VOL 4, ISSUE 4 - NOVEMBER-DECEMBER 2020

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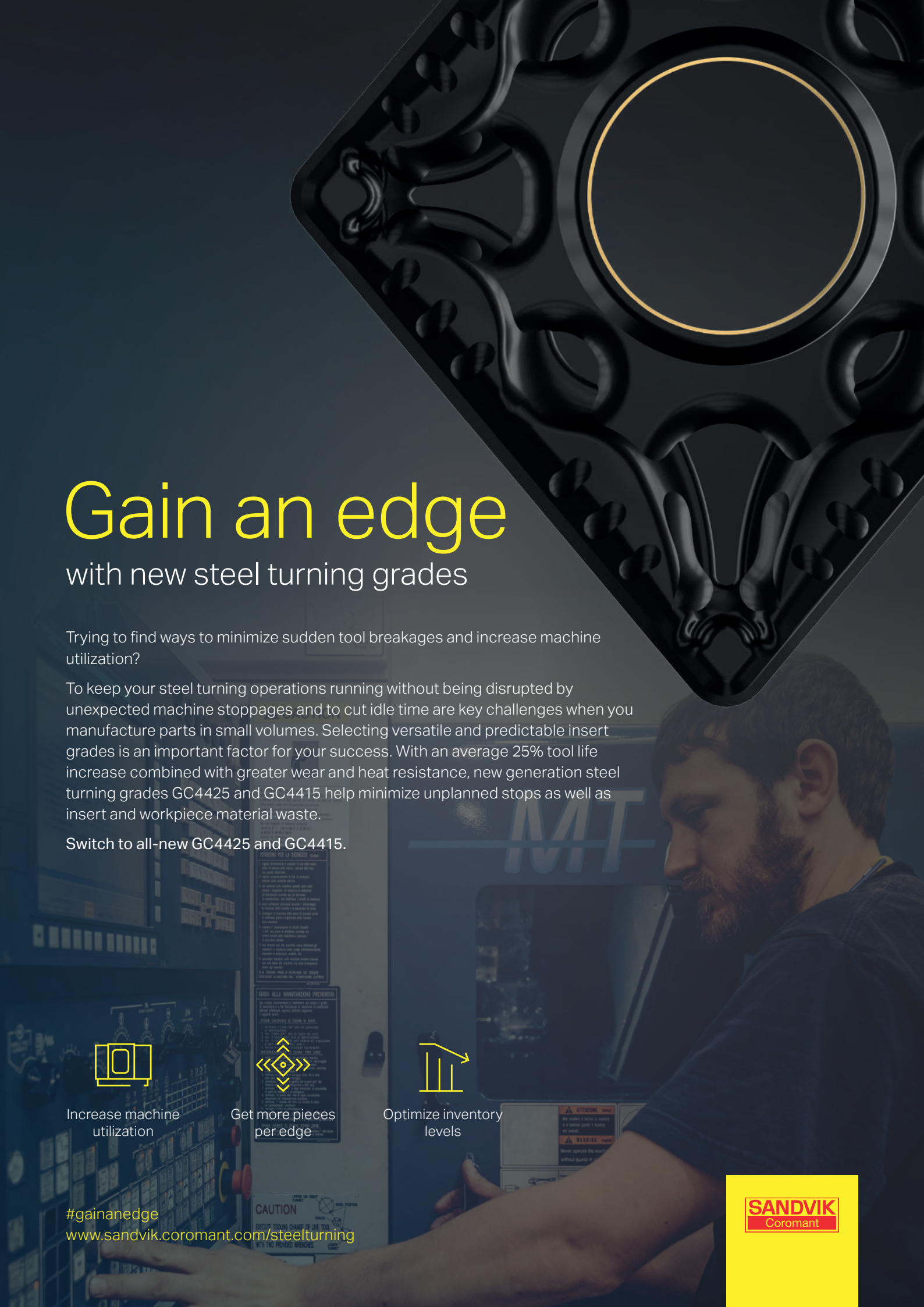

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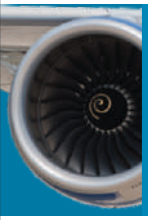

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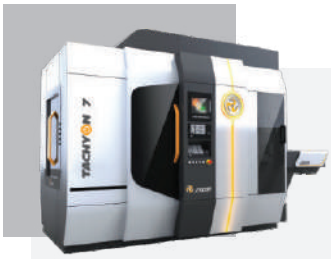

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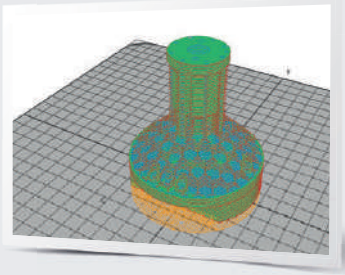

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TOWARDS THE NEXT LEVEL OF MANUFACTURING

INDRADEV BABU
PRESIDENT
INDIAN MACHINE TOOL MANUFACTURERS' ASSOCIATION (IMTMA)

Dear Readers,

It is encouraging to see that the Manufacturing industry seems to have taken the recent setback in its stride, reinventing and strategizing its businesses and looking to bounce back.

Welcome to the post-Covid lockdown scenario!

Industries have received encouraging sales and orders in the last few months and the auto sales picking up during the season has managed to lift the pall of gloom and bring customers back to the market.

On the economic front, industries have regained momentum as visible in the recent GDP figures. It's encouraging to see the accelerated production revealed by IHS Markit (a leading global research and analysis group). Hopefully, it sustains till the end of the financial year. Also, India's manufacturing purchasing manager's index (PMI) rose to 58.9 in October 2020, the highest since mid-2008, as against 56.8 in September 2020.

The recent uptick in the sale of tractors and passenger vehicles has reinforced the fact that the Manufacturing industry is on the right track and India is steadily moving towards becoming an export-oriented market in the capital goods sector. As this happens, the country would perhaps realize its dream of becoming a $5 trillion economy with the contribution of $1 trillion from the Manufacturing sector in the next few years.

IMTMA is organizing the National Productivity Summit 2020 on December 18-19, 2020 as a virtual event with the aim to provide an insight into some of the best practices in the industry that contribute to the overall growth.

The Government of India's measures have also ushered in positive sentiments. The Manufacturing industry has received its growth tonic with the Union Government announcing a series of measures to support the growth of MSMEs. The Government also approved the Production Linked Incentives worth ₹1.46 lakh crore for 10 sectors including the Automotive and the Textile. The incentives are expected to propel the Automotive sector to scale further heights resulting in simultaneous growth for the Indian Machine Tool industry.

Moving with the market's changing dynamics and the need to connect and collaborate in today's manufacturing industry, Indian Machine Tool Manufacturers' Association (IMTMA) is organizing the National Productivity Summit 2020 on December 18-19, 2020 as a virtual event. The Summit aims to provide an insight into some of the best practices in the industry that contribute to the overall growth.

We do have some interesting days ahead to look forward to and I hope that these initiatives will provide immense opportunities for the manufacturing fraternity to interact and find avenues for growth.

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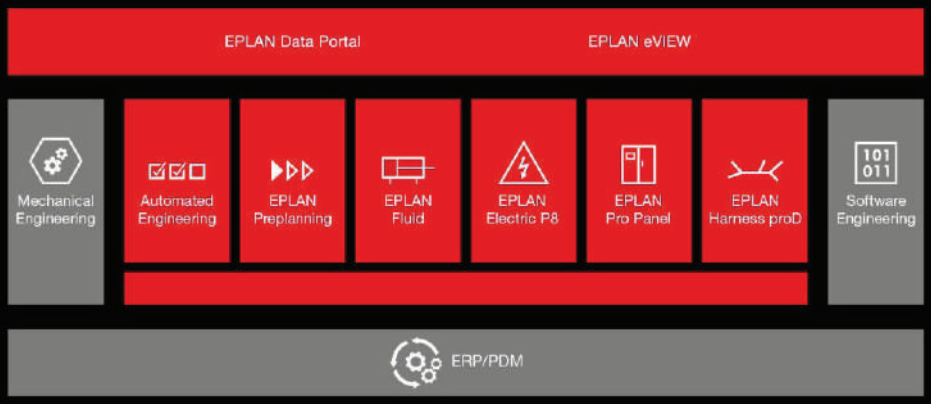

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V ANBU
DIRECTOR GENERAL & CEO
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Manufacturing activities have picked up steam and is expected to reach its pre-Covid days' growth sooner than expected. Industries have shown resilience in managing life and livelihood challenges and broadening their horizons with appropriate use of technology.

Dear MMI Readers,

Indian Machine Tool Manufacturers' Association (IMTMA) is happy to bring you the December edition of its Modern Manufacturing India (MMI) magazine. Many thanks for your continued interest and support.

Manufacturing activities have picked up steam and is expected to reach its pre-Covid days' growth sooner than expected. Industries have shown resilience in managing life and livelihood challenges and broadening their horizons with appropriate use of technology.

MMI, with its rigorous research and analysis, endeavours to bring you the latest information from the manufacturing world on to your table. This month's edition focuses on metal cutting. Read on for a quick peek into an opinion piece by IMTMA on the need for resilience to tide over tough market conditions.

As we continue to share inspirational stories from the industry, we also reach out to you for your feedback, comments, and thoughts to make this magazine more insightful and interesting. This will help us understand your requirements and enable us to meet your expectations.

I thank you once again for your interest in the activities of IMTMA. You can download previous issues of MMI from the IMTMA website.

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CLOSING THE DOOR, TURNING THE PAGE, MOVING ON

My penchant for traveling has taken me places across the globe. As a voyageur, I have been in love with sunsets that seem different in different landscapes. Watching the sundown is, for me, a spiritual experience that leaves me brooding over thoughts that I discover hidden in the deep recesses of my mind. Though, in the literal sense, it symbolizes the end of one more day in our timeline of existence, metaphorically, it seems a promise of renewal and a reminder to rest and reset our hearts and minds for a new day.

Every sunset presents an opportunity to reset our goals and aspirations for another day. Without endings there are no beginnings. Similarly, now that we are close to the end of 2020, it is time to take stock of our misses and success and gear up for the coming year. On introspection, this calendar year has brought unprecedented and unforeseen challenges. It has also provided opportunities for exploring new ideas, new norms, and new thinking.

Businesses around the world are trying new ways to come back stronger. The five R's – Resolve, Resilience, Return, Reimagination, and Reform – have become the pillars of the New Normal. Risk-takers and innovators are creating new jobs and industries. Companies that are stepping up their game are better off and readier to tackle the challenges and chance upon opportunities.

> *"Keep Going. Your hardest times often lead to the greatest moments of your life. Keep going. Tough situations build strong people in the end."*
>
> *– Roy T Bennett*

Taking cue from the above, this issue is curated on how manufacturers are focusing on strategic areas for rebuilding their operations and accelerating the adoption of digital solutions to stay afloat in this competitive era.

On this optimistic note, Team MMI wishes all of you a Merry Christmas and a great beginning to 2021.

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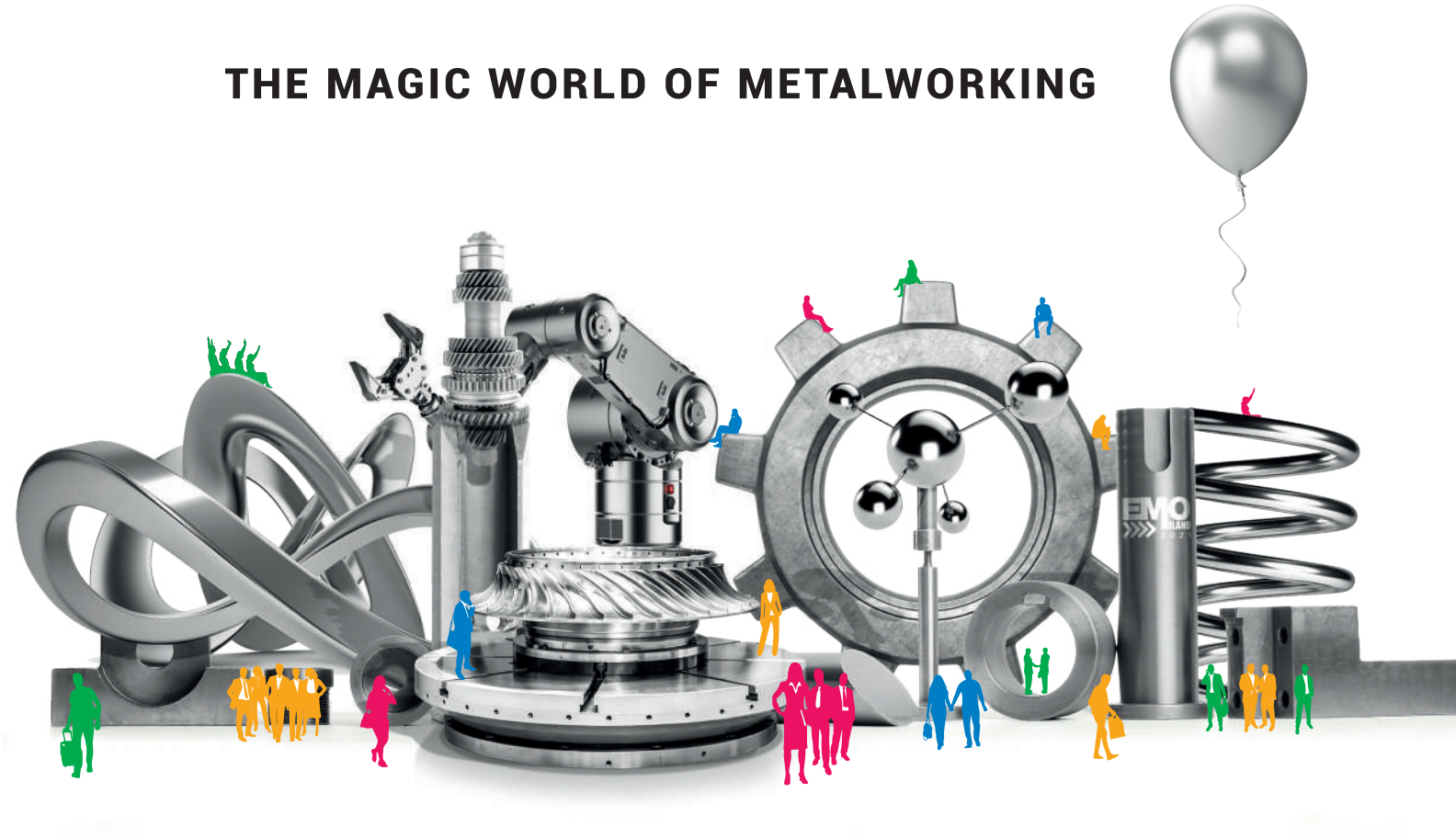

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BUILDING RESILIENCE IN TOUGH TIMES

The pandemic and the lockdowns following its onset spelt doom for the industries worldwide. However, the worst being assumed to be over, they are delving deep to innovate and are looking out for opportunities and strategies to innovate and emerge stronger.

Jean-Paul Sartre, arguably one of the best-known philosophers in the 20th century once famously remarked – 'Nothing has changed, yet everything is different'.

Considering the trans-boundary impact of Covid-19 on manufacturing industries, the statement makes more sense. The pandemic has not been selective; it has hit economies of the resource-rich countries as well as the ones without it with equal intensity. The Indian manufacturing industries have not been spared either.

Optimism looms large

Businesses faced the starkest challenges during the lockdown phase, experiencing significant drops in demand, price and production, driven by the pandemic. Well, everything was not lost and the uncommon times demanded new thinking as the industry took the setback in its stride, worked with their partners to give rise to new paradigms, while preparing itself to usher the next wave of growth.

The pall of gloom that had descended on businesses perhaps diminished with the onset of the festive season that brought consumers back to the market. Now, the industries need to stay resilient for the revival to be fully effective. It is time for industries to delve deep, look out for opportunities and strategies to innovate, enhance technological capabilities, reorient

Source: Magic Wand Media

market strategies, equip workforce with emerging technologies and come out stronger.
Governments, cutting across geographies, have also been striving to help industries tide over the tough market conditions with some noteworthy measures.

Staying strong

Sharing his views on the ongoing scenario, V Anbu, Director General of Indian Machine Tool Manufacturers' Association (IMTMA) and Bangalore International Exhibition Centre (BIEC) who recently took over as the President of UFI, The Global Association of the Exhibition Industry, said, "It is more about saving lives as well as livelihoods now. Both will co-exist and businesses will need to adhere to all the safety protocols actively and diligently, in letter and spirit. The onus is on the business community which needs to demonstrate that resilience is one of its primary characteristics that helps it to keep going."

Explaining further he said, "Purpose-driven leadership will have a vital role in charting out the primary course of action and steering ventures to more safe shores. Leaders lead by example in not just addressing the immediate concerns of safeguarding their businesses, but also in guiding and mentoring stakeholders during the lean period, strategizing resilience, re-strategizing technology and innovation and helping them reach normalcy levels."
He further added, "Leaders will be truly tested in the current adverse situation. Industries also need to adopt technologies for innovations; they need to fully comprehend and understand the impact of digital technologies. It will help organizations to survive, prepare themselves for future contingencies, and maintain the continuity of their operations. Adoption of digital technologies for accelerating transition and reducing unwanted dependencies is no more an option for industries and businesses."

Figure facts

On the bright side, according to International Monetary Fund (IMF), industries worldwide are expected to witness a 5.2 percent growth with Asia being a significant contributor with 6.7 percent growth. India and China are expected to substantially perform better with 8.8 percent and 8.2 percent growth respectively. On global trade, World Trade Organization has predicted a rebound of 7.2 percent in 2021. The Indian economy is expected to reach $5 trillion mark in the next few years with the share of manufacturing being more than $1 trillion. Most key sectors such as Automotive, Capital Goods, Aerospace, Defence, Medical and Pharmaceutical, Railways, Infrastructure, and many more) are also expected to grow robustly.
To encapsulate, the goal remains the same albeit some changes in the means of achieving it. Interesting days are ahead.

The pall of gloom that had descended on businesses perhaps diminished with the onset of the festive season that brought consumers back to the market. Now, the industries need to stay resilient for the revival to be fully effective.

ANBU V ASSUMES OFFICE AS UFI PRESIDENT

Bangalore, India - Anbu Varathan, Director General & CEO, Indian Machine Tool Manufacturers' Association (IMTMA) and Bangalore International Exhibition Centre (BIEC) has formally assumed office as the President of UFI, the Global Association of the Exhibition Industry, for 2020-21.

UFI is the leading global association of the world's tradeshow organizers and exhibition centre operators, as well as the major national and international exhibition associations, and selected partners of the exhibition industry.

Since Anbu is the first Indian to occupy the top post of UFI in its 95 years of existence, it makes for a historic occasion for the Indian exhibition industry.

He is the Director General & CEO of IMTMA and BIEC. He has been a board member of UFI since 2011 and serves as a member on the UFI Executive Committee. A Metallurgical Engineer from Indian Institute of Science, Bangalore, he has a work experience of around 30 years. Prior to joining IMTMA, he was with the Confederation of Indian Industry (CII) heading various key areas of Technology / IPR activities.

Indian exhibition industry to benefit

During his tenure, Anbu would focus on UFI initiatives to revive the exhibition industry and extend all possible support to industry leaders besides urging stakeholders to be resilient to face future contingencies, adopt technology that would enhance the value of face-to-face exhibitions in future and enhance a stronger connection with communities in the exhibition space.

Source: IMTMA

"UFI has played a scintillating role in developing the exhibition industry by working collaboratively with various international associations and making it a turf for promoting various sectors. I am glad to continue the endeavour to make global exhibition industry more vibrant and stronger."

V Anbu
Director General & CEO
IMTMA and BIEC
President, UFI

"I'm extremely happy to assume the Presidency of UFI and feel privileged to be the first Indian to get elected to this role in more than nine decades of UFI's history. I thank the UFI board for giving this opportunity to work with the global exhibition industry," he said.

He highlighted the four areas that he is passionate about — Resilience, Leadership, Technology, and Community. "These four focus areas aren't of recent origin, some are ongoing and some are planned for the long-term. These will set the broad directions for several of UFI's initiatives over the next one year," he added.

"It is a daunting task but also an opportunity for me to enable the Indian exhibition industry to be vibrant and stronger and get its due recognition at the global level. I also look back with pride IMTMA's journey in transforming IMTEX into a great international show, an ecosystem in itself and enabling BIEC as the best green venue and an industry infrastructure," added Anbu, on his first day as UFI President.

Silver lining in tough times

Anbu is taking over the reins of UFI at a time when the global exhibitions industry is passing through an unprecedented time and is recovering well from the after-effects of the Covid-19 pandemic.

On a brighter note, his elevation as UFI President provides significant opportunities for third world countries to uplift their exhibition industries and narrow the gaps with industries in developed nations. As governments create a well-structured exhibition industry ecosystem, trade and economy in these countries will flourish.

UFI directly represents around 50,000 exhibition industry employees globally, and also works closely with its 56 national and regional associations' members. Seven hundred and eighty-two member organizations in 83 countries and regions around the world are presently signed up as members. More than 927 international trade fairs proudly bear the UFI approved label, a quality guarantee for visitors and exhibitors alike.

Initially, UFI was created under the name 'Union des Foires Internationales' (UFI), or 'Union of International Fairs' in English, or 'Verband Internationaler Messen' in German. The name change to 'UFI', accompanied by the tagline 'The Global Association of the Exhibition Industry' was decided upon by the General Meeting in Cairo, Egypt, on October 20, 2003.

Source: www.ufi.org

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WEIGHING PROSPECTS

With most industries now providing a broad swath of flexible work arrangements to their employees, the dilemma for the Indian manufacturing industry looms large. Embracing the new culture of remote working and social distancing norms being far from possible, the industry is exploring possibilities to continue working traditionally without comprising its workers' safety.

Source: Magic Wand Media

RAGHAV GUPTA
Director
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E: raghav@snackfoodmachines.com

By now, all of us would agree that the Covid-19 pandemic is nothing less than a revolutionary wave that has changed the way we work in the recent past. Remote work, which employees of many companies were not even aware of, has now given rise to new work culture. Though all of us had heard the 'work from home' (WFH) in some context, it was always thought possible for certain job roles only. Surprisingly, many companies did not have any such policy in place before the outbreak of Covid-19. However, the current uncertain situation has led to the revision of priorities, working from home being one of them.

Now that there is complete unlocking happening in most places, many companies are embracing work from home as they wait for the situation to improve. The others, on the other hand, continue to face the dilemma of reopening the office. Companies have deployed best-in-class security systems, enhanced bandwidth, and provided several other facilities to their employees. However, it has severely hit the manufacturing sector hard where working from home cannot work. Thankfully, operations have resumed now and the management is trying all possible ways to ensure the safety of employees and not let the work get affected.

Impact on manufacturing industry

The Manufacturing sector is heavily hit as during the lockdown it shut the production in the Automotive, Food & Beverages, Electronics, Aerospace, Personal Care and many other sectors. It all began in China, the hub for the supply of raw materi-

als to the global companies, and then impacted the supply chain for the manufacturing companies across the globe.

Considering the current market conditions, consumption, as well as the supply chain for the companies are heavily impacted. There has been a wide increase in the demand for sanitizers and daily consuming food products, leading to a panicky situation in the market. The sudden high demand for the number of raw materials and ingredients by the F&B companies hampered the production initially and even forced many manufacturing units to shut operations due to limited manpower. However, much has been sorted now. According to French trade group ANIA's study, F&B companies have suffered a revenue loss of around 22 percent worldwide.

New order of business

Transportation and logistics disruption, heavy financial burdens, product delivery difficulties in the upstream and downstream industrial chain, lack of orders and difficulties in order fulfillment are all problems enterprises faced when they resumed production. Amidst all these challenges, the manufacturing industry has successfully set its pace as a result of the new order of business in manufacturing establishments.

Many organizations including Kanchan Metals are ensuring a safe environment for the employees. These manufacturing units are leveraging technology to ensure social distancing and safety standards in production functions. We were following 'work from home' during the earlier days but have now shifted to the regular course of work. During the WFH days, we would regularly conduct meetings via video calls and coordinate over the phone.

Kanchan Metals has provided its employees with all the safety equipment including face mask and shield and has a strict enforcement policy. We have an HR officer whose primary responsibility these days is to monitor the shop floor and office areas to ensure that social distancing is being maintained. Also, we have almost completely switched to e-meetings to avoid in-person discussions. Moreover, we have appointed a doctor who checks everyone for their vitals when they report for work in the morning and have a quarantine room with all medical facilities for anyone not feeling well during work hours.

Survival technique

In addition to finding ways to handle challenges including labor shortage, many companies have adapted themselves to the new market environment by following long-term approaches that drive organizational change. These comprise building new business teams, forming complete workshops to efficiently develop new projects, and drawing the sales and product talent from within. These organizations have managed to survive despite the pandemic and subsequent lockdown and labor migration.

Some companies have been least affected by all these events and has successfully managed their operations. Being part of the Food industry, which is an essential commodity, Kanchan Metals has been fortunate enough to have a steady inflow of orders. Also, a lot of effort has been put into reaching customers digitally which has helped in securing orders. Luckily, labor migration never affected us because most of our employees lived nearby, and those who did not, were considerate enough to return when we resumed operations.

In addition to hurting business operations, the virus has also created opportunities for the companies to innovate, strategize, and evolve with time to remain relevant. Likewise, the incorporation of automated technologies in factory operations and workers' safety is enhancing the production capacities of companies and helping them gain employee and consumer trust.

According to French trade group ANIA's study, F&B companies have suffered a revenue loss of around 22 percent worldwide due to Covid-19 impact.

ADVANCING AHEAD

For India to be really Atmanirbhar, it is important to understand the vital role Electronic Manufacturing and the overall Manufacturing sector has to play in nation building and in employment creation for the country's future generations.

Source: Magic Wand Media

VIJAY KUMAR SACHDEVA
MD & CEO
Laxmi Remote India Pvt Ltd

The Indian Manufacturing industry has the potential to be the biggest employment generator in India. The sector which accounts for 14 to 18 percent of GDP is one of the core areas along with the Agriculture and the Service sectors to generate employment and lead the nation to economic prosperity. In the past five fiscal years, from FY16 to FY20, the gross value addition (GVA) of the sector was estimated to be $397.14 billion in FY20PE, with a CAGR growth of 5 percent as per the national income given by the Government of India. An important part of Indian manufacturing, the Electronics Manufacturing sector, which accounts for 3 percent of the global electronic production, has a major role to play in the employment generation within the sector.

Navigating through challenges

While the sector has immense potential, it has to navigate several challenges for it to play a larger role in employment creation. Hit by the pandemic, the Manufacturing sector contracted by 40 percent in the first quarter of FY21. The supply chain as well as the distribution network was severely disrupted. There is also the challenge of dispersed skilled workforce who migrated to their hometowns and villages during the lockdown. The current uncertainties are preventing reverse migration to industries. Indians have faced severe financial duress due to the heavy impact on jobs, salaries, and health of people. The liquidity crunch and low demand have also affected the sector.

Having said that the Indian electronics manufacturing is reviving quite significantly. As per the government projections, Indian electronics manufacturing is expected to set a record annual growth rate of approximately 30 percent in the next five years, which would create an estimated over 8 lakh jobs.

Government support

The measures introduced by the Government of India have provided the much-needed impetus to the sector. The Ministry of Electronics and Information Technology launched the National Policy on Electronics, which aims to make India the

hub of electronics system design and manufacturing and generates a revenue of $400 billion in five years.

The Government has also introduced several other initiatives such as Modified Incentive Special Package Scheme (M-SIPS), Electronic Development Fund (EDF), Production Linked Incentive (PLI) Scheme, Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS) and Modified Electronics Manufacturing Clusters (EMC 2.0) Scheme, amongst others.

These initiatives are designed to address several objectives including covering risk to both industry and academia for R&D of new electronics technology; boosting domestic manufacturing in mobile phone production and specified electronic components by attracting large investments in the segment; giving financial incentive of 25 percent on capital expenditure for an identified list of electronic goods which include products such as electronic components, semiconductor/display fabrication units, ATMP units, specialized sub-assemblies, and so on.

Electronics manufacturing and job creation

With the kind of Government support and the tremendous enthusiasm in the industry to boost growth and chart a revival process, the rise of manufacturing sector will create more jobs for people for the following reasons.

Manufacturing – a complete ecosystem: The growth in electronics manufacturing basically leads to building of a complete ecosystem, which includes real estate, infrastructure, service sectors and so on. As the sector grows, there would be a growing need of skilled people across verticals from warehouse and plant management, house-keeping staff, transport, printing and packaging, smart accessories and so on. Employment will be generated at wholesale/retail and supply chain partner levels as well. Therefore, the Manufacturing sector not only creates employment in its own field, it also creates employment opportunities in the Service sector as well. The same cannot be said about the Agricultural sector.

Direct employment creation: It is estimated that the Manufacturing industry is largely operating with about 75 percent capacity utilization. As the economy revives and the demand for electronic products increases, these industries will become fully operational. The industry would need more of project managers, designers, component makers, specifiers, circuit builders, panel builders, electrical engineers, testers, and service and repair professionals, among many others. Hence, there will be employment creation across top, mid, and bottom levels.

Employment creation due to skill development: The growth in the sector will create demand for more skilled persons, which would need many small-, medium- and large-scale skilling and upskilling initiatives. The various institutions that will be established for skill development will further create job creation in India. As the Electronics Manufacturing industry does not necessarily need a highly qualified workforce, more than qualification, the focus is on skillsets.

IT and digital technology related employment: Also, the industry is increasingly adopting digital technologies and automation. This will lead to the generation of higher quality jobs. The new age technologies and digital innovations such as IoT, robotics, automation, artificial intelligence etc. will create employment opportunities in software development, product development, product engineering, R&D, programming, data intelligence, sales & marketing, and many other Electronic industry domains.

Employment creation in MSMEs: With more original equipment manufacturers catering to a rising demand, many companies would need support from component manufacturers, which will create job opportunities in Indian MSMEs. Owing to various changes in international relations, there is a higher possibility that more international enterprises would now be approaching India to significantly address their demand for electronic components.

Adapting to the 'New Normal': The pandemic has ushered in a new normal and the existing infrastructure and organizational processes are proving to be non-resilient. With the pandemic taking the shape of endemic, the Electronics Manufacturing industry would need to consider a significant overhaul of the operations and processes to build in the core learnings of the ongoing crisis. This will lead to fewer people sharing the same workspace. The industries and offices may transform into 24X7 workplaces, with companies adopting roster & shift systems to maximize the use of physical infrastructures and other fixed assets. There will be increased focus on health, safety, and sanitization methods, and so on. All these will attract creation of some new job roles and increase in existing roles. Despite thrust on automation, there will be equivalent significant rise in demand of qualified people for many forms of job opportunities.

For India to be really Atmanirbhar, it is important to understand the vital role the Electronic Manufacturing and the overall sector has to play in nation building and in employment creation for the country's future generations.

As per the government projections, Indian electronics manufacturing is expected to set a record annual growth rate of approximately 30 percent in the next five years, which would create an estimated over 8 lakh jobs.

LAYER BY LAYER

Deemed as a transformative approach to industrial production, additive manufacturing is the current rage in the global industry. The titans of the Indian industry expound their views on its opportunities, the challenges in the way of embracing it and the ways to overcome them...

Dr Vishwas R Puttige
Business Head
amace solutions Pvt Ltd

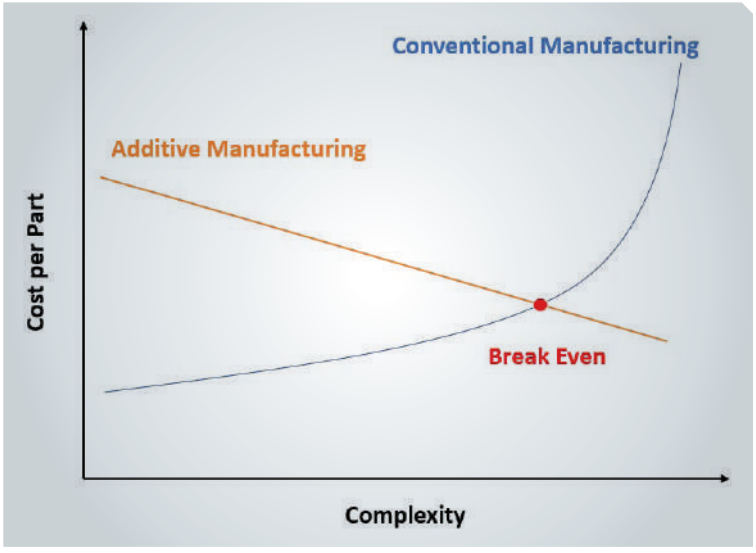
AM benefits galore

Additive Manufacturing (AM) is slowly but gradually revolutionizing the way products are manufactured. AM is slowly but gradually revolutionizing the way products are manufactured. One of its key advantages is that it reduces lead time of manufacturing prototypes. For many years, manufacturers have used AM to quickly develop prototypes for validation purpose before taking up mass production. AM also allows multiple iterations of these prototypes to be printed in a very short span of time significantly contributing to the product development lifecycle. What can be seen from the graph below is that with the increase in complexity of a part its cost of manufacturing by conventional means increases exponentially. However, in the AM technology, there is no influence of complexity on the cost of a part. This opens up opportunities for designers and manufacturers where for ease of manufacturing using traditional techniques, complex parts or assemblies are split into multiple individual parts which are then assembled together. This allows part consolidation to be done, hence minimizing the total number of parts. Similarly, AM allows different variety of parts to be printed together without any cost impact. Hence, there is no minimum print quantity in AM.

The tooling industry seems to have accelerated the adoption of AM in their manufacturing processes. Plastic parts with complex profiles, curved surfaces and varying wall thicknesses tend to take much longer time for cooling. Today, time is money and in the Injection Moulding industry, cycle time is usually determined by the cooling Injection moulders. Complex conformal cooling channel circuits that are impossible to be created through conventional manufacturing methods can be 3D printed in order to bring about uniform cooling in the injection moulding dies that ultimately leads to an improvized part quality and cycle times.

Relearning DfAM

Since its emergence in the 1980s, AM has grown beyond the scope of rapid prototyping. Once deployed purely for prototyping applications, it is today increasingly being used for tooling, space, aviation and defence parts, marine and automotive spare parts and other small series and batch production. AM has found innovative applications and is helping reduce production costs, lead



Source: amace solutions Pvt Ltd

POONAM PEDNEKAR
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times and enhance product performance. Interestingly, many automakers in the US and Europe have already deployed 3D printing to manufacture parts for their premium automobile models. However, various studies have found that over 63 percent of enterprises deploy AM for prototyping applications, while only 21 percent utilize AM to manufacture parts that that cannot be made with any other manufacturing technology. One of the key challenges is understanding of design concepts for AM which is now popularly known as DfAM (design for additive manufacturing). Some of the conventional design techniques will have to be unlearnt and DfAM will have to be relearnt. This not only makes the designed parts more suitable to AM but also can lead to cost reduction. To bring about AM awareness and enable a smooth transition of AM into production related activities, many software providers are now offering AM software suites that contain Design for AM (DfAM), Generative designing and other optimization tools. Another challenge is the high cost machines, making the overall process expensive. However, with time the costs of machines have been reducing and the machines are getting more productive in nature. This allows more printing to be done in lesser time making it more cost effective. In spite of this, the overall cost of additive manufacturing is substantially higher than the conventional methods for more type of parts. Today, there are a few emerging manufacturers in India introducing their advanced printing machines at cost-effective prices which will make the process more affordable in the times ahead. The high raw material cost is another factor inhibiting large-scale adoption of the AM technology. The economies of scale will lead to a constant reduction in the raw material price, allowing more parts to be printed and used quickly. With the emergence of domestic powder manufacturers, we are likely to see raw material available for printing at competitive rates. While AM is a relatively new technology, there are still gaps to close in terms of availability of certain popular materials. Specific applications have specific materials due to the inherent properties. Not all materials have been qualified for printing by the manufacturers limiting the printing process to a select few that have been well established. Some of the more popular materials such as cast iron and steels like C45 etc. are yet to be established in the AM route. It's a continuous endeavor by machine OEMs and powder manufacturers to develop new materials suiting specific applications. Although AM makes it possible to print assemblies with very short lead time, poor surface finish and the requirement of specialized post processing techniques make the process unattractive for production. To address this issue, machine OEMs, in particular, are coming up with machines that can print parts with enhanced surface finish and minimize post processing related activities.

Nishant Shah
Director
Imaginarium India Pvt Ltd

Space constraint resolved

Additive Manufacturing offers many advantages over conventional manufacturing methods. It allows one to consolidate multiple assemblies into one single complex part, saving time and material. It also makes it easier to go inventory-less as companies can manufacture spare parts based on demand, freeing up warehouse space by thousands of parts. Companies can also manufacture obsolete parts by reverse-engineering the parts.

Hurdles abound in large-scale production

There are four major challenges that are faced when adopting AM for large-scale production. The first one is high cost; there is a high investment cost when procuring the machines. Also, raw material tends to be more expensive as compared to traditional manufacturing. The second is the timeline; additive manufacturing tends to take longer than conventional processes like Injection Moulding. The third is limited material ability; metal printing offers only a select number of metals to work with, and while plastic may be more varied, it has several properties that are not ideal for large-scale production like porosity or poor heat and light resistance. The last major challenge is post-processing, as each part has to be finished and further processed.

Overcoming most of these challenges will come with time. As the technology grows, more materials and machines will be developed which will reduce the costs and increase the performance.

Jagannath V
Business Head
m2nxt - A BFW Subsidiary

AM is limitless

AM offers a quick design validation of a new product with infinite iterations directly from the native CAD. Any contour of an object or component can be realized without any manufacturing/machining limitation. The strength of a material with varied strengths and rigidity within the same structure can be flexibly assigned. Entire sub-assembly can be built instead of assembly parts as there are no manufacturing limitations.

Paucity of skilled personnel

Cost and cycle time to produce a component are primary challenges in the use of AM in large-scale production. Another is limited availability of professionals with the required skill set like deep knowledge on the strength of materials required in AM and the creativity in design and product functionality. However, there are a few ways to address this such as identifying the entire sub-assembly instead of parts which calls for high reliability, criticality in performance and long life with minimal wear and tear. Secondly, the academia must focus on specialization on Polymers and Metal Additive in the course syllabus. Promoting the technology academically will increase its awareness and, hence, takers in the fraternity. Last but not least there is an acute need to create a Center of Excellence in every region for users to feel and experience the technology.

Sunil Dixit
AVP-Sales, NBD
Marshall Machines Ltd

Applications in a wide range of sectors

The biggest advantage of AM over conventional manufacturing is quick throughput time. One can have the proof of their design concept in just a few hours. One can hold it, feel it and test it for various requirements. Hence, prototyping by AM is much faster, easier and cost-effective. Even small batch production by AM is viable in sectors such as Aerospace and Medicine.

AM offers a designer the flexibility to make changes without worrying about the feasibility. Complex parts and geometries which are difficult to produce by conventional methods can be easily produced with the help of AM.

3D printed human anatomy models used for education, training and surgical planning is replacing the use of cadavers. The Dental industry is already extensively using AM in crowns, bridges and clear-aligners because of the lower costs and ease of production. Less entry cost also makes it very useful for colleges and research labs.

The amount of material wasted in additive manufacturing is close to negligible. In conventional manufacturing, the products are created by removing material from large blocks, hence wasting material in the process. The importance of AM will only grow as the world moves towards cleaner and more sustainable methods of production.

AM enables shorter and more localized supply chains, therefore significantly reducing the amount of freight journeys and weight required to transport industrial materials that can be printed either on-premise or much nearer to the factory.

Raw material cost is concern

AM's biggest challenge in large-scale production is the cost of raw material. In the Automotive industry, manufacturing of components is cost-sensitive, hence adoption of AM is not suitable.

Dimensional accuracy of parts produced by AM is also an area of concern. We have to depend on conventional processes like machining of those 3D printed parts to get the desired accuracy.

BRIDGING THE PERCEPTION GAP

In B2B selling situations of machine tools that we encounter in our daily routine, it is supposedly impactful requirements like quality, productivity, flexibility that are being offered through measurable entities of size tolerance, surface finish, cycle time, speeds/feeds etc. This brings in measures and expectations of the product, performance and the known tangibles. What about the not directly measurable outcomes that are inherent and always present? What is actually valuable and what gets valued?

Getting the customer to spell out value and understanding his perceived value is an extremely critical process that must be in place and continuously honed as an organizational asset. This is a key skill that is a must for both sides of the coin. Another issue of the perceived value is that we need to understand the total value and how the value constituents add up, for example, size tolerance and cycle time, payment terms and delivery, Capex and cost of ownership etc. How do value constituents add up? It could even be an algebraic sum. Customers have issues that prevent them from spelling this out; it could be that they themselves are not clear or are plain worried to share. The way to go around these two issues are different, but both involve learning the understanding of each other and building trust from both sides.

A robust question and answer session among the teams under the framework of 'the ideal scenario' is the most engaging methodology to achieve this. However, establishing the environment of mutual need and a purposeful connect is essential. Most impactful and breakthrough value creations have happened under these circumstances where the value systems of both customers and/or suppliers have been challenged. This is of course supported with data points, facts and references.

> Successful salespeople are aware and instinctively know that they and their offering play a role and contribute to their customers' success and growth. The understanding of their contributions' impact on the customer significantly changes how customers perceive it and how salespeople should be perceiving it themselves.
>
> **TK Ramesh**
> **Managing Director**
> **Micromatic Machine Tools Pvt Ltd**

Successful salespeople are aware and instinctively know that they and their offering play a role and contribute to their customers' success and growth. The understanding of the impact of their contributions on the customer significantly changes how customers perceive it and how salespeople should be perceiving it themselves. This understanding is greatly facilitated when the synergy between customer needs and the product/service solution offered is understood, well-crafted and genuine.

The views expressed by the author are personal and he can be contacted at rameshtkr@gmail.com

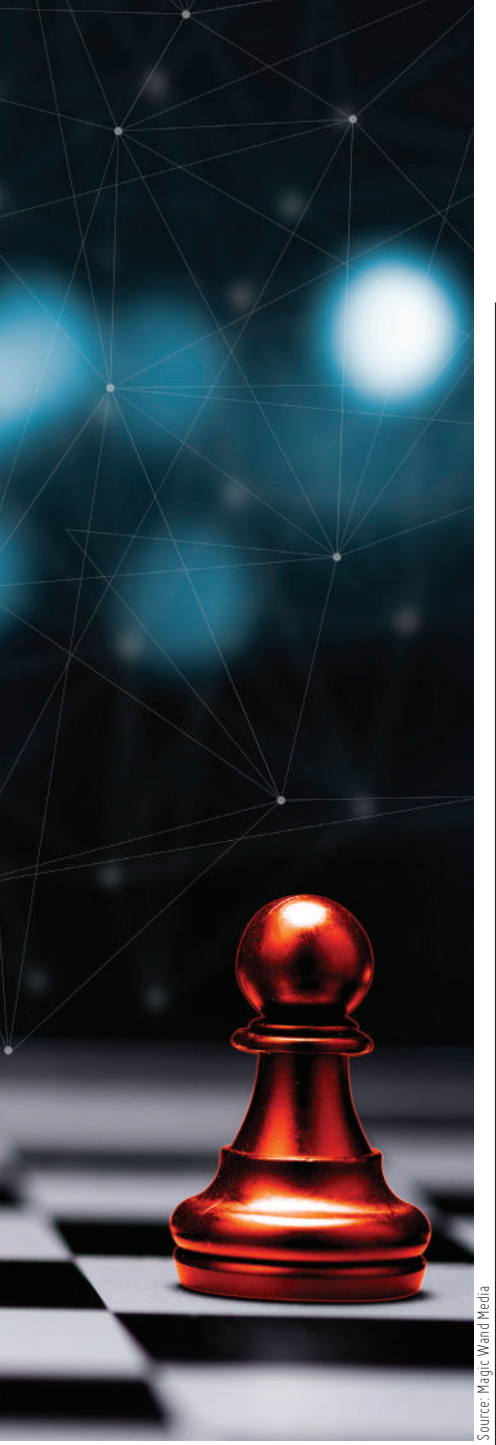
BEING COMPETITIVE IN THE MARKETPLACE

Source: Dassault Systèmes, SOLIDWORKS

Today's manufacturers face a host of challenges related to effectively managing product design and manufacturing data. How well manufacturing organizations manage product and production data—and leverage this data to support related functions—has a direct bearing on a manufacturer's ability to grow, as well as maintain and extend its competitive edge.

As product development and manufacturing organizations increasingly depend on computer-aided digital technologies to design and produce products, the data on which those processes rely has become the lifeblood of these companies. And just as healthy blood flow is an indication of overall fitness and physical performance in human beings, expertly leveraged, utilized, and managed data flow indicates an organization's fitness to grow, compete, and prosper in today's global economy.

Manufacturers will enhance competitiveness and benefit from improved data management for a variety of reasons. First and foremost, among these is that improved data management will boost productivity through support of greater automation and organizational efficiencies.



Source: Magic Wand Media

Yet the benefits of improved data management extend beyond its capacity to increase productivity and include its ability to improve product quality, facilitate effective collaboration, boost enterprise agility and flexibility, and inspire greater innovation.

The article is an attempt to explore why better data management benefits today's manufacturing companies by examining the top five reasons why manufacturers should improve their data management function and how they can realize the benefits of Product Data Management (PDM).

Alongside is highlighted how improved data management positively affects the operations of product development and manufacturing departments, as well as how effective data management can benefit every other function across the manufacturing enterprise, particularly through the integration of product data management and enterprise resource planning (ERP) systems.

Why manufacturers must improve data management

The top five reasons for manufacturers to improve data management—1) increased productivity, 2) improved product quality, 3) more effective collaboration, 4) enhanced organizational agility and flexibility, and 5) greater innovation—all stem from a manufacturing organization's ability to manage, secure, find, and leverage product data efficiently and effectively, not just in product development and production but also across the manufacturing enterprise. By improving data management, manufacturing organizations will be able to boost productivity by doing the following:

Automating manual, repetitive tasks – Throughout every manufacturing organization, a myriad of manual, repetitious tasks exert a real drag on productivity—tasks such as the manual creation of bills of materials (BOMs) or revision-checking on drawings. PDM tools can help identify all the manual, repetitive tasks in workflows that can be automated, sped up, or eliminated, boosting productivity while establishing a more accurate, secure process.

Minimizing delays, cost overruns – Missing deadlines and going over budget are clear signs that product development and manufacturing workflows are out of step and can benefit from the workflow automation that a PDM system provides. PDM tools can help manufacturers institute the automated workflows that can resolve time-intensive, costly issues and steps, and make schedule delays and cost overruns a rarity instead of the norm.

Integrating PDM and ERP systems – Many manufacturers rely on a PDM system to manage product development and manufacturing data, and a separate ERP system to manage all other business-related data. By integrating PDM and ERP systems so that they work in concert as a single system, manufacturers can realize additional productivity gains.

Eliminating wasteful, redundant processes – Every manufacturer has legacy processes that were once useful and critical to developing and manufacturing products, but no longer serve any practical purpose. As manufacturers increasingly rely on computer-aided digital technologies to design and produce products, a PDM system can help scrutinize their existing processes and workflows, and then eliminate, replace, or automate outdated processes by utilizing PDM to revamp workflows.

Working smarter instead of harder – Getting more out of existing resources to boost productivity does not necessarily require manufacturers to force staff to work longer, harder hours. An integrated PDM system will enable staff to accomplish more in the same amount of time—not by working harder, but by working more intelligently due to the automation and structure imposed by PDM.

Accelerating time to market – As part of the development, production, and market introduction of all new products, manufacturers lose substantial amounts of

The top five reasons for manufacturers to improve data management all stem from a manufacturing organization's ability to manage, secure, find, and leverage product data efficiently and effectively—not just in product development and production, but across the manufacturing enterprise.

time due to confusion, questions, and miscommunications involving data. With a PDM system supporting automated, formalized workflows, manufacturers can winnow out unnecessary instances of lost time and consistently accelerate product time to market.

Achieving additional automation via API – While a PDM system can help a manufacturing organization automate many processes, choosing an integrated PDM system with an open Application Programming Interface (API) carries the potential for automating additional processes, especially those that are unique or custom to its products and manufacturing techniques.

With the greater productivity, flexibility, and agility provided by a PDM system, manufacturers can more quickly leverage broader collaboration and more agile operations to innovate new products, pursue new markets, or both.

Improve Product Quality

By improving data management, manufacturing organizations will be able to sustain consistently high levels of quality by doing the following:

Eliminating revision errors – Shoddy product quality caused by working with old, out-of-date revisions was common when data management consisted of physically filing paper drawings in cabinets and drawers. With a PDM system's tighter revision controls, one can eliminate design errors and product issues associated with working with the wrong revision of a product design.

Achieving greater design reuse – Why design a new component when a perfectly good, tested design for the part already exists, buried somewhere in the product data? Of course, if an existing design cannot be found, one cannot reuse it. Data management tools with search capabilities can help a manufacturing organization increase reuse of proven, existing designs. As design reuse grows, product quality improves.

Reducing scrap and rework – Design errors—whether related to use of an out-of-date revision or a new, untested design—have ramifications on a manufacturer's volume of costly scrap and rework. Any time that a manufacturer needs to rework or retrofit a part or product, the probability that the rework will negatively impact quality grows. A PDM system can help manufacturers weed out revision errors, increase design reuse, and reduce scrap and rework, all of which can help an organization improve product quality.

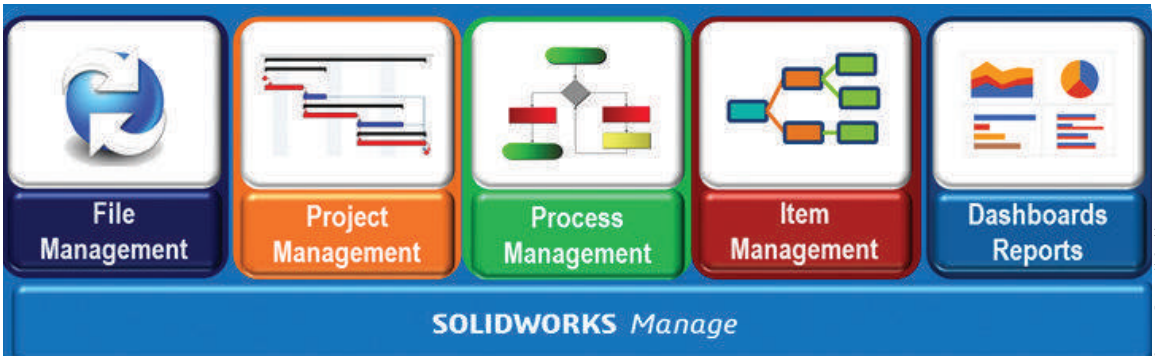
Improving handling of engineering change orders – When a design or engineering change is required after a product design has already been released for production, manufacturers issue an engineering change order (ECO). How well an organization implements ECOs—and how many ECOs are issued—has a direct bearing on overall product quality. With an integrated PDM system, manufacturers not only can execute ECOs more efficiently but also can ensure that the handling of ECOs produces the result of improving quality.

Facilitate Collaboration

By improving data management, manufacturing organizations will be able to support more effective collaboration by doing the following:

Connecting globally dispersed locations – As manufacturers become more global in scope, the need to connect product development, engineering, and manufacturing groups—as well as related business functions—has become critically important for increasing efficiencies and maximizing resource utilization worldwide. A PDM system with a replicated vault is vital for connecting globally dispersed manufacturing locations and facilitating collaboration among them.

Integrating communications between engineering disciplines and departments – As more and more products include mechanical, electronic, and electromechanical assemblies and components, the need to stimulate and support collaboration between different engineering disciplines and departments is growing. An integrated PDM system can help foster inter-disciplinary collaboration because it establishes a common repository for the design and engineering information required



Source: Dassault Systèmes

before this type of collaboration can begin.

Linking product development and production – Whenever product development and manufacturing departments are linked by a common PDM system, each department can collaborate more freely and efficiently. Product designers and engineers can collaborate more effectively with production specialists on the best manufacturing method, and manufacturing personnel can see and collaborate over what is coming in the product development queue.

Fostering collaboration with other departments across the enterprise – An integrated PDM system also allows manufacturers to accelerate and support other critical applications that can leverage product design data, stimulating collaboration across the enterprise. Product development information, such as bills of materials (BOMs), development timelines, and anticipated manufacturing processes can then be used to prepare and drive other important functions, including manufacturing planning, estimating, and quoting, purchasing, sales, marketing, and other product launch activities, further streamlining a manufacturer's core operations.

Increase Agility and Flexibility

By improving data management, manufacturing organizations will be able to support increased organizational agility and flexibility by doing the following:

Shortening engineered-to-order lead-times – Shortening development and delivery lead-times is a critical success factor for many manufacturers of engineered-to-order products. The automated workflows supported by an integrated PDM system can dramatically shorten both proposal and product development, giving engineered-to-order manufacturers the agility and flexibility required to compete successfully in a global competitive market.

Incorporating concurrent product development and manufacturing planning – With the agility and flexibility afforded by an integrated PDM system, manufacturing planning can begin concurrently with the final stages of product development. Because both product development and manufacturing personnel can collaborate more effectively during the latter stages of development prior to a product's release to production, they will need less time to plan for production and have the flexibility to collaborate on and make changes through a product's release to manufacturing.

Developing products and documentation simultaneously – Instead of waiting until a product is manufactured to develop content for user manuals, service manuals, parts lists, and other forms of product documentation, manufacturers can leverage a PDM system to establish a concurrent workflow through which products and accompanying documentation are developed at the same time, with design changes reflected in auto-updating design data that is used for both purposes.

Inspire Innovation

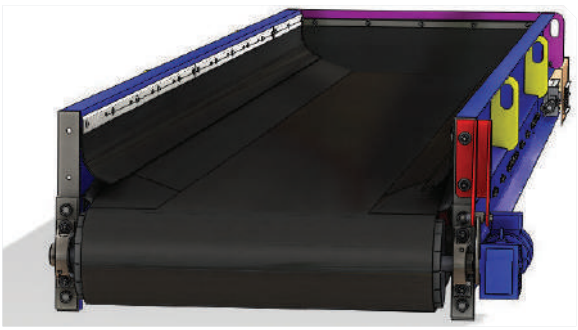
By improving data management, manufacturing organizations will be able to inspire innovation from within by doing the following:

Including input from across the enterprise – Innovation can come from many places, and some of the best ideas can come from the most unlikely of sources. Innovation does not come from becoming complacent—doing things the way that they have always been done. With an integrated PDM system, manufacturers can gather valuable input and perspectives from across the enterprise, including from those who routinely work with customers and frequently use your company's products, helping to inspire greater innovation throughout product development.

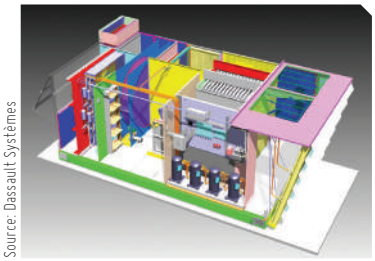
Leveraging faster, broader collaboration – With the greater productivity, flexibility, and agility provided by a PDM system, manufacturers can more quickly leverage broader collaboration and more agile operations to innovate new products, pursue new markets, or do both. Successfully introducing an innovative product or product feature requires bringing it to market first, and PDM tools can help you move more quickly and decisively

The benefits of improved data management extend beyond its capacity to increase productivity and include its ability to improve product quality, facilitate effective collaboration, boost enterprise agility and flexibility, and inspire greater innovation.

CP Manufacturing has leveraged the SOLIDWORKS API to automate a host of specific development processes, as well as to automate manual and repetitive tasks, saving the company considerable time and money.



Source: Dassault Systèmes



Source: Dassault Systèmes

By implementing additional SOLIDWORKS solutions, including SOLIDWORKS PDM Professional software, Vermeer Corporation has automated its development workflows, increased development and production throughput, shortened and formalized its engineering change process, and improved the quality of its products and documentation.

than your competitors.

Supporting more-innovative approaches to product development and manufacturing – A PDM system can also help manufacturers support more innovative approaches to product development as well as tap the latest manufacturing techniques. Concurrent product development—whereby all related functions are completed concurrently with the development of a product—and the use of additive manufacturing techniques are examples of the innovative approaches to product development and manufacturing that are supported by PDM.

A PDM system can help manufacturers weed out revision errors, increase design reuse, and reduce scrap and rework, all of which can help an organization improve product quality.

SOLIDWORKS Solutions

As a leading provider of easy-to-use design, engineering, and product development solutions, SOLIDWORKS has introduced the industry's first distributed data management product portfolio, which enables manufacturers to take advantage of PDM, advanced data management, and powerful searching applications, either individually or as a combined Distributed Data Management system.

SOLIDWORKS PDM solutions for product data management are fully integrated with increasingly popular SOLIDWORKS design software, enabling manufacturers to safeguard, store, and organize product design data for maximum efficiency. These solutions also allow product development teams to collaborate more effectively. Two different solutions—SOLIDWORKS PDM Standard and SOLIDWORKS PDM Professional—are available, depending on the size and PDM needs of the manufacturing enterprise.

SOLIDWORKS Manage is an advanced data management system that extends the capabilities of the global file management and application integrations enabled by the SOLIDWORKS PDM platform. Combining the ease of use and familiar Windows® Explorer interface of SOLIDWORKS PDM, SOLIDWORKS Manage adds advanced capabilities that allow teams throughout the manufacturing enterprise to manage project timelines and resources, streamline complex business processes, automate records management, and aggregate, communicate, and present PDM-related information in formats tailored for consumption by varied audiences.

Geometry and Metadata Search–EXALEAD® OnePart

EXALEAD OnePart is a business discovery application that accelerates reuse of parts, designs, specifications, standards, test results and related data for engineering, manufacturing, and procurement activities. Leveraging the proven web semantics, analytics, and big data management technologies of EXALEAD CloudView™, OnePart locates information from multiple sources and makes it available instantly.

It extends the text- and file-based search capabilities of SOLIDWORKS PDM solutions into the realm of the 3D shapes, geometries, and mechanical features of existing designs across the entire enterprise. Even without a CAD license, users can search on geometric shape, business function, and even mechanical features, such as holes, pads, and grooves. This application can find parts, drawings, and assemblies, as well as view critical information on parent-child relationships within assemblies, enabling users to navigate down through an assembly to locate a specific part. Part discovery through 3D shape similarity and 3D mechanical feature data mining will reveal existing parts that text- and file-based searches cannot find, facilitating design reuse.

Also, EXALEAD OnePart can quickly locate any type of metadata associated with existing component designs. Metadata search capabilities enable users to discover analysis and testing results, materials and sourcing data, specifications and applicable standards, and price and performance information for any part that is developed anywhere across a manufacturing enterprise.

Leveraging Competitive Strength

By improving their organizations' ability to manage, secure, find, and leverage product data efficiently and effectively—not just in product development and production, but across the manufacturing enterprise—manufacturers can increase productivity, improve product quality, facilitate collaboration, enhance organizational agility and flexibility, and inspire greater innovation.

SOARING HIGH

Dr Udayant Malhoutra, CEO & Managing Director, Dynamatic Technologies Ltd, takes us through the journey of the company from its initial days to the current coveted position, and presents his view on advanced manufacturing technologies and trends, and what can A&D companies do to achieve digital transformation...

Source: Dynamatic Technologies Ltd

Dr Udayant Malhoutra (Right) on the Dynamatic-Airbus Flap Track Beam Assembly Line

SOUMI MITRA
Editor-in-Chief
Modern Manufacturing India
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Dynamatic Technologies has come a long way from just making hydraulic pumps to diversifying into the automotive business and now being a key global supplier of complex parts to Airbus, Boeing, and Bell Helicopter. Did you hold this vision when you started off?

Dr Udayant Malhoutra: Dynamatic started off as a Hydraulic Business in the early 70s. The company until the middle of the 80s was under severe financial stress. However, we today have the largest market share of Agriculture Gear Pumps in India, and globally, have over 30 percent manufacturing in India and the UK. We also have a Warehouse Center in the US.

As a kid, I had a passion for aeromodelling. The Aerospace & Defence (A&D) venture started in a garage in the back of our Hydraulic business in the mid-90s. We used to work with DRDO (Defence Research and Development Organisation) Labs and build products, which was challenging. We then started working with Hindustan Aeronautics Ltd (HAL) starting with IJT, moving on to ALH, Cheetah-Chetak, LUH, Sukhoi, and finally LCA. We knew that for us to grow big, we needed to globalize the business. Hence, we started our business with Airbus in the late 2000s and focused on building our competency.

A&D is a highly skill-based sector and there is absolutely no room for error. We focused on building competency and a large resource pool with engineers and technicians who understand global customer requirements.

You were an early adopter of digital tools, investing in research and development, com-

puters, and computer-controlled machine tools. So much so, you also bought a horizontal machining center in the early 1990s for INR2.5 crore, an amount that was more than the entire gross block of your company's facility. Hence, your view on today's advanced manufacturing technologies and trends matters immensely.

Dr Malhoutra: Well, I was 20 years old when I joined Dynamatic. The company had no money and we went outside the paradigms to finance it. I did not go to the OEM market, but the after-market and the spares market, and was able to get advances, post-dated cheques, and delivery schedules for 4-5 months in advance.

I would talk to a bank manager and manage an alternative form of working capital. Similarly, I would commit to the suppliers and get credit from them. This way we were able to go beyond the traditional banking markets to finance the business through external stakeholders who normally do not give credit. Our limitations encouraged us to rethink ways to do business.

We started making investments in advanced technologies and processes way ahead of time. These did look expensive then, but we had our strategies to make these investments work. We kept thinking of innovative ways to do business and finance ourselves in similarly innovative ways.

"We have a strategic teaming agreement with IIT where we are bringing the finest of academia and industry to provide our military forces the best it can get to ward off adversaries."

With some A&D organizations lagging in the adoption of Industry 4.0, what can they do better to achieve digital transformation?

Dr Malhoutra: The A&D industry is still into handmade products. We have realized that India has some incredible cost advantages when it comes to labor, but we also have the highest cost of interest in the world.

So, if it's capital intensive, as part of our design we place it in Dynamatic UK. A lot of people ask me why would an entrepreneur from India come and set up plants in Germany and the UK, which are high-cost economies. They are high-cost only in terms of labor. We don't have labor there; we have built Industry 4.0 manufacturing with robots and have a very low cost of capital. We take advantage of local supplies for raw material and all our scrap – about 90 percent of aluminum or titanium – is machined out. We briquette it and give it back to mills, making the cost of production cheaper.

Source: Dynamatic Technologies Ltd

"We started making investments in advanced technologies and processes way ahead of time. These did look expensive then, but we had our strategies to make these investments work. We kept thinking of innovative ways to do business and finance ourselves in similarly innovative ways."

Dr Udayant Malhoutra
CEO & Managing Director
Dynamatic Technologies Ltd

Then we move the parts to India where we get the best value of the labor cost and the best artisanal workers. We have workers from our villages who have been trained in Aerospace but these are artisans and children of artisans. We have this advantage at a time when artisanship across the world is becoming rare. Additionally, we have the 3D engineering capability of Bangalore. This way we have ensured all the elements add value to the customer.

Dynamatic Technologies Ltd has become the first private sector company to build a complex fuselage section for a supersonic fighter aircraft Tejas Light Combat Aircraft (LCA) and is a preferred production partner for HAL for over three decades on all its major platforms. This is the model for PSU-Private industry partnership in the D&A sector. What do you feel about this achievement?

Dr Malhoutra: We have a great relationship with HAL. It has been our mentor and helped us in growing our skillsets in the early days.

When the Sukhoi-30 MKI program was signed between India and Russia, HAL, as the partner of MoD, was to build the complete aircraft. Dynamatic became its partner to build all the major control surfaces with a dedicated plant inside HAL, Nasik.

Source: Dynamatic Technologies Ltd

Airbus A330 Flap Track Beam Assembly Line at Dynamatic Aerotropolis, KIADB Aerospace Park, Devanahalli

This project was one of a kind in the country and has been the first successful Public-Private-Partnership model for A&D. We delivered over 130 aircraft sets and have just completed the contract.
As the Sukhoi program came to an end, we built competency for the Front Fuselage of Tejas-LCA, which is a very complex aero-structure. By building the Front Fuselage we have now the capabilities to build any part of a fighter aircraft in India.

Dynamatic Technologies and IIT Kanpur have signed an MoU for joint indigenous development of innovative Unmanned Aerial Systems. This is a remarkable move in the direction of industry-academia collaboration. Kindly elaborate on this.

Dr Malhoutra: We have a vertical that focuses on Homeland Security where we have developed our own drones. We have developed a quadcopter for agricultural use, and are in the process of developing different variants of UAS.
We have a strategic teaming agreement with IIT where we are bringing the finest of academia and industry to provide our military forces the best it can get to ward off adversaries. The project has just started and we are working on a couple of products that we will be demonstrated to the forces.

You had to gear up for a spurt in volumes from BELL and increase capacity from 3 helicopter kits per month to 9 kits per month at a short notice. This is the highlight of IMTMA's forthcoming Productivity Summit. Our readers would be keen on knowing the same from you.

Dr Malhoutra: Dynamatic has been a strategic supplier for Bell Helicopter. This transition included moving over 1,500 detail parts from across 56 suppliers to 5 assemblies with Dynamatic as the only supplier. In addition to consolidating the supply chain, but also reverse-engineered the product from paper drawings to digital data.
The company also showcased the skill to manage engineering concessions and was granted with Material Review Board approvals. This transition was the first time Bell moved outside of North America for its largest selling Helicopter, the Bell 407. We were the single source for all the products that were made and delivered just in time to Bell.
The helicopter market is cyclic and requires adaptation by suppliers to varying volumes. We were building at the rate of 3~4 sets per month and when the cost of oil changed, the demand for helicopters boomed. We had to quickly ramp up from Rate 3 to Rate 9. This had to be done quickly to ensure timely deliveries to the end customer.
We had a dedicated team that was put in place to analyze the requirement and come up with a plan to increase the volume, but not the cost. Our team worked on multiple strategies for duplicating certain long-lead items, building sub-assemblies to reduce on-jig work, etc. The team was conscious of not letting the cost of the products go up. They were able to deliver Rate 9 well ahead of the plan. We have been on time for delivery with 100 percent quality for the customers.

Please share your views on the government's new directive that allows foreign firms to directly invest up to 74 percent in the defence sector, raising the Foreign Direct Investment (FDI) cap from 49 percent through the automatic route.

It ideally should be 100 percent. This will help major OEMs to bring in the best of know-how and technology to the country. Any enterprise can then develop an ecosystem of suppliers to make these products, thereby increasing the economy and making the job and tax scene better for the state.
With the limitation of FDI, a partner is needed, which makes room for challenging issues such as ownership of liabilities and the subsequent cropping of distrust between partners. Thus, we have always believed in single ownership.

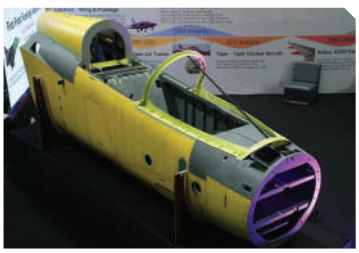
Moody's Investors Service has predicted continued challenges for India's Auto sector with auto unit sales declining at least 30 percent in 2020, following a decline of over 40 percent in the seven months through July. How much do you agree or feel otherwise about it?

Dr Malhoutra: The Covid -19 pandemic has had a severe impact on the Auto industry, which now faces concerns such as short-term liquidity as well as long-term growth in revenue and profitability. The outbreak of pandemic has created major job losses and uncertainties in the business, thus depleting consumers' financial ability to purchase new cars. Additionally, the concept of Work from Home has led to a massive reduction in the number of people using transport.

"By building the Front Fuselage of Tejas-LCA, we have now the capabilities to build any part of a fighter aircraft in India."

Source: Dynamatic Technologies Ltd

Bell 407 Helicopter Cabin Assembly



Source: Dynamatic Technologies Ltd

Front Fuselage Assembly of LCA Tejas for Hindustan Aeronautics Ltd

ENGINEERING EFFICIENTLY

Since its foray into the Indian market, EPLAN India has been consistently on an upward growth trajectory catering to diverse industrial segments with its host of high-quality offerings. An insight into its values, the unwavering focus on customers, and the company's plans going ahead...

Source: EPLAN India

Exterior Building of EPLAN India in Bangalore

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EPLAN India started as a subsidiary of EPLAN Germany in 2017, though it was present in India through its agents since the beginning of 2000. Its direct India operations were started to improve the engineering efficiency of the company's Indian customers in the field of electrical, automation, and mechatronics engineering with its direct support and services including consulting. "It has been one exhilarating experience so far. We have increased our business multi-fold in the first couple of years from the business that we used to do through our agents. However, now there is a slowdown due to the recent pandemic, which we are sure, is a blip in our otherwise upward trajectory," shares Umesh Pai, Managing Director, EPLAN India.

"We endeavor to engage with our customers in assessing their current set of engineering processes through our process consultancy and transform their engineering through software and implementation services along with our global support. We are engaged in a wide range of customers right from plants, machine design, warehouse automation, etc., catering to diverse industrial segments such as Automotive, Food and Beverages, Pharma, Power, and Process, etc.," he adds.

The company has offices in Bengaluru, Chennai, Mumbai, Pune, Ahmedabad, and Delhi. Its major international customers include MNCs such as VW, Ford, Daimler,

ABB, Siemens, Yokogawa, GE, Atlas Copco, DMG Mori, Coca-Cola, Nestle, Krones, Kuka, Bosch, Festo, KK Winds, etc. Its list of Indian customers comprises L&T, LMW, Pari Robotics, Grindmaster, Ace Micromatic, Titan, Addverb, Hirotec, ACG group, Wipro, and BEML.

Receptive Indian market

Indian establishments, Umesh shares, have been very open and proactive about EPLAN's offerings. "Competing in the global marketplace makes it imperative that our Indian customers focus intently on improving their efficiency and offer world-class quality products at competitive pricing, which indeed is our core strength. Engaging with our customers on global best practices opens up many avenues for us," he notes. He points out a challenge too which is of end-to-end adaptation of technology that the company believes Indian enterprises are yet to fully internalize. To address this, EPLAN India is working closely with its customers so that they harness the complete benefit of a thorough implementation, resulting in reduced cost, increased efficiency, and improved quality of their products or associated services.

Engaging with customers

Umesh takes immense pride in the company's high-quality offerings be it software or services. "We have a definitive methodology as to how we engage with our customers before sales for understanding their current systems and post sales for training and implementation," he shares. This approach, according to him, helps customers realize the significant value that EPLAN India brings to their table to transform their processes.

Being part of the Friedhelm Loh Group, EPLAN India abides by the ten corporate principles

Source: EPLAN India

"We believe for transformation to be effective, it is important for us to be diligent, understand our customers well and then structure a solution that provides them a maximum value."

Umesh Pai
Managing Director
EPLAN India

defined by the Group. He singles out number 3, which focuses on customers, "We view our customers as our partners. We must satisfy their wishes and help to solve their problems for they are the guarantors of our future. Our products and services must offer clear benefits to our customers in particular concerning quality, technical capability, range, and availability."

Efficient Engineering

EPLAN India has 'Efficient Engineering' as its focus. When asked the vision behind it, Umesh explains, "All companies in their day-to-day activities create a humongous amount of knowledge and data. Our focus, in the field of electrical and automation space, is to influence both the creation and consumption of this data in such a way that the customer realizes maximum benefit with the least cost. Hence the terms such as platform, standardization, automation, configuration management, etc. That is why we say, 'Efficient Engineering is when a plan becomes EPLAN.'"

Beefing up industry-academy bond

EPLAN India is engaged with several academic institutions through its solutions including EPLAN Platform, EPLAN ePULSE. "Academic institutions play an important role in our strategy to reach out as many users as we possibly can. We are engaged with top-notch universities to bridge the gap between academia and the industry. We are associated with the study boards of multiple organizations in terms of formulating their curriculum, practical setups, etc. A case in point is our association with PSG College in Coimbatore," he shares. The company has set up an EPLAN – Excellence Center for Robotics. Similarly, it is in various levels of discussion with premier institutes for setting up innovation labs. "Here, we are working along with our group company Rittal and designing unique offerings like Automation labs, etc.," he adds.

Broadening the horizon

Other than catering to its existing customers/industries, EPLAN India plans to deepen its engagement with the Indian Railways, Water Treatment industries, and Warehouse Automation industries, where, according to Umesh, lies a huge potential for Indian industries to grow. "It would be a necessity of Indian firms to invest heavily in technologies that would make them not only efficient but also completion proof. Since these fields are projected to be of rapid growth, we see a significant number of start-ups entering, resulting in intense competition. This is best suited for us to broaden our engagements and thus be at service to our customers. We will be able to share our know-how as well as best practices which can make our customers in markets like Europe successful along with our clientele here," he sums up.

EPLAN India plans to deepen its engagement with the Indian Railways, Water treatment industries, and Warehouse Automation industries.

EXPLORING POSSIBILITIES

Modellbau Clauß and DMG MORI's association dates back to the early 2000. The trust built over the years made the former invest in a 3D Printing machine, bringing in numerous benefits such as production of metal prototypes...

Source: DMG MORI

Powder change <2h — The rePLUG powder modules ensure safe powder handling.

Modellbau Clauß GmbH & Co. KG, founded in 1948 in Neukirchen near Chemnitz in Germany, has its origins in the production of foundry patterns. Initially the patterns were made of wood, later of plastic and then, with the advent of the first CNC machine tools, also of metal. The range today also includes moulds and prototypes. The family business with 45 employees supplies customers from the Automotive, Machine Building and Plant Engineering sectors. Modellbau Clauß has been working with turning and milling machines from DMG MORI since 2003. In 2018, the company invested in 3D printer a LASERTEC 30 SLM 2nd Generation for additive production of metal components.

"With regard to the production of models and prototypes, we benefit from ongoing development of 3D printing," states Ulli Clauß. Together with his brother Rico Clauß, they are third-generation managers and have added this technology to the company's production department. "Following the first 3D printers for plastic models, we quickly recognized the potential for the production of metal prototypes," Rico adds.

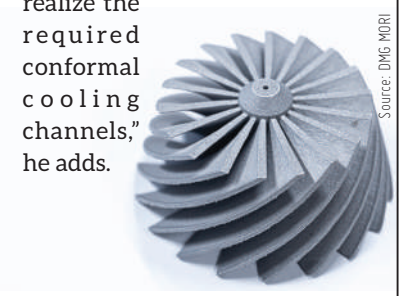
New potential and new component geometries using the powder bed process

The five machine tools from DMG MORI at Modellbau Clauß now also involve 3D printing. "The LASERTEC 30 SLM 2nd Generation ideally complements our machinery," says Ulli approvingly. With the powder bed machine, highly complex and filigree components made of materials such as aluminum or steel can be produced in a footprint of 300 × 300 × 300mm. "Such geometries cannot be realized subtractively," he adds. The combination of 3D printing with DMG MORI 5-axis

Source: DMG MORI

machines allows high-precision metal cutting of additively manufactured components that cannot be produced in a conventional way.

In such complex geometries, Rico and Ulli see the great added value of selective laser melting in a powder bed. "It enables highly complex component requirements to be met and new business fields to be opened up," shares Rico. Moulds for producing carbon fiber wheel rims are a current example. "Thanks to the LASERTEC 30 SLM 2nd Generation, we can now realize the required conformal cooling channels," he adds.



Source: DMG MORI

With the additive production of metal components, Modellbau Clauß has rounded off its range of services in 3D printing.

rePLUG - Safe material changeover in less than two hours

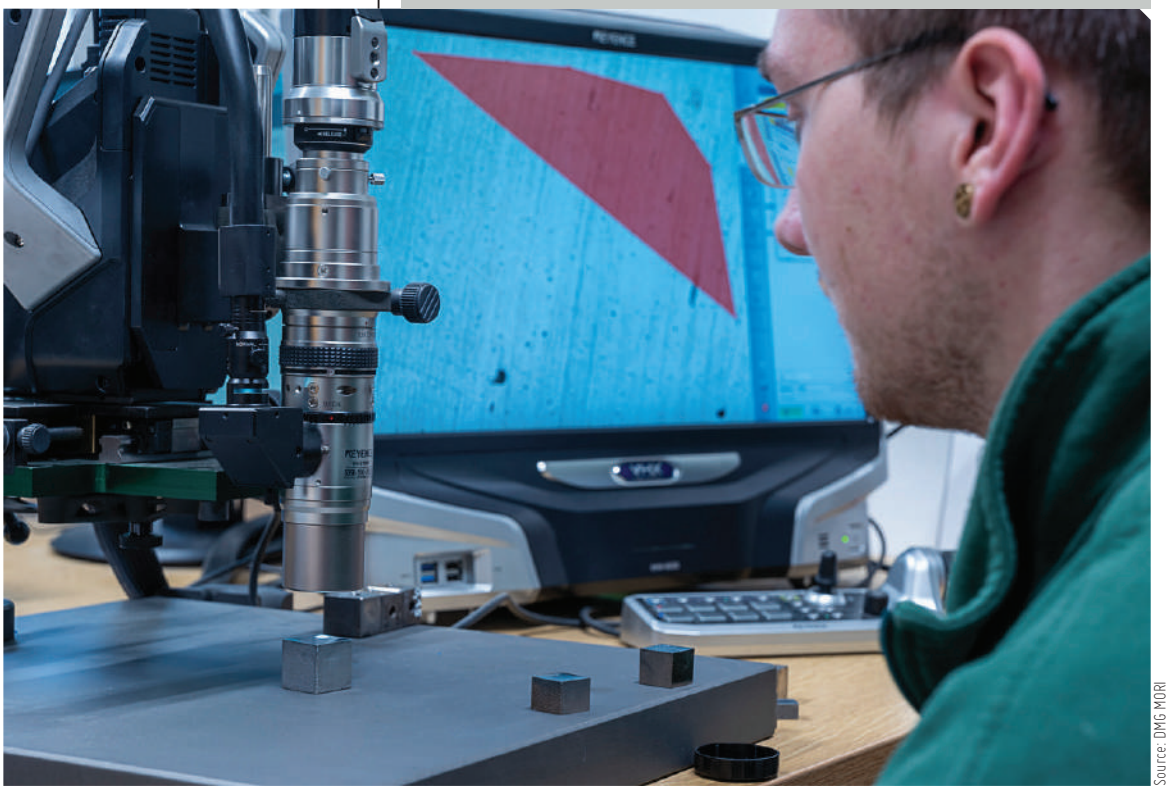
Modellbau Clauß has purchased the LASERTEC 30 SLM 2nd Generation with a total of three rePLUG powder modules. "Therefore, we always have different metal powders on hand," Ulli explains. An operator can change the individual modules in less than two hours, of course without contamination. Rico also sees an advantage in the closed material cycle: "This means we have absolutely safe powder handling."

CELOS as an innovative and integral software solution

The LASERTEC 30 SLM 2nd Generation is equipped with DMG MORI's proprietary control and user interface, CELOS. Geometrically highly complex components can be programmed quickly off-line and transferred

Benefits of LASERTEC 30 SLM 2nd Generation

- **Following the first 3D printers for plastic models, Modellbau Clauß quickly recognized the potential for the production of metal prototypes with the LASERTEC 30 SLM 2nd Generation.**
- **It complements Modellbau Clauß's machinery. With the powder bed machine, highly complex and filigree components made of materials such as aluminum or steel can be produced in a footprint of 300 × 300 × 300mm.**
- **It comes with three rePLUG powder modules that allows the operator to change the individual modules in less than two hours without contamination.**
- **It is equipped with DMG MORI's proprietary control and user interface, CELOS that aids geometrically highly complex components to be programmed quickly off-line and transferred to the machine.**



Source: DMG MORI

Modellbau Clauß uses a microscope to check the structural density of the workpieces created in the powder bed.

The combination of 3D printing with DMG MORI 5-axis machines allows high-precision metal cutting of additively manufactured components that cannot be produced in a conventional way.

Source: DMG MORI

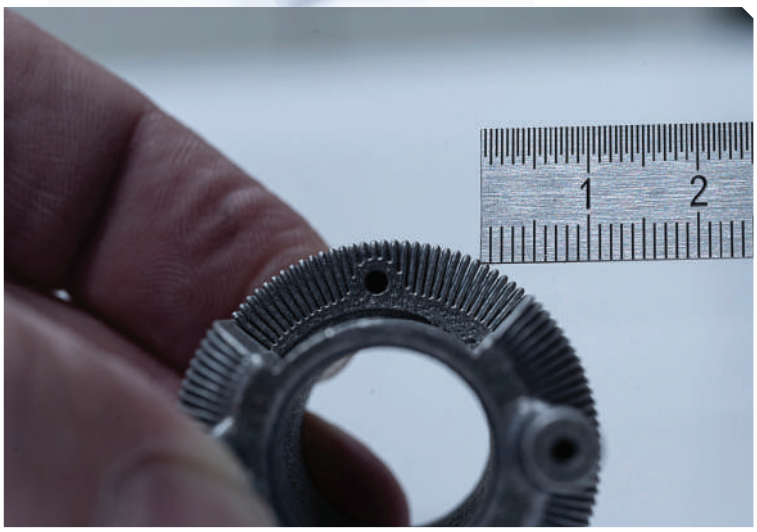
The workpieces are programmed externally and transferred to the CELOS APP RDesigner. User-friendly CAM programming from the CAD data is carried out.

The LASERTEC 30 SLM 2nd Generation is equipped with DMG MORI's proprietary control and user interface, CELOS.

to the machine. "The process is a completely open system. In other words, all machine settings and parameters can be adapted individually," says Ulli, giving an insight into the day-to-day use of the machine. CAM programming is carried out in the CELOS APP RDesigner based on CAD models. Heat calculation is also integrated. It calculates the mass distribution in advance and automatically adjusts the laser parameters. The CELOS APP JOB CONTROL supplies all relevant machine and job parameters including camera-based tests and error detection of each individual component layer.

Source: DMG MORI

With SLM technology, Modellbau Clauß can produce highly complex prototypes.



Source: DMG MORI

Even the most filigree geometries can be realized effortlessly in the powder bed process.

New service thanks to know-how in additive manufacturing

With experience in 3D printing, especially in the powder bed process, as well as upstream and downstream process steps such as design and post-processing, Modellbau Clauß is building a future for the company. Additive manufacturing has not yet arrived in all development departments, says Ulli: "We would like to show our customers the design freedom that is possible and support them in optimizing their components with the help of additive manufacturing."

Source: ASIMOV Robotics Pvt Ltd

PUSHING BOUNDARIES

Infamous for being reluctant in adopting disruptive technologies, the Indian market is surprisingly witnessing a whopping rise in robot installations. Domestic startup ASIMOV Robotics Pvt Ltd is playing a crucial role in digitally transforming many an enterprise in several sectors with their innovative offerings.

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ASIMOV Robotics had quite an interesting start to it. The company came into being as a continuation of another initiative in the robotics space by the same team which was under the contract of a US company to design, develop and export robot platforms to government and private agencies in the US, Central America, Europe, Canada, and China.

"During that period, we were fortunate to connect with the world's top universities to understand that the research activities in the robotic space were heading towards the development of service robotics," shares Jayakrishnan T, Founder & CEO, ASIMOV Robotics Pvt Ltd, who possesses over 20 years of experience in Robotics, having previously worked on projects for the US Army, Lockheed Martin, Canadian Space Agency, and Fukushima Nuclear Reactor Japan.

Other team members include COO, Saju G Namboothiri who has over 20 years of experience in Automotive Embedded Systems and Automation; Lead Engineer, Rajesh Subramanian who is experienced in Manipulation, Navigation, NLP, and Computer Vision and has worked with Humanoids, Delivery Bots, and Barista Robots; and Dr Ritesh Malik, MBBS, Serial Entrepreneur/Investor, Ex-Y-combinator who is ASIMOV's Seed Investor and Advisor.

The journey ahead

By 2012, the team, having disassociated with the US firm, then incorporated ASIMOV Robotics to focus on developing service robots and release India's first humanoid robot ISRA (Intelligent Service Robot Assistant),

capable of cooking and serving a few selected popular dishes on its users' request.

Since the Indian market was not ready at the time, the company started developing test automation systems and supplied products to most Indian IT companies. "By 2016, the service robot market in India started responding. We had released the first Indian robot for banking lobby management named SAYABOT," he adds.

Being a highly customizable robot, SAYABOT became remarkably successful to be able to get deployments in BFSI, Security and Hospitality, and Healthcare applications. By 2019, India's first police robot KP-BOT, a version of SAYABOT was launched at state police department headquarters which is currently serving as lady sub-inspector there.

"By the end of 2019, we started concentrating in Healthcare applications along with the second outbreak of Nipah in Kerala. However, this initiative helped us in quickly deploying a fully autonomous robot, KARMI-Bot for serving food and medicines to Covid-19 patients at the government hospital in Kochi during the initial days of Pandemic," he informs. Today, the company is developing a range of products for Covid-related issues.

Asimov Robotics developed the first Indian multi-purpose humanoid service robot, SAYABOT. The form factor, appearance and behaviour of SAYABOT are similar to that human beings.

Products that spell innovation

Of the wide range of products, the company's main revenue spinners are SAYABOT and KARMI-Bot. With recent developments in AI, we are seeing the advent of intelligent robots that can perform tasks like that of a human. There is a rising demand globally for human-like robots that can perform tasks such as information assistance, delivery and surveillance.

Source: ASIMOV Robotics Pvt Ltd

"The Indian market is not yet matured to include robotics as an unavoidable part of the workforce due to a high initial cost and delay in identifying possibilities due to the lack of knowledge. Hence, the other possibility in this scenario is introducing semi-autonomous systems."

Jayakrishnan T
Founder & CEO
ASIMOV Robotics Pvt Ltd

With SAYABOT, ASIMOV Robotics became the first Indian multi-purpose humanoid service robot. The form factor, appearance, and behavior of SAYABOT are similar to that of human beings. It is a versatile robot that can be customized to perform tasks in various sectors such as Hospitality, Security, Retail, Healthcare, Education, and Banking. "With AI and a range of sensors collecting information of the environment, SAYABOT can work alongside humans seamlessly," informs Jayakrishnan.

Robots in the medical space

The medical community, says Jayakrishnan, has been incredibly supportive and encouraging when the ASIMOV team approached them with its prototype in March 2020. "We had to first approach the district health administration, the RMO, and the team heading the Covid-19 treatment at the Government Medical College in Kochi. We then realized that serving food and medicines inside the Covid ward was not enough, collection of trash and used items and frequent cleaning and disinfection, etc. was also needed," he shares.

Needful modifications for KARMI-Bot were made for it to do additional duties such as collection and disinfection of trash using UV light. The robot has been ruggedized and weatherproofed so that it can be cleaned using detergent spray after every visit. Since then, KARMI-Bot has been successfully serving Covid patients for the past months at Cochin Medical College.

Recently, the company also received ₹48 lakh from the central government for research on a minimal invasive cutting technology for craniostenosis—a condition that affects the skull development of a foetus. Elaborating on the venture, he shares that ASIMOV Robotics has been approached by Dr Derick A Mendonca, Consultant Craniofacial Plastic Surgeon, Sakra World Hospital, Bangalore. "The proposal is to develop a minimally invasive micro-robotic system which can perform locomotion under the scalp and separate the sutures prematurely fused," he adds.

The initial idea of localizing and navigating the robot under the scalp was using the Stereotactic method. Based on this reference and a provisional patent filed, the company was asked to design and develop the mechanical system and control algorithms to perform the surgery minimally invasively.

The system consists of a cutting mechanism with a camera, a suction-irrigation system and a retractor to protect the dura mater. Due to manufacturing difficulties, this neces-

Product RoadMap

2012
CoolARM
Robotic Arms

2013
ISRA
1st Service Robot Prototype

2014
Xterrabot
Mobile Manipulator

2015
Sayabot
Retail Robot Concept

2017
Sayabot V1
Hospitality Humanoid Robot

2019
Sayabot V3
Hospitality Humanoid (+Multilingual, active eyes)

2019
Sayabot V4
Security Humanoid Robot(+Face recognition , Office automation)

2020
Chhaya
Human lookalike Character Robot

2020
KARMI-Bot
General logistics +Covid care

2020
SEVA-Bot
Intra hospital logistics

Source: ASIMOV Robotics Pvt Ltd

sitated the scaling of the unit and also separating the navigation from the cutting unit to be able to work with scaled-up skull models. This project has been funded by DST and is still in the process of refinement and miniaturization.

Why Robotics and Automation Solutions

"All the automation or robotization requirements are not necessarily to reduce the cost of labor. Based on each industry, it optimizes a parameter or a set of parameters," explains Jayakrishnan.

"For example, in the Manufacturing industry, the goal is to boost production throughput and the quality of work. In surgery, accuracy is to be increased and lead time for recovery must be reduced. In certain other places, the risk of humans in hazardous tasks has to be reduced," he adds.

While automation of repetitive jobs aces in terms of efficiency, automating mundane jobs addresses the shortage of resources, and automating default jobs helps save human lives.

"However, the Indian market is not yet matured to include robotics as an unavoidable part of the workforce due to a high initial cost and delay in identifying possibilities due to the lack of knowledge. Hence, the other possibility in this scenario is introducing semi-autonomous systems," he notes.

Despite all constraints, according to him, early adaptors to these technologies have a huge advantage of minimizing expense in switching over to autonomous systems. At a later stage, others may require many folds of investment as their existing systems and practices will not comply with the autonomous approach.

"Early adaptors also get an edge over their competitors in scaling their business while delivering the solutions with the required level of quality and price as the market demands," he says summing up.

ASIMOV Robotics has came-up with newly designed robotic platform, KARMI-Bot to support the health workers from getting infected inside the quarantine zone. KARMI-Bot is a very practical and capable of autonomously navigating inside the isolation ward to transport and dispense food and medical supplies for patients under care. The robot can engage the patients as well as initiate video conferencing between patients and the human caregiver from a remote location. It is capable of disinfecting the used items during the return journey to home station.

Source: ASIMOV Robotics Pvt Ltd

Recently, the company received ₹48 lakh from the central government for research on a minimal invasive cutting technology for craniostenosis—a condition that affects the skull development of a foetus.

ON THE RIGHT TRACK

Dormer Pramet has been supporting the railway industry with its wide range of cutting tools to improve both production and maintenance. Here's a sneak peek into its offerings...

Source: Dormer Pramet

Railway-focused cutting tools can often be complex due to the specific requirement needed to machine a certain component in an efficient and highly reliable manner. Therefore, across many applications, the majority of cutting tools for the railway industry are classed as Specials, designed with the customer and operation in mind.

For many years we have been focussing on supporting the railway segment, offering customers a wide range of cutting tools to improve both production and maintenance. Therefore, delivering excellent service levels, with innovative tool designs, is paramount to becoming an established, trusted, long-term partner to the railway industry.

Dormer Pramet's cutting tools can support a variety of applications such as dynamic rail milling and the machining of switches, wheel sets, rail profiles, base plates and coupling mechanisms. There are several tools available within Dormer Pramet's standard assortment which can be used to support the production of various railway components. The company's Penta HD and Econ HN, for example, are milling tools from its Pramet indexable range which can be used for various applications including machining switches, base plates and wagon parts such as frames, wheel axles and bogies.

Machining Switches

Rail switches and crossings are the sections that guide trains from one track to another. Dormer Pramet's assortment encompasses tools for machining switches in all major rail profiles. The 60E1 and 60E2 rail profiles, for example, are the most common, especially in Europe. The type T section rail (flat bottom rails) is suitable for medium and heavy load traffic.

In the crossing part of the two rails, known as the frog, manganese steel, also known as Hadfield Steel, is used. An alloy steel, it is ideal for high impact environments. Manganese steel is not magnetic and has a very high abrasion resistance because the crossing must withstand the highest load on a railway track. It is a very tough material, with a low hardness (200-280HB), however, when it

Source: Dormer Pramet

is machined, the hardness increases to more than 350HB.

Another material used in the production of switches is Bainite steel, which is much easier to machine, even though it is a harder material at 450HB. It is ideally suited to this part of the track due to its high strength and wear resistance. Rail steel must be designed to be able to resist plastic deformation, rolling contact fatigue, bending and thermal stresses during the welding processes and renovations.

When machining switches, the design is usually made from a single component and therefore one of the first operations is roughing the top and bottom sections of the rail. This requires a large diameter cutter, enabling the fewest number of passes possible. Both the Penta HD and Econ HN assortments have indexable cutters up to 315mm diameter.

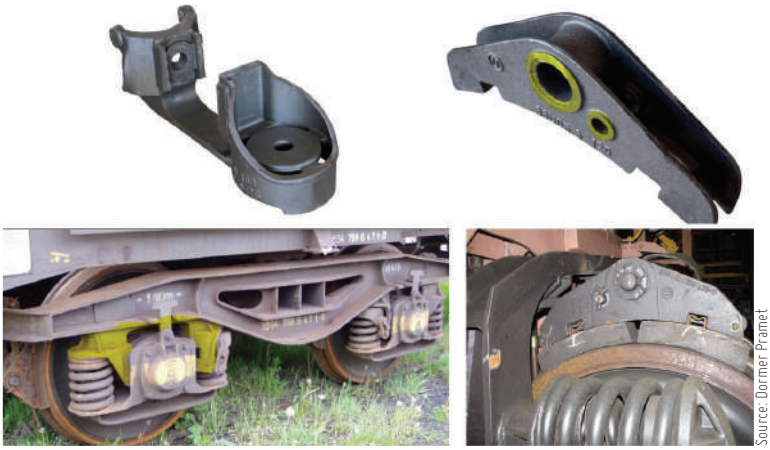
Penta HD

The Penta HD milling cutter was specifically developed with switches machining in mind. Allowing operators to utilize the full power of their machines, the Penta HD with PNMU insert is ideally suited to heavy roughing operations in a variety of material including steels, stainless steels and cast iron.

Offering up to 10mm depth of cut and a feed rate of 0.7mm per tooth, the range enables high metal removal rates and productivity. Its double-sided insert design with ten cutting edges has an available length of 100mm, with each edge numbered for easier indexing.

Source: Dormer Pramet

Penta HD



Source: Dormer Pramet

Face milling components

In a recent test example, the Penta HD with PNMU insets, M chipbreaker and M8345 grade was able to machine 4,600mm of track in 39 minutes, with a cutting speed of 70m/min, a feed rate 0.33mm/tooth and an axial depth of cut (ap) at 7mm.

Another key feature of the Penta HD is the use of Dormer Pramet's patented Sidelok technology system, which provides quick and easy clamping and release of the inserts. With a large retention screw permanently remaining in the cutter body, inserts can be quickly changed enabling more machine time and further increasing productivity.

Econ HN

Additional railway operations where standard tools can be used include the machining of base plates - the connecting element which ensures the rail is securely attached to the tie or sleeper. Also, wheel set axles, break-pad connectors, beam bolsters and bogie frames all require machining into shape.

Source: Dormer Pramet

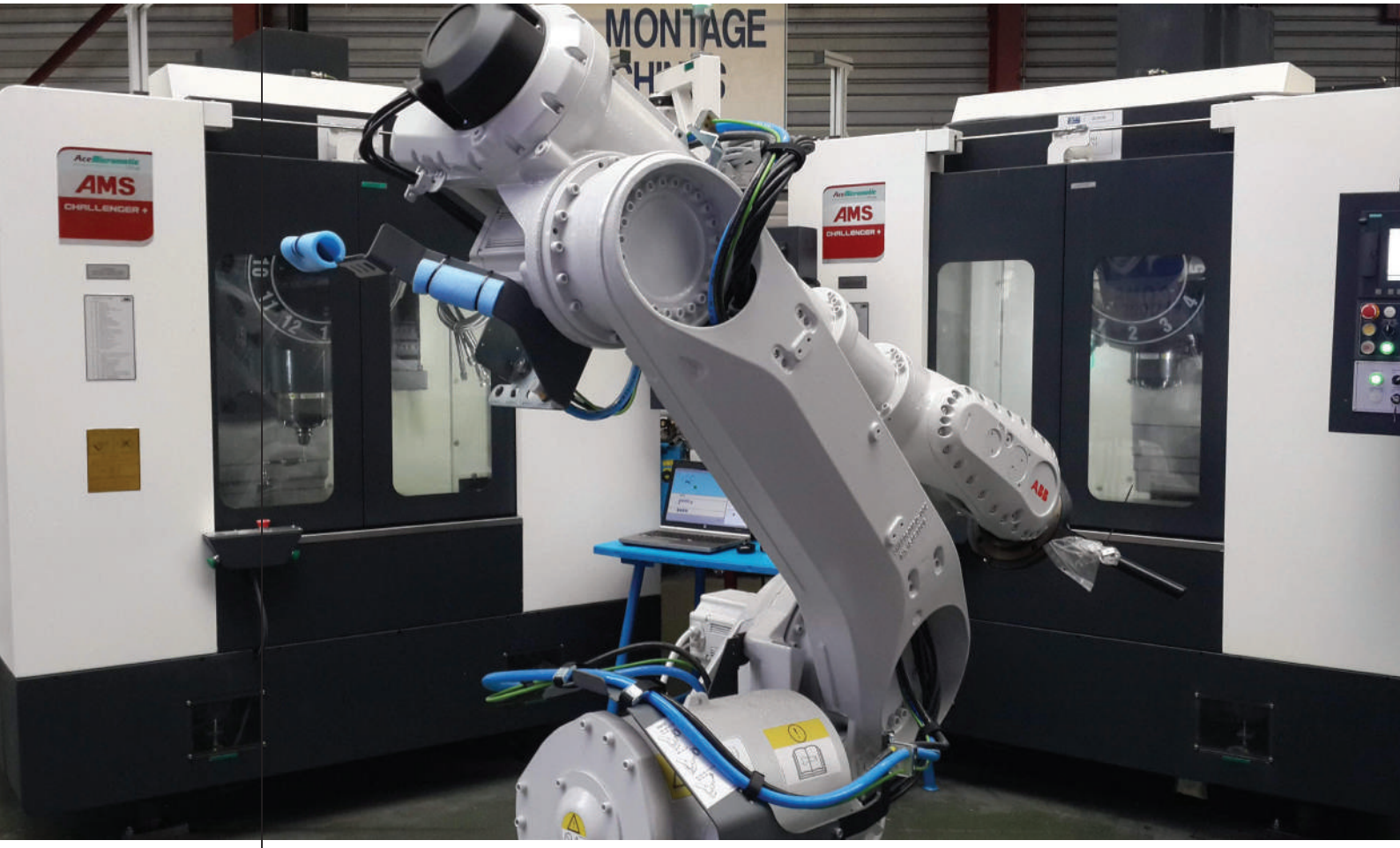
Econ HN

For all these applications, customers demand high productivity, while at the same time, respecting specific production limitations and materials. In any initial machining, face milling cutters are usually the most suited tool. This allows for the removal of large amounts of metal and creates a smooth, flat surface and base, before specific shaping can be performed for connectivity with other components.

When machining the bottom part of base plates, for example, face milling cutters with diameters up to 160mm are often used. The Pramet Econ HN assortment offers a 45° face milling cutter, which is available from 25 - 315mm in diameter and includes the HNGX 06 and HNGX 09 inserts.

Designed to generate improved surface quality, the indexable range can perform both roughing (up to 6mm depth of cut), through to finishing (up to 1mm depth of cut). Its inserts have 12 cutting edges, with a wiper option for higher surface finish and is ideally suited to machining cast iron, as well as steels. High insert density for high productivity and longer tool life, means lower cutting forces are required. Also, a differential tooth pitch and a unique geometry (F, M or R) for each operation, from finishing to roughing, along with an internal coolant supply, provides high tool accuracy and quiet running.

Dormer Pramet's Penta HD and Econ HN are milling tools from its Pramet indexable range which can be used for various applications including machining switches, base plates and wagon parts such as frames, wheel axles and bogies.



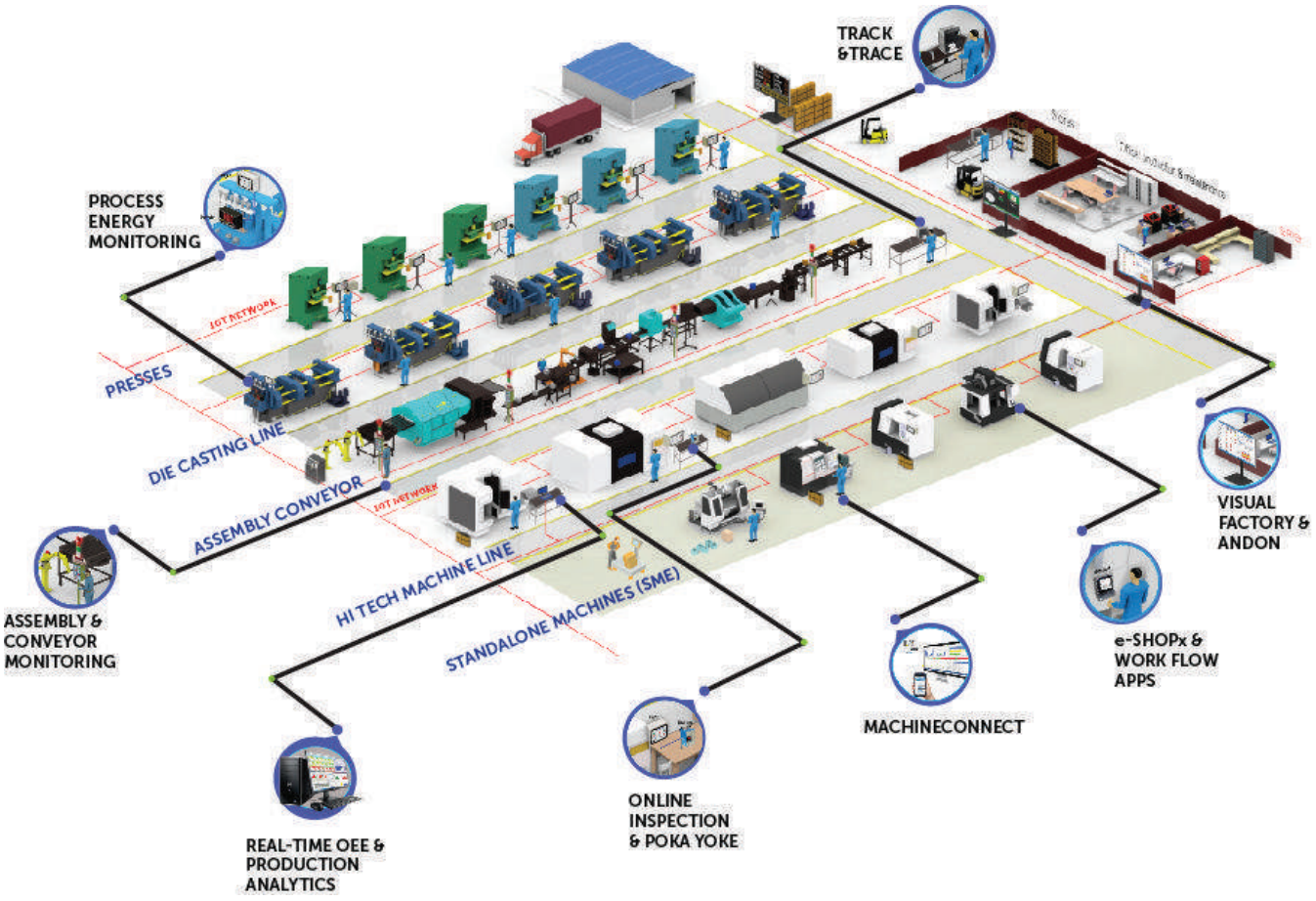
Source: Ace Micromatic Group

DIGITIZATION FOR UPPING PRODUCTIVITY

A deliberation on a practical approach towards productivity improvement and how digitization can help in the process...

Productivity is accurately defined as a ratio of output volume in standardized units to input volume in the same units and is simply a measure of how efficiently diverse production inputs are being used to produce a given level of output. However, when we talk of workplace productivity, we are referring to how much is accomplished in a specific work environment over a specific period. We expect and want workplace productivity to keep getting better and be maximized (optimized) in mature businesses. The market for mature products and services keeps getting more complex and challenging normally. Throw into this a black swan event like Covid-19 and it is something else. The attempt being made here is not how to deal with extraordinary situations but to look for a practical approach to productivity with automation, connectedness, data, information, and accomplishment in a wholesome manner that could be starting from the center and branching out or alternately starting at the pain points and merging into the central system. Wholesome performance accomplishment is not unidimensional. It is not just the productivity improvement. It is productivity along with quality, flexibility, transparency that makes an agile work environment empowering to its people and customer.

Source: Ace Micromatic Group



Source: Ace Micromatic Group

Amplifying productivity

If we take the metal cutting component manufacturing business, machining is the core activity. Cost and the technicalities of machining metals matter but from the workplace productivity perspective, there are hundreds of issues that impact it, which are overlooked and, when addressed, give huge gains cost-wise. What is needed here is looking deeply at the relevant data, a process to make the data meaningful, and an index to show direction. This kind of significant connectedness is strictly not productivity but is a true productivity amplifier. So how we go about this is not normally a one-size-fits-all approach but understanding the unique requirements and adapting to universal standards to get the best of both worlds.

From the Indian perspective, we observe our customers have only some basic understanding of the linkages and experimentation, the adaptation, on the other hand, has been slow and painful. The reasons are largely to do with diverse unconnected equipment, unavailability of infrastructure like connectivity and other last mile issues. Incompetence and the inability to chart a roadmap are the key causes. However, over the last two years, there has been fair progress. Companies are adopting it by connecting devices on their equipment for tracking specific outputs like cutting time, idle time, the number of parts produced etc.

The initial automation adaptation was in the areas of machine tending, painting, cleaning washing etc. Now there exists huge possibilities in hazardous areas, repetitive environs etc. in line with social needs. We are beginning to see machines with robotics, cell automation and more for higher output but we have a long way to go in the areas of continuous productivity improvement, predictability and flexibility requirements.

Data as an asset and fuel for productivity gains and flexibility is still in its infancy. Informed decision-making, even in part tracing, scheduling, process tracking on shop floors, is yet to be appreciated and used. Here, it is important to understand the data while manufacturing products. The other aspect is the data from the product while it is being used by its customers. This feedback is of immense im-

We are beginning to see machines with robotics, cell automation and more for higher output but we have a long way to go in the areas of continuous productivity improvement, predictability and flexibility requirements.

Source: Ace Micromatic Group

We need to be clear about what do we want to do with digitization and what are we trying to solve. Then comes the business impact – flexibility, agility, time to market etc. – each leading to workplace productivity.

pact and will revolutionize design manufacturing and even the business model of how the product will be monetized for new service opportunities and business models.

Typically, digital transformation is a continuous, long-term initiative with milestone markers. The engagement into it needs to evolve along the way. Thus, it is very important to have a partnering approach with creative financing as we move on. An evolving methodology – right from budgeting to tranche funding, and its accounting – is crucial to make it viable. Digitization investments also have high obsolescence rates and a clear understanding. Tight monitoring and speedy implementation from the successful pilot to full scale is the key. Pilot scope expansions and any retardant to implementation are what one needs to be very careful about. Summing up, we need to be clear about what do we want to do with digitization and what are we trying to solve. Then comes the business impact – flexibility, agility, time to market etc. – each leading to workplace productivity.

Source: Ace Micromatic Group

TECHNOLOGY @ work

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GROWTH THROUGH PRODUCTIVITY

Indian Machine Tool Manufacturers' Association (IMTMA) will be virtually organizing the 14th edition of National Productivity Summit (NPS 2020) on December 18 – 19, 2020. In keeping with the tradition, the event will be highlighting production bottlenecks in the Indian manufacturing and having experts over to point out ways to effectively address them and boost productivity...

The winners of Productivity Champions 2019 Award with the jury and IMTMA titans.

Source: Magic Wand Media

National Productivity Summit (NPS) is an annual event that Indian Machine Tool Manufacturers' Association (IMTMA) organizes with the aim to present best practices in manufacturing and aid the industry improve its productivity.

The summit has been serving as a platform for knowledge sharing, cross-learning, and networking. Through insightful keynotes, live case study presentations, plant visits, success stories, the event asserts the need to embrace an integrated approach to increase manufacturing productivity, and the ways to make it possible with efficient team, processes and technology.

This year, owing to the present circumstances, the event will go digital on December 18 and 19, 2020. The two-day summit will enable delegates to learn more about the various facets of manufacturing competitiveness from prominent industry experts as well as case studies presented by various companies. The thought-provoking sessions will provide participants with an enriched learning experience, enabling companies to enhance their productivity and train their workforce in the latest technologies and processes for productivity excellence.

Dr Gregory H Watson, Chairman, Business Excellence Solution Ltd, Finland and Vipin Sondhi, Managing Director & CEO, Ashok Leyland Ltd, India, will be the keynote speakers.

Treasure trove of knowledge

Leading manufacturing compa-

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nies such as Bharat Heavy Electricals Limited, Brakes India, Dynamatic-Oldland Aerospace, Faiveley Transport Rail Technologies India, Hero MotoCorp, Indo MIM, Mahindra & Mahindra, Tata Hitachi Construction Machinery, TVS Motor Company, and Yuken India will present their case studies.

The summit will also feature presentations on productivity improvements in the SME sector. Under this, Adler Mediequip and Khutale Engineering will present their case studies and contest for the IMTMA – ACE Micromatic SME Productivity Championship Award 2020. The award acknowledges outstanding efforts from the shortlisted case studies of companies that have excelled in achieving superior performance. They are then rewarded with cash prizes.

Over 1000 participants are expected to participate in the summit. More information on the event can be accessed at **www.productivity.imtma.in.**

Innovative case studies

BHEL: Quantum leap in productivity in gas cutting

BHEL produces fabrication of heavy-duty pipes, and its manufacturing process involves Gas/Flame cutting of large pipes followed by edge preparation for welding. The pipes range from 100mm-1400mm diameter, 6-10m length, 5-100mm thickness, and 3-10 tonne weight. Gas cutting and Edge preparation was hitherto being done by turning the pipes manually with crow bars while operating on one quarter of the circumference in each setup. A rotator-based positioner has been implemented for continuously rotating the pipes, so as to improve productivity, safety and ergonomics.

Dynamatic-Oldland Aerospace: 300% ramp up of helicopter kits

Dynamatic-Oldland Aerospace supplies kits of fabricated structural parts for BELL 407 Helicopters. The company had to gear up for a spurt in volumes from BELL and increase capacity from 3 helicopter kits per month to 9 kits per month at a short notice. The resorted approach was advance planning, aggressive pushing for resources and inventory management, use of auto-nesting for optimizing and speeding up cutting of parts, and implementing a number of administrative best practices. Not only did it smoothly ramp up production, but also improved its operational performance and work culture.

Hero MotoCorp: Low-cost Automation and JIT

Cylinder kit line at Hero MotoCorp's facility at Neemrana produces kits of loose parts for two-wheeler engine cylinders. Owing to increase in demand, it was required to increase the production rate from 8 kits/min to 14 kits/min. It implemented low-cost Automation through addition of conveyors in line with JIT principles. Also implemented was modernization by replacing conventional label sticking on products with automated laser engraving on the fly. Apart from increasing the rate of production, it reduced manpower and realized savings through the improvements.

Mahindra & Mahindra: Improvements in core making

In line with Mahindra & Mahindra Group's commitment towards adopting Green manufacturing and reducing carbon footprint in its oldest plant, it has identified captive foundry, and within the foundry, Core shop as its priority areas. Two varieties of Cores were merged into one type for optimization of lines and handling. To reduce handling of hot core and improve productivity, it implemented automation and added pneumatic sand transfer system. This resulted in improving productivity of Core shop by 110 percent, improving production capacity of Crankcase castings by 50 percent, in addition to achieving aggressive environmental results. It has also achieved I4.0 compatibility for energy monitoring.

Yuken India: Reengineering of chip compacting machine

Yuken manufactures Chip Compacting machines to help machine shops in user industries to improve productivity in chip handling and enable better realization of scrap value. The Chip Compacting machine has been extensively reengineered for better productivity and operational performance, both for company as well as to offer better value proposition to its customers. The principle benefits were reduction in Die change time and power saving for the customers, and reduction of throughput time, inventory and import substitution for Yuken.

Tata Hitachi Construction Machinery: Use of the latest cermet hobs in gear cutting

Tata Hitachi Construction Machinery manufactures Transmission devices and Gears for its in-house products. It had to scale up volumes by 50 percent, for which it considered options of achieving this with minimal Capex. The original process of gear manufacturing was roughing by hobbing. The company has changed the process where Finish machining is directly done by Cermet hobbing, followed by heat treatment. It can now achieve the required capacity for much lesser Capex and has a verified gear quality with the new process.

Dr Gregory H Watson, Chairman, Business Excellence Solution Ltd, Finland and Vipin Sondhi, Managing Director & CEO, Ashok Leyland Ltd, India, will be the keynote speakers.

The summit will also feature presentations on productivity improvements in the SME sector.

Indo MIM: Automation and Robotics

The performance of metal injection molding at Indo MIM was suffering on account of a sluggish process, higher dependence on manual work, low productivity and consistency. The company undertook a drive to implement a slew of improvement measures such as the use of tools with additional cavities, automation in thread unwinding, robots for material handling between machines, automation in de-gating operation and I4.0 based on line productivity monitoring. With this, the company has achieved about 30 percent increase in throughput per machine, and 45 percent increase in throughput per operative.

Faiveley Transport Rail Technologies: Value Stream Mapping in panel manufacturing

Faiveley Transport Rail Technologies is the sole supplier of E70 brake panels for the Indian Railways. In order to address increase in demand, the company had to improve its processes. After a systematic process of VSM (Value Stream Mapping) and application of MOST (Maynard Operation Sequence testing) techniques, a number of improvements were done in the bottleneck area. This included elimination of non-value adding activities, layout changes and work-cell optimization, automation in testing of panels and nut runner improvement. With these improvements, the company was able to double its capacity and attain significant cost savings.

Brakes India: Plating process change

Brakes India was facing major quality issues due to black dots on plated parts, leading to rejections and customer complaints. It tackled the issue by changing the Zinc Barrel Plating process from acidic to alkaline process. A major project was undertaken to modify the Zinc Plating Line with specific efforts to crunch the process cycle time. The company achieved the quality target, improve productivity by 20 percent, avoid significant Capex incurrence, and implemented bar code traceability in line with I4.0

TVS Motor Company: Cobots on the fly inspection

TVS Motor Company was faced with a pressing need to improve quality appeal, coupled with a capacity rise. A final inspection was identified as a vital area for improvement. The company implemented AI-backed, Cobot-maneuvered, digital camera-based 'in-line' 100 percent inspection from Left Hand (LH) and Right Hand (RH) sides of the two-wheeler assembly line. Its capacity increased from 1,000 products/shift to 1,800 products/shift with better quality assurance. It also attained the ability to stop the line at the first appearance of any major defect. It is an example of I4.0 implementation for quality.

Adler Medieqip: Low-cost Automation in Rasp teeth punching process

Adler Medieqip manufactures medical implants. When an implant is placed in Femoral hip joint to provide support to the largest load bearing bone in the thigh, the cavity needs to be filed/rasped to match the shape of the implant. This is done with a Trial Rasping tool, with teeth punched on its surface for abrasive action. Teeth were being manually punched on this tool, which hampered the safety, speed and consistency of the process. Besides, the punches used needed frequent re-sharpening and punching, followed by annealing process. A fixture was developed, which positions the Rasp below a fly press for easy and consistent punching. The fixture has an embedded heating coil to combine annealing within the punching process. The capacity could thus be raised from 1-1.5 Rasp/shift to 3-3.5 Rasps/shift.

Khutale Engineering: A Zero Effect Zero Defect journey

Khutale Engineering is the 'lean' supplier of sheet and tube parts, and assemblies for the White Goods industry. For an all-round improvement in its operations, the company embarked upon a Zero Effect Zero Defect journey in letter and spirit. It did extensive deployment of 5S, safe practices/conditions, Poka Yoke, conservation measures and addressed productivity issues by the use of Digital Read Out and improvement in fixture, among other measures that led to significant multi-dimensional results.

Precision Instruments

Towards Consistent Quality

Mettler Toledo knows trust takes years to build and seconds to break.

Mettler Toledo is the world's leading manufacturer and marketer of weighing instruments for use in laboratory, industrial and food retailing applications. The company believes that weight-based quality control is one way to help one meet their customers' expectations and maintain their confidence as a trusted supplier.

Customers have high expectations for their suppliers and a small mistake can lead to broken trust, reputational damage or business losses. There has never been more training, news or tips available for companies to learn about the importance of a successful customer supplier relationship.

Keeping customers' trust

Experience shows that repeatable processes, flawless quality, on-time delivery, ongoing price reductions and exceptional customer service are most important. It's not an easy task to accomplish because quality control is possibly the most critical factor when it comes to keeping customers satisfied.

While aiming to deliver high-quality products, one must include the right product in the exact quantity and according to specifications. Precise, timely deliveries are crucial when providing supplies to customers with just-in-time production. Checking quality by weighing is a simple way to ensure customers get the right quantity of product every time. It also makes sure that each part is manufactured without defect and that assemblies are complete as specified.

There are several tools that can be used to detect production errors and to perform quality checks, including smart cameras, X-ray inspection systems and weighing technology. Each system provides advantages for special demands.

Smallest parts matter

Especially when producing small parts or complex components, weighing technology is the safest and most reliable.

The integration of a scale into a process requires very little work. In comparison to the demanding installation requirements for camera and X-ray systems, the required investment for a scale is moderate.

So how precise is a scale? Imagine assembling an engine and adding the exact amount of lubricant. An engine weighing more than 100 Kg may need option for carrying out completeness checks of packages, orders or single products. Also, the differentiation of cavities and the tiniest material deviations can be detected and controlled. A camera system can also perform the same task, but only at a low speed and when marks are viewable. The handling of reflective parts disrupts both camera and X-ray inspection systems, whereas the right scale can detect even the lightest parts, such as small foils.

Source: Mettler Toledo India Pvt Ltd

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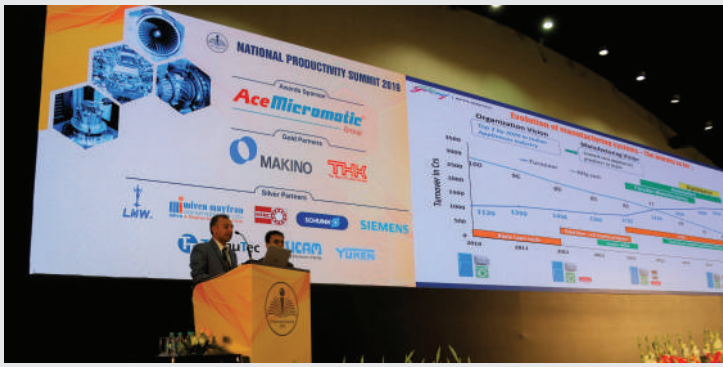
Dr. Gregory H Watson
Chairman
Business Excellence Solutions Ltd
Finland

Mr. Vipin Sondhi
Managing Director & CEO
Ashok Leyland Ltd
India



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