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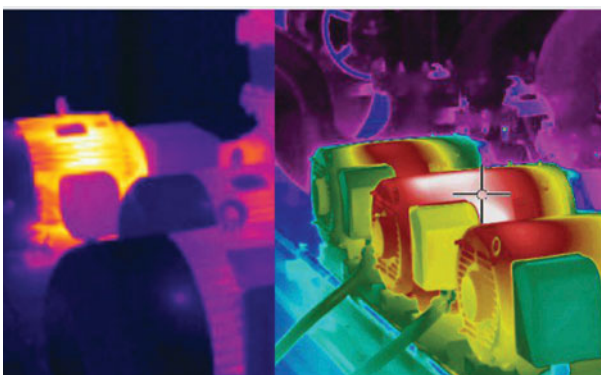

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EDITOR'S NOTE

Capitalise on smart-edge technologies

The Government of India has put forward a target of increasing contribution of manufacturing to India's GDP from the present 16-17 per cent to 25 per cent by 2025, for which the manufacturing sector will have to grow from $ 300 billion to $ 1 trillion. To reach near this ambitious figure, Indian economy will have to record annual growth of about 10 per cent with major contribution coming from exports.

With Production Linked Incentive (PLI) scheme, the government intends to make India a global manufacturing hub. Multinational companies (MNCs) are looking at India with renewed interest to scale-up their manufacturing footprint. For example, Apple, is reportedly examining to shift one-fifth of its production to India. US-based Tesla has also publicly announced its intention to start a production unit in the country, as the electric vehicle (EV) giant draws up plans to achieve its ambition goal to launch 20 million vehicles by 2030.

The global interest in India's manufacturing abilities comes with the consistent progress of this industry and its willingness to adopt new technologies such as Industry 4.0 to improve outcomes while enhancing profitability. Capitalising on Covid disruption, domestic companies opted digital-first ways of working to ensure real-time decision making, respond to fluid market conditions, changing customer needs and disrupted supply chains with agility and accuracy.

Under such conditions, embracing smart manufacturing technologies is an imperative for producers in India. Indian arms of MNCs have already kickstarted projects to harness the power of advanced automation solutions. GE has reportedly spent over $200 million in a flexible advanced manufacturing plant to produce diverse products, from jet engine parts to locomotive components. Similarly, Indian steelmaker JSW Steel plans to create a network of digitally connected smart steel factories in India by FY25 by deploying advanced technologies such as enhanced artificial intelligence (AI), machine learning (ML) & robotics and connected cloud capabilities.

Discrete manufacturing is one of the big beneficiaries of Industry 4.0 and smart manufacturing, and this is where the good news for MSMEs is. MSMEs could concentrate on the two critical aspects - Internet of Things (IoT) and big data processing - to ramp up volumes, quality, delivery compliance through better production planning and improve profits through synchronous manufacturing. Another area of opportunity for MSMEs and start-ups is 3D printing (or additive manufacturing), which is going to revolutionise industry itself, by taking us back to the era of craft manufacturing. In addition, rise in smart manufacturing will increase demands for products such as wires & cables, electronics, etc, which can be exploited by MSMEs.

Experts believe in order to be counted among the top global manufacturing hubs; a country has to have high manufacturing productivity. China's manufacturing labour productivity is four-to-five times higher than that of India - mainly due to their investments in robotics and automation over the years. While China has a robot density of 187 (i.e. number of robots deployed per 10,000 employees), India's robot density stands at only four.

In the long run, India will have to improve manufacturing productivity for which it has to invest in intelligent industrial robots with advanced automation systems. Only then can India vault over the competition, and into the pole position for the future.

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Transforming manufacturing landscape by upgrading technology

SMEs need to tackle this gap by becoming not just agile, but also staying ahead of the curve, with the ability to withstand strong market competition. The key is to attract global players by using their small status as an advantage, says **Parag Jhaveri,** MD & CEO, Yasho Industries.

The Indian manufacturing sector is one of the most dynamic in the world, and a key industry contributing immensely to the Indian GDP. As an extensive and all-encompassing sector catering to many important segments of the economy, its aim is to increase share to 25% of GDP or $ 1 trillion by 2025. As the industry revives and reboots itself globally, the manufacturing sector is all set to play a key role in this new post COVID era, acting as a trendsetter for business all across the globe.

One of the crucial elements spearheading the growth of the Indian manufacturing segment is the adoption of new technologies. As the Make in India movement grows, India continues to adopt the latest manufacturing tools to help organize the segment into one of the key players driving the future of the country, further supported by the government, with the Union Budget 2021-22 expected to enhance India's domestic growth in manufacturing, trade, and other sectors.

As small segments of the industries scale up, they continue to boost the eco-system with significant upscaling, making them the hub of industry 4.0, a new era of technological upgradation. One of the leading trends shaping this include the many advancements in supply chain management, in order to further streamline manufacturing processes.

Some of the greatest advantages of shifting one's technology to industry 4.0 is the competitive edge it provides in today's time, allowing small firms to compete with market giants like amazon, with their world class offerings. It is essential to continually optimize and improvise one's operations in order to customize the workings across verticals, to provide well finished products to the countless industries manufacturing caters to. Another advantage of optimizing one's supply chain is the real time analysis provided for better efficiency. Furthermore, Industry 4.0 technology allows the industry to spot small problems before they become big issues.

The modernization brought in by Industry 4.0 has also become an excellent tool for the manufacturing sector to align the entire workflow together, making workings more collaborative. With the tools embedded in the system, it offers several strategic advantages such as real time data intelligence to boost collaboration between teams, which in turn results in a much higher operational efficiency. Other technologies that are swiftly spearheading this great shift for small players are IoT and advanced human machine interfaces, that have been at the centre of this great shift. This digital integration will be the epicenter of the future domestic manufacturing landscape, providing several new offerings for the sector such as predictive maintenance and 3D printing technology.

Many segments have been reorganizing themselves in order to prepare for this monumental shift and embrace the changes. Some of the sectors spearheading this unique wave include the chemical industry, electronics industry, and even agriculture. According to Invest India, the chemical manufacturing sector is likely to produce $111 billion worth of chemical products by 2023 for domestic requirements. At present India is the sixth- largest producer of chemicals internationally, while it continually innovates to produce the industries' requirements in segments ranging from specialty chemicals to agrochemicals, fertilizers, petrochemicals, etc.

However, as small players in the

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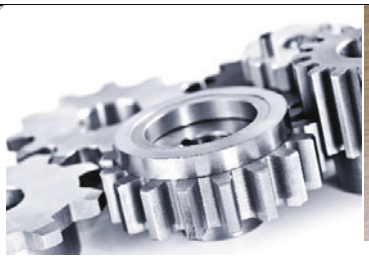

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industry swiftly progress to offer the best of the digital landscape, there are several factors that come into play, such as its high economic costs and the loss of many jobs due to increasing automation in the domain. With the ever-evolving technological developments, there has been an onslaught of several practical challenges for the global industry, such as the lack of skillsets to tackle the automation in the field and the slow transition to new business model adaptions. As small manufacturers continue to grow, it presents continual organizational changes for the swiftly developing industry, such as technological unemployment and privacy concerns such as surveillance and distrust, information transparency.

SMEs need to tackle this gap by becoming not just agile, but also staying ahead of the curve, with the ability to withstand strong market competition. The key is to attract global players by using their small status as an advantage. The strongholds of being a small player include becoming part of a value chain of relevant and adjacent stakeholders and using their adaptability to continually reinvent their offerings to be of relevance in global markets.

Another route SMEs can take to become smart is continuing to deliver personalised solutions across industries, with a dedicated lookout on growth and expansion. This development is absolutely intrinsic to the larger framework of business, a fact well recognised by the government, to ensure fair competition and help the industry scale up through friction free regulations. In any setting, the development of SMEs in a nation indeed always reflects in an economy's long-term success. As a result, the manufacturing sector has been rapidly developing cutting-edge infrastructure, and forging long term partnerships with dependent industries, and generating investment in order to accommodate the future needs across verticals. The segment has been constantly adapting to create value, working through the landscape by increasing reliance on intellectual capabilities of the upcoming technologies.

Furthermore, the rise of smart factories has been monumental, with different models integrating the vision of a production environment with feasible functions to make decentralized decisions and simplify product processes, in order to further develop their self-adapting manufacturing capabilities. Merging operational and AI systems, they are swiftly bringing about globalisation within the field. For the industry today, technological upgradation, brought on by smart factories is the most important factor and a prerequisite to the various developments in the industry level, as well as to designing advanced manufacturing plants with new settings.

Smart factories offer the benefit of self-optimized performance, not only providing the capacity to enhance productivity for SMEs, but also autonomously run production processes, reducing the scope of any manual error, and eliminating any roadblocks in the swiftly evolving domain. As the domestic manufacturing industry experiences a fresh transformative opportunity, local manufacturing hubs are scaling to new levels of flexibility and providing just the right environment for this global transition.

As a result, SMEs in India are likely to play a huge role in the post COVID world, with the make in India campaign currently focusing on 27 sectors, that are all inter-dependent on the domain for their operations. Financial reforms and the heightened government emphasis on reviving the local economy are likely to play a key role in this fresh new age for the industry. Furthermore, India also has a young working population, to help it achieve its full manufacturing potential.

As the manufacturing segment continues to conquer new markets, they are likely to mark a turning point for the Indian economy, with strides in domains as diverse as biomanufacturing to automobiles. The segment is also actively catering to swiftly developing healthy consumer markets for products such as fast-moving consumer goods, consumer durables, food products that come from agri-processing, agrochemicals, marine products, automotive products, aluminum, and renewables.

With the impetus on ever-expanding industrial corridors and smart cities, the manufacturing sector is swiftly witnessing the development of a robust infrastructure, logistics and utility environment that will be well equipped to handle the needs of the future. Facilitating the transition with fresh new capital, small businesses are at the heart of Industry 4.0. Quickly diversifying, becoming more agile and competitive to be at par with global markets, the domestic manufacturing sector today is indeed led by small and smart enterprises, that have continually evolved, to go beyond the traditional 'one size fits all' approach of the manufacturing sector, transforming the industry and its future workings through their unique offerings. IPF

About the author:

Parag Jhaveri is the Managing Director & CEO of Yasho Industries. He has over three decades of experience in the chemical industry and played a key role in ensuring the robust growth of the organisation with oversight over the functions of sales, finance, R&D and marketing along with its founder promoter. Under his visionary leadership, the company has built a model for a sustainable future.

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Smart factory: An integrated approach to manufacturing

Smart manufacturing - a part of the overall Industry 4.0 - is an interoperation of the many developments that have been seen in the last 20 years, like, Internet of Things, Digitalization, AI, ML, 3D printing, Big Data, etc. With the building of smart factories, industries will be able to control the environmental emissions, and, in general, address the seventeen new sustainability requirements of the United Nations, says **R Jayaraman**, Head of Capstone Projects, Bhavan's SPJIMR.

The world is moving fast, and so are the jargons covering the manufacturing industry. The Figure 1 shows the developments since the beginning of the Industrial Revolution.

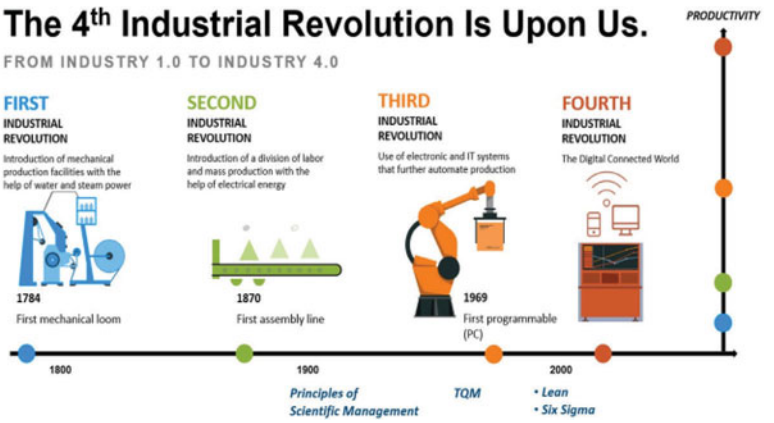


Figure 1: Stages in Industrial Revolution

Industry 4.0 and the origin of smart factories

The fourth Industrial Revolution – I 4.0 - began a little after 2000. The beginnings were seen in the auto industry in Germany, led by the likes of Mercedes Benz and BMW. I 4.0 has been characterized by a few traits, which include: global connectivity, comprehensive automation, intelligent and self-learning algorithms amenable for continuous upgrade through Artificial Intelligence and Machine Learning (AI and ML) to run machines, social media applications using FB/WA/Twitter/ Instagram to help track trends in customer behaviour like never before, and, the most important of all – Big Data – gathering, collating, transmitting, processing and using for making decisions.

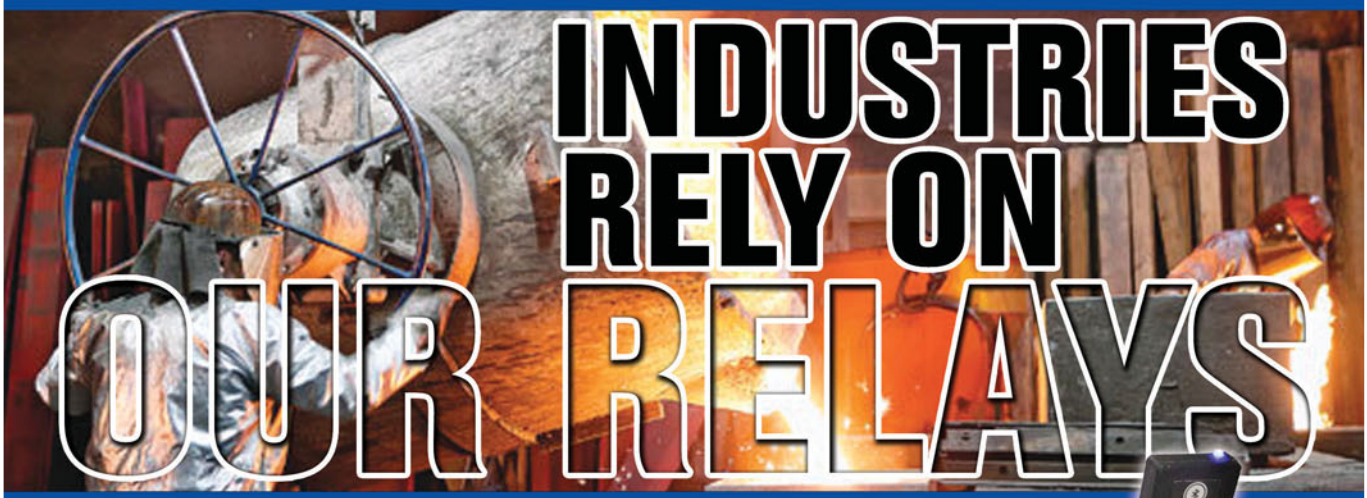
> **Distributed manufacturing will be greatly strengthened by 3 D printing, and this should take manufacturing to each household in the villages of India.**

Never before has industry had it this good. This is probably too much of a good thing, and, like all good things, takes time and efforts to fructify. If someone told you that you can easily install and benefit from I 4.0, that is not the truth. It needs to be done deliberately, carefully and in co-ordination with many internal and external stakeholders, for successful usage. Smart manufacturing, which is where the impact of I 4.0 is to be the most significant, is a part of the overall I 4.0. It is an interoperation of the many developments that have been seen in the last 20 years, like, Internet of Things, Digitalization, AI, ML, 3 D printing, Big Data. Each one of these leads to advancements in specific directions, and a collective deployment of these will lead to smart manufacturing.

MESA International, a well-known, not-for-profit organization of manufacturers, producers, industry leaders, and solution providers which is involved in knowledge diffusion, best practice training, and advocacy, uses the following definition:

According to an article in Asian Productivity Organization (APO)[1], "Smart manufacturing is the intelligent, real-time orchestration and synchronization of business, physical and digital processes within factories and across the entire value chain. Resources and processes are automated, integrated, monitored and continuously evaluated based on all available information as close to real-time as possible."

This is a comprehensive



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definition and covers all the key functionalities in a smart factory. To begin with, synchronisation. This term assumed considerable significance in manufacturing due to the Theory of Constraints (TOC) approach. Lean manufacturing had led to the appreciation of work-in-process (WIP) as a key variable in shortening lead times and improving customer delivery compliance. TOC used this thought and designed the 'synchronised manufacturing' concept, which ensures that WIP is kept fully under control, and at the optimal levels. Synchronous manufacturing contributes to efficiency and customer satisfaction.

Intelligent and real-time indicate the major change of deployment in manufacturing. Factories always liked to stay in control of the inputs and outputs and ensure customer satisfaction using these concepts. But, before the advent of IOT (Internet of Things), and Big Data Processing (BDP), these remained as concepts on paper. But I 4.0 changed all that. Mind you, some factories, especially integrated steel plants and oil refineries, used sensors and SCADA to practice 'computer-controlled manufacturing'. Thermal power plants and some pharma factories also used these concepts, and tasted the first benefits of I 4.0. However, IOT and BDP changed all that totally. Its like landing on the moon, as far as the manufacturing industry was concerned.

With these two technologies, continuous processing factories increased their I 4.0 component, while discrete manufacturing factories entered the era of I 4.0. One of the big beneficiaries of the I 4.0 and smart manufacturing will likely be discrete manufacturing, and this is where the good news for MSMEs is. MSMEs could concentrate on these two I 4,0 components to ramp up volumes, quality, delivery compliance through better production planning and improve profits through synchronous manufacturing. Another linked technology is 3D printing, which is going to revolutionise industry itself, by taking us back to the era of craft manufacturing. Distributed manufacturing will be greatly strengthened by 3 D printing, and this should take manufacturing to each household in the villages of India. This is a topic which needs to be explored in greater depth.

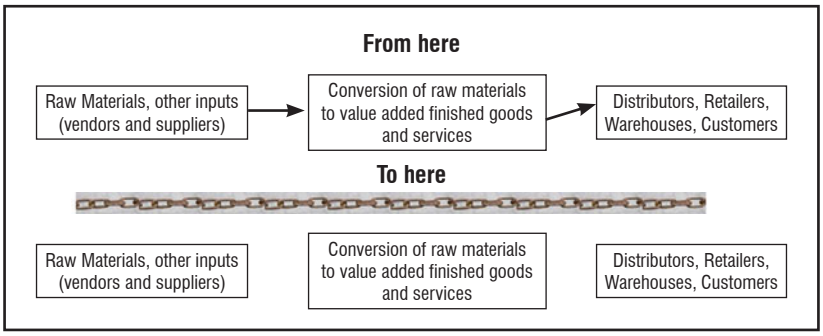

Figure 2: Industry 4.0: Integrated Manufacturing (Source: Author)

The 'real-time', continuous monitoring through digitalisation, use of IOT and BDP, and the continuous fall in the cost of manufacturing due to the better-quality output (less wastage, less quantities need to be produced as the defect rates could be close to zero, etc) will see many smart factories coming up soon. In India, the first such 'factory' came up in the Indian Institute of Science, in 2016, under a government grant and private funding. The developmental work is continuing, and several companies, including Siemens, have used the outcomes from the work in setting up smart factories. These are still in the gestation stage, and will take time and efforts to become full fledged smart factories.

While automation has been in vogue in manufacturing for many years now, intelligent automation is the new paradigm. Toyota and many other automobile companies have pioneered the use of automation, through robotics, to improve efficiencies and reduce quality and cost, the advent of AI and ML, along with BDP have changed the scenario. It is now animated automation (AA), quite different from the programmed automation (PA). This is a serious difference, which is likely to lead to the increase in the number of smart factories, in fact, it can be said that this will be the heart of the future smart factories. Those who master AA will rule the manufacturing universe. And what is this 'animated automation'? Currently, central consoles are used to control automated operations. But commands have to be given by the persons who are managing the consoles to make changes, from time to time. In the AA world, interconnected equipment, with embedded sensors, which are driven by AI and ML driven logic and algorithms, will make many of the decisions which are now being made by the console controllers. And that's big.

Smart manufacturing is integrated manufacturing

Manufacturing industry is a conglomerate of value chains. With the advent of the supply chain terminology, the value chains started to integrate like never before. This has led to the current best practice as shown in Figure 2, called 'integrated manufacturing', which is what Industry 4.0 and smart manufacturing is all about:

Smart manufacturing is the next step in I 4.0 implementation. It


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cannot happen without experience. One can join a number of pieces in Lego, but cannot create a 'living' building which works like a seamless union of many flats, tenants, and a community – a condominium. So, to begin with, one must assemble various pieces. These pieces are the building blocks of smart manufacturing. And then breathe 'life' into it, by making changes gained through experience and continuous learning.

To see the difference between I 4.0 and smart manufacturing, take the example of a machining shop, where operations like grinding, drilling, shaping are done, for which the shop may be using lathes, drilling machines, planers, grinders etc. When sensors are inserted into each of these machines and their performance is monitored, the first step in I 4.0 has been taken. Notice that all the machines are individually monitored, their performance improved because they are monitored continuously, and, by using AI and ML, and the data gathered by the sensors, decision making by the machine themselves has been achieved. The next step would be to link all these machines together, and the job cards for each job can be tracked through the various machines. This will make for improved co-ordination, and better machine utilisation through better planning. In the third step, the vendors and suppliers are connected to the shop, so that JIT supplies, supply of surge requirements, work in process are all managed. This is the beginning of smart manufacturing. As shown in Figure 2, this is a part of the total value chain integration. When the forward chain is also linked in, the full benefits of smart manufacturing can be achieved at the business level.

In achieving this level of 'integrated manufacturing', several features have to be brought together. Under an overall digitalization plan, an organisation needs to design the step-wise program to introduce smart manufacturing. Introduction of smart manufacturing can be done in a progressive manner. So far, in India, companies who have chosen to adopt I 4.0 have done in this way. The logic in simple, use, learn, find out the gaps, improve and improvise, and then forge ahead. The benefits have been obtained as per plan, with quality and quantity improvements seen upfront. One reason why this happens is the continuous monitoring, and the use of AI/ML algorithms in sensors, which self-correct as and when required, before defects are produced/ go out of control.

It is well known that all processes have a 'natural drift', which makes for production of products beyond the three sigma limits. This is the reason why Motorola studied the phenomenon and introduced the concept of the industrial six sigma limits, which are much tighter than the theoretically predicted ones. If self- correction is introduced, then the statistical formulae will enable the value chain to make timely adjustments in the components, and thus avoid defects altogether. This was the dream of the 'zero defects' of Philip Crosby, the US quality guru. Which is now in the realm of possibility. And we are likely to see more 'Mumbai Dabbawallas' type of operations.

Flexibility in smart factories will be ensured by the use of AI/ML, with BDP and algorithms. Unlike the console-controlled factories, which enjoyed flexibility due to the possibility of human interventions, smart factories are less prone to human corrective actions.

Will smart manufacturing lead to rigidity and loss of flexibility?

This is a valid question. When Toyota introduced automation in its plant, it designed one of its plants – the Tahara plant – with a very high degree, almost 100%, of automation. While it achieved efficiencies, in the long term, it was found that the rigidity in running the assembly line had increased beyond expected limits, leading to diseconomies of automation. This led to Toyota adopt 'optimal automation' as a flexible, golden option, to try and have the cake and eat it too. This philosophy has guided the company since that experience. But, with AA, the philosophy may have to be relooked, although this could happen after a while, with experience of running smart factories. In the pharma industry, near smart factories have been operating, but integrated manufacturing has not happened. For successful smart factory operations, integrated manufacturing, as shown in Figure 2, is the way forward.

Flexibility in smart factories will be ensured by the use of AI/ML, with BDP and algorithms. Unlike the console-controlled factories, which enjoyed flexibility due to the possibility of human interventions, smart factories are less prone to human corrective actions. Continuous updations of the embedded software in the sensors, with fresh instructions based on experiential learning, captured by the AI/ML aspects, will enable the factory to run as per current requirements. Of course, the defects-free production has already been explained. The success of the factory will then be based on the skill and competence of the humans who are handling the AI/ML and the BDP interfaces as well as the cloud and servers which establish the

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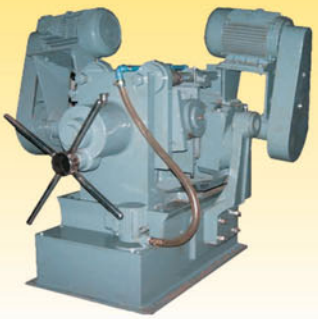

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connectivity. IOT is key, and any interruptions in the availability of connectivity will be crucial. With the building of smart factories, industries will be able to control the environmental emissions, and, in general, address the seventeen new sustainability requirements of the United Nations.

Smart factories: The way forward

Over the next ten years, the world will see a lot of development in this area. Will it make the US less dependent on outside sources of manufacture? Will it lead to creation of islands of self-contained manufacturing units? Will the 3 D printing era make distributed manufacturing possible? This technology could really make poorer countries less dependent on the rich ones and we may see more 'democratised' industrial development. Distribution of wealth could become more acceptable, and inequalities may lessen considerably. Overall, industry will be able to gain a big advantage in the fight against climate change, and lead to sustainable manufacturing, aligned with the global agenda. IPF

Reference:
1: https://www.apo-tokyo.org/resources/articles/what-is-smart-manufacturing/

About the author:

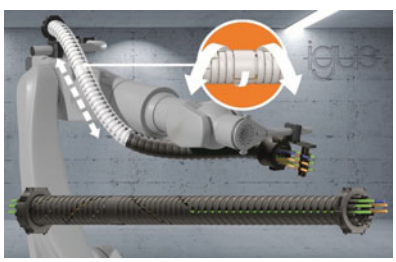
R Jayaraman is the Head, Capstone Projects, at Bhavan's S P Jain Institute of Management & Research (SPJIMR). He has worked in several capacities in the Indian industry, including Tata Steel, for over 30 years. He has authored more than 60 papers in academic and techno economic journals in India and abroad. Jayaraman is also a qualified and trained Malcolm Baldrige and EFQM Business Model Lead Assessor.

TECH BYTE

Triflex TRX energy supply system revolutionises 3D motion of robots

To ensure that cables on industrial robots can be guided in motion safely, easily and compactly, igus has now developed the four-dimensional triflex TRX energy chain. The new design study replaces classic robot hose packages and retraction systems. Special feature: 40% retraction length ensured by a unique telescopic mechanism inside the chain. This allows users to save space on the third axis of their robot, up to 83% weight and high costs for retraction systems.

The three-dimensional triflex R energy chains from igus are widely used in the industry for fail-safe guidance of cables and hoses on robots. Retraction systems have so far been used on the third axis to ensure that no loops are created during the movement of the energy chain system which could hinder the robot. "However, the axes on the robots offer less and less space, so a new solution was needed," said Jörg Ottersbach, Head of the e-chains



The new TRX system from igus saves space on the third robot axis and ensures a retraction length of up to 40%

Business Unit at igus GmbH. No sooner said than done, the triflex TRX system was developed based on the triflex R energy chain. This is a four-dimensional energy chain in which the retraction system is already integrated.

"With TRX, we created a space-saving chain that can be fixed directly and compactly on the third axis. The energy supply twists into itself, lengthens and shortens spirally as in a telescopic pull-out, by up to 40%," said Ottersbach. For this purpose, igus relies on a screw connector system in the unique mechanism as well as on an integrated reset band. The band brings the chain links back to their starting point time and again, and thereby the retraction force can be adjusted. The cables are placed in the chain in the form of a spiral and are guided safely in the movement with the help of the chain. In addition, the cables and hoses are fastened in place in the middle of the TRX so that they do not leave their position when the chain is pulled.

Compared to other retraction systems, the user saves up to 83% weight and requires less than half the space. In this way, the performance of the robot can be further improved, and costs are significantly reduced by dispensing with an additional retraction system. TRX can be easily connected to existing TRE series triflex R chains. As with triflex R, the cables can be quickly filled into the energy chain from the outside. IPF

For more details on triflex R energy chains, visit: https://www.igus.in/info/triflex-r-trx

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How simulation technology can help manufacturing industry

Simulation is a powerful technique that enables manufacturing organizations to increase throughput, identify process bottlenecks and inefficiencies within the production line, says **Shirin Hameed**, CMO, Detroit Engineered Products (DEP).

In today's highly competitive market, every company is trying to get their products to market, better than the previous version, and faster than their competitor. The mandate of fast to market continues to be a huge factor that determines the success of a business. It is not enough just to get to market the first, but the most optimum version of the product has to hit the market with minimum flaws, in the shortest time. The need for efficiency is paramount in all industries, and simulation is helping with it. In the manufacturing industry, variables like material, transportation and labour costs continue to increase each year, and companies have to ensure that these are being utilized in the most optimal way possible while keeping any kind of wastage at a minimum.

Now, add in the component of customization and personalization, which has seen a huge increase in the way the manufacturing industry works in the last few years, whereby companies are giving their customer a greater degree of flexibility and control over their products. This has called for a transformation to the product development process, from the traditional method, towards a more virtual process. The virtual product development process involves simulation-driven engineering, and a model-based systems engineering approach.

When we say simulation in manufacturing, this can be at 2 levels- First, where simulation is used in the product design and development stage, to ensure that the product is designed in the most optimum way, and secondly, where it is used at the production level to simulate the entire manufacturing scenario to make it more productive and efficient. We will be exploring the first, and analyse how simulation in the design stage using CAD and CAE is helping companies to navigate the complexities of the ever-evolving demand of manufacturing.

Simulation is a powerful technique that enables manufacturing organizations to increase throughput, identify process bottlenecks and inefficiencies within the production line. In manufacturing, simulation technology significantly impacts many decisions like project complexities and challenges.

As the use of simulation as a tool for enhancing product performance increases, there are simultaneous efforts focused on the democratization of simulation, and boosting advanced simulation tactics using multi-disciplinary optimization (MDO), artificial intelligence (AI), machine learning (ML), etc. With simulation progressing as an easier and more accessible tool for non-experts, it is now the choice of the manufacturing organization as an insight provider for a better design and process.

Simulation in the product design stage

The usage of CAD and CAE to assist in the creation, modification, analysis and optimisation of a design has been around for a few years now. The competitive market landscape increases significantly the level of requirement in terms of functionality and quality of products. Simultaneously, the complexity of the design process is increasing, while product development time is decreasing. Such constraints on design activities require efficient CAD and CAE systems.

Traditionally, the product development process involved physical prototyping, with the advent of simulation, a lot more flexibility can now be offered. Complex designs can be offered with just a few clicks, and most of the testing can be done online, rather than through complex and elaborate physical testing mechanisms. There is also the advantage of analysis and accuracy, which may not be

attainable in physical testing. Additionally, simulation allows you to virtually test locations in the product which cannot be physically accessed with measurement equipment, can output physical parameters for which no sensors exist.

The biggest advantage continues to be that because the whole testing is simulated, there is no risk of the physical object being damaged, which is a cost-saving factor for a company. In addition, an extra parameter to be tested just means applying a different boundary condition, applicable in a few clicks, rather than creating another prototype product. Design simulation has a wider operational range than physical testing; it can virtually model and test conditions which are difficult to generate in a real-world environment. Because there is no risk of wasting materials, simulating a new manufacturing process is just a matter of working with a product definition to apply a specific manufacturing method.

The goal remains to get a near-perfect designed model which can be handed to manufacturing at the earliest.

Let us look in a little detail at an example of where simulation is used for manufacturing a bottle. In designing the bottle, a 3D finite element model is first constructed to explore the effect of the bottle thickness, and parameters are decided to gauge the critical load and stress distribution. The model is analysed against various parameters to determine the effects of plastic thickness across the plastic bottle. It is observed that the plastic thickness at the bottom of the bottle naturally needs to be thicker to be able to handle stacking and handling stresses. Finally, a lightweight design is proposed in which the structural shape of the original bottle is retained, but the thickness is varied in different regions of the body to reduce the weight. This results in both a lighter model which makes it easier for transportation and associated functions, as well as reduced material requirements during manufacturing.

Companies like Detroit Engineered Products support the integration of their simulation technology into the design environment, for earlier detection of design improvements in a cost-effective way. They provide guided simulation workflows for repeatable CAE process applications that can improve efficiency and decrease the overall time needed for simulation-based design, as well as the need for a trained professional to operate it. It helps improve the life of tooling and reduces manufacturing defects.

For manufacturers, it gives real-time inputs to reduce scrap during manufacturing by way of design suggestions like shape effects, structural performances, connection types, joint strength, and joining sequence. Also, there are part level and assembly level assistance programs for manufacturing processes that are applicable based on product development requirements. IPF

About the author:

Shirin Hameed is the Chief Marketing Officer of Detroit Engineered Products (DEP). She has over 12 years of experience with a proven track record of accomplishment in planning and leading comprehensive B2B marketing projects in the B2B technology space. In the past, she has worked with Tata Technologies and National Instruments.

NEWS SNIPPET

Vedanta Aluminium wins 'Best in Future of Digital Infrastructure' award

Vedanta Aluminium, India's largest producer of aluminium and value-added products, has won 'Best in Future of Digital Infrastructure' Award at the IDC Digital Transformation (DX) Summit India and Future Enterprise Awards 2021. The prestigious IDC Future Enterprise Awards celebrate the tech-enabled resilience of enterprises, as they navigate through the challenges and disruptions of the digital economy in an ever-changing world. Vedanta Aluminium has bagged this coveted award in the 'Best in Future of Digital Infrastructure' category for its Digital Smelter and Wi-Fi 6 projects, deployed in smelter and power operations respectively.

Vedanta is India's first – and the world's third – aluminium smelter to deploy digital-twin based Digital Smelter technology at its Jharsuguda plant, which is the world's largest single-location aluminium smelter.

It uses digital twin technology with predictive & prescriptive analytics, which allows for remote monitoring and control of potline operations, enhances energy efficiency, reduces raw material consumption, and arrests wastage of material through remote advisory system. It processes historical information and real-time data to generate alerts and insights which are effectively used by the operation and maintenance teams. It also uses machine learning algorithms to provide multiple outcomes such as pot health-related alerts, virtual-sensor based recommendations etc. IPF

Smart solutions: Redefining the future of manufacturing

Post-Covid-19 phase, e-buying has substantially increased presenting a challenge of timely delivery. Digitalisation of warehouses is crucial for sustaining of business and to be afloat in the competition, says **Ramesh Bhorania**, VP, Robotics and Factory Automation, Prama Hikvision India.

Smart factory is technology driven concept that is driving the future of manufacturing across the globe. Welcome to the whole new world of Industry 4.0, in which latest technologies, including Internet of things (IoT), Industrial Internet of Things (IIoT), Autonomous Robots, Simulation, Augmented Reality (AR), Big Data, Cloud computing, Additive Manufacturing, Vertical and Horizontal System Integration. Here automation come together with robotics connected remotely to systems equipped with machine learning algorithms that can control the robotics with minimum human support.

Industry 4.0 has highly intelligent, connected systems that create a fully digital value chain. Here the objective is that the machines talk to other machines and products and information is processed and distributed in real time, resulting in profound changes in the entire industrial ecosystem.

Market trend

According a recent Markets And Markets report, the Industry 4.0 market is projected to grow from $ 64.9 billion in 2021 to $ 165.5 billion by 2026; it is expected to grow at a CAGR of 20.6% from 2021 to 2026. The key factors fuelling the growth of the Industry 4.0 market include rapid adoption of Artificial Intelligence (AI) and Internet of Things (IoT) in manufacturing sector, increasing demand for

industrial robots in pharmaceutical and medical device manufacturing sector, rising government investments in 3D printing and additive manufacturing, and growing adoption of blockchain technology in manufacturing industry.

Material management solutions

The material is paramount substance in manufacturing plants to retail stores to even end-consumers. Raw material, finished goods, inventory at each stage, and material movement itself are the important part of an entire business process and takes significant consideration from operational manpower, equipment, and process itself. If all are not in sync, the impact on overall efficiency and production yields will be negatively huge and may become bottlenecks. This synchronization process is broadly termed as material handling or material management. It is clearly apparent that the importance of material handling to the economy of a country is as equal as of industries itself.

Impediments

Conventional material handling systems cannot be replaced immediately by the modern or advanced system in one go. Challenges are of huge capital investment, consideration of an RoI, and the readiness to adopt newer technology. But steady and slowly it is happening and will accelerate this adoption of advanced automation technology for Material Handling Equipment (MHE) in logistic domain. The latest technology is based on machine vision, AI and mobile robotics.

Machine vision will provide visual sensing of material in the form of type and volume and will work in tandem of material handling robots like automatic guided vehicles (AGVs), mobile robots and other equipment. Also, due to vision-based AI, natural navigation becomes an integral part of mobile robots and mobile forklifts. Mobile robots handling pallets, bins and multiple SKUs, it can do inbound, distribution and outbound with 100% accuracy, lower cycle time, high volume management and with less

human dependency. Further, this system can cooperate with existing WMS, SAP and ERP and also collaborative in nature with equipment control systems like PLC, etc. Also, integration with pick to light, has removed human errors in inbound and outbound for both forward and reverse logistics.

Significant changes

Automation has brought in many significant changes, which is being witnessed in conveyers and bulk material handling system in process industries. One thing is for sure, conveyers are getting smarter, conveyers are being designed with defined yet flexible purposes, compact footprints for new industrial-conveyor designs, smarter motors and controllers on conveyors of all types and advanced materials for conveyors.

Conveyors are at the heart of an array of exciting changes in material handling — from the vast installations of automated warehousing to humbler stations only recently automated. Each conveyor installation has unique design requirements: Food and beverage conveyors might need to survive wash-down settings; conveyors in aerospace and defense operations may need to be explosion-proof; and conveyors automotive manufacturing facilities may necessitate conveyors with very high load ratings. Conveyor systems that carry a product on uniform pallets and pallet-handling conveyor systems are also becoming more compact. Transfers between conveyors are streamlined, utilising direction-changing modules and pallets with mating features.

Additionally, pallet positioning devices, including stops, locates, and rotates are also being combined into all-in-one modules. This reduces the number of separate devices down the length of the conveyor, which means less floor space is required. Design innovations have also made asynchronous pallet conveyors; that recirculate the pallet possible. Previously separate conveyors as well as vertical transfer units were needed to recirculate an empty pallet back to the start of the line.

Safety features

If the latest material handling equipment is a concern, then yes. Its safety features should be checked and verified with the help of an expert. The Cobots for palletizers are equipped with all safety sensors to work safely in coexistence of human operators. All mobile robots are embedded with obstruction sensors on the front, back and sides, also safety algorithms monitor how far is the obstruction or moving object coming towards Martial carrying mobile robots and dynamically decided the safe speed and stoppage of it. The smart conveyors are also equipped with all safety measures, light curtain sensors and all. Depending of risk factors associated with the process, measures are to be taken.

Emerging technologies

As mentioned, newer technology is equipped with all safety mechanism based on AI, IIoT and latest sensory technology. So far robotics are concerned, Cobots are available now on the floor and it can work with a human operator in safe conditions. Mobile robots for MHE, also work on coexistence of human. Due to ultrasound and laser technology, it can work safely with operators, find dynamic obstructions and plan re-routing in accordance with Robot Control System or Fleet management system. Due to digitalization and IIoT, real-time update of all SKUs is available and this information can be availed for quick delivery of SKUs through mobile robots. The automatic verification of inventory in storage through machine vision-based scanner mounted through mobile forklift is the latest example of changing the scenario at warehouse landscape.

Latest trends

Inbound, sorting, distribution and outbound are the key process of e-Commerce. Post-Covid-19 phase, e-buying has substantially increased and hence the challenges of delivery in time due to high volume, high variants, sorting from the mother hub and dispatch to transit hub, reverse logistics issues, and many more. Digitalisation of warehouses is crucial for sustaining of business and to be afloat in the competition. Manual sorting is replaced by AGV or mobile robot-based sorting, which can be done with 100% accuracy at a rate of 20k to 30K parcels per hour.

Also, another big challenge is to decide the volume of transit bags and total volume or weight dispatched through transportation. Automatic system is required to find the weight and volume of parcels, for efficient baggage and transport handling. Thanks to machine vision systems and image process and AI based analytics, it is possible to find volume through 3D scanners and weight measured through weighing systems can be incorporated in the database. The DWS (Dimensioning, Weighing and Scanning for barcode) system are available to work with mobile robot-based sorting system. This combination has proved to be a game changer for e-commerce and logistics sector. IPF

About the author:

Ramesh Bhorania is the Vice President (Robotics and Factory Automation) at Prama Hikvision India Pvt Ltd - the leading video security solution provider. In addition to the security solutions, the company's robotics and factory automation business vertical provides machine vision and mobile robots solutions for logistics, warehouse and manufacturing industries.

AR: Immaculate digital experiences for manufacturing sector

Just like IT or engineering services industry, Augmented Reality (AR) experiences services is the next big opportunity as many companies will leverage AR to further their goals of digitalization and derive added benefits, says **Atul Marwaha,** EVP, DesignTech Systems.

Augmented Reality (AR) is set to revolutionise the way in which companies have been communicating and sharing products/systems information. Digitalization trend was imminent and key to the success and competitiveness of the companies. But in reflection on the pandemic scenario, it has become a necessity and assumed an even greater significance for companies of all sizes. Digitalization is now imperative for companies to manage their operations remotely and in the best possible way. Companies have since then moved up their plans for achieving their goals in process and operations digitalization. By expediting their timelines, they want to stay prepared for a future, which as of now looks uncertain at the best.

The global pandemic opened the eyes of the countries, economies, and industries to the devastating effects, which until this time were unimaginable and unanticipated. If the industry has to not just survive and sustain, but also continue to grow, they need to adopt technologies and processes that require lesser human contact, interference and contribution, while still ensuring superior quality output and efficiency.

Before we delve deeper into how augmented reality is going to change the face of products communication, let us first understand what AR is.

Augmented reality is an enhanced semi-immersive interactive audio-visual virtual simulation in which the user can observe, understand and witness the products information through a dynamic digital experience. In this type of format, the user is not a part of the experience but an observer. The user can however interact with the experience through a set of commands, functions, and applications. In augmented reality, the user is introducing the product/system into the real environment around him and experiencing its operations, and performance through enhanced visual simulation. The digitally inserted product becomes the part of the user's current surroundings. The user is aware of the surrounding and the product is kind of superimposed on added-on in the real environment. Any of the smart devices such as a smart phone or a tablet can be used to access and visualize this experience. The best thing about AR is that it provides the user the flexibility to overlay the digital content in the real-world environment, and allows the real-world information to be taken into account while experiencing the digitally simulated reality.

Augmented reality finds applications in diverse functions and disciplines right from manufacturing, product marketing, training and servicing, to design review and visualization, for industries right from automotive, aerospace, industrial machinery, consumer electronics to medical devices and healthcare.

In this article, we will focus on applications of augmented reality in the manufacturing sector.

In the Industry 4.0 or smart manufacturing scenario, the machines and systems in the manufacturing plant would be connected with Internet-of-things devices that will help the companies pre-empt the machines failure, through the red flags generated by the IoT applications. However, once the issue is highlighted, a trained or experienced technician has to physically take care of the problem and resolve the issue. However, what if the expert's help is unavailable and a fresher has to manage the crisis? In this scenario, AR could be a biggest boon. The fresher simply has to launch the application using his smart phone, and through the interactive and intuitive experience understand how he can resolve the problem step-by-step by overlaying the digital system

in the real environment right next to the actual physical system. It would certainly mean a crisis averted, problem solved, and a big help for the new technician. This is just one of the many beneficial uses and applications of AR.

Augmented Reality can help companies in the manufacturing sector in complete machine commissioning, installation, troubleshooting, servicing and maintenance. Following are some of the advantages of AR:

- Change of operators mean repeat trainings. AR makes it possible and handy for the new operators to learn and understand at their pace and time
- Enhanced Visual, semi-immersive and interactive experiences reduce ambiguity and facilitate faster and better learning
- Language barriers are broken as commands and user interface can be created in multiple languages
- When new machinery is introduced, or changes are made at the manufacturing facility, it is easier to make a change in the AR experience than any other medium such a video shooting
- The AR experiences allows the user to introduce or overlay the digital system right next to the real physical system which makes it easier to compare, analyse and perform the task than a traditional animation.
- AR also facilitates in the interior and exterior view and performance of the system which contributes in better understanding.
- Manual guides on operations and maintenance can be tedious and confusing, especially when the number of parts is many and tiny. In such scenarios, AR can give a detailed visual identification of every part, show its purpose, where it is attached in an enhanced digital experience making comprehension easier and clearer.
- It reduces the dependency on expert's guidance and advise. A semi-skilled operator can also take care of the issue with the help of an AR experience.

When you are talking about large complex machines, and big manufacturing facilities, AR can be an ideal approach to ensuring maximum machines and systems uptime, while reducing the costs and time of maintenance. For e.g. AR can make for an ideal way to train personnel in MRO operations (Maintenance and Repairs) for aerospace industry. Availability of different types of airplanes can pose as a challenge to train the technical staff on its maintenance, repairs and servicing operations. Through AR experiences this can be achieved perfectly. AR, thus, enhances the overall productivity, and efficiency of manufacturing facilities through creating seamless real-like digital experiences for systems communications.

Marketing tool for the machine manufacturers

Many of the large machine manufacturers transport their machines to be put on display at industrial expositions, exhibitions and other symposiums. They have to incur large logistical costs and ensure that the machine is not damaged in the transit. However, with augmented reality, the companies can market, promote and demonstrate these machines at any forum through rich and impressive AR experiences. Imagine the amount saved on logistics and the added worry of the condition of the machine in transit being completely taken out of the picture, while still not in any way compromising on the demonstration of the machine to its full capabilities.

Augmented reality is a significant part of Industry 4.0 and companies are increasingly adopting this to take their communications initiatives to the next level. Besides augmented reality, virtual reality and mixed reality formats are also becoming popular. Virtual Reality (VR) offers a complete immersive experience where the user is the part of the experience and is transported into a different digital environment/reality. VR requires the users to use Holo lens and other gears. While Mixed Reality (MR) combines the elements of digital and real physical world to create an experience in which the digital elements can be visualized in context of the physical world elements. In Mixed Reality, as the name suggests, both the realities merge to create a completely cohesive and congruous experience in which the digital elements interact with the physical world elements to deliver a seamless mixed experience.

Many companies in manufacturing and other domains are either investing in AR solutions to help them develop these experiences or outsourcing them to a partner who possesses these capabilities. Just like IT or engineering services industry, AR experiences services is the next big opportunity as many companies will leverage AR to further their goals of digitalization and derive added benefits. IPF

About the author:

Atul Marwaha is the Executive Vice President – International Business with DesignTech Systems Pvt Ltd, a leading engineering services and solutions company. He is responsible for driving the overall business strategy for the organisation in the US, European and South East Asian markets. He has over 20 years of experience in the SMEs sector across different industry verticals ranging from automotive, suppliers, machinery and equipment, heavy engineering etc.

Smart manufacturing helping realise Make in India goals

As India positions itself to cater to the world's demand through domestic manufacturing under its Aatmanibhar Bharat dreams, Smart manufacturing is sure to help it achieve this dream, says **Rahul Sharma**, CEO – Aluminium Business, Vedanta Ltd.

Smart manufacturing, a term synonymous with the 21st century, is a technology enabled production process that is collaborative, automated, and autonomous enough to modulate itself as per changes in real time requirements. While the Indian manufacturing industry had embarked on technology augmentations to drive efficiencies and productivity, the pandemic has accelerated the pace of automation in manufacturing processes. With restrictions in manpower, human interaction, mobility, etc., technology came to our aid to carry on processes with limited human intervention and supervision. This move was fast tracked by the government's ambitious plan of increasing the share of manufacturing in overall GDP to 25% by 2025. In this rapid upgradation of processes, manufacturing is emerging as a key driver with sector's (GVA) at current prices at $ 348.53 billion. As India takes long strides towards establishing its dominance as a manufacturing hotspot, smart manufacturing will be key to cost-competitiveness, quality and sustainability standards at par with global standards. The producers of aluminium, the metal of future, are leading this development in India.

Aluminium is a strategic metal and the second most important metal in the world. Owing to its unmatched properties, aluminium finds critical usage across key growth sectors such as aerospace, aviation, automobile & transportation, construction and infrastructure, renewable energy, electrical transmission & distribution, packaging and more. India is the world's third largest producer of aluminium, and houses a vibrant primary and downstream aluminium manufacturing ecosystem. Indian producers such as Vedanta Aluminium have deployed cutting-edge smart manufacturing technologies to produce the widest range of aluminium products, which cater to raw material needs of numerous industries. Smart manufacturing is enhancing the prospects of Indian aluminium manufacturers further.

Digitalisation of manufacturing

Capitalizing on COVID disruption, domestic manufacturers adopted digital-first ways of working to ensure real-time decision making, respond to fluid market conditions, changing customer needs, disrupted supply chains and employee safety with agility and accuracy. The tech and automation initiatives enabled companies to unlock value across their entire value chain in ways that provided a positive step change in productivity as well as design and quality.

As an instance, some of the key innovations and technology augmentations deployed at Vedanta Aluminium business include:

- Deployment of India's first Digital Smelter Solution using digital twin technology, which allows for remote monitoring and control, enhances energy efficiency, and arrests wastage of material.
- Implementation of Manufacturing Execution System (MES) across plants ensures visibility of all critical plant operations and allows for decision making remotely through mobile applications, thus ensuring seamless sustainability of operations while employees are also following the social distancing and other norms stated and yet fulfil their activities on the plant floor.

Technology and digitalisation collectively played a major role in ensuring business continuity for domestic manufacturers, monitoring and operating plants with safety, precision and efficiency, while also ensuring people safety

and wellbeing.

Smart manufacturing earmarking India's Industry 4.0 journey

The 'Make in India' initiative led the wider adoption of 'Industry 4.0' in the country, is bringing a new dawn to the country's manufacturing sector. It has officiated severance from age-old practices of blunt resource consumption for manufacturing processes and facilitated contextual innovation that is now being termed as the birth of the Fourth Industrial Revolution or Industry 4.0. We are witnessing the successful marrying of computer-programmed automation with digital technologies such as analytics, artificial intelligence (AI), and the Internet of Things (IoT) on the production line. Since its inception, Industry 4.0 has spread beyond the factory walls to encompass a broader digital transformation that spans processes, functions, and industries. This technology-driven transformation is changing the way many organizations make sense of information and act upon it to make decisions that are impacting overall operations.

Advanced manufacturing – in the form of additive manufacturing, advanced materials, smart, automated machines, and other technologies – is ushering in a new age of physical production. At the same time, increased connectivity and ever more sophisticated data-gathering and analytics capabilities enabled by the Internet of Things (IoT) have led to a shift toward an information-based economy. This has made it possible to build smarter supply chains, manufacturing processes, and even end-to-end ecosystems. Companies are taking full advantage of technology improvements of the last 25 years, which result in hyper-connectedness via the digital economy, transforming the structure of their business operations.

The prospects of smart manufacturing go beyond merely optimizing manufacturing processes. It also contributes to effective process assimilation. Some of the biggest advantages of smart manufacturing are:

- Energy saving through power monitoring
- Enhanced industrial efficiency
- Increased asset performance
- Predictive and prescriptive maintenance
- Real –time quality management

The implication of smart manufacturing goes beyond factory walls too. It is important to analyze and contextualize this technology-aided transformation for India's goal of becoming a $5 trillion economy. As smart manufacturing slowly gets customized for India, it is also weaving in human components in the process while striking a well-designed balance between automation and digitization. India, a country of 1.33 billion, has to create ample jobs for the dual purpose of generating livelihoods and becoming a manufacturing hub.

Industrial manufacturing processes thus need to have an equilibrium between automation and manual labour functions to provide jobs for all and incorporate them in the nation building process. An enabler of this equilibrium is smart manufacturing. Technology is helping the process of modification so as to successfully achieve resource optimization and efficiency. It will allow room for incorporation of manual power in the manufacturing assembly line to guarantee effective control, conduct and capitalization while constructing a bridge between digitization and optimal usage of human resources to achieve the ultimate goal of sustainable manufacturing.

Smart manufacturing's potential to unlock Aatmanibhar Bharat

As India positions itself to cater to the world's demand through domestic manufacturing under its Aatmanibhar Bharat dreams, smart manufacturing is sure to help it achieve this dream. In this context, the centrality of metals, particularly, 'strategic' metals (critical in providing an economic edge to a nation) is set to become key. Aluminium as a strategic metal is extremely essential to the success of the country's self-reliance dreams. It supports downstream industries and incorporates a sturdy employment multiplier effect (backward and forward linkages) on varied key sectors of the Indian economy. Aluminium is aptly called 'the Metal of Future' due to its diverse physical and chemical characteristics helping it play a vital role in other crucial sectors like energy security, aerospace, automobile, defence, infrastructure, packaging, consumer durables, building & construction etc.

It is to be noted that the present undertaking of smart manufacturing by aluminium industry leaders also sets the precedent for other manufacturing industries. It can well be assumed that with greater commercialization of smart manufacturing technologies, it will lead to slow filtration of it to SME and MSME level for true realization of Make in India. IPF

About the author:

Rahul Sharma is currently the Chief Executive Officer of Aluminam Business at Vedanta Ltd. He is leading the growth and expansion of the Lanjigarh refinery in Odisha to 6 MTPA. Sharma has varied experience of over 25 years and has held various leadership positions at Vedanta Limited and Sterlite Technologies Ltd. Prior to joining Vedanta he was Chief Marketing Officer (Domestic & International) and Business Head- Integrated Management System at Sterlite Technologies Ltd.

"Automation offers huge potential for SMEs"

Securing supply chains has gained prominence due to Covid 19 pandemic; thus, increasing the need for scalable infrastructure and high-performance communication networks. Digitalization has certainly received an extra boost from the Covid pandemic, says **Manoj Dunung,** Managing Director, Weidmuller Electronics India Pvt Ltd. In this interview, Manoj Dunung explains how Weidmüller is helping manufacturing companies to prepare for the future with its pioneering solutions.

How is Weidmuller serving industries?

Weidmuller Electronics India Pvt Ltd is a 100% subsidiary unit of the Weidmueller Interface GmbH & Co, Germany. Weidmuller is the leading international provider of solutions for electrical connectivity, transmission, conditioning and processing of power, signals and data in industrial environments. Weidmuller provides solutions to different industries like machinery & factory automation, process, energy, transportation, device manufacturers, building infrastructure etc.

Weidmuller develops, produces and sells following products in the field of electrical connectivity, functional electronics, communication electronics and industrial automation:

- Modular terminal blocks
- Application-specific solutions
- Device Connectivity (PCB) and field wiring solutions
- Enclosures/ glands even for hazardous area applications
- Electronics & automation products and solutions
- Tools & markers

"Every company should be aware that digitalization makes the need to change certain processes inevitable. SMEs, in particular, can benefit from this, as they can implement changes more quickly and flexibly.

- Network interfaces
- Industrial anayltics
- Energy management

What are the advantages of Weidmuller products & services? How do they help customers to increase their efficiency and productivity?

Today, hardly any industry - be it automotive manufacturing, power generation, machinery or plant engineering - can do without electronics and electrical connectivity. Whether in the automotive industry, transport or energy sector, we develop innovative solutions for our customers' challenges with passion and in-depth know-how. Today, Weidmüller stands for much more than a simple terminal block. Weidmüller has developed into a specialist in Industrial Connectivity and offers a wide range of corresponding products. In recent years, the market's requirements for Industry 4.0 and the Industrial Internet of Things (IoT) have been added to this.

Weidmüller has accepted the challenge and supports industrial companies with industrial analytics, connectivity consulting and the "Automated Machine Learning Tool". These are the right tools to identify concrete solutions and individual potential for our customers, to develop needs-based solutions and to successfully integrate them into existing structures.

As the economy (global & Indian) recovers from Covid 19 pandemic, what are key challenges before the manufacturing sector?

Digitalization, climate change, the energy transition or even electromobility are topics that not only move us privately, but also us as Weidmüller. We are thinking about new technologies that contribute to the reduction of electricity consumption and more efficient use. In this context, DC technology is seen as having great potential for improving the energy balance in industrial production, for example. An important step towards climate-neutral production.

What kind of new opportunities are you looking to tap?

As a pioneer and trailblazer,

Weidmüller already offers concrete solutions that enable manufacturing companies to prepare for the IoT and secure production control from the cloud. We want to consistently pursue this path and offer our customers solutions from the sensor to the cloud. In doing so, we focus on solutions for data acquisition, data pre-processing, data transmission and analysis. Always according to the motto: The path to the Industrial IoT does not have to be complicated. Regardless of whether access to valuable data is required or new, data-related services are to be generated, Weidmüller offers components, services and, thus, enables simple access to the Industrial IoT.

Regardless of whether access to valuable data is required or new, data-related services are to be generated, Weidmüller offers components, services and, thus, enables simple access to the Industrial IoT.

Do you think the need for automation has increased because of Covid pandemic?
Digitalization has certainly received an extra boost from the Covid pandemic. The need for scalable infrastructure and high-performance communication networks has increased.

The pandemic in particular has shown how important it is to secure supply chains. In particular, rapid market changes can be better responded to with the right automation strategy. Companies find it easier to adapt. Vertical integration in manufacturing, with fewer interfaces, plays a large part in this.

How can SMEs adopt automation & digital solutions in their manufacturing and business processes? Can small (SMEs) become smart?
Yes, there is a lot of potential in automation and digitalization processes, especially for SMEs. However, every company should be aware that digitalization makes the need to change certain processes inevitable. SMEs, in particular, can benefit from this, as they can initiate and implement changes more quickly and flexibly. The company must first clarify for itself where it wants to develop and how much change the company organization can handle - in terms of culture, know-how and technology. The basic rule is: many small steps are often easier than one big one and create more acceptance for changed working environments. To do this, the right products, tools or system solutions need to be found. A partner can also help to increase one's own competitiveness and develop sustainable business models. Weidmüller is taking the steps towards digitalization itself and also supports its customers from its own experience.

DC technology is seen as having great potential for improving the energy balance in industrial production, for example. An important step towards climate-neutral production.

Are automation solutions presently available in the market cost-effective?
The answer to this question is a resounding yes. Automation solutions have been used in various forms for 30 years and are established technology. In addition, there are new tools with the expansion of IoT and AI. In this area, we are currently in the investment phase. The development of automation solutions towards IoT and AI is indispensable for Industry 4.0 and the IoT.

Why is upskilling important for companies with the rise in usage of automation?
The opportunities, but also the challenges, are becoming greater due to increasing automation and digitalization. For this, the topic of training is very important. Bringing your own employees along and introducing them to the new technology creates trust and acceptance, especially for the use of new technologies. We ourselves have an extensive training program for our employees. But we also support our customers who are going down this path with training courses, webinars and training sessions.

Are you planning to launch any new products/services? If yes, please elaborate on it
In particular, we will continuously expand our automation and IoT portfolio to offer an end-to-end solution from data collection to data analysis. For example, with the expansion of our u-sense components, the smart sensor technology for data collection or acquisition. In the area of data processing, our u-control web control system scores points, which with its newly integrated container technology stands for future-proof automation infrastructure. With the use of new, open communication protocols, Weidmüller convinces users not only at the control level, but also with IoT solutions, such as the IoT gateway. The trend towards communication-enabled solutions is clearly evident. The best example is our communication-enabled power supply or the IoT-enabled surge protection. For the further processing of data, the integration of ML and AI methods into further hardware and software products will be on the agenda. IPF

"Rise in digitalisation is driving electronics hardware demand"

Germany-based Festo supplies pneumatic and electrical automation technology to 300,000 customers of factory and process automation in over 40 industries across the globe. In addition, Festo Didactic offers training solutions in the field of automation technology for industries, educational institutes and individuals. In this interview, **Rashmikant Joshi, Managing Director, Festo India,** elaborates more on the company's offerings and emerging trends in the market.

What kind of products and solutions is Festo providing to the manufacturing sector?

Festo is a global player and an independent family-owned company with headquarters in Esslingen, Germany. The company supplies pneumatic and electrical automation technology to 300,000 customers of factory and process automation in over 40 industries. Applications of our products are in all types of manufacturing industries such as automobile, food, packaging, printing, textile, machine tools, consumer electronics – to name a few. On the other hand, we also play a major role in automating processes in industries such as biotech & pharma, chemical, water treatment plants, metals and minerals etc. Our products and services are available in 176 countries.

Being the leader in industrial automation, Festo Didactic offers training solutions in the field of automation technology for industries, educational institutes and individuals. Festo Didactic invests continually in developing new

training hard- and software, training curriculum and other training aids to help industries and institutes.

Festo is represented in the Indian subcontinent since 1963, and since 1986 with its own national company; it is benefiting from the upswing in the Indian mechanical engineering industry and the growing demand for automation technology. Our state-of-the-art manufacturing facility supported by a large team of R&D team in Bangalore caters to the requirement of domestic and global market.

How are Festo's technologies and solutions helping customers to increase their productivity and efficiency?

As the world's leading provider, we offer the right solution for every challenge. With around 30,000 catalogue products, customised components and ready-to-install solution with a service package to match, we exploit the synergies between both areas for our customers benefit while our fully integrated range offers you solutions from a single source. Our customers profit from the know-how of our experts, right from the initial consultation to far beyond the application of our products and solutions. We offer software solutions to our customers from design to procurement and commissioning, which help them independently and efficiently complete projects seamlessly. That is what we mean by a fully integrated range that covers the entire value chain.

Rising use of digitalisation has increased demand for electronics hardware. Production of vaccines, ventilators, medical oxygen, masks, gloves, sanitisers, and other protective aids has increased automation requirements.

Automation had already been prevalent in the manufacturing industry, but during COVID, artificial intelligence took on a new importance. This trend won't go away when the pandemic finally fades.

What are key challenges before manufacturers today with the economy (global & Indian) recovering from Covid 19 pandemic?

With all the changes that are on the horizon and the changes we have already witnessed in the span of last one year, it is important that the manufacturing industry is above all, adaptable. The best way to embrace these changes is through

technology and the implementation of digital supply chains, automation and moving the business online to keep up with consumer needs. In addition, manufacturers should be exchanging clear and timely information with their employees, as well as ensuring their staffs are learning new skills to help bridge the skills gaps and be better prepared to face the challenges ahead.

What kind of new opportunities are you looking to tap?

The demand for automation in new segments such as battery assembly and handling, e-vehicles is increasing in the country. In addition, medical and laboratory automation applications will have a good potential for growth. In the traditional food industry applications, hygiene and food safety is attracting focus.

Unlike software training, training in industrial automation is very capital intensive. This is the reason why we do not find suitable training facilities in most of the education institutes.

Has Covid pandemic propelled the need for automation?

Automation had already been prevalent in the manufacturing industry, but during COVID, artificial intelligence took on a new importance. For example: if you've got robots on the production line, you don't need to worry about social distancing, temperature checks, absences because of illness, work slowdowns and a whole host of other COVID-borne challenges. This trend won't go away when the pandemic finally fades.

On the other hand, rising use of digitalisation has increased demand for electronics hardware. Production of vaccines, ventilators, medical oxygen, masks, gloves, sanitisers,

With all the changes that are on the horizon and the changes we have already witnessed in the span of last one year, it is important that the manufacturing industry is above all, adaptable.

and other protective aids has increased automation requirement.

Can SMEs adopt digital solutions to become smart?

Implementation of automation or digitalisation should be for serving specific purpose, based on cost-benefit analysis. The size of automation or digitalisation can be different in different industries. One can introduce automation in specific processes to become more efficient, reduce human errors, reduce fatigue on human body, ensure safety and hygiene as required, ensure quality consistency, etc. The level of automation can then be increase as the business grows.

How cost-effective are automation solutions at present?

If the purpose of automation is clearly defined, there are enough automation solutions available out there in the market. One has to however, ensure that it is not only initial investment that is important. Often the user makes mistakes of going in for low priced solutions and end up incurring cost on maintaining and early replacement of solutions. A sound support of technically competent team from automation solution provider plays a major role here.

Why is upskilling important for companies with the rise in usage of automation?

Festo is active in Indian subcontinent since several decades, setting up training facilities at ITIs, government tool rooms, engineering colleges and training centers of industries. We have also set up our own training centers where we provide trainings to industry employees. Unlike software training, training in industrial automation is very capital intensive. This is the reason, why we do not find suitable training facilities in most of the education institutes. Those who do have training facility, may not regularly upgrade the facility. Due to this reason, the industries do not get trained and industry ready workforce from institutes.

On the other hand, the existing employees in the industries need to be retrained and upskilled with changing automation landscape to cope with new technologies such as digitalisation, I4.0, AI etc. Festo Didactic offers industry-specific learning concepts: From access to the Festo Learning Experience Platform for self-study to learning factories for "hands-on" training with perfect knowledge transfer to the shop floor.

Implementation of automation or digitalisation should be for serving specific purpose, based on cost-benefit analysis. The size of automation or digitalisation can be different in different industries.

What are your future plans with respect to new products?

In its role as a technology and innovation leader in industrial automation and technical training, Festo aims to establish artificial intelligence (AI) as a key technology and core competence and to use it consistently for its customers' automation solutions. To this end, Festo offers intelligent solutions and services, with a focus on predictive maintenance, predictive quality, and predictive energy. IPF

"Automation has power to solve challenges posed by pandemic"

...says **Rohit Dashrathi, Founder and Director Rucha Yantra LLP,** which provides robotics solutions for material handling challenges, in this interview.

Kindly brief us about Rucha Yantra and solutions it offers to the industry

Rucha Yantra is a leading Indian company that provides robotics solutions for material handling challenges. With our innovative team of engineers, we specialise in building Autonomous Guided Vehicles (AGVs) and Autonomous Mobile Robots (AMRs) that handle floor transportation of material from one point to another without human intervention. We also specialise in customised Special Purpose Machines (SPMs) and Robotic Integration & Automation services. Our aim at Yantra is to develop effective, reliable, and affordable solutions for challenge that our customers face on a daily basis.

What are the advantages of your products & services? How do they help customers to increase their efficiency and productivity?

Our products are developed to reduce cost, increase productivity and efficiently solve material handling issues. Manufacturers benefit immensely through a host of Industry 4.0 features such as remote performance monitoring, auto loading-unloading accessories,

and wireless charging. Our AGVs and mobile robots are rugged for manufacturing and commercial setups' challenging conditions. What makes them suitable for shop floor is their design - compact and innovative - that lets them access almost any section of the floor. All in all, manufacturers can rely on Yantra AGVs to increase the speed of floor transportation, reduce errors, and boost productivity.

What kind of challenges are manufacturers facing today?

The spread of the coronavirus pandemic came as a heavy blow to the world economy and led to a massive deceleration in the manufacturing sector. Supply chain disruptions, social distancing on high-touch assembly lines, limited ability to travel, and the need for oversight add significant complexity to today's manufacturing processes. While adjusting to the 'new normal' was a daunting task, getting back to the 'old normal' could be even bigger. Risks to people's safety, varied regulations in different geographies, and increased pressure on costs shall be the main challenges going forward.

While adjusting to the 'new normal' was a daunting task, getting back to the 'old normal' could be even bigger. Risks to people's safety, varied regulations in different geographies, and increased pressure on costs shall be the main challenges going forward.

Is Covid 19 pandemic leading to increase in demand for automation?

It is definite that the COVID-19 pandemic has made people realise the importance of automation and as the situation improves, many leading businesses have started taking steps to ensure smooth operation and survive this crisis situation. I believe in the power of automation in solving manufacturing challenges posed by the pandemic. Social distancing, avoiding health risks, and cost reduction can all be addressed by increasing automation.

Are automation solutions presently available in the market cost-effective?

I do understand manufacturers' complaint that automation solutions, today, cost a lot and are thus not readily willing to invest. But I must maintain that manufacturers should look at automation from a long-term perspective. While the upfront cost may seem high, in the long run, they shall be more than offset by the benefits.

Will the need for upskilling growing with the rise in usage of automation?

Automation shall significantly transform many job roles let alone eliminate some of them. Thus, employees and higher management will have to co-exist with automation and other similar trends in the future. For such a scenario, upskilling is a must for survival. IPF

What lies ahead post pandemic

The pandemic has shifted focus from global to local. In this situation, manufacturers are trying to bring supply chains closer to home and are creating opportunities. Manufacturers are leveraging automation and digital technologies to foster growth, says **Frans Van Niekerk**.

Covid-19 pandemic has disrupted every sector. Organisations which are serving technology, healthcare have experienced a surge in demand while those that manufacture tools for aviation, energy, and the automotive industry have experienced a slowdown. Manufacturing industry is the hardest hit segment due to Covid-19. India's manufacturing sector output shrunk by 20% in the first quarter of 2020. Last year, the lockdown and restrictions completely halted manufacturing and derailed the global supply chain. The manufacturing sector is facing major disruptions in the areas of standard manufacturing processes i.e., production, demand, and supply chains.

However, there are some sectors like pharma and healthcare that witnessed major manufacturing demand and, therefore, growth.

The impact of Covid-19 on the global manufacturing industry can be divided into distinct manufacturing i.e., machinery, automobile, electrical and electronics, metal, aviation, etc. and process manufacturing sector includes chemicals, pharmaceutical, food & beverage and medical equipment, personal care & cosmetics, etc.

Component manufacturing sector

The hardest hit sector in the manufacturing industry is component manufacturing. Due to pandemic, the factories and production operations of automotive, electronics, aerospace, and others, got shut. China, the hub for the supply of raw materials to produce all the industrial tools, impacted due to Covid. It also impacted the whole supply chain due to lockdown in the entire world. Followed by lockdown, the manufacturing plants came to a halt and derailed the supply chain of several companies.

Food & beverage manufacturing sector

In the given scenario, food & beverage manufacturing companies are facing considerably reduced consumption as well as supply chain problems. The supply of ingredients and raw materials to the manufacturing sites has been affected badly which resulted into hampered production, forcing manufacturers to abstain from operations. Also, manpower availability in the time of lockdown has been another hurdle. According to French Trade Group, it has been noticed that food and beverage industry have suffered 22% loss in turnover globally.

The grocery sector is facing scarcity and the widespread

stockpilers who have dived in panic buying have contributed heavily to it and of course the supply chain derailment.

Automotive manufacturing sector

Every industry segment has been affected by the pandemic and the globally integrated automotive sector is no different. Factory disclosures, supply chain disruption, and declining demand have all taken rise. Due to Covid, the industry almost been at standstill. A sustained shortness of consumer demand has significantly affected auto manufacturers' cash flows and revenues due to lockdown.

Suppliers facing liquidity issues may capitulate to worsening market conditions, causing extensive disruption across the entire manufacturing ecosystem.

Pharma manufacturing sector

The effects of Covid-19 have put the global supply of medical products, raw materials, manufacturing of medical equipment etc. under enormous pressure. India and other countries who are under medical device and manufacturing rely largely on sourcing material directly or indirectly from China. Now, with the limited operational capacity in China, they faced supply shortages. Indian pharmaceutical sector depends almost 80% for active pharmaceutical ingredients (API) on China, considered as world's leading producer and exporter of APIs by volume. Pharma sector has suffered tremendously due to heavy outbreak of pandemic.

However, it brought opportunities for some of the pharmaceutical companies to come forward and start trials and produce vaccines. India has established itself as leading manufacturer in the pharmaceutical sector. Many pharma and other industrial tools manufacturing companies started producing masks, ventilators, oxygen manufacturing and other related products and equipment. This approach has been able to minimize the loss due to pandemic but for long term, the medical sector must follow innovation and need to review the business processes to survive Covid.

The silver lining remains in the fact that the pandemic has urged businesses to build resilience and the government has opened many avenues for manufacturing to gain momentum with a view to restore economic progress.

What lies ahead post pandemic Opportunities that lie ahead

India witnessed improvement in the manufacturing sector since October 2020 with businesses growing production. According to annual national income by Government of India, the gross value added at basic prices from the manufacturing sector in India grew at a CAGR of 5% during FY16 and FY20.

> **Industry experts across manufacturing sectors believe that the incorporation of software and automated technologies for factory operations and safety of the workers will enhance production capacities of companies in future.**

Companies are investing a lot into R&D and innovation to be prepared for the future demand. Manufacturers are working on robust plan for the betterment of business on short notice, prioritizing work force, implementing other measures to stay resilient during crisis and monitor potential collaborations. Many industrialists are also optimising and streamlining their distribution networks. They are now building better crisis management strategies and emergency response plans.

The pandemic has shifted focus from global to local. In this situation, manufacturers are trying to bring supply chains closer to home and are creating opportunities. Manufacturers are leveraging automation and digital technologies to foster growth. However, there is a need for manufacturers to revisit their sourcing strategies and alternate suppliers. This will create future opportunities for manufacturers who are currently utilizing industrial tools, such as cellular connectivity and technology hardware that will guarantee better ROI.

Industries like healthcare and pharma that have gain prominence will see further growth as demand for medical consumables and personal medical equipment is likely to grow. This would benefit the manufacturers of medical supplies across the board. Medical suppliers are now looking for local manufacturers rather than offshore to avoid disruptive supply chains. Many businesses are looking to optimise costs and maximise their productivity. Manufacturers should ensure efficacy and safety of medical products to guarantee patient trust in future.

Overall, industry experts across manufacturing sectors believe that the incorporation of software and automated technologies for factory operations and safety of the workers will enhance production capacities of companies in future. IPF

About the author:

Frans Van Niekerk is the General Manager (Industrial Technique) at Atlas Copco - a Swedish company that provides compressed air and vacuum equipment, individual power tools, and construction and mining equipment, post selling service and maintenance.

Surface engineering: Modern tool of smart manufacturing

Material surface has a crucial role to play in overall service life of any component. Hence, surface engineering related technologies have gained wide attention of the researchers worldwide, says **Dr Umesh R Mhatre**.

Rapid changes in the technology progressively calling for sustainable materials with smarter features, high resistance to wear and tear along with the new functionalities. This is one of the important reasons why the scientific fraternity worldwide is in the quest of smart materials with the unique properties. Demand from different industrial sectors, like the automotive, bio-medical, textile, renewable energy, aeronautical sectors, etc has generated an enormous demand in specific technologies geared towards tailor made materials with unique surface properties.

In the current state of our engineering industry, it is very well understood that, not just materials but the “smart materials” hold key to our future development. These smart materials cannot be designed merely by modifying bulk properties of the materials. Material surface is also equally important as it continuously interact with the surrounding atmosphere and with other materials in contact. Therefore, material surface has a crucial role to play in overall service life of any component.

Surfaces are important mainly due to two basic reasons, Firstly, it is on their surfaces, that phenomena like corrosion, wear and fatigue originate and secondly, surfaces determine the chemical, electronic, optical, or mechanical properties of a material. Contemporary engineering challenges demands for efficient and robust at the same time smaller, lighter materials. In the material science world, these terms represent material properties that are totally contradictory. Today, it is well understood that these challenges of modern engineering industry can only be addressed by a combination of the competence of the bulk material and flexibility of tailoring surface properties of these competent materials to perform against the challenging conditions they are subjected to. In this pursuit, surface engineering related technologies have gained wide attention of the researchers worldwide.

Surface engineering is a field within material science. It comprises various branches of sciences related to chemistry, physics that influence the surface of the materials and alter the surface properties without changing the bulk properties. It has no longer remained only wear and friction related phenomena, but strongly emerging as a discrete branch of modern material engineering with a wide range of cost-effective surface modification technologies. As stated earlier, it is an effective combination of competent materials and novel surface treatments with optimised mechanical, electrical, electrochemical, and biomedical properties.

A choice of competent bulk material with appropriate surface treatment produces efficient components with desired properties. Bulk material can be made competent by choosing right alloy with suitable heat treatment processes and/or cryogenic treatments. Apart from bulk hardness, crafting perfect and uniform microstructure, management of residual stresses is also equally important to impart basic strength. Surface engineering does not only include deposition or coating technologies, but it is three-fold approach viz. under surface treatments such as nitriding, carburization, ion implantation etc, surface texture preparation treatments such as buffing, lapping, shot peening, electro-polishing, abrasive treatments etc. and above surface treatments such as coatings, oxidation, passivation etc. These possesses can be used individually or in combination as applicable to achieve desired results.

Among various surface engineering technologies, Physical vapour deposition (PVD) and Chemical Vapour Deposition (CVD)

techniques are the most widely used surface modification techniques by the engineering industry. Particularly a strong impact of these technologies can be very clearly seen in automotive, aerospace, biomedical, plastic processing industries, electrical and electronic industries. These techniques have capability to deposit very hard wear resistant and corrosion resistant coatings by a combination of metals or alloys with reactive gases in ultra-high vacuum environment. To the great extent, these techniques offer flexibility to tailor the surface properties as per the need.

Cutting and machining tools were among the first to be coated with PVD technology. Titanium Nitride (TiN) was the best suited coating that has proven the improved performance of coated cutting and machining tools during the decade. As the cutting and machining technologies kept on improving upon the high speed and high productivity processing, PVD coating technology has also kept on supporting them with innovative coating solutions that can further improve the performance of modern tools and components.

Today, for different mechanical operations we can have a separate and dedicated PVD coating solution. Engineering industry has already started enjoying the benefits of these coating to achieve higher productivity and good quality at optimum tool cost. It is very clearly proved that surface engineering by physical vapour deposition technique is a rapidly developing technology with considerable scientific and commercial potential. With more and more technological upgrades, these techniques are made simple and user friendly. Today use of this technology is not only limited to tools, but also gained wide acceptance in various sectors of the industries such as aerospace, optical, pharmaceutical, bio-medical, textile, decorative, chemical etc. Therefore, it is worth to get involved with this technology and enjoy the benefits.

Surface Modification Technologies Pvt Ltd (SMT) is striving to address these technical challenges of future engineering industry through in-house strength of surface engineering expertise with in-depth knowledge of PVD technologies. SMT designs appropriate surface engineering solutions to make the component work under desired working conditions. SMT's ultimate aim is to address the practical needs of modern industry. We strongly recommend users to find a technology partner that you can trust, work with them to give you the result you need now and for the future. It does not matter how big or small industry you are in, keep updating yourself with futuristic technological achievements that not only benefit yourself but supports the beautiful dream of 'Make in India' initiative successfully on the challenging canvas of global engineering. IPF

About the author:

Dr Umesh R Mhatre is the Managing Director of Surface Modification Technologies Pvt Ltd.

NEWS SNIPPET

Safcon Seals offers solution to protect fire extinguishers from tampering

Fire extinguisher is something you hope you never have to actually use, but when you do need to use it, you want to be 100% certain that it will work exactly the way it is supposed to work, keeping your family or business safe from fire. Because fire extinguisher often sits for long periods waiting for a fire emergency, you want to be certain that no one has tampered with it or used it already, rendering it inadequate to your needs when an actual fire strikes. An easy and affordable solution to this problem is to purchase anti-tamper seals for all your fire extinguishers.

Kolkata-based Safcon Seals Pvt Ltd offers Safcon Ball-lok security seal (Part No. BL-26) that is especially designed to fix around the safety pin on the fire extinguisher so you can see at a glance that it has not been used. Safcon security seals are manufactured from virgin plastic materials and are available in yellow colour as standard. They are also available in red, orange, green and blue colour. The security seal is very effective and inexpensive way to ensure your fire extinguisher is unused and ready to go in the event of an actual fire. The security seals are customised with customers' word logo and/or consecutive serial numbers. IPF

For details, contact Safcon Seals Pvt Ltd, Kolkata, on +91 33 2229 5486, Mob: +91 98748 55114, Email: sales@safcon.co.in, or visit: www.safcon.co.in

EMAG SU offers high-tech solutions for top component quality

With the G 160 for components up to module four with a maximum outside diameter of 160 mm, for example, EMAG SU has the fastest machine in the market.

Sectors ranging from the automotive industry, aerospace technology, transmission engineering, and numerous others are going through a technological transformation, with many users requiring increasingly powerful production solutions to reduce their per-unit costs and meet the growing demands for component quality within the micrometer range. In view of this, it is easy to understand why gear cutting technology from EMAG SU (formerly Samputensili) is in high demand all over the world. The Italian machine manufacturer develops high-precision milling, grinding, shaping, and shaving machines, with few companies matching the wide technological variety it offers.

Its specialty is rough and fine machining of gears, shafts, worms, rotors, screw shafts, and other screw-type workpieces. EMAG SU has implemented a whole series of technological innovations for huge improvements in performance, as the example of generating grinding clearly shows: the machines boast short chip-to-chip times, intelligent axis concepts, thermal and mechanical stability, and easy user navigation. With the G 160 for components up to module four with a maximum outside diameter of 160 mm, for example, EMAG SU has the fastest machine in the market. The speed is made possible by two parallel workpiece tables that take turns moving at high speed (with the help of hard-wearing linear motors) to the grinding wheel.

The high-speed grinding element of the G 250 HS makes it possible to grind workpieces with interfering contours using small generating and profile grinding wheels.

Just as interesting are the profile grinding machines from EMAG SU for machining external and internal gear teeth, rotors, and worms in small and large volumes. What sets the technology apart is its precision, short tooling times, and reliability. This can be seen in action in the G 500 H for components up to module 35 mm with an outside diameter of 500 mm and a length of up to 1,850 mm. It can grind workpieces with internal and external gear teeth with the help of quick-change grinding elements. The long variant GW 7000 H can grind ball screws measuring up to 7 m, for example. This machine can also be equipped with a tool changer, which has great advantages with single-shaft extruder shafts. The GW 3600 HD (4- or 5-axis machine) is designed for economic machining of rotors or worms with a maximum diameter of 500 mm and a length of 2,500 mm. All the machines permit flexible production with short tooling times.

Focus on shaving, chamfering, and deburring

The company Samputensili, now trading as EMAG SU, has been part of the EMAG Group since February 2021. With this acquisition, the Group is expanding its scope of technology by adding a range of gear production methods: hobbing, shaving, shaping, tooth flank grinding, profile grinding, and generating grinding.

The focus is also on efficient processes when it comes to the shaving machines from EMAG SU. They can perform all shaving processes, depending on the model and axis configuration – from plunge and parallel shaving to underpass and diagonal shaving. The high rigidity guarantees high precision here. At the same time, powerful tool and workpiece axes ensure productivity with varying batch sizes.

The chamfering and deburring machines from EMAG SU for manufacturing spur and helical gears have short cycle times as well, since chamfering, smoothing, and deburring are combined in one process. Self-centering tools guarantee symmetrical chamfers on both sides of the workpiece. The SCT 3 can be easily connected to a wide range of automation systems or robots, and even the standard version has a loading slide for manual loading and unloading.

Success in the market with EMAG Sales

EMAG SU guarantees its customers

competitive advantages and a fast return on investment, whether in milling, grinding, shaping, or shaving. It achieves this by continuously investing in research and development to further boost the efficiency and environmental friendliness of its machines. At the same time, EMAG SU benefits from the global reach of the EMAG Group: the machine manufacturer from southern Germany handles the global distribution of the machines and thus lays the foundation for

The G 160 has two parallel workpiece tables, which take turns moving at high speed to the grinding wheel.

success on the market. All things considered, the specialists at EMAG SU see themselves ideally positioned for the gear cutting applications of the future. For example, in the field of e-mobility, the high torque of the electric motor is directly associated with special dimensional and surface requirements here, which are no problem for the machines from EMAG SU. Several European car manufacturers are successfully using several grinding machines from EMAG SU in this field now. IPF

TECH BYTE

Finger change at the push of a button

SCHUNK has again increased its gripper fingers program, and they can be exchanged more rapidly now: whereas the proven SCHUNK BSWS jaw quick-change system required an Allen key for operation, however, the new manual BSWS-M system only requires the push of a button to mechanically unlock the top jaw and pull away from the gripper. Attaching a new jaw and connecting it with the gripper is also done as quickly and easily with just the push of a button. As a result, the toolless jaw quick-change system reduces set-up times to a minimum, and therefore increases productivity and flexibility of the complete system. Dowel pins and a corresponding bore hole are available options, serving as an additional mounting aid, to ensure e.g. in the case of asymmetric finger pairs that they can be only mounted in the correct position.

Three versions available

Just like the BSWS, the toolless jaw quick-change system is available in three versions: The exchange mechanism of the BSWS-BM version (seven standardized sizes from 50 to 200) are incorporated in the base, which is firmly mounted on the base jaw of the gripper, and therefore only the gripper fingers need to be changed. For this version, existing SCHUNK gripper fingers which are equipped with an adapter bolt of series BSWS-A can be used. The second version is the BSWS-URM (six sizes from 50 to 160 are available) and can be easily and modularly incorporated into customized attachable fingers. The gripper fingers include a kit with the necessary locking mechanism for direct installation in the gripper fingers. Therefore, as there is no base, the complete finger length can be used for clamping. The third version is the BSWS-ABRM which is available in six sizes from 50 to 160. It includes finger blanks with an integrated change mechanism, and customers can adapt them individually to the respective clamping contour. All three versions are versatile in use and can be combined with every SCHUNK premium gripper and numerous gripping modules with SCHUNK PGN-plus finger interface.

Also useable as a stationary change system

The benefit of the SCHUNK BSWS-M quick-change system can be seen not only in its rapid exchangeability of the gripper fingers, but can also through its strength and adaptability to different applications: in stationary applications, or if it is used on a transport system, because workpieces can be quickly removed and replaced by another version at the push of a button. The system is as easy as push/pull allowing the BSWS-M to be integrated into many applications without the need for any technical training. IPF

Easy to use: For unlocking the jaw quick-change system SCHUNK BSWS M, all it requires is a push onto the release button and the gripper fingers can be removed. If the BSWS-M quick-change system is frequently used, then it is easy to see a pay back within a very short time.

For details, contact Satish Sadasivan of SCHUNK Intec India Pvt Ltd, Bangalore, on Tel: +91 080 4053 8999, Email: info@in.schunk.com, or visit: www.schunk.com

Collaboration in the ecosystem: What matters

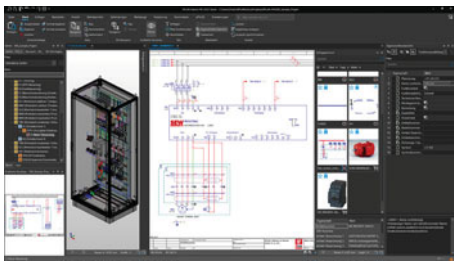
Using the new Eplan eManage, projects can easily be uploaded to the cloud and managed and shared from there. More specifically, this brings together the worlds of on-premises software and the cloud.

Operators of production facilities, machine builders and system integrators, control cabinet manufacturers and component manufacturers all have one thing in common: they all work together along the value chain, from the planning through to operating a finished machine or plant system – and continuously exchange information in the process.

What does this process – the collaboration among the various process participants – look like today? In the planning phase, the characteristics of the desired machine or plant system are described. If the company has particular supplier specifications, these are also detailed and then passed on to the operator, who takes the specifications into account when designing the machine or system. The planning phase is followed by the preplanning process. Additional information such as devices, release lists from Excel, specifications in Word or preplanning tools such as Eplan Preplanning are taken into account and, in turn, are used by the basic engineering designers to prepare a quote, for instance. In the case of more complex production lines, this is traditionally taken care of by a system integrator, who is also responsible for the detailed engineering and for generating electrical and fluid-power schematics.

Data is enriched in the Eplan Project

The project created with systems of the Eplan Platform – Eplan Electric P8 or Eplan Fluid, for example – is



now transferred to the control cabinet manufacturer. This manufacturer creates the virtual prototype of the switchgear system in the form of a 3D assembly of the control cabinet using Eplan Pro Panel. The control cabinet is then built, approved and commissioned by the operator. With the delivery of the switchgear system, the control cabinet manufacturer processes are complete. The company hands over the Eplan Project, which has been enriched with data, back to the machine builder or system integrator, who then commissions the machine or plant system based on the final project data. The project is then made available to the operator, who can access the current documentation, for instance using Eplan eView, in the event that servicing or maintenance becomes necessary, and who can digitally document any changes using the redlining function as needed.

This process describes the daily work in this ecosystem of industrial automation. The challenge, however, is that all the data for an automation project is created and added at various stations along the value chain. Often, all the project participants are working with partially inconsistent data, which ends up making the process even more time consuming and error prone. For instance, the drive power of a motor is changed at some later point in a project, but this change isn't taken into account when the machine or plant system is commissioned. As a result, the documentation is not up to date.

A "data container" as the central source of information

This is where Eplan comes in: the systems of the upcoming Eplan Platform 2022, in combination with the new Eplan eManage cloud service, network together machine builders and system integrators, control cabinet manufacturers, component manufacturers and the operators of machines or plant systems. Sebastian Seitz, CEO, Eplan, explained: "We connect companies with their clients and suppliers via the cloud, for easy and secure data sharing. The Eplan Project as the central, digital model of an automation solution supplies all processes with the necessary data. What we're talking about is a sort of 'data container' that is fed from the systems of the Eplan Platform. This generates added value in the digitised collaboration of all participants – through secure data transfer and central access to the Eplan Project."

A new feature includes the connection to the cloud via Eplan ePulse, which also significantly facilitates mobile working in design and engineering. Using the new Eplan eManage, projects can easily be uploaded to the cloud and managed and shared from there. More specifically, this brings together the worlds of on-premises software and the cloud. Clear access rights via role management ensure data security and provide flexibility for accessing projects. IPF

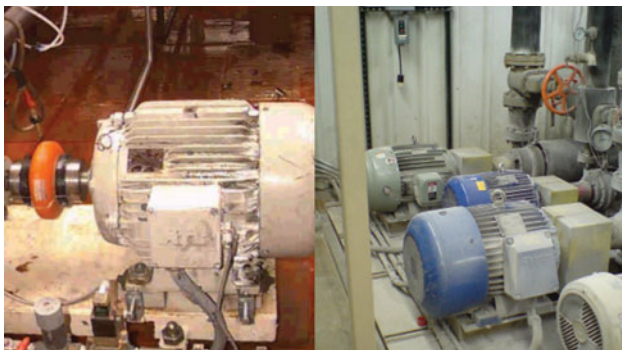
Prevent downtime faults in rotating equipment with thermal imaging

A thermal imager, such as the FLIR E8, allows the maintenance team to quickly detect overheating that may lead to a failure.

A motor breakdown, pump failure, or bad valve is always a critical issue in the oil and gas supply chain. They may result in pollution, product or energy loss, and shutdown of equipment or a production line.

The customer's challenge

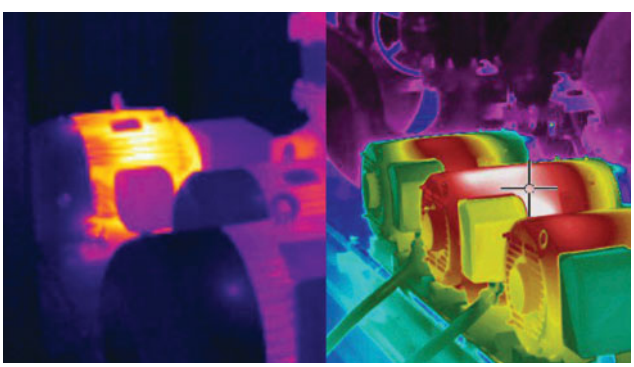
Vibration analysis is the most common technique to detect faults in rotating equipment such as unbalance, misalignment, or bearing issues. This inspection method requires the maintenance professional to collect vibration measurements on every single piece of equipment, which can be time consuming.



Motor, pump, and valve inspections are an important part of predictive maintenance programs to aviod an upplanned shutdown.

A solution

Thermal imaging technology makes it easier to identify where there may be a risk of a mechanical issue. It enables inspectors to easily scan for hot spots to see which motor or pump is overheating, and complete vibration measurements on those parts to save time and money. A thermal imager, such as the FLIR E8, allows the maintenance team to quickly detect overheating that may lead to a failure. It can also be used to inspect valves for improper operation. A closed valve will always have a warmer or colder temperature at the inlet, depending on the temperature of the fluid inside. When the valve is opened or leaking, the temperature of the pipe from the outlet will also be up or down. A digital multimeter or clamp meter, such as the FLIR DM93 or FLIR CM74 with VFD and inrush mode, can be used to take electrical measurements to control electrical circuits and connections.



Thermal imaging makes it easier to identify hot spots on pumps and motors, indicating overheating that may lead to a failure

The results

Through regular thermal inspections, oil and gas plants can rapidly locate hot spots and detect temperature issues in motors and pumps. Electrical issues and problems with connections are visible in thermal inspections, and valve failures are easy to identify. After each inspection campaign, visual and thermal images of the defective component may be stored and reported with a diagnostic failure and corrective action request, set per level of priority. IPF

For more information about FLIR in the oil & gas industry, contact on Tel: +91 11 4560 3555, Email: flirindia@flir.com.hk, or visit: www.teledyneflir.in/oilandgas/transmission-transportation

Need of robots in smart manufacturing

The post-COVID-19 world understands the needs of automation and robotics better, which is precisely what we do at Yantra. With a team of 20+ creative engineers, we aim to provide solutions that eliminate complexities in labor-intensive processes such as transporting loads from point A to point B and storing goods at the shop-floor and warehouse. Our Auto Guided Vehicles (AGVs) and Mobile Robots are rugged and equipped with advanced Industry 4.0 capabilities such as remote performance monitoring, auto loading-unloading accessories, and wireless charging to work in manufacturing and commercial setups' challenging conditions.

The need for automation was primarily felt in the COVID-19 lockdowns when personnel couldn't gather in large numbers, and the manufacturing industry had to bear its effects. "But in times of difficulties, we saw opportunities. We realised that achieving growth post-pandemic would be possible if we applied robotics for a wide range of applications," said Rohit Dashrathi, Founder of Rucha Yantra.

Need of automation in manufacturing industries

What the manufacturing industry needs today are reduced testing efforts, faster delivery capabilities, and more affordability. Robots can now perform the tasks of three to five people, depending on the functions, and thus, help the manufacturing industry address the three needs. Yantra specializes in building Autonomous Guided Vehicles (AGVs) and Autonomous Mobile Robots (AMRs) that handle floor transportation of material from one point to another without human intervention. AGVs increase the bottom line for an operation by reducing labor costs and by increasing productivity. Though these robots come with a price, they can be considered as one of the best investments in the long run.

Vamen and Raghav

With our passionate team of engineers, we strive to achieve perfection. As a result, we have been able to roll out AGVs and Mobile Robots that are cutting-edge and well-suited to solving floor transportation challenges that the industry faces. The first Line Follower Robot was built in the basement of our founder's residence, marking the beginning of Yantra's journey, and today we can proudly say that we have come a long way since then. Our products Vamen and Raghav, prove to be a game-changer in the manufacturing industry by helping lift bulk material and reducing labor strain.

We made a breakthrough in tugger-type AGVs with RAGHAV, which helps fulfill the demand for a mobile robot that smoothens the floor transportation process. Raghav is a two-in-one AGV that can tow trolleys and carry bins/ pallets as a unit load carriage. It complies with international safety standards, and its ultra-modern technology uses colored path guidance technology, which is three times more flexible than laser-based navigation. RAGHAV comes with remarkable value-added features such as Self Rotation Feature and Mobile App Control. These features make RAGHAV easy to use along with minimizing the labor work. It can also move seamlessly on the uphill as well as a downhill slope with a full load. This is an added advantage for shop floors with un-leveled floors and inclinations.

Yet another innovative offering from Yantra is the tunnel type AGV - Vamen. It is a low-height compact AGV that comes with flatbeds to access locations other AGVs cannot. Its slim structure enables it to reach under the trolley and lift the load easily. VAMEN automatically carries the load from one point to another with automated picking and placing trolleys and pallets. It is bi-directional, i.e., it can move both forward and backward, which helps lower cycle time and enable faster movements from point A to point B. Vamen achieves a complete automated material movement by saving additional costs for forklifts and pallet trucks.

In an era when goods are transported from one point to another on the shop-floor, predominantly by human labor, we identify opportunities to impact the industry by making it big in the world of automation and robotics. Today, Rucha Yantra has developed multiple products for a wide variety of applications for the shop-floor and warehouses, and it remains committed to revolutionise material handling through robotics. IPF

Updating traditional steel fabrication methods

Pioneer Intertrade Pvt Ltd - founded by Prakash Khandelwal, a Mechanical Engineer with distinction - has been pioneering implementing of state-of-the-art steel fabrication activities. Since 1982, the company has been in the forefront of change of traditional methods of working. It started as an agent and distributor for foreign manufacturers in India and, in 2011, it branched out to a Group of 5 companies, each now the leading brand in their field with its own teams.

BROACHCUTTER® is the leading brand in magnetic drilling machines and annular cutters. Seeing the way drilling was done traditionally in work sites and workshops using a heavy magnetic stand on which a hand drill or radial drills; we have introduced lightweight magnetic drilling machines which drill upto 6 times faster than traditional solid drills. We have also adaptors and arbors which adapt traditional radial drilling machines and also CNC machines to use Annular cutters.

Prakash Khandelwal,
Group MD, Pioneer Intertrade Group

FABMAX is leading name in cold pipe cutting and beveling machines. We offer cold pipe cutting & beveling machines for pipes upto diameter 48" (1219mm) with pneumatic, electric and hydraulic drives; hand held pipe beveling machines with ID or OD clamping, Quick Pipe facing machines, for eg, for heat exchangers tubesheet tube facing, boiler panel cut-off saws (pneumatic and electric drive). We also undertake service and give machines on rental with technical supervision.

VMAX® offers the widest range of steel plate beveling and chamfering machines, plate clad removal machines, steel pipe facing machines. With hundreds of machines sold across industries, VMAX® is a well-known brand in the industry. We also have the capability to customise machines as per application. We have the capability to work with plates upto 200mm thickness.

In SUPERCUT, we offer primarily orbital pipe cutting machines for absolute straight cutting required in SS tubes before orbital welding.

Pioneer Intertrade continues to distribute on all-India basis some products such as portable bandsaws and industrial bandsaws from Italy and heavy duty pneumatic and hydraulic tools, reciprocating saws for cold cutting of pipes upto 24" diameter, ATEX tools for working in Inflammable areas and underwater working tools. In conclusion, we will continue to lead change in the fabrication industry and drive efficiencies and latest working methods in tune with modern India.

IPF

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PIPE CONVEYORS


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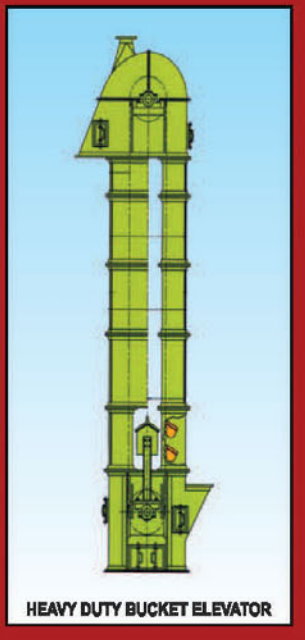
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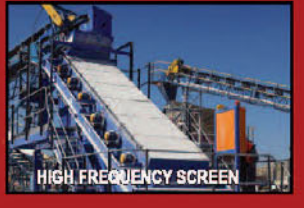
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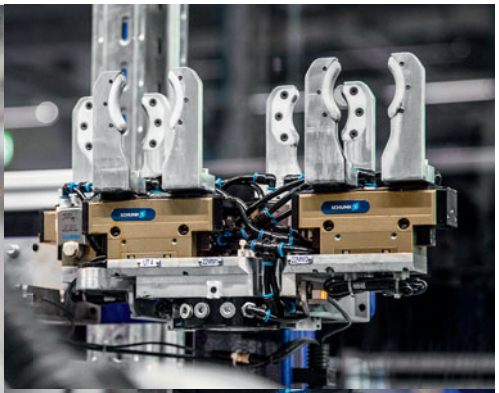

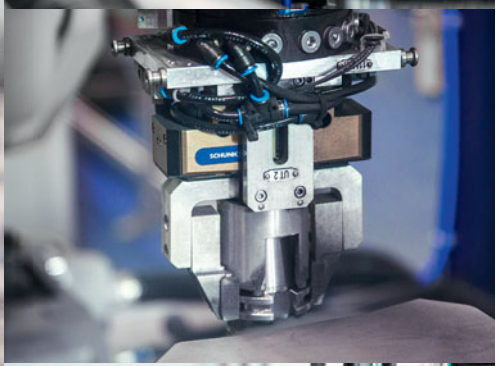

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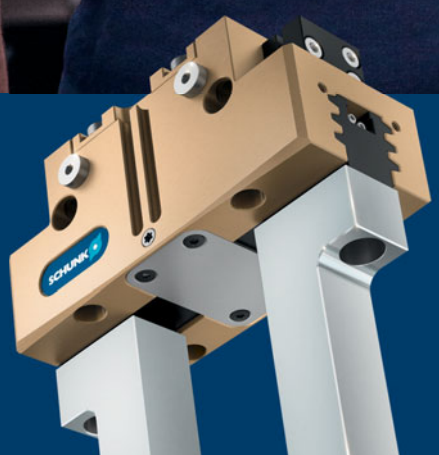

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