

THE MACHINIST

ULTIMATE GUIDE TO PROFITABLE MANUFACTURING

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Details on page 9

Strategic focus

Rajeev Joisar explains why Bombardier Transportation is concentrating on projects with long term prospects in India

IT IN MANUFACTURING
INDUSTRY 4.0 IN THE
NEW NORMAL

LEADERSHIP LESSONS
LEARNING FROM
THE PANDEMIC

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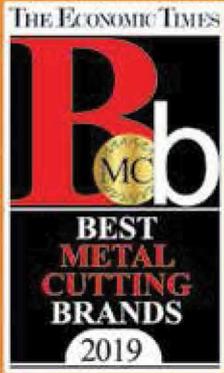
tachyon¹

/teɪkˈɒn/ or tæchiˈɒnɪk

noun

is a hypothetical particle that always moves faster than light. Conceptualized by a team of scientists which includes Indian scientists Mr. V.K. Deshpande and Mr. E.C.G.Sudarshan in 1962.

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ALL ABOUT PEOPLE

With most governments all over the world prioritising opening up of the economy, the number of Covid-19 cases has gone up dramatically. It is not that governments are not bothered about saving lives; but the current scenario has forced the administrations to focus more on livelihoods. Unfortunately, the results have not been really encouraging. Take for example, the case of a leading two-wheeler and three-wheeler manufacturer from Maharashtra that reported dozens of positive cases and even a couple of deaths after restarting operations in the new normal.

“WE NEED TO ENSURE THAT THE BENEFITS OF THE BEST PRACTICES IN THE NEW NORMAL REACH EVERYONE IN THE MANUFACTURING ECOSYSTEM.”

So, what is the way forward? Yes, technology will certainly continue to help us navigate the new normal with automation, robotics and other smart features. However, not all manufacturing companies – particularly the MSMEs – will be able to implement technological changes at this stage – either due to operational issues or financial constraints. Even in the cases of large enterprises, with a few exceptions, human intervention is essential for quite a few operations. In this scenario, it will be critical for the administration, the management and the people themselves to maintain the basic rules of hygiene while ensuring social distancing as strictly as possible. This may sound quite simplistic, repetitive and even boring to some. But, let's understand that it is the only way ahead if we plan to bounce back and create the new normal to our benefit.

Do feel free to share your thoughts with us on this issue. We need to ensure that the benefits of the best practices in the new normal reach everyone in the manufacturing ecosystem. Stay safe, stay strong and stay clean.

Editor & Chief Community Officer

THE ULTIMATE GUIDE TO PROFITABLE MANUFACTURING
MACHINIST

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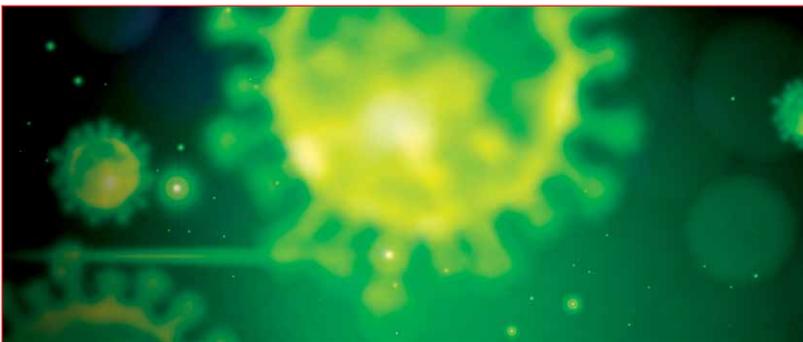
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NEW HIGH TECH RANGE FOR GEAR GRINDING

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CGW specializes in customized solutions for the Gear Grinding industry.

- **Continuous Worm Grinding**
- **Single Rib Grinding wheel**

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- Cool grinding capability

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CGW Gear Grinding wheels are available in a wide variety of sizes and grains

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- Open or closed structure wheel
- Straight or pre-profiled
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- Up to 635 mm diameter size
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India allows private sector to participate in space activities

UNION CABINET CHAIRED BY PRIME MINISTER NARENDRA MODI approved far reaching reforms in the Space sector aimed at boosting private sector participation in the entire range of space activities. The decision taken is in line with the long-term vision of the Prime Minister of transforming India and making the country self-reliant and technologically advanced. India is among a handful of countries with advanced capabilities in the space sector. With these reforms, the sector will receive new energy and dynamism, to help the country leapfrog to the next stages of space activities. This



File pic of GSLV MkIII-M1 rocket, carrying Chandrayaan-2 spacecraft.

will not only result in an accelerated growth of this sector but will enable Indian Industry to be an important player in global space economy. With this,

there is an opportunity for large-scale employment in the technology sector and India becoming a Global technology powerhouse. Space sector can play a major catalytic role in the technological advancement and expansion of India's Industrial base. The proposed reforms will enhance the socio-economic use of space assets and activities, including through improved access to space assets, data and facilities. The newly created Indian National Space Promotion and Authorization Centre (IN-SPACe) will provide a level playing field for private companies to use Indian space infrastructure.

COVID Emergency Credit Facility for all companies



The FM chairing the 40th GST Council meeting via video conferencing, in New Delhi on June 12, 2020.

UNION MINISTER FOR FINANCE AND CORPORATE AFFAIRS NIRMALA SITHARAMAN has said that the COVID Emergency Credit Facility covers all companies and not just MS-MEs. Addressing the FICCI National Executive Committee members, Sitharaman assured the industry of all possible Government support with the intent of supporting Indian business and reviving the economy, and said, "We are committed to support/intervene if any of your members have a problem." On the question of liquidity, the Finance Minister said, "We have fairly clearly addressed the issue of liquidity. There is definitely the availability of the liquidity. We will look into it if there are still issues." Sitharaman also said that every Government department has been told to clear dues and if there is any issue with any department, the government will look into it. The Finance Minister also said that the Government will consider an extension in the deadline for availing the 15 percent corporate tax rate on new investments. "I take your point for considering an extension in the deadline of March 31, 2023," she said. With regard to the need for reduction in GST rates in the badly affected sectors, she said, "GST rate reduction will go to the Council. But the council is also looking for revenue. The decision for reduction in rate for any sector has to be taken by the Council."

Emission norms for diesel equipment to be deferred

MINISTRY OF ROAD TRANSPORT AND HIGHWAYS has invited suggestions and comments from all stake holders including general public on the proposed amendment in the Motor Vehicle Draft rules for deferment of BS-IV emission norms for construction equipment vehicles, tractors and harvesters. A Notification to this effect has been issued on the 19th instant, which can be seen at www.morth.gov.in. A draft notification GSR 393 (E) dated 19th June 2020 has been issued by the Ministry on the request from Agriculture Ministry and construction equipment manufacturers in regard to providing some time for implementing the next stage of emission norms which are to be made applicable wef 1st Oct this year in view of COVID-19 situation. Considering the request, the ministry has issued the draft Notification regarding deferment of BS(CEV/TREM)-IV emission norms which pertain to construction equipment vehicles, tractors and harvesters, from 1st Oct 2020 to 1st October 2021 inviting suggestions from stakeholders.

EESL, GAIL sign MoU for trigeneration projects

GAIL (INDIA) LIMITED and Energy Efficiency Services Limited (EESL) has signed a Memorandum of Understanding (MoU) for cooperation in development of Trigenation projects in India. The MoU aims at building a closer strategic partnership between the two companies by jointly exploring business opportunities in Trigenation business segment in India. Under this MOU, GAIL & EESL shall jointly undertake studies and if found viable, 50:50 joint venture between GAIL & EESL will be incorporated for undertaking Trigenation projects. Trigenation or Combined Cooling, Heat and Power (CCHP) typically involves natural gas-fired generators to produce electricity.

Announcing



Theme

From shopfloor to topfloor

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& exhibition in
August 2020**

Conference Highlights

Keynote Panel - Disruptive Times, Evolving CEOs

Managing and maintaining the plant

The 'Fire' Chat - Chinese companies in India

Clean Bowled! - Hygiene & Cleanliness on the shopfloor

Westside story - CEOs of Western MNCs discuss their views

Industry Presentations

Exhibition Highlights

Virtual Stall Space

Interactive Displays

Easy to Navigate

Engagement through Chats & Polls

Maintain social distancing

Network with the right audience

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Indian Railways starts inducting electric locomotives

ALSTOM has started deliveries of the 12000 hp, WAG-12B electric locomotives to Indian Railways. Built by Alstom, certified by Ministry of Railways and Commissioner of Railway Safety (RDSO), these WAG 12B engines are the highest-powered locomotives that will run on Indian rails. Entry of WAG 12B (e-loco) will allow faster and safer movement of heavier freight trains capable to haul ~6000 tonnes at a top speed of 120 kmph. Planned to be deployed for operations on Dedicated Freight Corridors (DFCs), these e-locos will increase the average speed of freight



trains in India by at least 20-25 kmph. Equipped with Insulated Gate Bipolar Transistors (IGBT) based propulsion technology, it would lead to considerable savings in energy consumption due to use

of regenerative braking. Additionally, this move will not only bring down operational costs, but also reduce the congestion faced by Indian Railways. The project has a strong impetus on indigenous manufacturing with 90 percent localisation and as per the delivery schedule, 100 locomotives will be delivered annually. "This is a revolutionary product which will be faster, safer and eco-friendly. Also, it is scripting a new chapter for India's sustainable mobility journey and we are happy to be partnering in this," said Alain Spohr, MD, Alstom India & South Asia.

Kinetic to manufacture Nano-Tech based disinfectant

KINETIC GREEN ENERGY AND POWER SOLUTIONS LIMITED and Defence Institute of Advanced Technology (DIAT) have entered into the transfer of technology agreement to develop a nanotechnology based disinfectant



to combat the spread of Covid-19. Under this agreement, Kinetic Green will manufacture and market advanced Nano-Tech based disinfectant, Kinetic Ananya. Kinetic Ananya is designed to destroy any kind of virus including the Corona virus. Sulajja Firodia Motwani, Founder and CEO, Kinetic Green Energy and Power Solutions said, "We are proud to be associated with the reputed Defence Institute of Advanced Technology (DIAT) to offer a 'nano-technology assisted formulation' that has abilities to neutralise the virus when it comes in contact with this formulation layer." Sangeeta Kale, Professor of Physics and Dean of DIAT said, "The solution Ananya has been developed by synthesising silver nanoparticles and drug molecule. Before making it official the properties of this material have been tested by two methods – Nuclear Magnetic Resonance Spectroscopy and Infrared Spectroscopy."

Tata Power to develop solar project in Maharashtra

TATA POWER has announced that Tata Power Renewable Energy Limited (TPREL), the Company's wholly owned subsidiary, has received a Letter of Award from Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL) to develop a 100 MW solar project in Maharashtra. The energy will be supplied to MSEDCL under a Power Purchase Agreement (PPA), valid for a period of 25 years from scheduled commercial operation date. The Company has won this capacity in a bid announced by MSEDCL under Phase V dated December 2019. The project is required to be commissioned within 18 months from the date of execution of the PPA. Speaking on this achievement, Praveer Sinha, CEO & MD, Tata Power, said, "We are proud to announce that we have been awarded 100 MW Solar Project in Maharashtra, and are thankful to the Government of Maharashtra and the officials at MSEDCL for this opportunity. With this award the cumulative capacity of renewables will be 3,557 MW."

155 Indian firms account for \$22 billion investments in US

ONE HUNDRED AND FIFTY-FIVE companies with origins in India are responsible for generating over \$22 billion in investments and nearly 125,000 jobs across the United States, according to a new survey report released by the Confederation of Indian Industry (CII). The report, "Indian Roots, American Soil 2020," is a state-by-state breakdown of tangible investments made and jobs created by 155 surveyed Indian companies doing business in all 50 states, as well as Washington, D.C., and Puerto Rico. Texas, California, New Jersey, New York, and Florida are home to the greatest number of workers in the U.S. directly employed by the reporting Indian companies. The surveyed companies disclosed the highest amounts of foreign direct investment (FDI) in Texas, New Jersey, New York, Florida, and Massachusetts. The states with the top concentrations of Indian companies reporting were New Jersey, Texas, California, New York, Illinois and Georgia.

Greaves revenue for Q4FY20 stands at Rs.360 crore

GREAVES COTTON LIMITED reported revenue, at Rs. 1,821 crore in FY20 as against Rs. 1,988 crore in FY19 despite economic slowdown and pandemic. Revenue for Q4FY20 stands at Rs.360 crore as against Rs.528 crore in Q4FY19. EBIDTA at Rs. 228 crore in FY20 as against Rs.275 crore in FY19 while PAT is at Rs. 148 crore in FY20 as against Rs.169 crore in FY19.



Deadline for sending
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* The Machinist Super Shopfloor Award 2020 for Covid-19 Innovation is an intellectual property that belongs to the Worldwide Media Pvt Ltd (WMM). It is part of 'The Machinist Super Shopfloor Awards' platform.

GWM appoints President & MD for India



GWM has announced the appointment of James Yang as President for the Indian subsidiary of GWM. The company has also appointed Parker Shi as Managing Director for the Indian subsidiary of GWM. James Yang brings in rich experience in the areas of R&D, project and marketing management and will be leading the entire GWM India project with major focus on R&D, Plant & Industrial operations in India.

James Yang said, "I am happy that I have been given the chance to lead the operations at such a crucial juncture and hope that we can work towards providing the best quality products and at the same time generate more employment, business and economic viability." He also said, "India holds great importance for GWM and is an important partner in the overall scheme of things in the ASEAN region. Our commitment towards the Indian market has been showcased with the investments in the Talegaon plant and R&D facility."

Parker Shi has rich global experience and has made immense contribution in expanding GWM business in Middle East, Africa and Australia regions. He will be responsible for Commercial Operations for GWM in India. He said, "I am happy to be a part of a team that is looking at making a foray in a highly competitive and soon to be the fourth largest market in the world. We at GWM are highly optimistic about the India market and we foresee recovery of the market in near future."

Rohit Prakash to head Varroc's as metallic business



Varroc Engineering Ltd has appointed Rohit Prakash as President - Metallic Business and Business Development for a major two-wheeler OEM. He will be reporting to Tarang Jain, MD - Varroc. Rohit has also been appointed the Additional/Whole-time Director of the Company. Rohit Prakash has over 30 years of experience with major four & two-wheeler manufacturers in the country and carries extensive experience in planning & executing projects for new plant set ups and developing new business opportunities. His expertise lies in business turnarounds, strategic management, M&A, and operations excellence. His analytical ability coupled with hands-on approach and excellent management skills will drive sustainable and profitable relationships with all Varroc stakeholders. Rohit has joined Varroc from Sogefi Engine Systems India Pvt Limited. Previously, he has worked with companies like NTTF Industries Ltd and FIEM industries.

Varroc's Metallic business consists of transmission and engine valve divisions. The transmission division supplies forged, precision, and machined parts for engine and transmission from its four manufacturing plants and an engineering centre in India as well as two manufacturing facilities in Italy. The engine valve division supplies intake and exhaust valves for both automotive and non-automotive applications, especially titanium and sodium-filled valves for high-performance engines. The division has two manufacturing facilities and a state-of-the-art engineering centre in India, exporting nearly half of the production to countries in US, Europe and Asia.

Wipro appoints Thierry Delaporte as CEO & MD



Wipro Limited has announced the appointment of Thierry Delaporte as the Chief Executive Officer and Managing Director of the company, effective July 6, 2020. Until recently, Thierry Delaporte was the Chief Operating Officer of Capgemini Group and a member of its Group Executive Board. During his twenty-five year career with Capgemini, he held several leadership roles including that of Chief Executive Officer of the Global Financial Services Strategic Business Unit, and head of all global service lines. He also oversaw Capgemini's India operations, and led the group's transformation agenda, conceptualizing and driving several strategic programs across various business units.

"I am delighted to welcome Thierry as CEO and Managing Director of the company. Thierry has an exceptional leadership track record, strong international exposure, deep strategic expertise, a unique ability to forge long-standing client relationships, and proven experience of driving transformation and managing technological disruption. We believe that Thierry is the right person to lead Wipro in its next phase of growth," said Rishad Premji, Chairman, Wipro Limited. "I want to thank Abid for all that he has done for Wipro and for making this transition as smooth and seamless as possible despite his personal commitments." Abidali Neemuchwala will relinquish his position as CEO and MD on June 1. Rishad Premji will oversee the day to day operations of the company until July 5. Thierry Delaporte said, "I look forward to working closely with Rishad, the Board, senior leadership and the hugely talented employees of Wipro to turn a new chapter of growth and build a better tomorrow for all our stakeholders." He will be based in Paris and report to Chairman Rishad Premji.

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PK Goswami takes over as Director (Operations), OIL



Pankaj Kumar Goswami has taken over as Director (Operations) of Oil India Limited (OIL) on 1st June 2020. Prior to taking over as Director (Operations), Goswami was in the Projects Department at OIL's Field Head Quarter, Duliajan as Chief General Manager (Projects), where he looked after implementation of a large number of complex and high-value projects related to production of Oil & Gas of the Company. Pankaj Goswami is leading a team for development of gas field in Upper Assam. By virtue of his rich experience of working in production of oil & gas from India's oldest and matured oilfield of Naharkatiya in Northeast India, he carries the distinction of being a hard-core oilman with deep learning on geology, drilling and the social fabric of a difficult exploration terrain of the states of Assam and Arunachal Pradesh. With over 31 years of experience in oil & gas production activities at Assam-Arakan basin in Northeast India, Goswami has conceptualized many out-of-box ideas. He has headed various

high-level committees and task forces to oversee critical projects and activities related to oil and gas production, infrastructure facility implementation, operational issues and technology initiatives. A thorough technocrat, Goswami has presented number of scientific papers relevant to the oil and gas industry both at national and international level. Goswami joined OIL in the year 1988. Pankaj Kumar Goswami comes from the oil town of Digboi in Assam.

VN Datt is CMD of National Fertilizers Limited



Virendra Nath Datt, Director (Marketing), National Fertilizers Limited (NFL) has taken over the additional charge of Chairman & Managing Director of the Company. Datt is associated with Company as Director (Marketing) since October 2018.

Datt has a rich professional experience of over 35 years with premier Central Public Sector Enterprises -CPSEs such as GAIL and ONGC) besides the Fertilizer Industry.

Prior to joining NFL, he was Executive Director in GAIL (India) Limited where he handled all India marketing operations of the company in addition to Corporate Strategy, Planning and Advocacy. He was also a Director on the Board of Mahanagar Gas Ltd., Mumbai.

Datt also had a 10 year stint with ONGC before joining GAIL in 1995.

As Director (Marketing), NFL, Datt is credited with sustained growth in fertilizer sale of company from 43 Lakh MT in 2017-18 to 57 Lakh MT in 2019-20, an increase of 32 percent over previous two years. During this period, NFL established a pan India footprints in the fertilizer industry.

Vijay Chhibber appointed as Director General of EPTA

The Electric Power Transmission Association (EPTA) announced the appointment of Vijay Chhibber to the position of Director General effective 8th April 2020. In this role, Chhibber will be primarily responsible for engaging with stakeholders to further the goal of reliable 24x7 power supply through development of least cost transmission system throughout the country. Chhibber is a former Indian Administrative Service (IAS) officer with over 37 years of public service in the Indian Administrative Services. In his earlier role, he was the Union Secretary Ministry of Road Transport and Highways with additional charge of Chairman, National Highways Authority of India. He has worked on several key assignments in the Government of India for the Ministries of Defence, Health, Commerce, Fertilizer, Shipping, Road Transport and as a Cabinet Secretariat. He was also Advisor to the Chief Minister, Government of Tripura.

Welcoming his appointment, Pratik Agarwal, Managing Director, Sterlite Power, said, "We are excited to welcome Mr. Chhibber as the new Director General of EPTA. He brings wealth of experience in managing several core sectors including infrastructure with the Government of India. We are confident that under his leadership, EPTA will create opportunities to strengthen the Inter-state and Intra-state transmission networks and the power transmission industry will scale new heights."

Vivek Singla, President T&D, Adani Transmission, said, "We are pleased to have Mr. Chhibber join us as the DG, EPTA. Mr. Chhibber is a widely regarded technocrat and his insights and direction will be invaluable as we head into a strong phase of growth in the power transmission industry."

Volvo Penta appoints Heléne Mellquist as President

Heléne Mellquist has been appointed as President Volvo Penta and new member of Volvo Group Management. She will replace Björn Ingemansson, who after a long and successful career will retire. Heléne Mellquist, born in 1964, currently holds the position as President for the European Division at Volvo Trucks. Her career at the Volvo Group began in 1988 and she has held many senior positions at the company. She has also held the position as CEO at TransAtlantic 2012-2015. Heléne Mellquist will join Volvo Penta on July 1st, 2020 and take up her new position on September 1st, 2020.

New sales & marketing head at Mercedes-Benz Vans



Klaus Rehkugler (52) will take over as Head of Sales & Marketing at Mercedes-Benz Vans on 01 August 2020 and will report directly to the Head of Mercedes-Benz Vans, Marcus Breitschwerdt. At present Rehkugler is Head of Sales Operations and Marketing for the Region Europe at Mercedes-Benz Cars. He will take over from Klaus Maier (58), who will leave the company at the end of June at his own request. "We are pleased to be gaining Klaus Rehkugler, an internationally very experienced sales colleague, for Mercedes-Benz Vans," said Marcus Breitschwerdt, Head of Mercedes-Benz Vans. "I am very much looking forward to working with him. Thanks to his comprehensive experience in sales, with responsible stations in product management and fleet customer business operations, as head of a retail branch and in the marketing and sales management in important international markets, I am sure that he will quickly create impetus within the Vans division." Rehkugler studied European Business Studies in Reutlingen

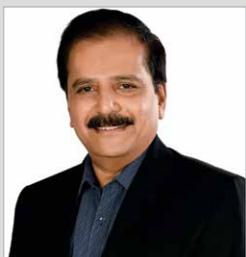
and joined afterwards the former Mercedes-Benz AG via the International Trainee Program in 1994. Following several positions with specialist and leading responsibilities at Mercedes-Benz Cars in fleet and used car sales, and as a product manager for Mercedes-Benz compact cars, Rehkugler took over as the Head of Market Planning and Order Management at smart GmbH.

Kurt Bock to succeed Jürgen Hambrecht at BASF SE



The Supervisory Board of BASF SE has elected Dr. Kurt Bock as the new chairman of the Supervisory Board of BASF SE. Bock had previously been elected to the Supervisory Board of BASF SE by the Annual Shareholders' Meeting as a shareholder representative. The term runs until the end of the Annual Shareholders' Meeting in 2024. Bock succeeds Dr. Jürgen Hambrecht, who, as announced by him before his election to the Supervisory Board by the Annual Shareholders' Meeting on May 3, 2019, resigned from the Supervisory Board at the end of the Annual Shareholders' Meeting 2020 and thus left the Supervisory Board.

3D printing veteran Pradeep Nair joins Intech



Intech Additive Solutions Pvt. Ltd. (formerly known as Intech DMLS Pvt. Ltd.), the pioneering metal additive manufacturing company in India, has announced the appointment of 3D Printing veteran Pradeep Nair as Vice President-Hardware Sales (APAC & ME Asia). Pradeep Nair will be primarily responsible for the business development and sales of the company's recently launched iFusion series of Metal 3D Printers along with its marketing and support functions. He will also play an advisory role in the development of Intech's 3D printing technology roadmap. Pradeep Nair is a veteran in the field of Additive Manufacturing (AM) having introduced the technology into the Indian and ASEAN markets back in 1996. Pradeep joined as Regional Director at Stratasys to set up its operations in India and the ASEAN markets. After 19 long and fruitful years with them, he then moved to SLM Solutions GmbH as Director-India to start their operations in India, selling and servicing Metal 3D Printers. Sridhar

Balam, MD & CEO of Intech Additive Solutions, said: "His appointment will give a big boost to our plans to revolutionize Additive Manufacturing in India especially with our 'Made in India' iFusion series of Metal 3D Printers."

By Niranjana Mudholkar

STRATEGIC FOCUS

We are focused on projects which we consider as strategic and have long term prospects for our operations in India, says **Rajeev Joisar**, Country Leader for India at Bombardier Transportation.



"It's clear that a new reality is upon us and it's critical that we embrace this new reality very quickly. We'll need to change how we operate - and how we move forward to support our customers. That's exactly what we are doing to execute our priorities and business in India to be more predictable and consistent in our performance."

What is your analysis of the railways industry in India at present?

India has the fourth largest rail network in the world and we at Bombardier are pleased with the efforts of Indian Railways and Metro rail organisations to modernise the rail transportation in India.

There are multiple challenges to rail infrastructure development - funding constraints, land acquisition issues and shortage of skilled manpower are some major reasons currently causing delays in infrastructure projects. With modernisation in the intermodal transport, rail transportation can be a significant engine of inclusive growth and development for India.

We are pleased with the overall direction of Indian Railways and Metro rail operators in India, which stresses on safety, introduction of new trains and technologies, increased focus on PPP (Public Private Partnership), improving passenger comfort, standardising norms, introduction of innovative financial models and most importantly reinforces commitment to involve the private sector. There is a growing market for public transit driven by urbanisation, environmental concerns and, most importantly, infrastructure spending by cities and governments.

Indian rail transportation market is very strong, and we have a key role to play. With Indian government, we're seeing clarity on modes of transport ideal for a particular city with major focus on integration and safety.

We are focused on projects which we consider as strategic and have long term prospects for our operations in India. We are closely pursuing various metro projects around India. There are various projects of Indian Railways requiring rolling stock, components, signalling and services where Bombardier is keen to participate. Ministry of Railways has set out its vision for rail as a key provider of connectivity and enabler of economic development, with significant investment over the next five years and with our presence and experience in the Indian market, we are well poised to play a key role in the rail market. The Indian government is actively pursuing long-term vision for a sustainable and stable railway system in India with emphasis on improv-



ing safety, expanding rail infrastructure, increasing capacity, reducing congestion, raising passenger comfort levels, technological innovations, and improving speed.

Bombardier aims at investing in India with a long-term perspective in manufacturing facilities, local talent, developing local supplier base and enhancing engineering capabilities in the projects which are strategic to our growth in India.

What are the things that you see working in the favour of Bombardier Transportation in India and what are the things that you would like to improve upon?

For over 50 years, Bombardier has been investing in India and well-established manufacturing setup, engineering capabilities, strategic supplier base and over 1500 highly skilled employees locally.



Indian rail transportation market is very strong, and we have a key role to play. With Indian government, we're seeing clarity on modes of transport ideal for a particular city with major focus on integration and safety.

Bombardier is one of the largest rolling stock suppliers to Delhi Metro having delivered 776 metro cars with 40 more metro cars in delivery phase. Bombardier is also the largest signalling supplier to Delhi Metro with over 140 track km delivered. Bombardier has been a partner to Delhi Metro for over 10 years with more than US\$ 1.25 BN worth of orders placed on Bombardier since 2007. The high degree of localization executed in the project at Bombardier's Savli and Maneja sites fulfils the requirements of the Indian government's 'Make in India' campaign and Delhi Metro's indigenous procurement plan that encourages local manufacturing. Our energy efficient trains have helped the city of Delhi improve mobility and manage pollution levels as well as provided effective public transport during the 2010 Commonwealth Games. Our vehicles have also

contributed to Delhi Metro receiving UN carbon credits, world's first for a metro project.

Bombardier completed serial deliveries for the supply of propulsion equipment to Mumbai Railway Vikas Corporation (MRVC) for 72 twelve-car trains in 2017. Our propulsion equipped trains operate on Mumbai suburban rail network which safely move millions every day. Bombardier is supplying propulsion equipment to Indian Railways for locomotives and this long-standing relationship began in 1993 with a design-and-build contract for electric mainline passenger and freight locomotives. Currently, Bombardier is moving around five million people daily in the cities of Mumbai, Delhi and Kolkata and our propulsion equipped locomotives travel around 300,000 track km every day on Indian Railways network.

In 2019, we completed deliveries for 450 commuter cars for Queensland Rail project and continue to export rail equipment for various global projects. Our team continues to deliver high quality products for Indian Railways and in 2019, we successfully commissioned over 260 locomotive sets of IGBT Traction Converters at Chittaranjan Locomotive Works (CLW), a record by any Indian Railways supplier to date.

As a private rail supplier, our Indian team is one of the only teams in the country who supported two global sports events – 2010 Delhi and 2018 Gold Coast Commonwealth Games.

How's been the business for the last financial year?

Business in India has been in line with our expectations. As a company policy, we don't reveal local entity related numbers as Bombardier is only listed in Toronto Stock Exchange. Bombardier Transportation is committed to the growth of rail transportation industry in India.

Our investment of around Rs.230 crore (33 million euro) in state-of-the-art railway vehicle manufacturing at Savli, Gujarat, is a testimony to the fact that India is one of the most important markets. Bombardier has invested around US\$ 100 million over the last two decades in Indian manufacturing sites, people, technology and strategic supply chain.

How do you look at the endeavours of Indian Railways to explore the possibility of private train operation on their network?

We really appreciate the efforts of Indian Railways to explore the possibility of private train operation on their network. Bombardier is following the train operations project closely and is in discussion with senior Indian Railway officials. It is too early at this stage to comment on the future course of action as we continue to evaluate the viability of the project.



We, at Bombardier, feel that reinforcement on public private partnerships (PPP) will gain momentum in the coming years in India resulting in faster development of railway infrastructure, including rolling stock.

We, at Bombardier, feel that reinforcement on public private partnerships (PPP) will gain momentum in the coming years in India resulting in faster development of railway infrastructure, including rolling stock. We share Indian government's vision to decongest India by rail investments with higher involvement of private sector in train operations as an initial project and outlining a safer railway system in India. As our recent investments demonstrate, we are committed to the development of rail transportation in India, where we have built capabilities covering complete range of railway vehicle manufacturing, local engineering and strategic supplier base with local skilled employees.

Briefly tell us about a key project where Bombardier Transportation is currently working in India.

Bombardier Transportation has received a Letter of Award from India's National Capital Region Transport Corporation (NCRTC) to build and deliver regional commuter and intracity transit trains with comprehensive maintenance services for the Delhi-Ghaziabad-Meerut semi-high-speed rail corridor under Phase 1 of the Regional Rapid Transit System (RRTS). The project scope involves supplying 30 regional commuter trainsets of six cars each and 10 intracity mass transit trainsets of three cars each, together with 15 years of rolling stock maintenance. The Letter of Award is valued at approximately Rs.2577 crore (314 million euro, \$340 million US) and the customer has a provision to exercise an option of additional 90 cars and two years of maintenance.

Vinay Kumar Singh, Managing Director at NCRTC, has said that 'finalisation of the

Rolling Stock bid process is an important milestone in the implementation of India's first Regional Rapid Transit System (RRTS) project. He has mentioned that this partnership with Bom-

bardier Transportation to supply 100 per cent locally manufactured train sets for the entire Delhi-Ghaziabad-Meerut RRTS with over 83 per cent local content will be a shot in the arm for the Make in India initiative of the Government of India. He has also expressed confidence that 'together we will deliver this transformational project in time to fulfil the aspirations of the residents of the National Capital Region contributing to improvement in their quality of life'.

We are proud to be chosen to deliver India's flagship regional rapid transit system project which will expand public transport in the national capital and connect adjoining fast-growing cities. Our new trains will be truly designed and manufactured in India, and they will enhance passenger comfort and safety. This project award for India's first and most advanced semi-high-speed regional trains, together with maintenance services, reaffirms Bombardier's pioneering position in India's rail industry. This is also the first project in India for regional and local transit services operating on the same network, progressively realising India's vision for the multi modal integration of transport networks.

The project will be executed in accordance with Indian Prime Minister Narendra Modi's flagship 'Make in India' guidelines, with the trains being manufactured at Bombardier's Vadodara sites in India. The rolling stock will be designed at the Global Engineering and Technology Centre in Hyderabad, India and local teams will provide maintenance services through two project and maintenance depots established by our customer in Duhai and Modipuram. It is India's first project to include maintenance services as part of rolling stock



Bombardier's Firsts in India

- First foreign multinational company to set up a wholly-owned railway vehicle manufacturing facility in India;
- First Rail Company to use robotic welding in India;
- Delivered India's first indigenously produced metro train in India for India;
- Delivering India's first rolling stock project by a multinational company for exports;
- First multinational rail manufacturing site to be accredited with International Railway Industry Standard (IRIS) certification.



tender process and Bombardier will deliver globally proven maintenance solutions to ensure safe and reliable train operations.

The 82-kilometre Delhi-Ghaziabad-Meerut RRTS will boast a 180 kmph design speed, first of its kind rolling stock in India for regional transit services and will be implemented in phases between the cities. The corridor will have 24 stations and besides offering high-speed commuter services on the corridor, the infrastructure will also be used for offering local transit services in Meerut. The trains will reduce travel time from Delhi to Meerut to less than 60 minutes and daily expected ridership is around 800,000 passengers. Local transit



Bombardier aims at investing in India with a long-term perspective in manufacturing facilities, local talent, developing local supplier base and enhancing engineering capabilities in the projects which are strategic to our growth in India.

services between Meerut South and Modipuram Depot Station with 13 stations over 21 km on RRTS infrastructure will meet the local mobility needs of Meerut citizens and will provide efficient regional connectivity.

Where do you see Bombardier Transportation with regards to 'Design in India' and 'Engineer in India' and 'Make in India'?

In April 2017, Bombardier Transportation opened a new engineering centre supporting product development and design activities in Hyderabad, India. This new facility expands Bombardier's global network of specialised centres with a particular focus on the development of metro and electrical multiple unit (EMU) product platforms and engineering design for transportation projects locally and globally.

As part of our commitment to developing local talent, our goal is to continue to grow the team in Hyderabad and support our product development strategy,

innovation and improve our services to our customers. Bombardier has also been significantly growing its engineering presence in India over the years with a new rail control facility for Engineering and Product Development (EAPD) in Gurugram Delhi NCR, a Train Control and Management System (TCMS) centre in Vadodara, a bogie, carbody and vehicle engineering centre as well as an engineering centre in Hyderabad along with project engineering teams at our manufacturing sites near Vadodara.

The trains for our new NCRTC project will be designed, engineered and manufactured in India by our local team. We are not in a position to comment on number of employees, but we can say that there will be a significant ramp up of our operations at Hyderabad supporting NCRTC project.

What is the percent of local content used in your India made products at present?

Our Savli site is the only site in India to have manufactured and successfully delivered over 1000 rail cars (Delhi Metro and Queensland Rail combined) and over 4500 bogies and bogie frames for domestic and export projects. Bombardier has a large industrial presence in India. Vadodara is one of the few cities in the world with the capacity to deliver all key electrical and mechanical components for the manufacturing of railway vehicles. Our Savli site has a demonstrated capacity of manufacturing one car per day and we have built capacity to manufacture 35 metro cars per month. Our Maneja site is also supplying propulsion equipment to Indian Railways for locomotives and EMU's for over two decades.

Our commitment and investment have attracted world class rail suppliers to India making our local content and sourcing significantly from India itself.

Our employees in Gujarat are fully trained on special tools and processes to ensure standard quality across Bombardier. Savli started with rail engineering experts from across the globe moving to India to set up a manufacturing site has rapidly evolved into a truly Indian production and export hub with high international standards.

Are you also exporting from India?

In 2019, our site in India completed delivery of 450 commuter cars for the Queensland New Generation Rollingstock (QNGR) project for Australia. Vehicle assembly and bogie manufacture took place at the Savli site and the Maneja site, near Vadodara, supplied the propulsion equipment.

These trains travelled more than 10,500 km by road and sea from Savli, India to the Port of Brisbane. These trains supported mobility during 2018 Commonwealth



Games in Gold Coast and are operate successfully on the Queensland Rail network. This project truly demonstrated Indian government's promise on Make in India and Bombardier's efforts on this project have been acknowledged by Indian Prime Minister and his cabinet ministers. In addition, Bombardier continues to export rail equipment for Bombardier global projects.

How has the Covid19 outbreak impacted Bombardier Transportation in India and globally? How have you been dealing with the same?

We take it as a priority to ensure our employees and business partners can work in a safe environment. During the pandemic, Bombardier follows the guidance of the official authorities in each country; also the situation varies considerably from one site to another. In order to take all these factors into account, different regulations are applicable for each Bombardier site.

In the current unprecedented circumstances, we want to protect our people from COVID-19, support the Indian Government's efforts to contain the spread the virus, and to ensure sustainable business continuity. Following the Indian Government's directive to extend the lockdown whilst announcing relaxation norms for essential industrial units from April 20, Bombardier Transportation resumed its operations across both Vadodara sites in the last week of April. Our sites are operating in adherence to strict internal safety guidelines and in compliance with state and central government directive to re-start operations. Our remaining staff across India continues to work from home and customer services staff follows enhanced safe working practices in case of any urgent onsite support required by the customer.

How has the Covid19 outbreak impacted your outlook for the near and mid-term future?

When the crisis began to unfold globally and in India, we acted swiftly to protect the health and safety of our employees, support government mandates to contain the spread of the virus and provide service to our customers in the best possible way.

It's clear that a new reality is upon us and it's crit-

ical that we embrace this new reality very quickly. We'll need to change how we operate - and how we move forward to support our customers. That's exactly what we are doing to execute our priorities and business in India to be more predictable and consistent in our performance.

There is a huge focus on digitalisation across the business world. How do you see this impacting the Railways sector, both globally and in India?

We always put safety first, no exceptions. Now more than ever we believe that our relentless evolution of technical safety is a vital prerequisite for successful mobility solutions. Digitalization is a key enabler to safety standards in the transportation industry. This is for the benefit of rail operators, passengers and society.

The capital costs for a new train account for around one third of its full lifetime cost and today's trains are safer, more energy efficient, more reliable and easier to maintain than they have ever been. Everyone from manufacturer and operator to the owner and the authority has a significant role to play in ensuring our rail systems aren't compromised. Digitalisation is already improving security. Due to the relative affordability of advanced sensors, manufacturers are leveraging the power of mobility innovations for rolling stock services. This implies predictive maintenance or communication-based train control for signalling. Both have increased safety and reduced the potential for human error while improving efficiency. Of course, the Internet of Things, interconnectivity and the potential integration of personal devices into operator's platforms do present new challenges.

RRTS project is India's first project to include maintenance services as part of rolling stock tender process and Bombardier will deliver globally proven maintenance solutions to ensure safe and reliable train operations. Bombardier has proven capability to fully automate safety critical maintenance tasks using automated measurement inputs to prognostically forecast maintenance intervention. The use of technology to support delivery of an advanced maintenance strategy can enable improvement in safety and reduced total cost of ownership.

As a world leader in signalling solutions and rail control, we deliver complete mainline systems, subsystems and individual products to railway operators and infrastructure all over the world. In India, our innovative signalling solutions can support Indian Railway's urgent need to upgrade and install advanced rail control solutions on its vast mainline network. 

By Prof. Ravindra Ojha

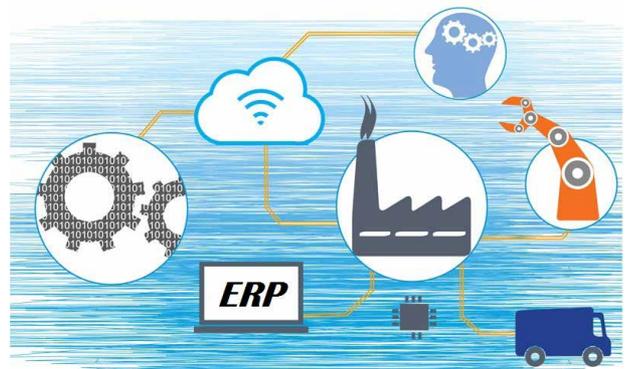
FROM CRISIS TO TRANSFORMATION

The value-adding journey of manufacturing in the supply chain is currently going through an unprecedented rough-terrain of COVID-19 crisis but is definitely going to transform itself to a much more robust chain tomorrow.

Manufacturing is all about the conversion of the bounty from mother-earth to the end usage-product for human being. This value-adding journey in the supply chain is currently going through an unprecedented rough-terrain of COVID-19 crisis but is definitely going to transform itself to a much more robust chain tomorrow. This transformation process in the next few years is going to be challenging but would have useful deliverables.

CHALLENGES

The burst of COVID-19 pandemic in India has severely impacted the entire manufacturing supply chain and is going to have long-term implications. The pandemic has led to a near zero / low market demand, fractured logistics, tight finances for MSME, huge job losses, scant workforce after their migration, changed consumption behaviour, safety and health anxieties, uncertainty in the consumer's mind-set and many more hardships. Such crises always throw up opportunities. The gradual transition from crisis to transformation is bound to manifest itself. The Indian leadership is talking about creating more than 50 percent value-add in the ecosystem by producing in-house. Core self-sufficiency value chain models are being explored. Many believe and also wish that India will evolve as one of the preferred centre for manufacturing products in the Asian continent. The factory of China is definitely under the radar due to the de-globalisation murmurs amongst the world industry-leaders and key policy de-



cision makers.

An attempt has been made to share a few transformational elements in the top five dimensions of the manufacturing supply chain.

SOURCING

A robust supply chain is likely to get built with diverse sourcing in times to come. JIT (Just in time) would continue to play a BIG role where inventory (inventory turnover) is a big ticket item. However, JIT system with the sole supplier which existed earlier shall become venerable tomorrow. Over dependence of automotive, electronics and medical companies on Chinese produced goods has shown the vulnerability. After being hit by COVID the thought is likely to change to JIT but with two or three geographically differently located suppliers. Moving out from a single-sourcing strategy to dual-sourcing and cross-sourcing to build a greater degree of resilience in supply chain, which could lead to a small unit product cost increase, would be preferred. The post COVID supply chain would see a balancing act between efficiency and resilience, ready to face more disruptions. Another key dimension would be a notable shift from globalisation to localisation, referred as 'self-reliance'

FLEXIBILITY

The uncertainty in terms of quantity and variety due to the new post-COVID consumer behaviour would call



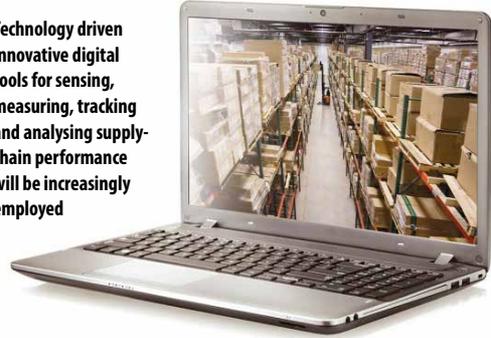
"JIT (Just in time) would continue to play a BIG role where inventory (inventory turnover) is a big ticket item. However, JIT system with the sole supplier which existed earlier shall become venerable tomorrow."

for increased application of faster and flexible production. Responsiveness in production would be stretched, thereby making Lead time the driving factor for manufacturing supply chain performance. JIT (Just in time) supplies coupled with near-zero setup-change duration would reduce the lead times and would improve the responsiveness for customers. Nimble and smart supply chain will get created with automation and small-batch production but with extra quick changeover systems. Based on the volumes and capacity utilisation, modularisation into production lines will dominate in the future. Remote access of machines and lines would be the new normal.

DIGITAL TECHNOLOGY

Technology driven innovative digital tools for sensing, measuring, tracking and analysing supply-chain performance will be increasingly employed to contribute to lower cost and better predictability and reliability in the manufacturing supply chain. Innovative applications

Technology driven innovative digital tools for sensing, measuring, tracking and analysing supply-chain performance will be increasingly employed



tively low market demand the low margins in the products are expected to reduce further, however, margin in services which is already healthy could grow or continue to remain high. Therefore, can adding more services to manufactured products open a new revenue stream? The product-as-a-service business model providing tangible goods as a service is expected to gain momentum. Instead of selling robots for spot-welding to automobile manufacturers, robot manufacturers can not only build, own and operate robots but also sell the client what it really wants and needs - World-class weld-spots, thereby maximising utility and life of robots and delivering more reliable automobiles. It will have the advantages of growth in revenue and profit, improved customer response, product innovation, facilitate circular economy, and new barriers to competition.

LAST MILE

Based on the cascading impact of COVID-19, the number of infected / hospitalized would be substantial, resulting in increasing social distancing and contactless handling. This would give rise to new core service – availability of the goods to the final consumer. The last mile reach out would become the differentiator. This would stretch the suppliers to Partnering with local organisations. Many such innovations in creating new channels to reach out to customers would take place.

In summary, the transformation in the five critical dimensions of manufacturing supply will be witnessed in India. New suppliers, systems, handling processes, technology applications and revenue channels will get created. However, the lopsided structure of Indian manufacturing firms – 80 percent of the Indian manufacturing firms have a manpower of < 50 employees vis-à-vis 15 percent in China, will also have to go through a transformation through reforms in labour-laws, Scalability is critical for technology integration. 

The author is with the Great Lakes Institute of Management, Gurgaon



In the competitive manufacturing world and comparatively low market demand the low margins in the products are expected to reduce further, however, margin in services which is already healthy could grow or continue to remain high.

of sensors and RFID (Radio Frequency Identification) would increase manifolds. Cost pressures would result in real-time tracing and tracking of inventory will gain greater importance and hence RFID will find enhanced application. Cost pressures, safety and health priorities and contactless operations would also reduce dependency physical labour across packaging, loading-unloading transportation vehicles, logistics and warehousing. Low-cost-automation, auto pick-and-place systems, small robots for repetitive movements would become a common sight in manufacturing shop floors. This would also accelerate enabling of the core digital technologies for Industry-4.0; Industrial Internet-of-things, Blockchain, Artificial intelligence, Machine learning enabled demand forecasting, algorithm based self-adjusting stock allocations, autonomous devices such as AGVs (Automated guided Vehicles) and drones and many more.

SERVITISATION

In the competitive manufacturing world and compara-

CONQUERING THE AUTO TECH FRONTIER

In continuation of its campaign to recognise and encourage the role of women in manufacturing, **The Machinist magazine** presents two shining examples from Continental Automotive.

The automotive industry has traditionally been chosen as a career choice more by men than women, especially in manufacturing, and engineering. Women have been typically seen in what was considered as softer roles in management.

The All India Survey on Higher Education (AISHE) of 2018-2019 indicated that merely 28.9 percent of women chose engineering programs.

However, these statistics suggest that there is a growth in the number of women wanting to work in the engineering and manufacturing areas.

The shift reflects a cultural change, where gender roles and perceptions are gradually being discarded. The introduction of government programs such as Indo-U.S. Fellowship for Women in STEMM, Vigyan Jyoti and scholarships like PRAGATI are a few schemes to encourage women in engineering helps to increase this number further.

Another factor influencing women to take up jobs in the automotive sector is the transformation in the automotive industry itself. The megatrends, such as autonomous mobility, electrification, and connected mobility, have paved the way for increased software content within the vehicle. Thus, the required skill sets of an engineer have broadened and evolved as well. With this transformation, the traditional gender-based roles are diminishing and creating opportunities for women with specific software expertise. Today, organizations are consciously initiating special programs to achieve better gender diversity, especially in leadership roles. Such



programs include re-skilling, up-skilling, focused training, leadership, and Intrapreneurship skill development.

While the employee benefit policies such as maternity, flexible work hours, and mobile work supports women's career greatly, regardless of lifestyle changes. Let's take a look at two exemplary women leaders working at Continental Automotive.

SETTING NEW TECHNOLOGICAL BENCHMARKS

Sirisha, Head Industrial Engineering & New Product Launch at Continental Automotive India is one such inspiration for a lot of aspiring women wanting to take up the technical and manufacturing role. In her role, she is responsible for developing concepts for manufacturing and product launches, capacity planning, and defining the technology roadmap for manufacturing.

She joined Continental in 2008 as a Technical Project Leader and went on to assume the role of Regional Competency Center Head - Access Systems. In her career spanning 16 years, Sirisha has won several accolades and recognitions. Women like her in the automotive industry 'bring a typical trait that balances mechanics and technology with innovation'.

Anupama Raman is the Global Head of Software Academy, comes with over 17 years of experience. She is responsible for devising strategies that define the directions for the functioning of Software Academy. Software Academy is a software technology enabler for Continental Automotive that is focused on developing the learning needs of the software engineering community through various formats like E-learning, classroom learning, coding challenges, micro-learning, and webinars, etc. The primary objective of this setup is to provide continuous learning and upskilling opportunities for software engineers. Anupama believes that 'women should be given a fair chance to explore their capabilities, and this will result in new technological benchmarks in the automotive sector'. With more women leaders in decision making roles, the automotive industry is set to a new direction and sustainable growth. 



"I believe in bringing a typical trait that balances mechanics and technology with innovation in the automotive industry."

Sirisha, Head Industrial Engineering & New Product Launch at Continental Automotive India

Ashok Leyland launches modular truck range

Ashok Leyland has launched its range of Modular Trucks, AVTR, with i-Gen6 BS-VI technology. The modular platform is a first of its kind in the Indian CV industry with multiple options of axle configurations, loading spans, cabins, suspensions, and drivetrains on a single platform for the entire range of Rigid trucks, Tippers and Tractors in the 18.5T to 55T category. Dheeraj Hinduja, Chairman, Ashok Leyland, said,

“This unique modular platform puts us on the global map of CV manufacturers and will help us in our journey of realising



launch of AVTR, we have taken the lead in terms of technology and innovation.”

our vision.” Vipin Sondhi, MD & CEO, Ashok Leyland, said, “With the launch of AVTR, we are very proud that we have achieved the dual challenge of meeting the BS-VI norms and development of a whole new platform, in one swift move. This gives us an edge not only in India but globally with its potential to switch between right-hand-drive and left-hand-drive.” Anuj Kathuria, COO, Ashok Leyland, said, “With the

Mercedes-Benz launches two new AMG in India



Mercedes-Benz has added two new models to its high-performance AMG line-up. The AMG C 63 Coupé and AMG GT R Coupé are the latest additions to the Mercedes-AMG portfolio in India. With the introduction of these two new AMGs, Mercedes-Benz India firmly underlines its strong presence in the performance car segment, which grew at a robust 54% in 2019. Martin Schwenk, Managing Director and CEO, Mercedes-Benz India digitally launched the Mercedes-AMG C 63 Coupé and AMG GT R Coupé at the company's Centre of Excellence in Chakan, Pune. Schwenk commented, “With a strong market presence, supported by a wide portfolio of performance cars and a dedicated retail network, our AMG strategy has helped us in cementing our market leadership in the luxury performance car segment. Encouraging customer demand for our top-end AMGs emerging both from metro and non-metro markets validates our efforts to introduce new products in the performance segment. Our decision of introducing these two products is aimed at expanding the top-of the pyramid performance segment, which has witnessed encouraging demand in 2019.”

Alliance partners to leverage leader-follower scheme

Groupe Renault, Nissan Motor Co., Ltd. and Mitsubishi Motors Corporation, the members of one of the world's leading automotive alliances, have announced several initiatives as part of a new cooperation business model to enhance the competitiveness and profitability of the three partner companies. The member companies plan to build on existing Alliance benefits in areas such as joint purchasing by leveraging their respective leadership positions and geographic strengths to support their partners' business development. “The Alliance is a unique strategic and operational partnership in the automotive world and gives us a strong edge in the ever-changing global automotive landscape,” said Jean-Dominique Senard, Chairman of the Alliance Operating Board and Renault. The new business model will enable the Alliance to bring out the most of each company's assets and performing capabilities, while building on their respective cultures and legacies. The three companies of the Alliance will cover all vehicle segments and technologies, across all geographies, for the benefit of every customer, while increasing their respective competitiveness, sustainable profitability and social and environmental responsibility. The leaders of the three companies have endorsed the principles of the leader-follower scheme for vehicles.

Škoda Auto Volkswagen India starts Pune facility

Škoda Auto Volkswagen India Private Limited (ŠAVWIPL) restarted production at its Pune facility in full compliance to applicable government regulations and directions of local authorities. The commencement of operation followed the company issued 60 point ‘Start Safe’ guide prepared in close collaboration with Medical Practitioners.



Continental and Pioneer sign strategic partnership

Continental and the Pioneer Corporation have signed a strategic cooperation agreement. Their integrated infotainment solution means both partners create a holistic user experience that is specially aimed at the Asian market. Continental integrates Pioneer's entire infotainment subdomain into its high-performance computer for vehicle cockpits as part of the agreement. Integration of such extensive software packages into a complex overall solution such as the cockpit high performance computer (HPC) from Continental offers vehicle manufacturers a much greater degree



of flexibility regarding the development of cockpit systems. "The user experience plays an increasingly important role in the perception of vehicles. In particular, operating safety, pleasant design and high functionality are of paramount importance," said Dr. Frank Rabe, head of the Human Machine Interface business unit at Continental. "Continental has great expertise for instrument clusters and vehicle safety systems, which complements our strong car entertainment expertise gained through more than forty years of worldwide marketing experience in both OEM and aftermarket," said Naoto Takashima, head of Mobility Products Company at Pioneer Corporation.

Datsun launches the all-new redi-GO in India



Datsun has announced the launch of the new redi-GO in India. Commenting on the launch, Rakesh Srivastava, Managing Director, Nissan Motor India, said, "With the new Datsun redi-GO, we have introduced a high-quality product with a strong value proposition. Built with Japanese technology, the new redi-GO offers segment-leading technological features that cater to growing ambitions of young India. We aim to enhance the value propositions of Datsun products in line with our mission of enabling progressive mobility." The new redi-GO is available in six variants. These include four 0.8L Manual Transmission variants – D, A, T, and T(O), and two 1.0L variants - Manual Transmission and Smart Drive Auto (AMT) T(O).

Maruti Suzuki sells 18,539 units in May 2020

Maruti Suzuki posted total sales of 18,539 units in May 2020 (including 13,865 units in Domestic market and sales of 23 units to other OEM). The Company resumed its manufacturing operations post lock down strictly in accordance with the Government regulations and guidelines, from May 12th at its Manesar facility and from May 18th at its Gurugram facility. Production also resumed at Suzuki Motor Gujarat Pvt Limited (SMG) from May 25th 2020. SMG manufactures cars on a contract basis for Maruti Suzuki. The Company exported 4,651 units following resumption of port operations at Mundra and Mumbai port, ensuring that all guidelines for safety were followed.

KYB Corporation partners with REE Automotive

REE Automotive (REE) and KYB Corporation (KYB) have announced a strategic partnership to develop suspension capabilities for future electric vehicle (EV) platforms. Automotive Tier 1 supplier KYB's semi-active and active suspension systems will boost REE's next-generation EV platform. The combined expertise of REE, a pioneering technology company and leader in electric vehicle platforms, and KYB, a leading global hydraulics manufacturer, will reshape the movement of goods, people and services by revolutionizing electric vehicle design. REE's partnership with KYB further expands REE's global manufactur-



ing capabilities. It also ignites a new level of suspension technology within the REEcorner architecture solution, which integrates all drivetrain vehicle components into the wheel. The REEcorner combines with the REEboard allowing complete freedom of design, improved performance and safety, and modular applications for any vehicle type – from last mile delivery to heavy duty shipping. The KYB-REE partnership marks the first time KYB has formally collaborated on EV platforms with a technology company. "We are excited to partner with REE Automotive and share its revolutionary EV vision," said Kazunori Masumoto, GM, Engineering Headquarters at KYB Automotive Component Business Division.

By Niranjan Mudholkar

INDUSTRY 4.0 IN THE NEW NORMAL

The COVID-19 pandemic has triggered large scale digital transformation across industries and the globe. This creates new opportunities to implement innovative digital strategies and rapidly embrace Industry 4.0 technologies, says **Saravanan Panneer Selvam**, General Manager – INDO Region, Grundfos

How would you analyse the role of Industry 4.0 in the New Normal with the Covid19 outbreak?

The COVID-19 pandemic has triggered large scale digital transformation across industries and the globe. This creates new opportunities to implement innovative digital strategies and rapidly embrace Industry 4.0 technologies. They are instrumental in augmenting smart factories and mitigating disruptions in the supply chain.

For example, in the 'new normal', sensors integrated with Internet of Things (IoT) can be used to enhance supply chain visibility. They will be able to track parts or products throughout the supply chain to enable remote monitoring and increase accountability. The data from these sensors can be used to create actionable insights that can help businesses make well informed decisions with respect to their processes and customers.

These technologies can also help bolster the overall resilience of businesses and are great tools for speed, reliability and data-driven decision making.

Technology trends like big data, cloud, mobile and Internet of Things (IoT) are propelling the industry towards a paradigm shift in terms of a digital transformation. Adoption of these trends is making factories 'Smart'. So how are these trends influencing the factory environment across different functions like design, development, production, marketing & sales, delivery and services?

Industry 4.0 has an impact across all functions and processes of a factory and its operations. It creates a focus on data-driven innovation across processes and product lifecycle. In the initial stages of product design and development, computer-based designing and 3D printing can be used to create prototypes quickly and eliminate the need for a trial and error method which used to be a long-drawn process in terms of time, energy and resources. The overall production can be streamlined through a smart supply chain that creates leaner



“Manufacturers are working towards continuous improvement and innovation by integrating customer feedback as part of their process. Data analysis is a core element of a smart factory and it can be used to understand customer requirements, optimise processes and improve transparency.”

processes. Companies can also leverage 3D printing to showcase the products to potential customers and in few cases investors. In the future, other technologies such as Augmented Reality (AR) and Virtual Reality (VR) can also play a key role in expanding their capabilities. IoT enabled sensors can also be used to track parts or products during the final delivery stage to ensure that it reaches the right customers and on time.

What role will 'Smart Factories' play in the success of 'Make in India' initiative, which aims to transform India into a global manufacturing power?

The pandemic has created new realities for the manufacturing sector. With the world leaning towards Asian countries to fulfil manufacturing requirements, India currently has a unique opportunity to strengthen its



presence as a manufacturing powerhouse.

In line with this, the Indian government has been strongly driving this vision by promoting 'Make in India' and announcing favourable economic packages and creating an investment friendly environment. The future will be defined by connected smart factories with the agility and capability to handle new customer demands. Besides streamlining the supply chain, Industry 4.0 technologies implemented in these smart factories can also help provide actionable insights and increase overall efficiency and hence energy savings.

The gradual shift to smart factories will poise India to leverage global competencies and transform existing standards of manufacturing.



The pandemic has created new realities for the manufacturing sector. With the world leaning towards Asian countries to fulfil manufacturing requirements, India currently has a unique opportunity to strengthen its presence as a manufacturing powerhouse.

Will 'Smart Factories' mean sustainable and ultra-efficient production lines that require little or no human intervention? Will it mean increasing automation and robotics at the cost of human jobs?

Every industrial revolution has introduced a new set of technologies to the workforce. Technology has also enabled employees to deliver better. As Industry 4.0 technologies such as advanced analytics, IoT, AI, cognitive automation and others grow exponentially, it is expected to reduce redundancies in the supply chain by automating or streamlining specific processes. This also means that there is a need for a highly skilled workforce with the right competencies to handle the technologies and increase the pace of its adoption.

However, the manufacturing industry's biggest

challenge today is the widening skill gap. Future workplaces must be prepared through skilling initiatives to successfully leverage industry 4.0 technologies and transform businesses. Existing workforce can also be upskilled or reskilled to improve their competencies.

Today, consumers can provide feedback directly

to manufacturers through various digital platforms. How can a 'Smart Factory' make the most of this information?

Manufacturers are working towards continuous improvement and innovation by integrating customer feedback as part of their process. Data analysis is a core element of a smart factory and it can be used to understand customer requirements, optimise processes and improve transparency.

Grundfos' SmartServ Service App is one such easy to use application that provides manufactures to help monitoring their products and tracking the same. The SmartServ will provide an option of getting Service Support for Grundfos products, besides the current traditional medium i.e. phone calls & email. We aim to provide prompt and efficient service to resolve any issues with Grundfos pumps, reducing the service processes and minimising the downtime due to any repair works. Through this app, one can contact Grundfos or locate the nearest service provider, fill in the details and raise a service request with the option to attach a picture of the pump/system which is geo tagged. This app also helps the senior management team track and monitor the status of every complaint and step in when needed to ensure customer delight.

How will a 'Smart Factory' adopt to the evolution from simple 'product development' to disruptive innovation?

The fourth revolution has digitized the manufacturing processes and revolutionized product development. It has empowered organizations to create smart products that successfully leverage technologies such as IoT at every stage of development.

For example, 3D printing can be used during initial stages of product development to provide proof of concept or prototypes. At Grundfos, we currently use 3D printing to create prototypes. It helps us work with new materials and make complex components for the actual

products that will help improve its performance.

About 30 years ago, it would have taken 4-5 weeks to make a prototype at the product development stage. Around 20 years ago, we could create prototype in 4-5 days and currently smart factories have helped us create prototypes in 4-5 hours. That explains the transformation that digitalisation has brought about to our industry and across many manufacturing industries.

3D Printing has the potential to further disrupt the manufacturing value chain. How does a 'Smart Factory' view this rapidly growing phenomenon?

Besides optimising product development, 3D printing has a positive impact on all other stages of the manufacturing value chain as well. They can be used to manufacture parts or products cost efficiently with a reduced production time and improved precision.

They are also an effective tool for companies to use prototypes and illustrate product functionality. This helps not only to secure orders before the final product is manufactured but to also attract investors at the initial stage of product / concept development.

Additionally, 3D printing helps optimise the supply chain by reducing the need for a large inventory by introducing on-demand manufacturing and increasing overall flexibility to new changes.



As Industry 4.0 technologies such as advanced analytics, IoT, AI, cognitive automation and others grow exponentially, it is expected to reduce redundancies in the supply chain by automating or streamlining specific processes.

Can the 'Smart Factory' optimise the supply chain for a win-win situation?

The supply chain is a crucial dimension of a smart factory. Digital transformation will help create leaner supply chains with optimised processes. Sensors along with IoT can be used to further improve transparency at each level of the supply chain while predicting potential bottle necks and automating redundant processes.

In the long run, an intelligent supply chain will be able to boost the efficiency of smart factories by embracing new technologies, improving responsiveness, strengthening resilience and delivering better business outcomes.

We have been able to optimise our global supply chain through a partnership with SAP. SAP APO interacts with SAP ERP to create an integrated platform that helps us with our overall sales plan and operational



planning. This is integrated across levels and geographies to ensure immediate intervention in case of any adjustments. We have been able to surpass customer expectations through this transformation by cutting lead time and improving overall delivery time by 10-15 percent.

It will be relatively easier to build Greenfield 'Smart Factories'. But how can Brownfield plants – particularly with bigger scales and complexities – become 'Smart'?

While it is easier to get a Greenfield project to be a Smart Factory from the planning stage, there is no barrier in also making brownfield plants smarter. Key elements here are planning, implementation and monitoring. There will be a requirement to upgrade the infrastructure – but this in the long run will create savings. Companies have to consider the life cycle costs rather than just initial investment costs here.

The first step of this transformation is to identify isolated equipment and improve its overall efficiency and connectivity by integrating IoT or upgrading its existing IoT network. This means that the aging infrastructure and machinery in these plants should also be upgraded to adopt intelligent and sustainable technology. Digitalization of these components will also help in remote diagnostics to understand if there is going to be any critical equipment failure ahead of time and ensure preventive actions in time. 

By Niranjan Mudholkar

USHERING A TECHNOLOGICAL RENAISSANCE

Additive manufacturing has evolved into a viable industrial manufacturing solution, says **Preran Prasad JM** of amace solutions pvt. Ltd.

How would you analyse the evolution of additive manufacturing?

The manufacturing industry is presently found to be in the middle of a technological renaissance, and is expected to embrace technological advancements to enhance productivity and gain competitive advantage. Additive manufacturing technology is evolving rapidly. Additive manufacturing has come a long way in the past couple of decades, especially in the last five years to evolve into a viable industrial manufacturing solution. The technology continues to evolve from the initial days where applications were restricted to simple rapid prototyping are now being used for batch production of parts and even large scale production of end-use parts for various industrial applications. Materials in additive manufacturing are defined by the technology. From polymers to metals and exotic materials such as Kevlar, graphite, diamond and even human tissues, this partnership between the material and technology is only going to get stronger as more material chemistry is being explored. 3D printing is often referred to as “rapid prototyping”; however, it may take several hours to print a part on a single laser machine. However, that day is not far when 3D printer manufacturers come up with multi-laser machines (up to 12 lasers!!) having larger work envelopes that offer higher productivity, where multiple parts can be printed simultaneously. India is yet to see large scale adoption of this technology. The low cost of labour and engineering are an inhibitor to proliferation of this technology in the Indian market. Though the first metal 3D printing machine arrived over 15 years ago, additive manufacturing technology is concentrated in Government research organisations for defence or aerospace applications or Government institutes for specialised applications. It is



A die showcasing conformal cooling channels

only in the past five years, that the industry is preparing to invest in the additive manufacturing technology and identifying applications by leveraging on the advantages of this technology.

Tell us more about the different types of this technology?

In additive manufacturing, one creates a design of an object using software, and the 3D printer forms the object by adding materials layer upon

layer until the final shape of the object is realised. The object can be made using a number of printable materials.

Fused Deposition Modelling (FDM), also referred to as Fused Filament Fabrication (FFF) is a material extrusion process where a spool of solid plastic material is pushed through a heated nozzle. The printer deposits the melted plastic filament on a build platform along a predetermined path. Up on cooling the filament takes the shape of solid object. The most common materials that can be printed are PLA, ABS, PET, PETG and TPU. Stereolithography or SLA, world's first 3D printing technology was invented by Chuck Hull in 1986, who filed a patent on the technology. It works on a 3D printing concept called Vat Polymerization where a vat of photopolymer resin is selectively cured by a solid-state laser, building it up layer by layer.

Selective Laser Sintering (SLS) is creating an object using the concept of Powder Bed Fusion technology and polymer powder. A bin of thermoplastic powder is heated to just below its melting point. Then, a recoater deposits a thin layer of the powder onto the build platform. A laser beam scans the surface where it selectively “sinters” or solidifies the powder. This step is repeated until all objects are manufactured. The powder that is not sintered supports the object that has been sintered, eliminating the need for support structures.

Material Jetting (MJ) as process goes by the same name and works similar to the common ink-jet printer. However, instead of printing a single layer of ink, multiple layers are built upon each other to create a solid object. Ultra violet light cures/solidifies the droplets of photopolymer that is jetted by the print head. The build platform lowers by one layer, once a layer is deposited and cured and the process is repeated until the 3D object is formed.

Binder Jetting (BJ) is a similar to SLS technology, here regions of powder are selectively bind by a liquid bonding agent. However, in binder jetting unlike the SLS, the print head travels over the powder surface depositing binder droplets. This process can be used to make parts from metals as well as sand.

Direct Metal Laser Sintering (DMLS) and Selective Laser Melting (SLM) is based on the concept of powder bed fusion technology and produces parts which from a process perspective is very similar to SLS. This technology is deployed to produce metal parts. While, the metal powder is not melted in DMLS, but instead heats up to a point so that it would be sintered on a molecular level, SLM uses the laser to fully melt of the metal pow-



Conformal cooling is possible using additive manufacturing, where metal powder is melted selectively by laser beam.

der, thereby forming a homogeneous part. The major difference between DMLS and SLM is that the former produces parts from metal alloys, while the latter form parts from single element materials. Both the processes require structural supports to support the printed parts. To relieve the parts from internal stresses, the printed parts are later subjected to heat treatment process.

Which are the ideal applications of additive manufacturing?

From prototyping to tooling to end use part manufacturing for sectors such as medical, dental, aerospace & defence, automotive and jewellery, new and innovative applications of additive manufacturing are currently being explored. The aerospace industry was one of the first adopters of additive manufacturing as this has helped improve the part performance and aided weight reduction. Automotive industry is a high-volume production industry with over 1,00,000 parts per year. Additive



Topology optimised 3D printed rear wheel hub with internal lattice structures.

Manufacturing here has predominantly been used for prototyping rather than manufacturing of end use parts. There are many applications have been happening for some time now with 3D printing of aircraft parts to make lighter and more efficient engines and 3D printed turbine components.

One of the biggest users of 3D printing is the dental industry. Scans are taken from the patient's mouth to 3D print customised dental copings to fix dental problems. With additive manufacturing,

patient specific implants can be printed with minimum lead times. Additive manufacturing also offers the ability to print lattice patterns on the surface of implants. These lattice patterns aid osseointegration. Additive manufacturing seems to be a game changing technology when it comes to complex tooling. Conformal cooling is possible using additive manufacturing, where metal powder is melted selectively by laser beam. This has helped increase the productivity of injection moulding and contributed to better quality of plastic parts.

What are the key advantages of additive manufacturing vis-à-vis traditional manufacturing?

The benefits Additive manufacturing has got to offer over traditional manufacturing are plenty. With additive manufacturing, an organisation can reap the following benefits:

Topology optimisation: It is optimising the object structure through weight reduction and generative design concepts without deteriorating the quality or strength of object. The parts become light weight and stronger and display enhanced mechanical properties.

Freedom to design: Through Additive Manufacturing, intricate and complex geometry parts can be printed without any hindrance. It gives the designer freedom to explore designing bionic structures to bring about weight reduction in parts.

Rapid prototyping: The product development cycles are drastically reduced in additive manufacturing. Through generative designing there is a flexibility of creating, testing & validating multiple product design iterations to suit the end application or customer's preferences.

On-demand manufacturing: There is the flexibility to print parts only when it is needed. This brings down the unnecessary inventory carrying costs. This is extremely useful for spare parts management and organisations can enjoy reduced costs on inventory, supply chains and spares manufacturing.

Tell us about the most interesting project undertaken by your organisation.

It has been an exciting journey so far. There have been some very interesting projects that we have executed. It is a proud moment for us to be associated with ISRO for 3D printing The National Emblem of India for the Chandrayaan II mission. The national emblem was to be fixed to one of the rear wheels of "Pragyaan", the rover. It was proposed that as the rover moved on the surface of the moon, it would leave an impression of the national emblem on the moon. We had also 3D printed rear wheel hubs for an EV racing event. This was an interesting one as we had to redesign the wheel hubs completely. The wheel hubs were topologically optimised and lattice structures were incorporated to make the parts light weight without compromising on the functionality. Very recently, during the initial phases of lockdown when the country was shut, we printed crucial ventilator parts that were utilised by a company which is currently working on developing and manufacturing indigenous ventilators. These ventilators parts were developed, printed and dispatched in less than 24 hours from the enquiry!! Then there is of course the die mould industry, where we have been doing a lot of printing. The Indian tool manufacturers are gradually beginning realise the advantages offered by the concept of conformal cooling.

Aerospace manufacturing uses a variety of materials. How is additive manufacturing addressing this material complexity?

Today, it's additive manufacturing that has opened up new avenues for design and manufacturing in the aerospace manufacturing segment. For the aerospace industry, also known as the largest consumer titanium, weight reduction is a major issue for the aerospace industry. Titanium is an expensive metal and when you produce complex parts by machining away material from a solid block, major chunk of the metal you had paid is going away as scrap. There is a costly imbalance between the metal in the final component and the weight of the metal you had purchased. Additive Manufacturing through design and geometrical freedom facilitates a Buy-to-Fly ratio closer to one. During these challenging times of increasing fuel costs and fragile economic conditions, and with the commercial aviation industry operating on wafer thin profit margins, improving fuel efficiency of engines is key. Materials in additive manufacturing are defined by the technology. This partnership between the material and technolo-



3D printed rear wheel hub after undergoing post-processing

gy is only going to get stronger as more materials are being explored. There is an interesting case of GE aviation where they have 3D printed fuel nozzles that have been tested for airworthiness. Approximately, 50,000 of these are currently inside the jet engines and flying. The Boeing 777x aircraft that had successfully completed the maiden test flight in January 2020 had over 300 additively manufactured parts in the GE powered engine.

How can one be sure of the structural integrity of a metal component made using additive manufacturing?

The printed parts are subjected to a thorough and rigorous testing. The process itself takes care of structural integrity in AM. Additively manufactured parts are better than casting; it is just a process of micro-welding, where the present layer that is being melted layer fuses with the previous layer. Research has shown it to have properties similar to forged parts. Almost all metal parts need to be post processed to finish it to the desired size or surface finish. For parts with open tolerances direct applications is suitable. Otherwise, additive manufacturing replaces raw material sourcing (Casting, forging, extrusion, solid block, etc.), rough machining, and semi-finishing. Only final finishing process may be required for the parts suiting the applications. Considering the time required for all the above processes put together, additive manufacturing is faster. If the material that has to be removed is higher as in the case of aerospace components where input is mostly solid blocks of metal, then additive manufacturing is more suitable. Also, when the complexity of the part is higher requiring multiple machining setups or multi-part assembly additive manufacturing offers a better solution.

How has the corona virus outbreak affected your businesses? In what way and how are you dealing with the same?

The outbreak did not change much for our business. Many of the customers who had an R&D budget to get parts done have decided to postpone investments especially in the automotive sector. Many others affected by supply chain issues are taking the printing route to source parts faster. Many ventilator parts are being printed today. AM will get more prominence considering its speed to produce parts during the development stage. Currently the focus is to bring more awareness in diverse sectors. They say, when one door closes, may others open. It's about finding the right opportunity in the right market with the right customers. 

By Birender Siwach

DEALING WITH UNCERTAINTIES

Automotive SCM is considered to be one of the strongest SCM across the industries. It is a fast-evolving, lean, and efficient model that has seen continuous improvement over decades, covering various stakeholders.

One of the biggest challenges brought by COVID-19 pandemic that we, as an industry, are facing, is ensuring the supply chain remains undisrupted. The supply chain of the automotive industry is unique as compared to the other sectors, because of the given number of stakeholders involved, the new disruptive trends, availability of raw materials that require global coordination and adhere to strict timelines. This has also helped the industry evolve and create one of the best supply chain systems across sectors.

In a joint report by Thomson Reuters and AIAG, the concerns regarding the automotive supply chain are exacerbated by the acceleration towards electrification and automation, as well as the demand for more features in standard vehicles at a lower cost. However, there are always newer systems that can be implemented, which can help optimise processes.

ERP Systems: Enterprise Resource Planning (ERP) in SCM is very critical for manufacturing and distribution business as it helps in gaining greater transparency and managing business information, integrating various systems, working processes, and ensuring optimal operational efficiency.

3PLs: 3PLs/ third party logistics can facilitate day-to-day operations of an automotive supply chain seamlessly by managing customer demands for more



considerable product variation, availability, and quality. It collates data in real-time and helps automotive manufacturers in building relations with the customers.

Automation: The automotive industry is much ahead in automation and has reaped huge benefits due to this. Drawing from this, companies should adopt at least a significant degree of automation to reduce physical labour or even processes. An automated supply chain system helps in attaining a time advantage to a great extent while lowering the operational costs and improve the quality of outcomes.

Local Sourcing: At Continental, we are committed to the philosophy, local-for-local market, ensuring uninterrupted supplies even during uncertain business situations. Localised supply chains can benefit companies in many ways: flexibility, greater control, cost reduction, and can also help in generating more revenue. The automotive industry is quietly leading the way in creating a localised supply chain, by rationalising inventory levels and having supplier parts brought closer to the plants to contain costs and prevent a pricey factory shutdown.

Dual Sourcing: Always being reliant on a single source is a gamble, especially in a situation like COVID-19 pandemic, where there are heavy restrictions on the supply chain in terms of material movement internationally. In that perspective, dual sourcing can ease supply chain operations to a great deal.



"The automotive industry is much ahead in automation and has reaped huge benefits due to this. Drawing from this, companies should adopt at least a significant degree of automation to reduce physical labour or even processes."



Automotive sector can also acquire cross-company collaboration processes- which can provide them with an upper hand on technology utilisation. Collaboration in SCM brings efficiency, effectiveness, and profitability.

Market Analysis: Automotive companies rely on sales and analytics for forecasting long term demands. By evaluating market risks and challenges, the automotive industry can adapt and adjust accordingly.

Pricing and Negotiations: Automotive Supply chain work on a high level of networking, consolidating volumes across locations, and increases buyer's power of negotiations. And gives more leverage to agree on better terms and conditions, and all this can be managed sitting anywhere in the world through ERP systems. Highest level of transparency and compliance with audit requirements on pricing management.

Collaboration: Automotive sector can also acquire cross-company collaboration processes- which can provide them with an upper hand on technology utilisation. Collaboration in SCM brings efficiency, effectiveness, and profitability. It shortens lead-time, reduc-

es inventory and the cost, improves customer service, market share expansion, and higher revenue.

Inventory Management: It is one of the most vital aspects of the automotive supply chain. IoT and Cloud-based technologies can organise the entire inventory seamlessly with each detail, such as purchase and supply of the material, stock available in the warehouse, demand in real-time without disruption in customer production, just in time, and as per the requirement.

Automotive SCM is considered to be one of the strongest SCM across the industries. It is a fast-evolving, lean, and efficient model that has seen continuous improvement over decades, covering various stakeholders. Moreover, IoT devices, 3D printing, and other digital technologies are driving changes in SCM by improving production visibility and refining ongoing processes within the automotive supply chain. With aid from these technologies, companies can easily manage the uncertainties in the supply chains. 

The author is Head Purchasing, Continental Automotive India

APOLLO TYRES COMMISSIONS AP GREENFIELD FACILITY

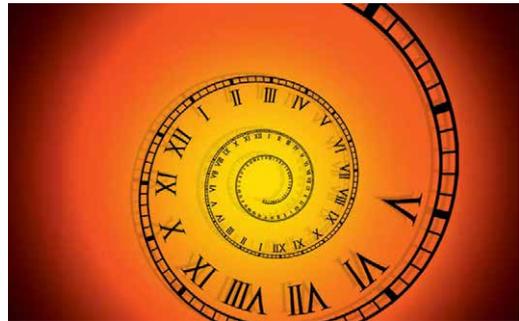
Apollo Tyres has commissioned its seventh manufacturing unit globally, and the fifth one in India, with the first tyre rolling out recently. Located in Chinnapanduru village in Chittoor district of Andhra Pradesh (AP), this facility of Apollo Tyres is spread over 256 acres. The company will invest close to Rs 3800 crore in the Phase I of this Greenfield facility. While the capacity will be ramped up gradually in the next 12 months to 18 months, as the demand improves, by 2022, this plant will have a capacity to produce 15,000 passenger car tyres and 3,000 truck-bus radials per day. With a modular layout, the capacity at this facility can be replicated with minimal engineering efforts and with economies on investments. Commenting on the commissioning of AP facility, Onkar S Kanwar, Chairman, Apollo Tyres Ltd, said, "This ultra-modern facility is a reflection of our growth aspirations and manufacturing capabilities, showcasing some of the best practices available across the globe in tyre manufacturing. This highly automated plant uses IT-driven systems and robotics, and employs young and skilled associates on the shopfloor, mostly hired locally. This plant mirrors the hopes and aspirations of the new

self-reliant India. I would like to take this opportunity to thank the AP Government for all the support that they have extended towards setting up of this facility." The deployment of state-of-the-art manufacturing technologies at this facility will enable the company to target premium OEMs and after-market customers in India. This will further consolidate the company's vision of providing world quality products to global markets. Adhering to its environmental obligation, this facility has been designed to accommodate roof-top solar panels, to be introduced in a phased manner, for optimum usage of natural light for the shop-floor with an eco-friendly power source, and as a zero water discharge facility with an in-built effluent treatment plant. In addition, the company has ensured the usage of energy efficient utility and process equipments, and environment friendly coolants. To improve productivity and reduce human fatigue, ergonomically balanced and weight optimised material handling equipment has been used across the facility. A 'Spine' like central utility corridor services both passenger car and truck radial units in a seamless fashion. Currently, the built-up area of this facility is 216000 square metres, and it employs around 850 people.

CHALLENGES GALORE

The mining and construction equipment (MCE) industry which was already going through a slowdown due to headwinds on several fronts now faces even more tough times, as a result of the pandemic and the subsequent time it will take for matters to return to normalcy.

The Covid-19 outbreak and the subsequent nationwide lockdown have led to a total shutdown of economic activity. This has severely jolted the Construction Equipment (CE) industry. As per ICRA Ratings Bi-annual Research on the industry, a pan India channel check during April'20 has revealed a deep pessimism currently. The mining and construction equipment (MCE) industry which was already going through a slowdown due to headwinds on several fronts now faces even more tough times, as a result of the pandemic and the subsequent time it will take for matters to return to normalcy. As things stand at present, barring mining which has been classified an essential service; construction activity has come to a shuddering stop since late Mar'20. While few states started work on some linear highway stretches from late April'20, movement of material as also labour is proving to be a hindrance. The CE industry contracted sharply in CY2019 (after three strong years of growth), falling by ~16 percent Y-o-Y as the domestic economy and the construction industry thereof witnessed a slowdown coupled with challenges like tight liquidity



In particular, weak road project awards in the past few quarters severely reduced equipment demand prospects, as the single biggest driver for CE demand in the past three years has been the roads sector. Currently, the rate of awards is far slower than the execution leading to moderation in pipeline. In addition, problems like land acquisition delays, costs escalations and weak contractor liquidity affected demand. With a full lockdown in March and April'20, several industries have been crippled. Factors like weakened state government finances, diversion of government support to healthcare at the cost of all other capital spends; new structural changes incorporating social distancing in several industries like construction; movement of labour; and the cost of restarting the economy - all these make CE industry forecast rather uncertain. Moreover, unforeseen headwinds in coming months cannot be ruled out."

Coming to the industry financials, the FY2019 industry-wide revenue growth was strong, confirming to the past four year trend. This was supported by sharp recovery in demand across product categories. Margins which hit an all-time high of 14.1 percent during FY2018 aided by scale benefits and a favourable cost structure corrected to 13.7 percent in FY2019, despite the strong demand owing to sharp increase in raw material prices coupled with unfavourable forex movement (on the sizable imports by the industry).



The CE industry contracted sharply in CY2019 (after three strong years of growth), falling by ~16 percent Y-o-Y as the domestic economy and the construction industry thereof witnessed a slowdown coupled with challenges like tight liquidity conditions, delayed payment to contractors and falling Government spend on infrastructure.

conditions, delayed payment to contractors and falling Government spend on infrastructure. Giving more insights, Pavethra Ponniah, Vice President and Sector Head, ICRA says, "While construction activity on projects under execution was on, new project awarding activity was muted in the 12 months pre-Covid also.

Nevertheless, the industry credit profile continued to be strong in FY2019 with negative net debt and a comfortable capital structure. Over the past few years, most of the sectors' debt has been for working capital needs at competitive interest rates. India is a lucrative growth market for global majors consequently, over the past five years alone; this industry (sample) has witnessed equity infusion of over Rs. 15 billion from overseas promoters.

Going forward and given the current industry scenario and recent development, ICRA estimates 15-20 percent volume and revenue decline during CY2020. Though industry credit profile is likely to moderate, debt metrics will stay adequately comfortable despite decline in revenues. With the strong cash accrual buildup over the past few years, dependence on external debt by the industry has been limited. This trend is expected to continue despite the decline in accruals during FY2020 and FY2021. Ponniah concludes: "ICRA has significantly scaled down its October 20 growth estimate (for CY2020), from a growth of 5-10 percent to a decline of -15-20 percent. Belying hopes of a recovery supported by stepped up infrastructure



Going forward and given the current industry scenario and recent development, ICRA estimates 15-20 percent volume and revenue decline during CY2020. Though industry credit profile is likely to moderate, debt metrics will stay adequately comfortable despite decline in revenues.

spend, the Covid-19 pandemic has led to significant global retrenchment in economic activity. Rebuilding the economy therefore will need sizable support from the Government not only on ensuring livelihood and health but also in kick starting infrastructure activity. Future forecasts are contingent on this spend. Further, the lockdown and disruption in utilisation will affect cash flows of equipment users leading to weakening of borrower profile. ICRA expects around 200 bps increase in delinquencies in the coming quarters. This will curtail lender appetite"

KEY FINDINGS OF SURVEY

This nationwide ICRA survey of CE dealers in April'20 covered 12 states - Andhra Pradesh, Bihar, J&K, Punjab, Haryana, Himachal Pradesh, Uttarakhand, Telangana, Karnataka, Kerala, Madhya Pradesh and Rajasthan:

During FY2020, 43 percent respondents witnessed volume de-growth > 25 percent. Dealers in few states like Karnataka and Bihar reported volume growth between -5 to 5 percent.

Tough financing environment and liquidity strain made it hard for majority of the dealers to secure funding, this to an extent impacted sales during FY2020.

Majorly respondents said funds flow from the government was weak. While central government payment was flowing, payments from state government was stuck which in turn impacted CE demand.

As for rental demand, 50 percent respondents felt it was in line with previous years while ~30 percent felt otherwise which impacted fresh CE buying to a certain extent.

Sales during March 2020 was severely impacted by the Covid-19 outbreak and the ensuing lockdown, ~83 percent respondents witnessed volume de-growth of more than 60 percent (in some cases as much as 80-90 percent).

Typically, March of every fiscal is the best month during which the CE sales witnesses a surge in volumes, but not in FY2020, leading to relatively higher inventory holding.

Currently, 85 percent respondents hold more than one month of inventory which is adding to higher interest costs for Q1FY2021.

Despite tight conditions, dealers received timely funds from financiers for sales during February and March 2020, even while the lockdown impacted sales during March 2020.

71 percent respondents expect demand to revive during Q3 FY2021, after Q2 FY2021 which is typically a lean period for the industry on account of monsoons.

The extent of volume de-growth during FY2021 remains uncertain given current market conditions; 50 percent respondents expect volumes to decline by 15-25 percent while 29 percent expect volumes to remain flattish during FY2021.

Emission norm change (on production of engines >50HP) to TREM IV standards for backhoe loaders and wheeled loaders is scheduled for October 2020. More than 70 percent respondents expect the emission norm changes to be implemented as scheduled.

More than 85 percent respondents expect cost of the equipment to increase by 5-10 percent given the upfront investments incurred by OEMs to implement emission norm changes in wheeled loaders and backhoe loaders. 

Source: ICRA Limited

By Rajiv Bajaj

TRANSFORMING THE AUTOMOTIVE INDUSTRY

Additive manufacturing has already ingrained itself at several steps of the production line, even among Indian automakers. Having started in the design and prototyping lab, 3D printing is now showing its value to automakers in several ways.



Usually, the conversation about 3D printing (Additive Manufacturing) quickly escalates to its massive potential and the amazing things we will be able to completely 3D print in the future. While it is a fascinating thought exercise, additive manufacturing is not the sci-fi technology many believe it to be, but a real application that is already making a difference across several industries.

In the automobile industry, additive manufacturing has already ingrained itself at several steps of the production line, even among Indian automakers. It may have started in the design and prototyping lab but in the past few years, 3D printing has shown its value to automakers in several ways. Although the potential for future uses such as creating a fully 3D printed car is

tempting, the technology has a more immediate value for car manufacturers — the ability to quickly print any component or part on demand.

Traditionally, car parts and spare components require both production and storage costs. Over time, this means cars stop being serviced, inventory costs soar, and production must be diverted to spare parts. With the potential to solve this major pain point, 3D printing is showing how it is already central to the auto industry's future.

Brands such as Stratasys create prototypes, manufacturing tools and production parts for leading automakers including Maruti Suzuki, Ashok Leyland, Honda, Mahindra and auto component maker Uno Minda, which has helped them significantly bring down time and cost involved in day-to-day operations.

THE COST OF BEING PREPARED

Producing car components is time-consuming, resource heavy, and necessary. While new car sales make up a large percentage of auto makers' revenue pool, older cars and replacement parts represent an important source of profits. Indeed, many observers estimate the aftermarket parts sector will show healthy growth over the next few years. Moreover, auto makers must always have components for a wide range of vehicles on hand to be distributed globally.

To fulfil their obligations and provide the necessary parts for repairs, sales, and other aftermarket uses,



Although the potential for future uses such as creating a fully 3D printed car is tempting, the technology has a more immediate value for car manufacturers — the ability to quickly print any component or part on demand.



companies must keep machines occupied that could be used elsewhere. Moreover, because parts are generally produced en masse, older parts for cars that are no longer in wide circulation can be an expensive burden that sits in warehouses.

This is a problem on several levels, starting with the cost of producing and storing parts that do not get sold. Additionally, producing these components creates material waste and takes time away from other functions. On the consumer side, this reality means that older parts or more specialized components may be rare or even non-existent, significantly raising the cost of repairs and maintenance on their vehicles.



Additive manufacturing offers car makers a different path with significant waste and storage need reduction.

The addition to large-scale 3D printing machines, the manufacturing floor changes the dynamics by removing many of the challenges mentioned above. Although they have become vital for rapid prototyping and design work, additive manufacturing technologies are a perfect fit for component manufacturers. Indeed, one of the biggest uses for 3D printers in today's automobile factories is in creating on-demand components that can be printed quickly and without altering production timelines.

JUST-IN-TIME COMPONENTS

Additive manufacturing offers car makers a different path with significant waste and storage need reduction. One of the biggest advantages 3D printers offer is in cutting costs due to a variety of factors. The first and most obvious is the ability to print out smaller batches of components as needed. This capacity means that automakers can cut down on their physical inventory—especially of older, less in-demand parts—and simply offer parts as needed and requested by customers. Additionally, this on-demand print capacity is not tied into

other production steps.

Machines do not have to be diverted but can quickly be repurposed for a small task and then reset. The ability to create rapid prototypes adds a layer of usefulness to on-demand printing. Equipment like that lets companies quickly shift jobs to create prototypes and test new configurations of components that are more efficient. This design capability lets automakers reduce the number of components used in each part produced, lowering the need for materials and providing better results.

Similarly, the 3D process itself is significantly more efficient when it comes to waste management. Whereas traditional manufacturing creates significant waste due to the unused portions of materials simply being discarded, most 3D printing materials can be reused or recycled even in the same cycle. As such, the cost reductions alone make additive manufacturing a worthwhile investment for most companies.

CARS ON DEMAND

Technology and our fast-paced world demand that our manufacturing keep the pace, and traditional production methods are starting to fall behind. 3D printing gives automakers the ability to keep on top of demand while still being able to innovate and provide service for customers well past the expected lifespan of an automobile. Take the case of Maruti Suzuki India. The automotive giant has leveraged 3D printing to enhance the final quality of its products by providing high quality detailing, design personalisation and seamless integration of the workflow.

Adopting additive manufacturing to improve customer service and car maintenance is not just a good idea, it's a necessary one. As 3D printing becomes more common, the auto industry will realise the real value in abandoning outdated production for fast, efficient manufacturing. 

*The author is Managing Director - India and SEA at Stratasys
All images courtesy: Stratasys*

By Nilaya Varma and Kanishk Maheshwari

PLAN FOR A MARATHON, BUT NOT A SPRINT!

While we formulate strategies to engage global companies looking for alternative markets, it is pertinent to remain focussed on the fundamentals of investments – market, regulatory certainty, cost of doing business and world-class infrastructure.

The coronavirus pandemic has hit the global economy at an unprecedented scale and speed. Essential preventive measures led to the shutdown of offices, the stoppage of factory outputs, and the disruption to global industries and their supply networks. Major industries including automotive, plastics and rubber, electronic equipment, pharmaceuticals, and medical equipment have been considerably affected. According to the World Bank, Global Value Chains (GVCs) are responsible for more than two-thirds of the world trade. The unfolding pandemic is deeply impacting the global manufacturing exports, reducing them by about US\$230 billion due to significant supply chain disruptions.

International borders are closed for most countries, and businesses are reeling under the pressure of limited availability of raw material and workforce, in the face of lowering demand. The critical international flow indicators, such as merchandise trade and foreign direct investments, are expected to witness declines in the range of 13 percent to 32 percent and 30 percent to 40 percent in 2020-21 (Source: Harvard Business



er, when China adopted strict measures to contain the spread of the contagion, the slowdown in this global manufacturing hub had a cascading impact on the world trade. UNCTAD estimates that manufacturing slowdown in China can lead to a US\$50 billion decrease in exports across global value chains. The rapid spread of COVID-19 led various supply chains to be significantly disrupted, exposing the dependence of companies on a single country as a focal in their value chain. Therefore, there is a growing sentiment of partially relocating manufacturing operations to other viable destinations. Sovereign Governments have come forward supporting this relocation strategy. Japan, for example, has set aside, ¥243.5 billion of its record economic support package to enable manufacturers in moving their operations and supply chains out of China. China's vast consumer base has driven its success in attracting global players to set up operations in the country. Global investors are looking for the best return on capital, access to skilled labour, robust infrastructure which can support operations at a competitive cost and regulatory certainty. As India fights its own battle with COVID-19, there is an emerging opportunity for the country to position itself as a preferred alternate destination. Many Indian states such as Uttar Pradesh, Haryana, Punjab and others are gearing to woo investors



We also need to moderate our expectation of a Tsunami of investments coming through because fundamentally nothing has still changed and the reasons why companies choose China or Vietnam over India has not changed.

Review). As per a March 2020 survey conducted by the Institute for Supply Chain Management, nearly 75 per cent of companies reported supply chain disruptions due to coronavirus-related transportation restrictions. The pre-COVID era had many global players looking to diversify their supply chains to mitigate the impact of escalating trade wars. The US-China trade took a toll of US\$84 billion in the second half of 2019. Lat-

who are looking to shift their manufacturing facilities. The country's large workforce and consumer base are critical attractions for investors.

We should be enthused by the opportunity, and we will indeed see many good wins, including significant investment decisions in technology space that have always threatened to come to India! Having said that we also need to moderate our expectation of a Tsunami of investments coming through because fundamentally nothing has still changed and the reasons why companies choose China or Vietnam over India has not changed.

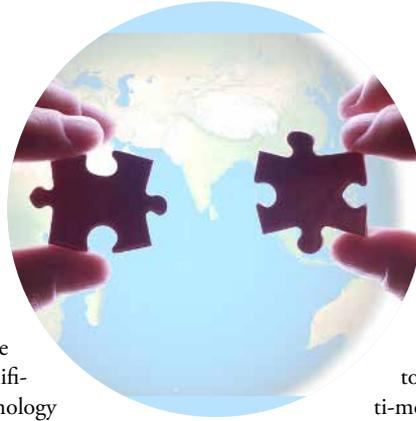
India must address some of the structural challenges in a time-bound manner to ensure, that we don't lose interested investors to competing destinations such as Vietnam, Thailand and Indonesia.

We recall a recent discussion with the CEO of a Fortune 500 company having substantial operations in China, asking if China is concerned about the chorus of relocation discussions. His point to me was very relevant - he essentially made three points:

1. China focuses on what global companies want – infrastructure, speed and cost of doing business. Those have not changed for China;
2. He has not seen any big companies moving out and
3. China always knew with rising incomes, certain industries (mostly environment unfriendly) will move out.

Without getting into whether the opinion is representative or the extent of opportunity, though we believe there is an opportunity for India. It is an interesting point of view, which should at the very least tell us that while we formulate strategies to engage global companies looking for alternative markets, it is pertinent to remain focussed on the fundamentals of investments – market, regulatory certainty, cost of doing business and world-class infrastructure.

Matching China's agility and speed to suit investor requirements is the need of the hour, and that is also possible in the short term. Tesla's Shanghai-based gigafactory was built in the record time of 168 working days. We need multiple such examples for India. India too needs to create deep-rooted supply chain linkages within the local ecosystem and develop a robust com-



India needs to focus on cooperative federalism to drive the next phase of growth

mon infrastructure that global players require. The country's investments in infrastructure will have to be expedited to leverage this opportunity and bring parity with global benchmarks, in terms of cost and access to a seamless power supply and multi-modal logistics. The development of industrial parks that can enable the plug and play model across industries, providing access to low-cost

power and logistics can enhance India's competitiveness.

India has made global headlines of a steady increase in the World Bank's Ease of Doing Business (EoDB) rankings. However, this is also an opportunity for India to create a customised EoDB framework which can create impact at the grass-root level, which is 100 percent focussed on the cost of doing business. Many of our frameworks can be seen as compliance or input-oriented as opposed to reality, and 200 percent focused on outcomes. In line with the Government's focus on easing the challenge for MSMEs, there is a need to create a framework that can provide support at the district level. Such a framework will also call for a renewed evaluation mechanism of the country's administrative arm, linking performance to impact made in the region, than just the number of announcements, media headlines, MoUs or notifications issued and money spent.

The uncertain regulatory framework in India in our view impacts most global companies looking to set up manufacturing operations in the country. We do need laws that protect large investors from localized regulatory changes that fundamentally alter business viability.

When it comes to attracting investments, India needs to focus on cooperative federalism to drive the next phase of growth and position India as a key hub in the global value chains. States should not compete to show how much more they can give, but should proactively engage with potential companies, trade associations, business chambers, and work closely with the Central Government. They should focus on creating an ecosystem that attracts investors that make project viable and leverages states inherent strengths. 

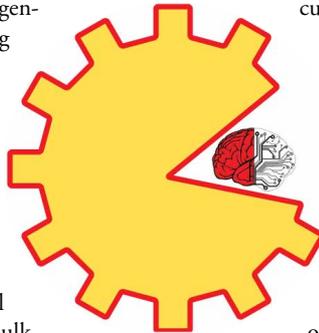
The authors are the Co-founders of Primus Partners

By Prof. Dr. Ganesh M. Kakandikar

MICRO FORMING AND MACHINE TOOLS: CHALLENGES AND OPPORTUNITIES

Micro forming is a well-suited technology to manufacture very small metallic parts, in particular for mass production, as they are required in many industrial as well as domestic products.

The term micro metal forming, generally coined as micro forming refers to the production of parts or structures with at least two dimensions in the sub-millimeter range. Micro forming is a well-suited technology to manufacture very small metallic parts, in particular for mass production, as they are required in many industrial as well as domestic products. Micro-metal forming can be broadly divided into bulk and sheet-metal forming. The trend of miniaturisation is increasingly determining the development of various products ranging from Automotive, Aeronautics, Healthcare to Electronics and Communication Applications. It is facilitating product usage, enabling unique product functions to be implemented in micro-scaled geometries and features, and further reducing product weight and volume. One of the major challenges facing the industry is the dynamic market which requires continuous improvements in design and fabrication techniques. This means providing products with complex features while sustaining high functionality. Cellular phones become smaller with every new generation and with adaptive designs offering enhanced functions to customers. Besides electronic components, these devices also contain mechanical parts such as connector pins, miniature screws, contact springs, micro gears, chip lead frames IC-sockets,



cups for the electron gun in color TV sets or shafts of small motors etc. Miniaturisation has also gained importance in Micro Electro-Mechanical System (MEMS). Miniaturisation has interdisciplinary approach, which brings together the know-how of electronics and mechanics, or in details, of physics, chemistry, material science, manufacturing technology and many others. Due to high demand of these components, forming processes play an important role in this sector, since they are unbeatable when large numbers of parts have to be produced. The processes typically employed are blanking, bending and stamping/forming. Wire bending is applied for production of filaments and springs as used in medical applications and the electronic industry.

CHALLENGES IN MICRO FORMING

The challenges appearing in Microforming which complicate the process are obviously strongly coupled with Miniaturisation itself. Two major issues in micro forming are most important. One is Size effect and other is Grain Size effect. As formability, flow stresses, deformation behaviour, damages, failure limit curve are functions of these. Plastic deformation is carried by the movement of so-called dislocations through the material on the so-called slip planes. Grain size effect on micro scale deformation is major issue that needs to be addressed in greater depth. Ductility in turn formability is greatly influenced by grain size. When the sheet metal thickness is decreased to microscale, the number of grains involved in the deformation zone becomes critical to the quality of the parts. It is revealed that the inhomogeneous deformation occurs with the increase of grain size. This is due to the fact that when there are only a few grains existing in the deformation zone, the deforming material cannot be considered as continuum due to the strong anisotropic properties of grains Basic research is needed to reveal the nature and mechanism of size effects with scaled down experiments according



“Miniaturisation has interdisciplinary approach, which brings together the know-how of electronics and mechanics, or in details, of physics, chemistry, material science, manufacturing technology and many others.”



There is need to design proper process chain for Micro Forming. Although some of the parts are currently being produced by micro forming technology, but still now the major numbers of these parts are produced using conventional manufacturing process.

to similarity theory. Because variation of the mechanical properties is interesting when down sized. Micro forming system can be split into four groups Material, Process, Tools and areas specific effects of Miniaturisation. The process is of course strongly coupled with the material used for manufacturing. However, there are additional challenges concerning the forming forces, tribology and spring back, which has influence on the accuracy of the parts to be produced. Handling small parts is itself challenging.

OPPORTUNITIES IN DEVELOPMENT OF MACHINE TOOLS

The research and realisation of micro forming processes in laboratories is very different when tested in mass production. Quality of product with speed and productivity of the system matters a lot. There is need to design proper process chain for Micro Forming. Although some of the parts are currently being produced by micro forming technology, but still now the major numbers of these parts are produced using conventional manufacturing process. Design of machine tools affect the performance of micro forming system and the quality of the micro formed parts in terms of

deformation load, stability of the forming system (scatter of process variables), defect formation, dimensional accuracy, mechanical properties and surface finish of the formed microparts. Designing and manufacturing of complex inner geometries of the tools like extrusion dies, the alignment of punch, die and knockout pin and the overall precision of the machine is most important. Presently all the machine tools applied in manufacturing are those of macro forming, utilized with customized setups for micro forming. The high capacity machines in terms of tonnage capacity are being utilized unnecessarily, at the cost of loss in productivity due to non-availability of specially designed machines. Light weight machines in the range of 20KN needs to be developed, with high precision and high-speed production. The Actuator can be operated by Linear motor/Piezoelectric/Servo motor. Clearance or backlash between the die and punch become a primary problem when the total stroke to form the micro-part is in the range of several hundred micrometres. The machine automation also needs to be developed to meet the industrial capability requirement. Since the part size is extremely scaled down and part weight is much lighter, handling and holding of micro-parts will be extremely difficult because of adhesive forces. Hence, special handling and part-holding equipment needs to be developed to address these difficulties. There is greater opportunity for machine tool manufacturers to design and develop modular micro forming machines which can be utilized for various micro forming operations enhancing the productivity. 

The author is a Professor at School of Mechanical Engineering, Dr. V. D. Karad MIT World Peace University, Pune.

LEIFELD ACQUIRED BY NIHON SPINDLE MANUFACTURING GROUP

Leifeld Metal Spinning and Nihon Spindle Manufacturing are joining forces. This strategic integration will strengthen the international competitiveness of both companies, which optimally complement each other with their technologies and market coverage. The brands and company locations will remain unaffected. With effect from May 29th, 2020, Nihon Spindle Manufacturing Co., Ltd. has acquired all the shares of Leifeld Metal Spinning AG. The previous owner is the investor Dr. Georg Kofler. He had been in talks about a possible acquisition with Nihon Spindle, a subsidiary of the Japanese conglomerate Sumitomo Heavy Industries Group, since the beginning of last year. The closing has now taken place, after both parties signed the

share purchase agreement in October 2019. Nihon Spindle Manufacturing was founded in 1918 and has its roots in the manufacturing of spindles for the textile industry. Today, the company is known as one of the leading spinning and flow forming machine manufacturers worldwide. The main business areas of the company are industrial machinery, HVAC (Heating, Ventilation and Air Conditioning), as well as environmental technology. "There is no better partner for us than Nihon Spindle Manufacturing," explains Oliver Reimann, CEO of Leifeld Metal Spinning AG. "I am convinced that this is the right way to lead Nihon Spindle and Leifeld to further growth. Our customers and our employees will both benefit from this collaboration.

PATH TO POSITIVE REVIVAL

Industry association CII has outlined a roadmap for building a self-reliant and competitive India that is deeply engaged with the world.

Covid 19 has created an unprecedented scenario across the world. Every segment of the society and economy has been affected adversely due to this pandemic. The economy across the world, which was already reeling under a slowdown for more than one year, has taken a severe hit due to the virus outbreak. Governments and organisations are grappling with the dual battle of saving lives as well as safeguarding livelihoods. Considering this critical predicament, industry association Confederation of Indian Industry (CII) has laid out a 10-point road map to revive growth and navigate the challenges of loss of lives and livelihoods posed by the global pandemic Covid 19 that has forced countries across the world to reset their growth paths. CII's new theme for 2020-21 'Building India for a New World: Lives, Livelihood, Growth' was unveiled by the newly elected president Uday Kotak on a virtual platform recently. Emphasising on the imperative to bring back growth, the CII President said, "Growth is a necessity that should lead to creation of more jobs while CII works as a knowledge partner with the Government for building self-reliant and competitive India that is deeply engaged with the World". COVID-19 has changed the status quo of the World



such challenge," he said.

1. Protecting lives and livelihoods

India, like many countries, is facing the challenge of saving lives and livelihoods. As India restarts, Centre, State and local authorities must work together to ramp up testing infrastructure along with robust identification of containment zones and an agile health and safety response to control the spread.

As 80 percent of the employment is in unorganised sector with no social security, addressing the protection of livelihoods will need measures to increase formalisation of employment through labour and regulatory reforms which would also encourage businesses to move towards formal sector.

The government has announced that labour reforms would be brought in the coming days. Some states have already announced new labour laws in the states. Industry will need to work in partnership to help create more jobs while bringing in more of the workforce under formal sector.

2. Prioritisation of Healthcare and Education:

The pandemic heightened the need for a robust healthcare system on the same strategic priority as defence. India's public health spending at 1.3 percent of GDP calls certainly for higher investment in public health. A long-term strategy of dealing with future pandemics through high quality preventive healthcare,

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Growth is a necessity that should lead to creation of more jobs while CII works as a knowledge partner with the Government for building self-reliant and competitive India that is deeply engaged with the World.

CII President **Uday Kotak**

and we need to focus our energies to manage growth, lives and livelihoods while considering the challenges associated with life after COVID, Kotak said, while presenting the following 10-point roadmap to revive growth in the post Covid world. "We are in uncharted territories and are grappling to find new ways to brave the changes. But we are confident of the resilience of Indian industry and its innovative skills to beat every

focus on nutrition, sanitation and hygiene needs to be established. India has tremendous shortage of health-care professionals at all levels. Education plays a key role in achieving the required levels of standards in delivery of healthcare, nutrition and hygiene.

Given the vast expanse of India and penetration of broadband connectivity, the e-healthcare and e-education interventions alongside the traditional methods of delivery, can play a very vital role.

3. Mother nature

The increase in the incidence and the intensity of natural calamities, locus attacks, and spread of disease calls for maintaining harmony with nature. COVID has shown us that the climate change is for real and that industrial activity is an important contributor to climate change. India has been at the forefront of climate change mitigating measures; however, we would need to deepen our work and accord attention to sustainability in all our economic activities. This is one area



India will have new Governance Standards driven by a Digital world. Industry will have to work with its vendors, especially with MSMEs to ensure that progress is across the value chain. Hence, Industry has a major role to play along with the Government in bringing inclusive and sustainable growth back.

Uday Kotak

that CII has been engaged in deeply in many of our activities as we have helped industry adopt sustainable business operations be it in energy usage and conservation, water use and emissions through our Centres of Excellence.

4. Fiscal deficit and financial stability

Government spending has been supporting the economy over the last few years. For substantive economic recovery, government spending would be crucial. However, this would mean higher fiscal deficit and rising public debt which would run the risk of rating downgrades and flight of capital besides leaving the currency vulnerable. Financial stability should also be an important factor while deciding the fiscal stance. Finding the fine balance will be of utmost importance at this crucial juncture as various stressed sectors of the economy will look for relief and stimulus packages.

5. Distribution of economic pain

The pandemic has caused significant loss to the

economic systems including individual & businesses, Governments and the financial sector. While the first loss is taken by individuals and businesses, the government will need bear the heavy burden of losses by stepping in as a key buffer. A battered industry will need support from government in many forms, including investment friendly policies that will drive demand and measures to help tide over the liquidity crisis.

6. Role of digital and physical

The shift to digital during COVID from physical will have a lasting impact in the post COVID times in terms of consumer behaviour. As industry find new business models, the role of Science and Technology becomes important. This tilt in favour of the digital also has the potential to widen the rural versus urban divide. The rural population is less skilled to participate in an economy with higher digital component and bringing digital skills to rural India is key to enhance rural jobs. The bright side is that connectivity to hinterlands through the telecom and digital services is growing significantly and this can be built upon to work on a more inclusive agenda.

7. Future of jobs and social security

The post COVID world is likely to see some transformational changes in the context of jobs in the typical sense. CII will work closely with Government to provide incentives and facilitation to companies wanting to shift their manufacturing operations out of China as part of their de-risking strategy. This will help India develop as manufacturing hub for the world. In addition, front loading of the National Infrastructure pipeline will not only create demand for industries like steel and cement but will also provide jobs. Government's focus on enhancing agriculture infrastructure, linking farm produce to markets by APMC reforms will also help increase farm incomes and livelihoods.

8. Rural-urban re-balance

For the first time in India, reverse migration was experienced with migrant workers going back. Industry should be encouraged to set up operations in the rural hinterland. The reforms announced in the minerals and mining sector should be expedited as most mining projects are in rural areas. Similarly, development of agro based clusters could be expedited in rural areas. A vibrant rural industrial sector will also de-risk the impact of COVID on economic activities as spread of COVID is far less in rural areas.

Further, industry and government should make available amenities in terms of housing, education and healthcare for workers who chose to come to the cities to work.



Out of the four engines of growth – consumption, investment, net exports and government spending, the economy has been primarily growing on government expenditure. This is not sustainable as the fiscal situation is under pressure. Hence, it is essential to re-start the other engines of the economy.

9. Four levers for growth

Out of the four engines of growth – consumption, investment, net exports and government spending, the economy has been primarily growing on government expenditure. This is not sustainable as the fiscal situation is under pressure. Hence, it is essential to re-start the other engines of the economy. Given demand uncertainties, private investment remains a challenge. Exports need a quantum jump and to achieve this integration with global and regional value chains is important besides being competitive.

In this scenario, CII will continuously deliberate on how the private sector can play a role in igniting the growth engines of private investments, exports and the forces of entrepreneurship.

10. Getting growth back is non-negotiable

Getting growth back is essential to protect as well

as generate jobs and livelihoods. CII will work intensely and closely with all stakeholders to bring back investments. Government spending in public infrastructure and direct benefits cash transfers may help boost demand initially but we need to find ways to sustain demand particularly in such uncertain times when consumers tend to save and get risk averse. The need of the hour is for government and industry to work together to return to a sustainable growth path.

In addition to these challenges, Kotak said that India will have new Governance Standards driven by a Digital world. Industry will have to work with its vendors, especially with MSMEs to ensure that progress is across the value chain. Hence, Industry has a major role to play along with the Government in bringing inclusive and sustainable growth back.

As referred by Prime Minister Narendra Modi at the CII Annual Session, CII would work as a knowledge partner for the Government to build India for a new world after COVID, Kotak said. Referring to Prime Minister Modi's clarion call at the CII AGM to accord importance to five "I"s namely intent, inclusion, investment, infrastructure and innovation, the new CII president said, CII's work through the course of the year, and beyond, will be guided by 10 lenses enumerated above and will be focused towards finding optimum solutions to the challenges that lie ahead. 

ANOTHER FUNDING SCHEME TO HELP THE MSME SECTOR

Minister of MSME Nitin Gadkari has launched the Credit Guarantee Scheme for Sub-ordinate Debt (CGSSD) which is also called "Distressed Assets Fund-Sub-ordinate Debt for MSMEs". As per the Scheme, the guarantee cover worth Rs. 20,000 crore will be provided to the promoters who can take debt from the banks to further invest in their stressed MSMEs as equity. It was being felt that the biggest challenge for stressed MSMEs was in getting capital either in the form of debt or equity. Therefore, as part of Atmanirbhar Bharat package, Finance Minister had announced this scheme of sub-ordinate Debt to the promoters of operational but stressed MSMEs. After completion of necessary formalities including approval of CCEA and consultation with Finance Ministry, SIDBI and RBI among others, the scheme was formally launched recently by Gadkari.

The highlights of the scheme are:

- This Scheme seeks to extend support to the promoter(s) of the operational MSMEs which are stressed and have become NPA as on 30th April, 2020;
- Promoter(s) of the MSMEs will be given credit equal to 15 percent of their stake (equity plus debt) or Rs. 75 lakh whichever is lower;
- Promoter(s) in turn will infuse this amount in the MSME unit as equity and thereby enhance the liquidity and maintain debt-equity ratio;
- 90% guarantee coverage for this sub-debt will be given under the Scheme and 10% would come from the concerned promoters;
- There will be a moratorium of seven years on payment of principal whereas maximum tenor for repayment will be 10 years.

It is expected that this scheme would provide much required support to around two lakh MSMEs.

GKN Aerospace flight tests thermoplastic components

GKN Aerospace has delivered a pair of thermoplastic composite, induction-welded Ruddervators and two compression-moulded Access Panels manufactured from reused thermoplastic waste material to Bell in June 2019. The newly installed components have now flown more than 12 hours on V-280 test flights, including during the recently completed autonomous flight testing. Ruddervators are the control surfaces for an aircraft with a V-tail configuration. As a partner in Bell's Team Valor, GKN Aerospace has designed and manufactured the complete thermoset composite V-Tail for the aircraft. The Bell V-280 Valor is competing for selection as the U.S. Army's Future Long Range Assault Aircraft (FLRAA). The advanced thermoplastic Ruddervators significantly reduce weight, cost and parts count. "We are always looking across Team Valor for new opportunities to incorporate advanced technology to add value for our customer. GKN Aerospace's thermoplastic ruddervators are a great example where we were able to add value and reduce risk for future programs," said Ryan Ehinger, Vice President and Program Director for FLRAA at Bell.



In parallel to the demonstrator program, the GKN Aerospace global design team continues to work with Bell to optimize the V-Tail design to meet customer requirements for the FLRAA program. The two compression-moulded Access Panels have been manufactured from recycled thermoplastic waste material from the two Ruddervators.

Tejas FOC aircraft handed over to the IAF

The Indian Air Force (IAF) has recently inducted Tejas Mk-1 FOC aircraft into the recently resurrected No 18 Sqn, the "Flying Bullets" at Air Force Station Sullur, marking yet another important step



towards enhancing the operational capability of the Air Force. The Squadron is the first in the IAF to induct this platform. This is also an important milestone in the country's indigenous fighter aircraft program and a significant boost to the 'Make in India' initiative. Tejas Mk-1 FOC is a single engine, light weight, highly agile, all weather multi role fighter aircraft capable of air-to-air refueling thus making it a truly versatile platform.

The Squadron was operationalised by Chief of the Air Staff (CAS) Air Chief Marshal RKS Bhadauria. Air Officer Commanding in Chief of the Southern Air Command, Air Marshal Amit Tiwari, and the Commodore Commandant of 18 Sqn, Air Marshal TD Joseph, Mr R Madhavan CMD HAL, Dr Girish S Deodhare, PGD (CA) and Director, Aeronautical Development Agency were also present during the ceremony. While addressing the personnel at AF Station Sullur, the CAS congratulated them and lauded the efforts put in by Southern Air Command and AF Station Sullur towards the induction of the new airborne platform. He complimented Chairman HAL, ADA, DRDO labs, DPSUs, MSMEs and all agencies involved in the production of LCA for achievement of this historic milestone.

Indian Air Force inducts indigenous ARPIT

The Indian Air Force has designed, developed and inducted an Airborne Rescue Pod for Isolated Transportation (ARPIT). This pod will be utilised for evacuation of critical patients with infectious diseases including COVID-19 from high altitude area, isolated and remote places. Requirement of an air evacuation system with facility to prevent spread of infectious aerosol from a COVID-19 patient during air travel was felt by IAF when COVID-19 was declared as a pandemic. The first prototype was developed at 3 BRD AF and has undergone various modifications. Supporting the "Atmanirbhar Bharat" call by Hon'ble Prime Minister, only indigenous materials have been used to fabricate



this pod. This indigenously designed system has been developed at a cost of Rs Sixty Thousand only, which is very less as compared to the imported systems costing up to Rs Sixty Lakh.

The system has been developed as a lightweight isolation system made from aviation certified material. It has a transparent and durable cast Perspex for enhanced patient visibility which is larger, higher and wider than the existing models. The isolation system caters for suitable number of air exchanges, integration of medical monitoring instruments, and ventilation to an intubated patient. In addition, it generates high constant negative pressure in the isolation chamber for prevention of infection risk to aircrew, ground crew and health care workers involved in air transportation. The ARPIT utilises High Efficiency Particulate Air (HEPA) H-13 class filters and supports invasive ventilation using Transport Ventilator.

3D PRINTED SUMP COVER FOR F110 ENGINE

US Air Force and GE's collaboration on metal additive reaches first technology milestone as the Air Force's Rapid Sustainment Office aims to accelerate adoption of metal additive technologies to improve readiness, sustainment and de-risk spare parts supply chain

In mid-2019, GE Additive and GE Aviation approached the US Air Force to propose a metal additive collaboration program to address its specific sustainment, readiness and affordability needs.

The US Air Force's Rapid Sustainment Office (RSO) is charged with increasing mission readiness by rapidly identifying, applying and scaling technology essential to the operation and sustainment of its fleet. And, with a significant number of aircraft soon entering their sixth decade of service, difficulties in sourcing and producing spare parts potentially represents significant risk.

GE's experience qualifying and certifying additively manufactured metal components that meet the commercial aviation sector's rigorous regulatory requirements were of interest to the RSO as the Air Force continues to shape its own metal additive airworthiness and certification path.

"The RSO is excited to partner with GE Additive and its efforts to deliver additively manufactured parts for the Air Force," said Nathan Parker, deputy program executive officer for the RSO who oversees and provides funding for the project with GE. "Their successes will help ensure our systems rapidly obtain the high-quality parts they need to stay flying and at the ready."

"The collaborative effort between the US Air Force and GE shows great promise toward the adoption of metal 3D printed parts as an option to solve the US Air Force's current and future sustainment challenges. This capability provides an alternate method to source



Additively manufactured, cobalt-chrome sump cover for F110 engine. Produced on a GE Additive Concept Laser M2 machine at the GE Additive Technology Center in Cincinnati, as part of collaboration with the US Air Force's Rapid Sustainment Office (RSO). (Photo: GE Additive)

parts for legacy propulsion systems throughout their life cycle, especially when faced with a diminishing supplier base or when infrequent demands or low volume orders are not attractive to traditional manufacturers," said Colonel Benjamin Boehm, director, AFLCMC/LP Propulsion Directorate.

SPEED IS ADDITIVE'S CURRENCY

GE's collaboration with the RSO has been the first time that teams from GE Additive and GE Aviation's engineering and supply chain teams have partnered for the benefit of an external customer.

"The Air Force wanted to go fast from day one and gain the capability and capacity for metal additive manufacturing, as rapidly as possible, to improve readiness and sustainability," explains Lisa Coroa-Bockley, general manager for advanced materials solutions at GE Aviation.

"Speed is additive's currency, and by applying our additive experiences with the LEAP fuel nozzle and



Re-engineering legacy parts and additively manufacturing low quantities of traditionally cast parts has incredible potential to improve USAF supportability. It's worth our focus to develop a fast, highly repeatable process.

Melanie Jonason, Chief Engineer for the propulsion sustainment division at Tinker Air Force Base (AFB) in Oklahoma

other parts additively printed for the GE9X, being able to offer an end-to-end solution and also applying lessons learned of a robust certification processes, we've been able to accelerate the pace for the USAF," added Coroa-Bockley.

Melanie Jonason, chief engineer for the propulsion sustainment division at Tinker Air Force Base (AFB) in Oklahoma was keen for her division to be a part of the program from the outset.

"Re-engineering legacy parts and additively manufacturing low quantities of traditionally cast parts has incredible potential to improve USAF supportability. It's worth our focus to develop a fast, highly repeatable process," said Melanie Jonason.

Jonason and her team already enjoyed a close working relationship with GE Aviation's large military engines team and its chief engineer Dr. Matt Szolwinski. The addition of James Bonar and a multi-disciplinary team of engineers from GE Additive rounded out the team.



As we build our metal additive airworthiness plan for the Air Force, the completion of each phase represents a significant milestone as we take a step closer to getting an additive part qualified to fly in one of our aircraft.

Beth Dittmer, Division Chief, propulsion integration at Tinker AFB

"Tinker AFB is a promoter of additive manufacturing for the Air Force, and Melanie has been a true champion in advocating for additive manufacturing, so it has been energizing to partner and problem solve with her team to deliver a component and a process," added Szolwinski.

The US Air Force and GE settled on a program based on a "spiral development" model (based on a concept often used to enhance software development) that increases in complexity and scale with each phase. In this program, complexity involves moving from simpler part identification, progressing to part and family of parts consolidation and eventually tackling complex components and systems, such as common core heat exchangers.

TECHNOLOGY MILESTONE REACHED

The team recently initiated Phase 1 of the program, which involved the identification of GE Aviation spare parts for the F110 and TF34 engines and demonstrating their airworthiness capability.

Having already experienced first-hand how stretched the casting industry has become, and with "cold start" lead times between two to three years for certain parts not uncommon, Szolwinski and his team had already

started exploring how and where metal additive processes might be integrated. Preliminary work had been completed on the sump cover for the General Electric F110 engine used on both F-15 and F-16 aircraft, and that part became the focus part for this first phase.

"Compared to other parts on the F110 engine, the sump cover might have lower functionality, but is incredibly important. It needs to be durable, form a seal and it needs to work for the entire engine to function – which is of course critical on a single engine aircraft like the F-16," said James Bonar, engineering manager at GE Additive.

The GE Additive team partnered closely with the GE Aviation team to build on the exploratory work on the sump cover, which was conventionally cast in aluminium. Bonar's team ensured the robust design practices were met during the fine tuning of parameters and the dial-in process at the GE Aviation's Additive Technology Center (ATC) in Cincinnati. GE Additive Concept Laser M2 machines running cobalt-chrome at the ATC were used for the first builds of additively manufactured sump covers.

"Part of that process involved exploring how to quickly eliminate the associated risks with castings, and how metal additive might replace it for those parts that are either no longer in production, or where we need smaller production runs to keep our platforms flying," added Melanie Jonason.

"The program with GE is ahead of schedule and the preliminary work already done on the sump cover has allowed us to move forward quickly. As we build our metal additive airworthiness plan for the Air Force, the completion of each phase represents a significant milestone as we take a step closer to getting an additive part qualified to fly in one of our aircraft," said Beth Dittmer, division chief, propulsion integration at Tinker AFB.

READINESS TODAY, ADVANCES TOMORROW

Phase 1b is already being planned, adding complexity, in line with the spiral development model, to focus on a sump cover housing, a family of parts on the TF34 engine - which has been in service more than 40 years.

As the program enters this next phase, the combined US Air Force and GE team finds itself at an exciting intersection: rapidly problem-solving today for the US Air Force's immediate readiness and sustainment needs, while turning its attention to tomorrow, and how additive will advance and inform design, manufacturing and certification for things we've never seen before in the commercial and military aerospace sectors. 

Source: GE Additive

By Nirranjan Mudholkar

LEARNING FROM THE PANDEMIC

The Covid19 outbreak has disrupted life and business in a way never known before. It is also teaching us invaluable lessons. Industry leaders speak with The Machinist to tell about the most important lesson they have learnt from this outbreak.



"We have to re-invent ourselves, find innovative solutions to the challenges in the changed circumstances and look for new business opportunities in the post COVID world."

Dr. Deepak Kumar Hota, CMD, BEML



"Life can never always be systematic and one should be prepared with eventualities in life and business."

Amit Gossain, MD, Kone Elevator India



"Stay calm, stay firm, and get fitter for running faster in future!!!"

Suresh KV, President, ZF India



"We are all a part of one ecosystem and unless we all support it with our wisdom, it will not function properly."

Hemant Watve, MD, WILO Mather and Platt Pumps Pvt. Ltd



"Normal life, as we know it, can change very rapidly."

Frans Van Niekerk, MD, Atlas Copco India



"Do not take anything for granted and, instead rediscover your new idea with a purpose, by challenging the status quo

since many changes and disruptions come about without prior notice."

Kamal Bali, President & MD, Volvo Group India



"Reality is an ever changing concept & we should be changing our perception continuously."

TK Ramesh, MD & CEO, Micromatic Machine Tools Pvt. Ltd.



"India manufacturing industry should rise to the challenge and try to grab all the opportunities we can get."

Dr. Sujatha Narayan, Regional GM, Wabtec Corporation in India & MD, Faiveley Transport Rail Technologies India Limited, a Wabtec company.



"Now is the time to focus more on the available resources in order to be self-reliant and help the government to accelerate the 'Make in India' mission."

Nagesh A. Basavanhalli, MD & CEO, Greaves Cotton Limited



"An agile and lean organization will succeed. Every risk gives us more opportunities to correct our past mistakes."

Sandeep Waykole, Country General Manager, Faurecia Automotive Seatings India



"Life is not easy and we should always learn from others mistakes, as our one life will not be sufficient to get our own experience."

Yatendra Kumar, Business Head, MotulTech India



"Respect nature and all its beings more than one would

worship god. The universe and its world are certainly not for our plunder and raids."

Rohit Warriar, Founder & CEO, Warriar Electronics



"Respect nature. Don't challenge the supreme."

Niraj Seth, President, Amada (India) Pvt Ltd



"This is a great opportunity to rediscover and reinvent the business. As Sun Tzu in his Art of War says, prepare for war at peacetime and prepare for peace during the war."

Ananthaseshan N, MD, CUMI



"Indian manufacturing industries must look for the opportunity called China alternatives."

Anil Kumar, MD, Ceratizit India



"You can never prepare enough and therefore resilience is the key!"

Deepak Paul, MD, Igus India Pvt Ltd



"Let's use this time to bring about a change and spread human values!"

Santosh Ullal, CEO, Emuge-Franken India Pvt. Ltd.



"What goes around comes around. Stop the carnage with nature or else..."

Umesh Pai, MD, EPLAN Software & Services Pvt Ltd



"Nature has given a lesson to mankind. We are just a COG in the delicate ecosystem."

R. Ramesh & G.C. Venkatesan, Executive Directors, Janatics India Pvt. Ltd.



"We can challenge ourselves to have a new way of working."

Gautam K. Ahuja, MD, Dormer Pramet



"I would like to put it simple under the 5Cs: Calmness, Collaboration, Cooperation, Communication and Compassionate. Resilience and patience will see us through."

Wu Song, MD, LiuGong India Pvt. Ltd.



"Harness the power of automation & reduce human intervention in your manufacturing to achieve world class standards."

Gururaj Patil, MD, EMAG India Private Limited



"This is an excellent opportunity to gear up for manufacturing in the future."

Pradeep David, General Manager, South Asia, Universal Robots



"We need to reboot and start afresh with new business strategies."

Rajesh T. Ghashi, MD, Chiron India Machine Tools Pvt. Ltd.



"This an important time to reflect, reboot and re-strategize the way we work and live and think how can we leave this Earth a better place for the next generation."

Udit Seth, Vice Chairman, Setco Automotive Limited



"It is of paramount importance for the global community to come together to collaborate, share knowledge, and put their concerted efforts to counter an epidemic like this."

Raju B Ketkale, Deputy MD, Manufacturing, Toyota Kirloskar Motor



"We are only as good as our team, and this is the time we all need to come together and put in our efforts to tackle the situation."

Arjun Ranga, MD, Cycle Pure Agarbathies



"Possibility exists for any unforeseen or unimaginable situation. Business Continuity Plan should be in place."

Prashant Sardeshmukh, MD, MMC Hardmetal India Pvt Ltd.



"Reset & remodel your business and product strategy. Innovate present skill sets and expand your playing field."

RK Sharma, Co-founder & CEO, Daejung India



"Concentrate on the present and essential, the ones who you love and love you, pray for more solidarity between human beings in such crisis."

Marc Jarrault, MD, Lapp India Pvt. Ltd.



"You need very few things to live healthy life, but your wants/greed makes your life miserable."

Vivek Nanivadekar, Executive Director, FIBRO India



"Crisis or difficult situation never comes with prior notice. So, one must be prepared to face the challenge and deal with it to the best of their abilities."

Farrokh Cooper, CMD, Cooper Corporation Pvt. Ltd.



"We thought we had conquered the world, but ALAS!"

Li Jian, MD, Shangdong Heavy Industry India Pvt. Ltd



"It's time to Upskill, Upgrade and tap the next wave of economic revolution."

Chandan Mundhra, Chairman & MD, Savē Electric Vehicle



"Our need to stay connected with fellow human beings is so innate. During this COVID 19 outbreak – we are LOCKED but not DOWN!"

Kamal Nandi – Business Head & EVP – Godrej Appliances



"One should be self-sufficient in all respects. . . personal as well as at professional level...Same gets extended to your company & country."

Mohini Kelkar, MD, Grind Master India



"Smart and efficient manufacturing is going to be the key going forward."

Saravanan Panneer Selvam, General

Manager India, Grundfos



"This is a good time to re-evaluate what you should consider essentials."

Sudhir Agarwal, General Manager, Montronix Inc



"Striking right balance between Nature & Technology is Must. Don't take things for granted due to supremacy on one area!"

Vikas Kadlag, MD - Morgan Advanced Materials (Molten Metal Systems) Morganite Crucible India Ltd.



"In the coming months, liquidity management will be the key to corporate survival."

Georg Graf, Regional Representative India - Freudenberg Group & President - Indo-German Chamber of Commerce



"The manufacturing industry should look at this crisis as an opportunity to reset business."

Sharad Malhotra, President – Automotive Refinishes and Wood Coatings, Nippon Paint India



"The biggest lessons learned are that discipline, resilience, self-reliance and common sense are the best tools to survive."

Hitendra Bhargava, CEO, Klüber Lubrication India.



"God chose to give us a place to stay, a job that pays, and a meal on the table. This indicates that He expects us to share what we have with many others who are not so privileged."

Bing-Lin Wu, Marketing Head, Maxxis India



"Put all energy to recover the business volumes. We would need to SPRINT during the first three to four months."

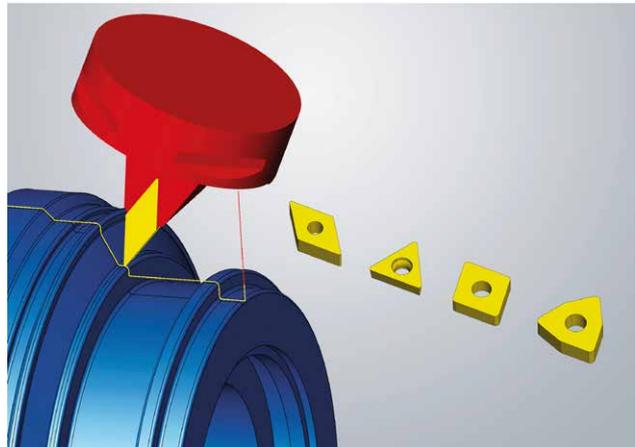
Nitin Lall, GM - Industrial Technique, Atlas Copco (India) Ltd.

GROUNDBREAKING AND FIELD-TESTED

A software company has driving forward automation and the integration of additive manufacturing with the latest release of its CAD/CAM suite. The developers have also implemented numerous functions to further simplify everyday machining tasks.

Open Mind Technologies AG drives forward automation and the integration of additive manufacturing with the latest 2020.2 release of its hyperMILL® CAD/CAM suite. The developers at Open Mind have also implemented numerous functions to further simplify everyday machining tasks. hyperMILL® 2020.2 highlights include new strategies for the machining of cutting edges, upgrades for mill/turning, parametric design in hyperCAD®-S and the 'hyperMILL® AUTOMATION Center Advanced'.

Plunge-milling cycles have been added to the 3D and 5-axis strategies for the machining of cutting edges. The material can be removed by plunging with 3-axis or 5-axis movements. The plunge-milling process reduces vibration for surface edges with steep walls, thus improving the surface finish. Any rest material machining using a smaller tool is easily calculated automatically from the previous job. With 5-axis ma-



New insert types are available for 3-axis simultaneous turning jobs

where the toolpaths for symmetrical components are recalculated on the basis of mirrored geometry data. Now with version hyperMILL® 2020.2 Open Mind has enhanced the functionality. The 'Mirror Path' function enables simple mirroring of the previously calculated toolpaths. Here, the machining direction is also mirrored and climb milling therefore becomes conventional milling. Users benefit now from shorter calculation time and improved process reliability. Both methods are available to provide the ideal solution for all situations.

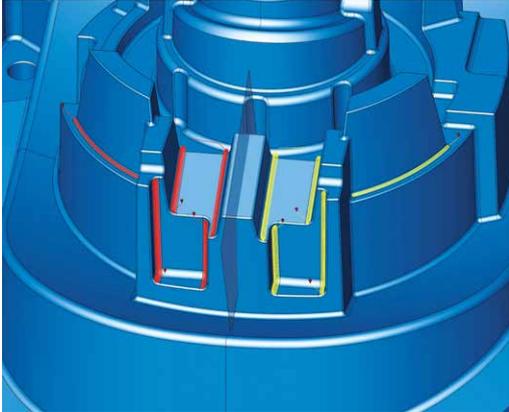
The user-friendliness of hyperMILL® has been improved even further. For a faster search in the tool database, the filter properties are now integrated into the top level of the user interface, meaning they are always visible. The filter properties are pre-loaded with the material from the job list and the spindle holder from the machine properties. Other tool parameters and custom fields can also be used with the tool database filter. Feature management has also been improved to save time during programming. Now you can quickly locate



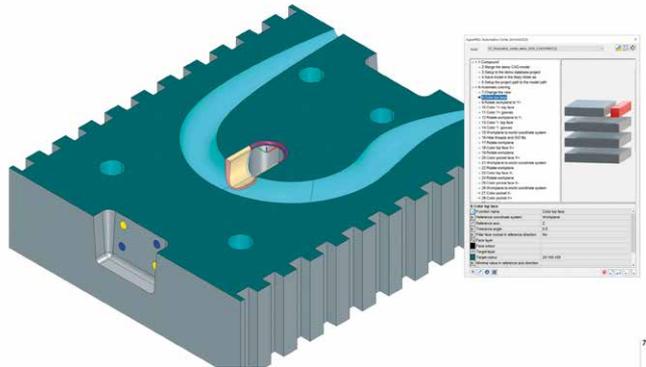
The plunge-milling process reduces vibration for surface edges with steep walls, thus improving the surface finish. Any rest material machining using a smaller tool is easily calculated automatically from the previous job.

chining, you can also reach undercut areas, such as for cutting edges. The tilted tool is specified by the lateral inclination and in order to optimally adapt the retract movement from the component, you can specify both a distance, circular or linear movement profile.

THE PROVEN – MADE EVEN EASIER
hyperMILL® already offers strong mirror functions



Shorter calculation time thanks to mirroring on the basis of previously calculated toolpaths



The 'hyperMILL® AUTOMATION Center Advanced' offers comprehensive template functions

special feature types such as holes or pockets even faster due to a new text search. These filter functions allow nimble access through a large customized tool database.

MILL/TURNING

Round inserts, as well as rhombic, T, and W inserts can now be used with 3-axis simultaneous mill/turning. There is now a function to control the approach and retract movements by applying user-defined curves for all



Round inserts, as well as rhombic, T, and W inserts can now be used with 3-axis simultaneous mill/turning. There is now a function to control the approach and retract movements by applying user-defined curves for all turning strategies.

turning strategies. This option unlocks the potential for productivity and programming optimization on workpieces with areas that are particularly difficult to reach – all movements are still collision checked, despite the manual operations.

HYPERMILL® AUTOMATION CENTER

The 'hyperMILL® AUTOMATION Center' has been upgraded in hyperMILL® 2020.2 and OPEN MIND now offers an optional advanced version that boasts numerous additional functions and extensive templates. These templates allow the user to define and standardize complex processes independent of the specific ge-

ometry from any one CAD model.

All the individual steps for data preparation and programming, right up to simulation and NC program generation are defined. Once you have defined a manufacturing process, you can apply it to a new model and have it automatically executed. If there are any decisions that cannot be made with confidence within the automated process, the user can be prompted to make the relevant choices during the automation sequence. The user is interactively guided through the individual process steps, making it possible to program the component in a fraction of the time it would normally take.

PARAMETRIC DESIGNING WITH HYPERCAD®-S

Components can now also be modeled directly in hyperCAD®-S parametrically. This function is of particular interest for fast, production-related designs. For example, you can design a fixture plate parametrically and change dimensions to define different variants to the base model very quickly. It can be simultaneously used in parametric mode in hyperCAD®-S, while static models can also be placed inside the same dataset. Similarly, you can use a static solid model in parametric mode and add parametric features to it for a hybrid approach. Parametric geometry data used in hyperMILL® is associatively linked, and when there are any changes, it is updated automatically.

hyperCAD®-S also brings new interfaces in release 2020.2 for CATIA V6 3DXML and Rhino 3dm. PMI data is also available now for CATIA, Creo, JT, NX, SOLIDWORKS, and STEP files. 

Source: Open Mind

SAFETY AT HIGH SPEED

Side-mounted energy chain from igus, ensures reliable energy supply in high-speed lightweight linear robots

Twice as fast and half as heavy: this is what makes the linear motor robot from FIBRO LÄPPLÉ TECHNOLOGY (FLT) different from other solutions. For the linear robot to be able to get production up and running quickly and reliably, a compact, durable and quiet energy supply was required. A side-mounted igus energy chain system with pre-harnessed chainflex cables proved to be the optimal solution.

“INSTEAD OF A RACK AND PINION DRIVE, THE DESIGNERS CHOSE A LINEAR MOTOR BECAUSE IT ALLOWS VERY HIGH DYNAMICS.”

Linear robots are the automation tool of choice for machine or press loading, order picking and high-bay warehouse loading or even for transport and handling tasks. Due to the demands of production for faster, more intelligent and economically profitable solutions, Fibro Lapple Technology has developed a linear robot which fulfils the desire to maximise production performance. In a new carbon design, the linear motor robot saves up to 50 per cent in weight compared to conventional solutions. The weight reduction enables twice the speed, accelerations of up to 26m/s² and twice the positioning accuracy. Instead of a rack and pinion drive, the designers chose a linear motor because it allows very high dynamics. An unsupported energy chain of the E4.1 se-

ries from igus ensures a secure energy supply for the z-axis. The integration of a suitable energy chain solution in the compact installation space of the x-axis was a challenge, because a classic gliding or unsupported solution was out of the question due to the high forces. “Together with igus, we therefore decided on a side-mounted energy chain,” explains Boris Bind, Head of Mechanical Design and Development at Fibro Lapple Technology.

Complete energy supply system directly from a single source

An E4.1 series energy chain is used with additional sliding elements that further reduce wear. The designers also used the igus range for the cables. They chose pre-harnessed chainflex cables - so-called readycables - that are



A side-mounted igus energy chain system, ensures safe cable guiding of the x-axis of the linear motor robot from Fibro Lapple Technology.

specifically designed for use in the energy chain and, thanks to many tests in the company's own 3,800 square metre test laboratory, are given a guarantee for 36 months. The complete system is housed in a special guide trough, which further minimises noise and increases the reliability of the system.

For more info, contact Kaushik Ramanujachar; Product Manager, E-ChainSystems*, igus (India) Private Limited, Email: kramanujachar@igus.net; or visit: www.igus.in

3D PRINTING 120,000 PARTS FOR VENTILATORS

HP has partnered with Redington 3D in India, to successfully produce 120,000 ventilator parts for AgVa Healthcare. As part of this initiative, 12 categories of parts have been 3D printed, to manufacture 10,000 ventilators. These ventilators are being deployed across India for the treatment of COVID-19 patients. The parts include inhale and exhale connectors, valve holders, oxygen nozzles and solenoid mounts among others. Since these components have complex designs and fine tolerances,



it would have taken 4-5 months to manufacture these quantities using the conventional process. With HP 3D printing technology, these parts were printed in just 24 days. AgVa Healthcare's ventilator is an ICU ventilator with Volume, Pressure & Flow Control. The entire system can be controlled by a capacitive multi-touch interface without the need of compressed medical air. It is extremely portable and can be used in ICU transport or homecare.

“In these unprecedented and difficult times, HP remains committed to serve the community and those impacted by the ongoing health emergency,” said Rajat Mehta, Country Manager, 3D Printing and Digital Manufacturing, HP India Market. To date, HP and partners have produced more than 2.3 million 3D printed parts. As part of this initiative, HP has ramped up its 3D printing team and global Digital Manufacturing Partner Network to design, validate and produce essential parts for medical responders and hospitals.

NEXT GENERATION FIRE SEAL FOR HIGH TEMPERATURE AIRCRAFT ENGINE DESIGNS

The hotter an engine runs, the more thrust is obtained from the same amount of fuel, making the engine more efficient with lower fuel consumption. At these extreme temperatures, specialized fire seals help ensure the safety of passengers onboard.

Aircraft designers aim to run engines at continuously higher temperatures with the latest options operating at +600 °F and beyond, significantly higher than their predecessors. The hotter an engine runs, the more thrust is obtained from the same amount of fuel, making the engine more efficient with lower fuel consumption.

At these extreme temperatures, specialized fire seals help ensure the safety of passengers onboard. Used in the fuselage, pylons, thrust reversers and engine applications, they act as a barrier to prevent airflow from one area of a plane to another during normal operating conditions. This is an important function. However, even more crucially, they serve as a precaution in incidents that lead to fire. Then they act to contain the fire to one section of an aircraft and enable the airplane to land safely within a 15-minute period.

Up until now, no high temperature fire seals existed that could operate up to +600 °F and also meet all fire seal requirements of customers. The Ultra High Temp Seal, developed by Trelleborg Sealing Solutions, is completely unique. Its patent-pending design overcomes the inherent silicone characteristic of relaxation and compression set at elevated temperatures; a major cause of failure in a fire seal's ability to perform against all requirements. This means that the Ultra High Temp Seal can successfully operate in high temperature aircraft engine applications.

To manufacture the product, Trelleborg Sealing Solutions developed a proprietary methodology to integrate all components and make complex geometries. As the Ultra High Temp Seal eliminates the need for thermal protection of sealing elements, this provides a further weight saving and part count reduction, making assembly easier.

The Ultra-High Temp Seal is proven to operate at a temperature range from -40 °C/ -40°F to up +315 °C/ +600 °F while meeting all customers' fire seal requirements. It is engineered to have a lifetime of 60,000 flight



“TO MANUFACTURE THE PRODUCT, TRELLEBORG SEALING SOLUTIONS DEVELOPED A PROPRIETARY METHODOLOGY TO INTEGRATE ALL COMPONENTS AND MAKE COMPLEX GEOMETRIES. AS THE ULTRA HIGH TEMP SEAL ELIMINATES THE NEED FOR THERMAL PROTECTION OF SEALING ELEMENTS, THIS PROVIDES A FURTHER WEIGHT SAVING AND PART COUNT REDUCTION, MAKING ASSEMBLY EASIER.”

cycles (take off, flight and landing), dependent on application. The Ultra High Temp seal can also be a drop-in replacement for seals that do not currently meet all fire seal requirements, such as high temperature operation, or for customers seeking extended life than that provided by their existing seals.

The seal meets the requirements of US Federal Aviation standard AC20-135 Powerplant

Installation and Propulsion System Component Fire Protection Test Methods and Standards and Criteria, as well as ISO 2685:1998 Aircraft – Environmental Test Procedure for Airborne Equipment – Resistance to Fire in Designated Fire Zones.

For more details contact, Trelleborg Sealing Solutions India, Email: tss.salesindia@trelleborg.com, or visit www.tss.trelleborg.com/in

GAGANYAAN WILL NOT BE AFFECTED BY COVID-19: MINISTER

Union Minister of State (Independent Charge) Development of North Eastern Region (DoNER), MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh said that the launch of India's first human space mission 'Gaganyaan' will not be affected by Covid-19 pandemic and preparation are heading in the right direction. The training of Indian astronauts in Russia has now been resumed and the launch

is scheduled to take place as planned, before the 75th anniversary of India's independence in 2022. Elaborating on the cabinet decision to encourage private participation in ISRO activities, Singh said, a regulatory body called 'Indian National Space Promotion & Authorization Centre' is to be established. This will help provide a level playing field to private players and encourage their participation, he said.

By Dipl.-Ing. Jakob Dück

MODULARITY IN PRODUCTION TECHNOLOGY: JUST HOW GRANULAR DO YOU WANT TO GO?

Find out how engineering customers can make the modularization of their products as efficient as possible.



Machine and plant manufacturers adopting consistent modular approaches are often particularly successful. This article draws conclusions from the experiences of mechanical engineering customers of the HARTING Technology Group and illustrates how they can make the modularization of their products as efficient as possible. Interfaces play a central role in these concepts.

The principle of modularity is best explained by the Lego building blocks. Innumerable objects can be created from a few basic bricks and defined connecting elements. This approach has also become established in industry for products featuring a far greater degree of complexity and variability: The platform strategy of the automotive industry is a typical example, according to which not only engines, transmissions and driving axles, but entire chassis are used as scalable modules for cars of different models, types and even brands. Also in the industrial control and drive technology area, systems such as PLC, IPC, HMI and drive components can be customized from individual 'slices' or several remote I/O blocks and customized to suit the machine or plant to be automated. They can be expanded or modified in their further use without entailing any major input.

It can be argued that modularization of complex, industrially manufactured products can often only

prove successful, both in technical and economic terms, given the fact that they are produced by the thousands (industrial controls), or even millions (automotive) of times over. But can a modularization approach also prove successful if at best only a few hundred machines of one type are turned out per year?

The answer must be yes. There is currently no alternative to modularization in mechanical

engineering: "Standardization and modularization are aimed at a portfolio with less variance and complexity and an overall lower cost level, without reducing the breadth and individuality of the product range," as the VDMA states ((1) Future prospects for German mechanical engineering. VDMA, McKinsey 2014 / p. 59).

In order to better understand the meaning of this statement, a number of typical market demands and requirements in the manufacturing systems market will be presented here:

1. A high degree of variability in production systems is called for, enabling the manufacture of a wider range of products even in small to medium unit volumes (keywords 'industrial production of individual products', 'Industry 4.0'). In order to achieve this, the systems must be scalable and offer options for subsequent expansion in terms of capacity and output. While the main focus used to be on net productivity, mechanical engineering customers are now paying more attention to variability and expandability. In other words, it is not 'highly sophisticated' systems for the production of components in high volumes that are in demand, but rather systems with which different products can be flexibly manufactured in small to medium volumes. ((2) Production Systems 2020. Roland Berger / 2011)

2. The competition in mechanical engineering is forcing the OEMs of production systems to expand their business models. In today's B2B market it no longer suffices to merely develop good products, sell them to operators and then wait for service and maintenance orders! TCO models for the profitability of investments, which were often used in the past, are more and more frequently extended by LCC models (LCC = Life Cycle Costs). This allows new business concepts, including maintenance, service, retrofit services (e.g. 'predictive maintenance') to be offered very transparently. It is easier for machine builders to convince users that the extended offering in connection with the life cycle of a plant are more advantageous. ((3) M. Bode, F. Bünting, K. Geißdörfer "Rechenbuch der Lebenszykluskosten") The rising demand for subscription models on the customer side ('Pay per Use', 'Pay per Month', 'Pay per Unit' etc.) confirms this general, overarching trend. In terms of OEMs, it also makes economic sense to turn to benefit- and



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service-oriented models. While the average margin in the new machine business stood at 5.4 percent in 2018, this margin was many times higher in the service business at over 40 percent. ((4) Sector report 'Mechanical engineering in Germany', Commerzbank). What is more, demand for service is far less cycle-dependent than demand for machines!

3. Especially in the case of expensive capital goods, it is often much more cost efficient for users to expand existing machines or to renew individual units or subsystems than to invest in an entirely new acquisition.
4. In some customer sectors of the mechanical engineering industry there is a widespread expectation that machine modules and subsystems from different suppliers can be combined into a coherent production line without any additional effort - without any incurring, any technical or economic disadvantages.

All these demands and requirements can only be reconciled very efficiently, both technically and economically, if the production systems are consistently

modularised and networked and offered as 'smart' systems in various expansion stages. Citing specific figures, ID-Consulting, Munich, recently proved in its study ((5) 'Modularization Study 2018/2019') that modularization in mechanical engineering is an above-average successful strategy: Modularization of products drives corporate success.

Based on experience with HARTING customers, OEMs should first answer the following general questions positively when deciding on the pros and cons of modular approaches:

- The total estimated input and expenditure for a new, consistently modular product group or family will at a maximum be so high that it can be plausibly introduced within the time frame usual for the industry and assuming worst-case market development;
- The technical challenges of the planned division of the machine or plant into individual modules with transitions and interfaces should be assessed as generally feasible by all the protagonists involved (mechanical, electrical, safety engineering);
- All operational functions involved in the future service delivery process - development & design, project planning & sales, production & assembly, documentation, service & after-sales services, supply chain & marketing communication - should be prepared to attune and align their working methods with the modular concept of the machines and to 'live' these methods both in-house and at the customer's premises.

To what extent should a machine or plant be divided into modules and what is the general procedure to be followed? The real genius of LEGO bricks does not reside in the bricks themselves, but in their interconnections. These determine the possible granularity of the division, but also represent the limiting factor for the connection of building blocks. The situation is similar when regarding the interfaces of individual modules of a machine or system: The interfaces ensure the coherent and expedient 'joining together'. At the same time, they guarantee the flawless and proper functioning of a production system, a single compact machine as well as of an entire production line. Consequently, the core question of modularization is: How do you delineate the components of a 'complete system'?

In defining the boundaries between the electrical and electromechanical power, signal, data and communication interfaces, HARTING recommends the following procedure:

To begin with, the basic, initial system should be considered in terms of its functions: Key functions, which reflect the core competence of the OEM; basic functions (e.g. carrier or transport systems), which

extend across the entire system, and add-on or auxiliary functions, which are more in line with the general state of the art and are of secondary importance for the OEM. A certain amount of over-engineering in the machine modules, in which the proprietary core competencies are bundled, is always an advantage and therefore also recommended;

Subsequently, the functions should be summarized in modules - but only as granularly as necessary; in this context, all aspects of the possible optimization effects and the necessary equipment variance - both on the manufacturer and on the user side - should be factored in. It is also important to include as many stages of service provision along the machine life cycle and/or country-specific features of customer requirements as possible.

In the following, for all elements of the machine that cannot be further 'separated' - sensors, actuators, HMI, drives etc. - that require electrical / electronic power, signal or data connections, a) the functional relevance for the respective newly defined machine module is assessed and best displayed graphically; b) assigned to a corresponding layer in the sense of the 'typical' automation pyramid; and c) all necessary interfaces for the connection of individual elements are assigned to the respective machine modules and listed.

The result is a matrix view with all modules of the future system. The hierarchical arrangement of the elements with associated interfaces including relevance for one or more machine modules is also visible.

The advantage of such an approach is the fact that it provides a basis for the evaluation of feasibility, technical risks and the required design of interfaces. Furthermore, transparency is gained by weighting the importance of the modules for the future system. Based on the list all fractions involved as well as further specifications and steps for module and process development can be derived.

The matrix view also helps in deciding to what extent the control of a modular machine or plant should be designed centrally or decentrally. Our observations demonstrate that: 1. Systems with a high degree of equipment variability in their key functions and a large spatial extension tend to be consistently equipped with decentralized I/O systems; 2. Combined structures are chosen for smaller, highly variable systems: in these systems, the control of key and basic functions is centralised; additional functions are controlled either centrally (simple functions) or decentrally (via complex interfaces), depending on their complexity; 3. In the case of smaller systems and/or simple systems with low variability, a purely central control solution is technically simpler and more cost efficient.

When deciding on a structure, it should be noted that central systems generally entail lower costs for com-

ponents or materials. By contrast, however, this increases the costs and resources required for both production and installation at the end customer. Enhancements and retrofits can also be more time-consuming and cost-intensive, while the same applies to service and maintenance.

A positive aspect from the OEM and end-user perspective is the fact that all modern control, drive and HMI systems enable the complete separation of the physical level from the logical levels. This applies both to particularly fast and precise sequences as well as to highly sensitive safety-relevant or interlinked systems. The (virtually) absolute freedom afforded by the modularization of production systems is decisively characterized and influenced by the interfaces. The HARTING Technology Group provides solutions and products for all types of power, signal or data interfaces that:

- a. Can always be designed to meet the necessary requirements (electrical, EMC properties) of the transmission path in a cost-optimized manner;
- b. Can be scaled incrementally both in the technical parameters and in terms of size and number on each machine module;
- c. Are able to meet different requirements with regard to contacting, assembly and protection type as well as the respective materials and can integrate alternative transmission media such as fiber optics and compressed air.

CONCLUSION

Consistent modularization based on the targeted optimization of all costs and service provision processes throughout the entire life cycle (LCC model) enable OEMs to manufacture machines according to a modular design principle - entailing significantly lower costs and time expenditure. At the same time, this strategy increases the scope for customized configurations. Users also stand to benefit from modularization, as they receive a cost and demand optimized machine that is designed transparently at the same time. HARTING provides solutions for all interfaces required in modern control, drive, HMI and communication technologies for production systems in order to implement modularization without functional restrictions. The Group has been demonstrating this impressively and in actual practice for years, both in the plants of its HARTING Applied Technologies machine building subsidiary, and in its Smart Factory 'HAI4YOU' pilot and demonstration plant, which covers such innovative application fields as digital twin and AI intelligence by way of basic parameterizable analysis functions, the visualization of selected machine parameters and safe access to the machine from outside. 

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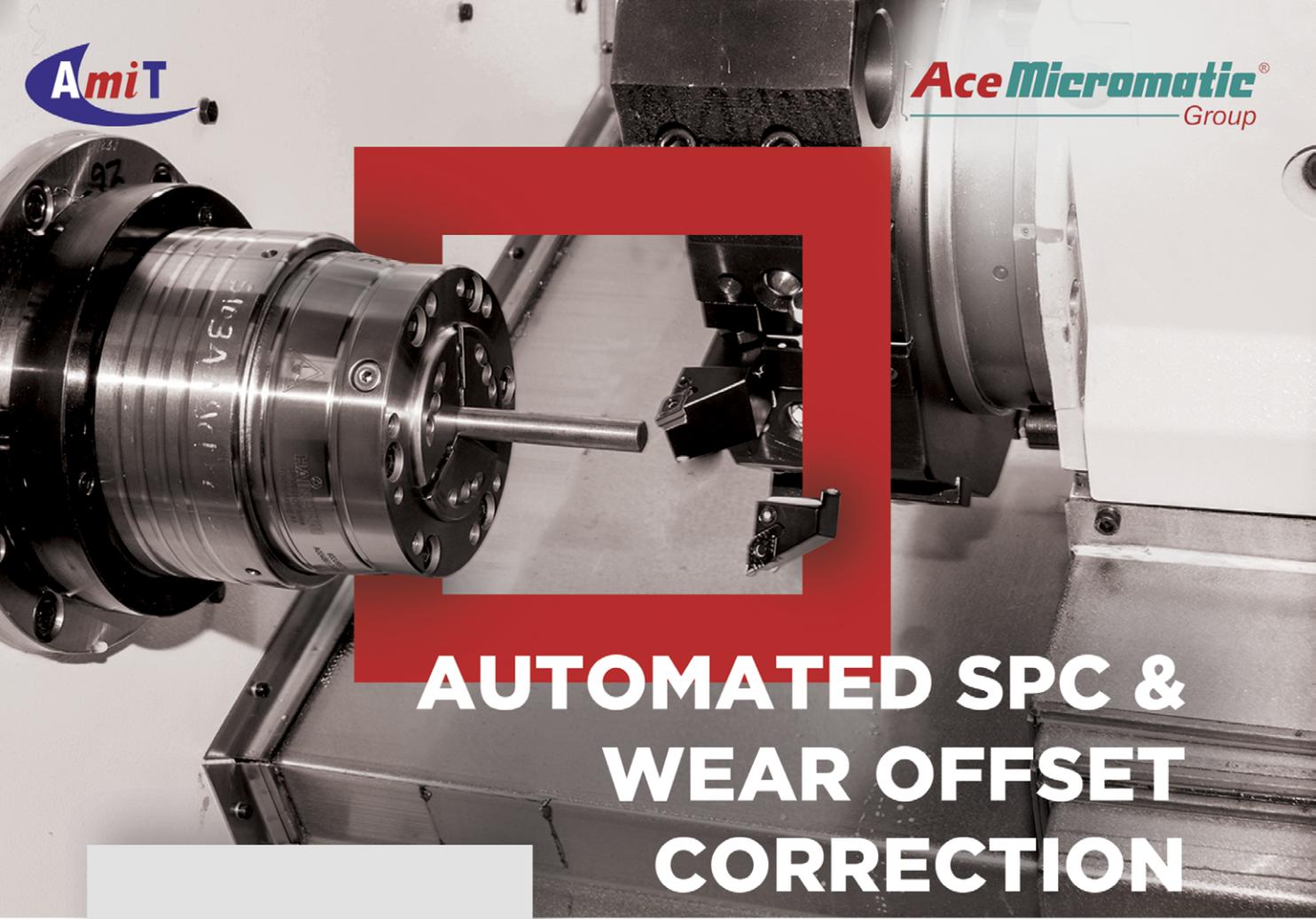


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