing more immersive on-the-job training. AR smart glasses that show video, images and text may visually train a worker through step-by-step assembly or maintenance operations. For example, the worker has to look at the machine part to be fixed to conduct a repair. This also provides an opportunity to upskill specific talents, especially manufacturing & engineering and become future-ready using AR and VR.

Product maintenance: Maintaining assets in the field have historically been a time-consuming and expensive activity, but it is essential to the uptime of equipment and smart manufacturing systems. Maintenance professionals can now use AR to access virtual engineering models and overlay these models over the actual equipment on which they are doing maintenance by wearing specialised AR goggles or

Factory planning — where to locate tools, equipment and staff – is critical for productivity and efficiency in mass-production manufacturing

glasses. This enables them to apply the most accurate and up-to-date engineering, assisting in effectively performing the necessary maintenance and performance criteria.

Technicians can use handheld devices to execute real work, input how long it takes to complete work orders, search through old work orders and log out of the system. Because all information is captured in real-time, managers may view it at any moment. New-age systems could combine the ability to track work, document it and send it to managers with wearable technology. This system can provide engineers with an elevated view of assets via thermal technology or the ability to see instructions on assets and use that data to train new hires without worrying about onboarding.

Factory planning: Virtual technology can be employed for factory floor design and manufacturing trade shows. Factory planning — where to locate tools, equipment and staff – is critical for productivity and efficiency in mass-production manufacturing. Engineering a new factory or modifying an existing one entails planning, testing and trials, and any unforeseen delays or production line halt, even if brief, may be costly. Virtual technologies have the potential to simplify and significantly reduce the procedure. Before modifications are made in the actual world, virtual plants may help evaluate production flows and how employees and robots accomplish jobs.

Inventory management

Warehouse managers and personnel will be able to handle goods hands-free thanks to AR. Workers may obtain precise instructions on how to accomplish a certain operation using AR smart eyewear. A worker, for example, can see the essential information shown on the screen, such as the order number, trolley number, bin information (where the robot must drop the items) and passage number. This data will assist employees in selecting which goods should be placed into which bin. As a result, personnel can complete the loading and unloading operation quickly.

AR and VR for the future of manufacturing?

More and more industrial and engineering companies are realising the benefits of AR and VR. Aerospace, automotive, energy, defence and medical industries are among those benefiting. Prime manufacturers are rapidly integrating their supply chain SMEs into their AR and VR setups, with digital models and cross-functional teams being immediately integrated.

AR is bringing precision to production and empowering workers with state-of-the-art methods for efficiency and ease. Through personalised guidance, automated support, better monitoring and analysis of faults & flaws, this technology assists people in focusing on their work and having an eye for detail.

The ability of new-age technologies such as AI, Big Data and IoT to make manufacturing smarter and more inventive has received a lot of attention in recent years. And today, the potential of AR for manufacturing is only beginning to be explored, signalling enormous potential. Because of the development of sophisticated technology, every critical activity previously carried out by a time-consuming, manual method is now automated, simplified and painless.

It is yet too early to tell if AR and VR investments indicate a coming revolution that will forever change manufacturing as we know it or if early adopters are experimenting. In any case, virtual technology in production is no longer just hype. □

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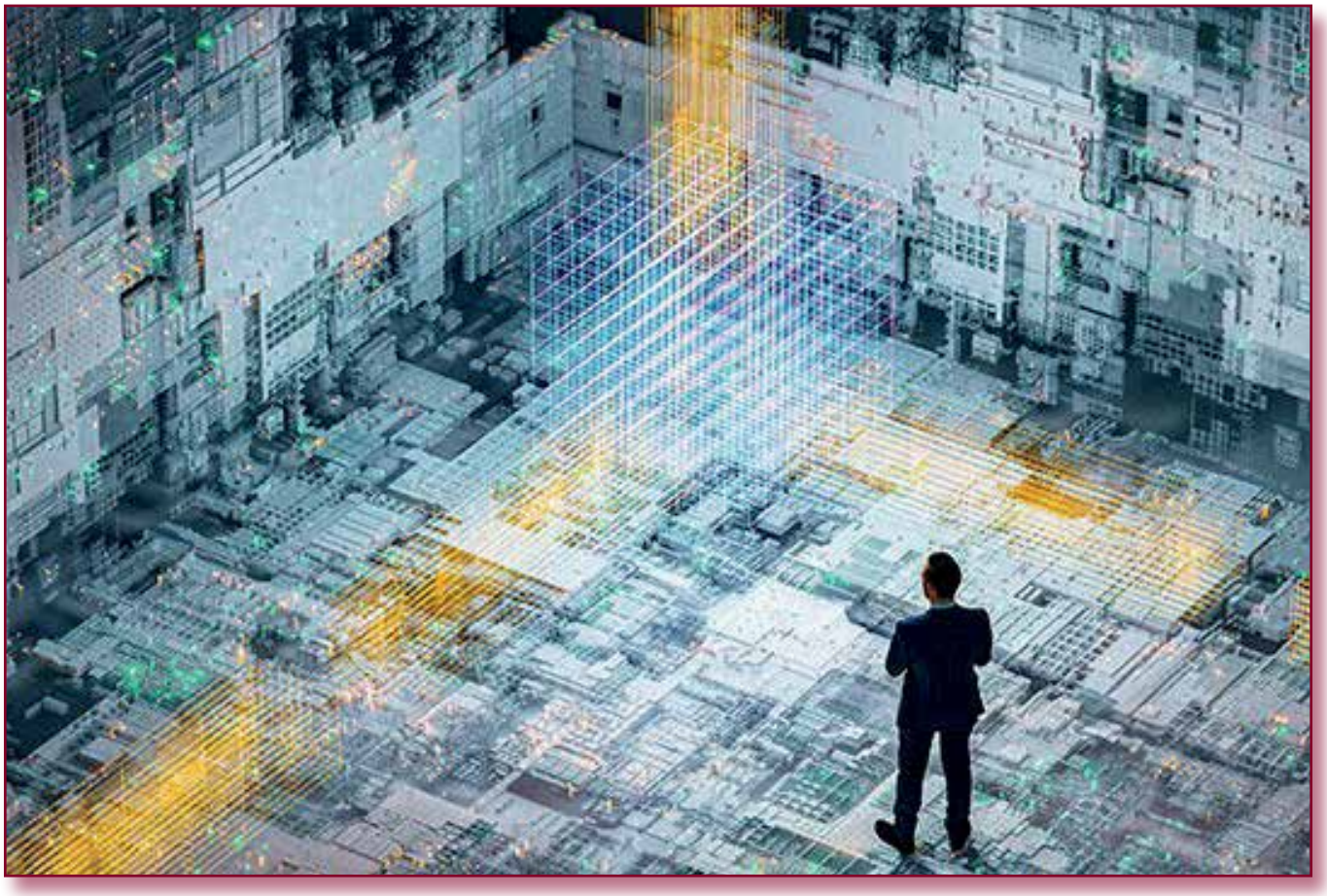

The pros and cons of blockchain in supply chain

Blockchain has been a technology of interest for the manufacturing industry owing to its decentralised and immutable data input technology, which builds up trust, efficiency and transparency across the supply chain. However, it also has its fair share of downsides which have rather not been emphasised on. The article elaborates on the effect of blockchain in supply chain whilst discussing its pros and cons.

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Blockchain has been heralded as a cutting-edge technology that will improve the contemporary supply chain structure by increasing supply chain trust, efficiency and transparency. However, as promising as blockchain technology is, blockchain is not a panacea for supply chain issues. There are numerous pros and cons of using blockchain in the supply chain:

Some pros of blockchain

- **Trust:** Because data on the blockchain is decentralised and immutable, members of the supply chain can trust the data they see on the blockchain. Conversely, a traditional supply chain data storage structure typically requires all members of the supply chain to keep their own records, and therefore disputes arise when those records do not match up.
- **Efficiency:** Because all data is recorded at every step in the supply chain, and every member of the supply chain can see the data, it is easy to quickly identify where in the supply chain a nonconformance (eg, a product defect or missing product quantity) has occurred because the life

cycle of a product is tracked at every step.

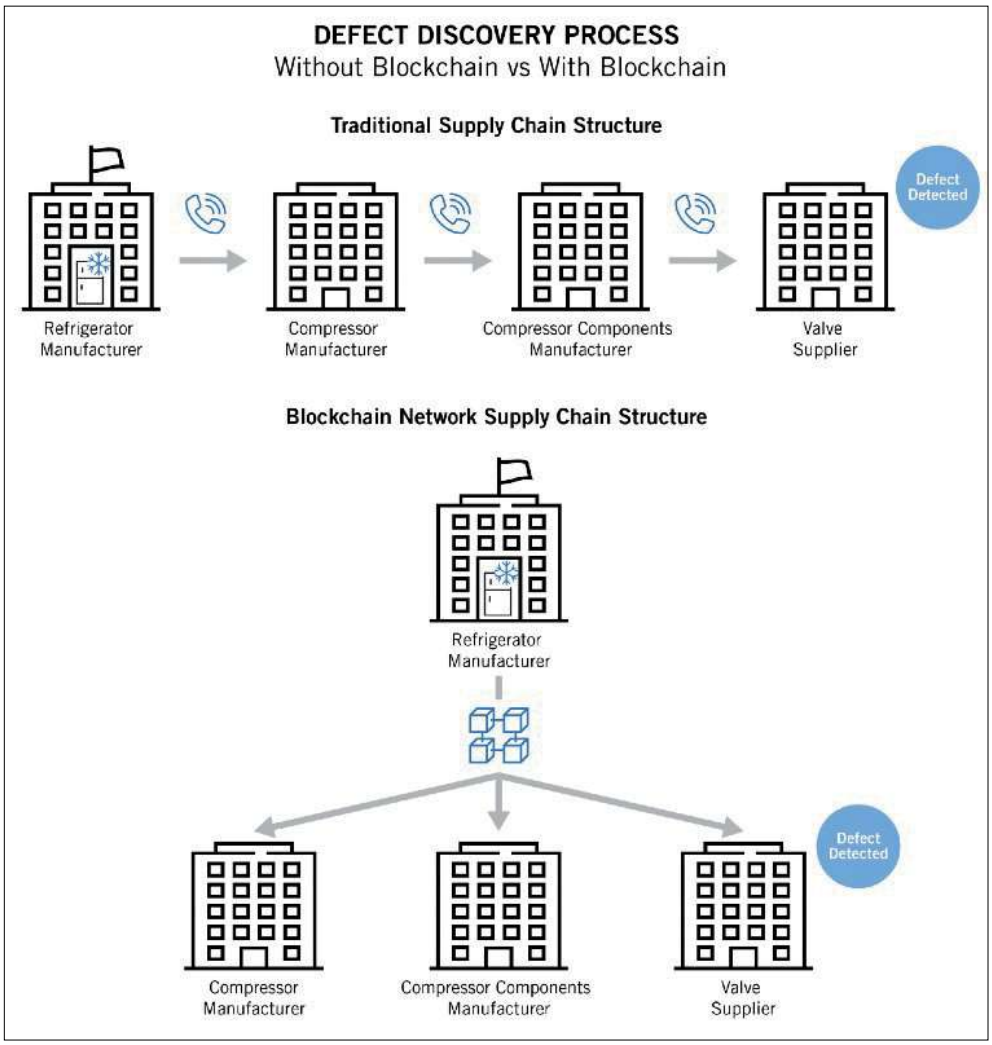
Let's take, for example, the construction of a refrigerator. In the case of a traditional supply chain structure, if the refrigerator manufacturer discovers that the compressor of a finished refrigerator contains a defective valve, the refrigerator manufacturer will then need to reach out to the compressor manufacturer, who will need to reach out to the manufacturer of compressor components, and so on and so forth, up the supplier tiers until the supplier of the defective valve is reached. In contrast, if all members of the refrigerator supply chain were members of the same blockchain network, the refrigerator manufacturer would be able to query the blockchain to find the entire tracing history of the defective valve almost instantaneously, cutting investigation time down considerably. Using blockchain technology allows for less time lost sending emails and making phone calls to find out the cause of the nonconformance. Additionally, because documents are stored on a shared ledger, physical paperwork is largely unnecessary.

- **Transparency:** Blockchain engenders transparency because all data on the blockchain is recorded automatically with a time stamp, including certain data that usually would not be recorded in a traditional supply chain system (such as the steps completed in a production process or the time of a seller's receipt of a purchase order). Blockchain technology also creates transparency by enabling end-to-end tracking (i.e., traceability from one end of the supply chain to the other), which can be enjoyed by all supply chain members on the blockchain. Blockchain transparency can accomplish quicker resolutions to disputes than with traditional supply chain systems.

Some cons of blockchain

- **Permissioned blockchains:** Because supply chain information can be sensitive, a permissioned blockchain (ie, a blockchain that is not open to the public) is usually preferred. However, a permissioned system is less secure, because there are fewer nodes to make up the blockchain, and those nodes are typically known to each other, resulting in an easier ability to collude to change a block.
- **The human element:** While there is great value in all members of a supply chain knowing that the data on the blockchain cannot be changed once it is established, there can still be human error or intentional misconduct in inputting the initial data onto the blockchain. Therefore, blockchain data is not perfect information – it could be false or even fraudulent.

For instance, a bad actor could fill a container with rocks and record it on the blockchain instead that the container was filled with auto parts. Blockchain technology could



make it easier to detect at which stage in the supply chain the container was filled with rocks but would not prevent the fraudulent data from hitting the blockchain in the first place. Essentially, blockchain technology does not prevent incorrect information from being entered onto the chain; it just allows every user on the blockchain to confirm that the data on the blockchain has not changed since a certain point in time. Because blockchain technology is traditionally immutable, fraudulent data inserted onto the chain is problematic. Accenture has developed a prototype to allow authorities of permissioned blockchains to edit previous transactions in extraordinary circumstances in order to resolve the human error, although some blockchain technologists have criticised such approaches to blockchain, stating that erasing immutability defeats the purpose of using blockchain over a traditional database.

- **Scaling:** Blockchain solutions are far slower to process transactions than traditional databases because the transactions must be validated on many different computers or servers. In addition, due to the high volume of transactions in the supply chain, having a permissionless aspect of a blockchain solution could be costly since transaction fees would need to be paid to fund the work performed by the miner nodes to create the blocks. Considering certain supply chains execute millions of transactions a day, the method in which blockchain technology is implemented must be thoughtfully approached with an eye towards scalability.
- **Upfront costs:** The upfront costs of implementing a blockchain solution have the potential to be steep. There are costs associated with hiring blockchain developers, which tend to cost more than traditional developers due to their specialised areas of expertise. Planning costs, licensing costs & maintenance costs can also contribute to a hefty price tag.

Well-tailored blockchain = Well-managed supply chain

While blockchain technology can potentially provide huge advantages to supply chains, there are also potential disadvantages that make it clear that any blockchain solution must be well-tailored to the targeted supply chain. □

Integrated platform for capsule filler

IMA Active, in collaboration with **B&R Industrial Automation,** recently created a compact yet full-featured new capsule filler that delivers unprecedented production density, the ADAPTA 50. It offers the same total in-process control, impeccable precision and dosing flexibility of the larger ADAPTA 100/200 on a one-third smaller footprint. Through collaboration with B&R's experts, IMA Active was able to master specific challenges, like heat dissipation & data-intensive processing, while at the same time maintaining a holistic approach to the overall concept. ADAPTA is innovative and is able to dose powder, pellets, tablets, minitablets and liquids into hard gelatine capsules. The new ADAPTA 50 capsule filler can reach a speed of 50,000 capsules/hour. The smart use of electrical motorisation is made for an endless adjustment capability of the filling unit, tailoring set-up of each product and optimising dosing precision. The built-in upside-down gravimetric scale ensures maximum accuracy in weight control and improves the quality of the final product also in case of product combination, allowing for 100% net weight control of each component.

ADAPTA 50

B&R Industrial Automation | Pune
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Bar peeling inserts

Dormer Pramet recently offered a range of cutting tools, specifically for bar peeling applications. This offers standard and special tools that ensure high efficiency, optimal surface quality and reliability in a range of peeling operations. In a recent addition to the bar peeling inserts, the company displays the geometry of the insert (PM), the variant of support facet on flank surfaces (S01, S02 or S03) and the grade on the tool. This helps the customer to recognise the difference between inserts with the same size and geometry, but a different edge preparation. Also, accurate holding cassettes have a significant impact on the machining process. The company can make custom-made cassettes using the highest quality tool steels that will match the machine tool specifics. Pockets on these holders are designed to utilise standard inserts, while spare parts are also available within the assortment. Production of special indexable tooling to meet the specific needs of customers is also possible. To showcase the wide range of tools for bar peeling, Dormer Pramet has produced a new catalogue which outlines the wide range of indexable inserts and cassettes that are used on machine tools of different manufacturers.

Bar peeling

Dormer Pramet | New Delhi
E-mail: lakshmipriya.nair@dormerpramet.com | Tel: +91-11-46015686

Six-fluted solid carbide trochoidal milling cutter

MAPAL recently launched the OptiMill-Tro-Inox, which is a new, six-fluted solid carbide trochoidal milling cutter to ensure highly productive machining of stainless steel (Inox). The OptiMill-Tro-Inox solves various challenges through an optimal ratio between the number of cutting edges, chip breakers and a new type of flute shape. The modern multilayer coating is another key advantage of the six-flute solid carbide trochoidal milling cutter. This counteracts adhesive wear and, combined with the carbide matched to the application, ensures optimum results. Initial applications underline the performance potential of the OptiMill-Tro-Inox, as compared to well-known market solutions with four or five cutting edges, the new six-flute trochoidal milling cutter stands out with a 20% increase in material removal rate and has a 30% longer tool life. The tool achieves cutting depths of up to 5xD reliably in one pass. The optimised helix angle also reduces the extraction forces which increases process reliability. The OptiMill-Tro-Inox is available in the diameter range from 4–20 mm in the designs 2xD to 5xD and will be available from stock from February, 2022.

OptiMill-Tro-Inox

MAPAL India | Bengaluru
Email: rajeshkumar@mapal.com | Tel: +91-97414 99824

Nickel-iron-chromium alloy in bar and hollow bar

Sandvik recently launched a nickel-iron-chromium alloy in bar and hollow bar, Sanicro® 825, for improved performance in corrosive, high-temperature environments. A high-strength alloy with minimum 40% nickel content, Sanicro® 825 has corrosion resistance to acids and alkalis, superior resistance to stress corrosion cracking (SCC) and good corrosion resistance to phosphoric, nitric, sulphuric & organic acids, seawater, caustic chloride alkalis and ammoniac media. Stable, easy to machine and weld, the new alloy is ideal for use in a wide range of components and installations including heat exchangers, evaporators, offshore piping systems, seawater coolant, valves and flanges. It serves a multitude of industries including oil and gas, chemical, petrochemical, pulp and paper, pickling equipment, nuclear fuel processing and food processing. Available in three to seven metre lengths with an outside diameter (OD) ranging from 20-260 mm, Sanicro® 825 offers a cost-effective alternative to superalloys, such as Alloy 625 and Alloy 718. Its chemical formulation has been tailored within EN, UNS and ASTM standards.

FBX flat-bottom drill

Sandvik Asia | Pune
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Superior lubrication monitoring for successful manufacturing

In today's industries, condition-based maintenance practices have gained widespread acceptance. Key business players are increasingly realising that oil analysis is a critical component of any efficient equipment monitoring programme. Duly, industry leaders like Mobil™ Lubricants are driving innovation to formulate more efficient services to attend to evolving industry needs.

Mobil's Mobil Serv℠ Lubricant Analysis (MSLA) is a step in the direction of more efficient monitoring and analysis. MSLA eases the lubrication monitoring process while producing reliable results that help maintenance professionals make the best decisions for their operations. The programme also creates informative reports on the condition of equipment & lubricant usage – backed by unmatched flexibility, expertise, and quality assurance typical to Mobil.

Oil analysis programmes might seem to be all the same but with a closer look, one will see clear differences. MSLA provides a thorough examination of Mobil-branded lubricants. It provides critical information on the health of a company's operations to aid:

- Enhanced equipment reliability to increase productivity
- Lower maintenance costs and unplanned downtime
- Improved equipment durability
- Reduced lubricant consumption

With MSLA, businesses receive the benefit of Mobil's expertise and knowledge that have been gained through working closely with original equipment manufacturers (OEMs). Further, MSLA can improve performance significantly by taking a proactive, predictive approach to maintenance with:

Safety: Through long oil drain intervals (ODIs) and strong component protection, which can reduce the need for employee-equipment interaction.

Environmental care: Through reduced waste due to long lubricant and equipment life.

Productivity: Through improved maintenance planning, which can help avoid unplanned equipment downtime.

MSLA also provides precise analyses & detailed, actionable recommendations through an intuitive interface for easy account management and fast results accessible on a computer or mobile device.

With MSLA, one can rely on Mobil's in-depth knowledge of product and service delivery

The MSLA programme provides one with precise analysis through an intuitive interface for fast results accessible on a computer or mobile device

Mobil's strong heritage of hands-on application expertise provides reliable analysis

Crucial analysis & convenient access

Designed to monitor key performance indicators based on international standards and on the specifications of leading equipment builders, MSLA provides one with:

Flexibility

- To choose the specific analysis that fits one's needs.
- To use time saving scan-and-go technology for sample registration.
- To receive and view sample results anywhere.

Expertise

- To use proprietary test control limits set specifically for the equipment.
- To help one set up & operate an optimal analysis programme through robust field support.
- To identify problems, establish causes, and recommend actions.

Quality assurance

- Through best-in-class, regularly audited practices and methods.
- Through commitment to consistent and accurate analysis.

Choosing an MSLA service

MSLA provides analyses options based on specific equipment application and desired analysis service level. These service level options use the 4-ounce (120 ml) bottle kit. For extended service level options, one should use the metal 1-litre tin kit.

MSLA also provides unparalleled knowledge of Mobil's lubricants that have been formulated through 150 years of industry experience and close OEM relationships. Mobil's strong heritage of hands-on application expertise adds reliability. The overall assessment focuses on three areas that help identify:

- Equipment condition
- Contamination
- Lubricant condition

The report by MSLA comprises an easy to read, colour-coded performance assessment with red indicating alert, yellow as caution and green as normal. If one knows what to look for in the analysis report, MSLA's detailed oil analysis can unlock a wealth of information on the condition of equipment. For business leaders, MSLA brings much-needed precision in decision-making with timely alerts and thorough review of operations as they unfold.

(Exxon Mobil Corporation has numerous affiliates, many with names that include ExxonMobil, Exxon, Esso and Mobil. For convenience and simplicity, those terms and references to "corporation", "company", "ExxonMobil", "EM", and other similar terms are used for convenience and may refer to one or more specific affiliates or affiliate groups.)

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Operating system for TwinCAT 3 applications

Beckhoff recently presented its new operating system, TwinCAT/BSD, for Industrial PC platforms. It combines the advantages of Windows CE – low cost and small footprint – with the numerous features of large Windows operating systems. It, therefore, is also an alternative to Windows 7 or 10 in many applications. The new operating system combines the TwinCAT runtime with FreeBSD, an industrially tested and reliable open-source system.

TwinCAT/BSD provides users with many new options in the Beckhoff IPC world. As the successor to Windows CE, customers can expect a larger range of functions. The robust ZFS file system and the tools provided by the company for the creation of restore points and backups guarantee data integrity and stability. The installation of software and the updating of the complete system via the Beckhoff Package Manager as well as the option to use Docker containers provide extra added value in comparison with Windows systems. Without a standard desktop, but with a lean HTML5 web browser and further options to realise HMIs, the customer is only given what is absolutely necessary for visualisation, while the system remains streamlined. However, If necessary, the system can be adapted with a wide range of software add-ons so that it optimally meets the wishes and needs of the customer.

Images courtesy: Beckhoff Automation

TwinCAT/BSD

Simple-to-use FreeBSD

It uses the FreeBSD open-source operating system, which is characterised by its compact size, stability and performance. In addition, it promises special advantages for use in the automation industry with many valuable functions. The familiar programming environment of TwinCAT 3 XAE in Visual Studio® is retained. A Windows programming computer is still used, which connects to a TwinCAT/BSD target system via network.

The roots of FreeBSD lie in the Berkeley Software Distribution (BSD). This operating system, developed by the University of California, Berkeley, improves and extends the functionality of the original Unix. In the course of this development, an operating system was developed that now contains almost no original Unix code and was published under its own license – the very permissive BSD license.

On account of the BSD license, Beckhoff has opted for FreeBSD which enables the integration of TwinCAT without licensing problems. FreeBSD supports both 32- and 64-bit platforms and makes scalable systems possible with ARM CPUs extending up to powerful Xeon CPUs. The system – and thus also TwinCAT/BSD – supports ARM CPUs up to Intel® Xeon® processors, providing a scalable platform from small, embedded controllers to high-performance IPC controllers.

TwinCAT

TwinCAT/BSD supports all TwinCAT 3 runtime functions. The programming is still carried out with the familiar Microsoft Visual Studio®-based TwinCAT 3 XAE from a Windows development computer. TwinCAT/BSD offers multi-core support, allowing individual cores to also be reserved for the exclusive use of TwinCAT.

In addition to the TwinCAT HMI Server, a modern HTML5 web browser can be used as a client for TwinCAT HMI. The configuration takes place as usual via the graphic editor of the TwinCAT 3 XAE development environment.

Highlights

As user is familiar to the Windows operating system, TwinCAT/BSD provides a write filter. This protects the system against persistent changes. With the write filter activated, the system works in a previously defined state following a restart.

A TwinCAT/BSD system can be backed up and restored using a USB stick that offers similar functions as the Beckhoff Service Tool for Windows operating systems. A backup can also be created from the live system, which is backed up locally or via the network to a remote system.

The current minimum size of a basic image is around 300 MB, with a very small RAM consumption of less than 100 MB. Therefore, very compact controllers can be realised with TwinCAT/BSD and all TwinCAT 3 runtime functions can be used.

The already well-known IPC Device Manager is also used for the configuration of the system under TwinCAT/BSD. This can be done via website or also under program control via the familiar ADS Secure or OPC UA interfaces.

On account of its FreeBSD basis, TwinCAT/BSD also includes the well-known container technology Jails as standard. Jails have been part of FreeBSD since the year and stable. In addition, it is also possible to use docker containers by means of virtualisation.

This operating system offers multi-core support, making it possible to reserve individual cores exclusively for TwinCAT if required. In addition to a large number of FreeBSD and Linux programs, TwinCAT functions can also be installed via the Beckhoff Package Server. Moreover, uncomplicated updates of the operating system and the TwinCAT runtime are possible in this way via the network.

Beckhoff Automation | Pune
Email: info@beckhoff.co.in | www.beckhoff.com/twincat-bsd

Highlights - December 2021

» **Medical Machining**
In the new normal, with the move towards minimally invasive surgery and micro-machined parts, medical device manufacturing is expected to experience growth for years to come. In the coming edition, some of the latest trends in medical machining will be discussed.

» **Smart Logistics**
As e-commerce continues to reshape the market, logistics capabilities have proved that they are more crucial than ever for getting products to the customer intact and on time even during the pandemic. And, as commerce gets smarter and expands into more channels, supply chains are turning to IoT-based smart solutions. The next issue will focus on the applications and various aspects that are currently being considered to improvise the supply chain.

» **Precision Machining Technology**
From the production of aircraft aluminium alloys to surgical bone drilling devices and custom automotive tools, precision machining reaches into every technology and industry. The forthcoming issue talks about the blueprints of the updates in this technology.

» **Manufacturing & Data Analytics**
Manufacturing dashboards and data analytics can streamline operations by giving more dedicated and actionable insights that continuously help to alter the production line. The subsequent issue throws light on how data analytics can result in clear enhancements across manufacturing operations, how it is being used to direct the industry towards fresh spaces and what are some data analytics mistakes that manufacturers should avoid.

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