

# TAGMA TIMES

NEWSLETTER

(Technical Info. on Die, Moulds & Toolroom)

Volume: XXVI / No. 08

(Private Circulation for Members Only)

April 2020

## COVID-19: What it Means for Tooling Industry?



### **TAGMA Digital Initiative**

TAGMA Partners with various companies to help industry in skill development

### **Machining Mantra**

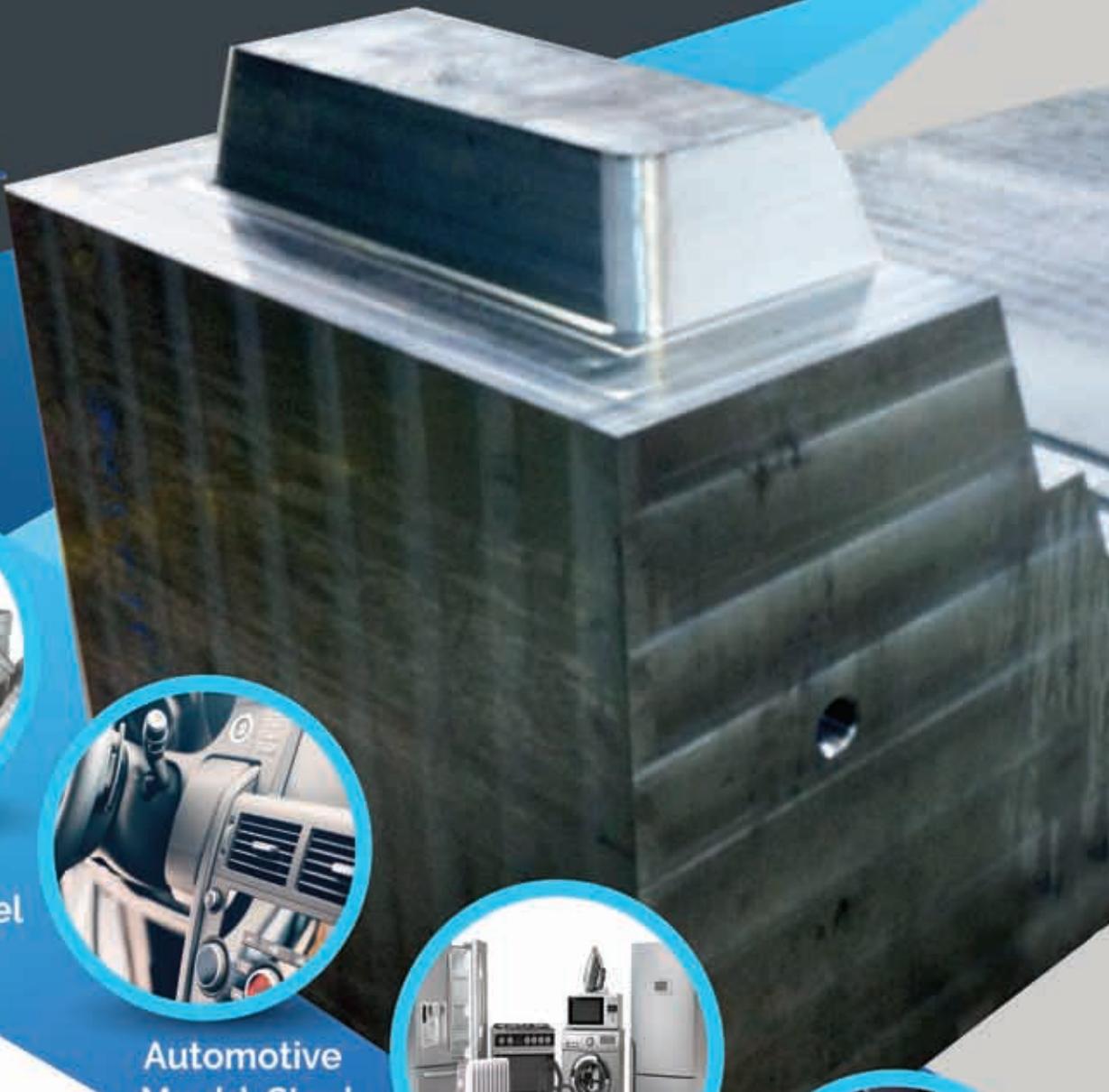
Six Ways to Make 5-Axis Machining More Productive

### **Tech Focus**

What Mold Do You Fit Into?



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EDITED & PUBLISHED BY : D. K. SHARMA FOR TAGMA INDIA at A/33, Nand Jyot Indl. Estate, Safed Pool, Mumbai - 400 072.  
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## Time to Think!

**T**oday, I will start with the story. A story of a vegetable vendor who I have been getting my weekly supplies from. But how did this change happen, what worked for the team? The answer is innovation leading to the creation of a unique attacking style of soccer. It required building a cohesive team and leadership, both in management and on the field. Brazil came back stronger by reimagining everything.

Amidst the pandemic, we have all been maintaining social distancing and trying to avoid going out as much as possible. We are trying to restrict ourselves at home, managing to get our daily essentials delivered at our doorstep as much as possible. This is where the vegetable vendor comes in. This hardworking and smart person is making profits more than ever.

How, during this lockdown?

He sends a list of vegetables and fruits available with him every morning along with the price via WhatsApp. All I have to do is reply with the items I want. Those items are then delivered to my doorstep and I pay him using an online payment mode. It not only makes my life easy, but I also don't have to compromise on my safety.

Recently, when I spoke to him, my curiosity got the better of me. I asked him, "Have you always been doing business like this?" To which he replied, "No Sir, I did not even know how to operate a smartphone but with help from my wife I installed WhatsApp and some online payment applications. I started handing out my contact to everyone who came out for vegetables because I know how risky it is during this situation. Now, my business is doing great and profit is soaring."

This is not all, he also puts a leaflet with the 'Dos & Don'ts' related to COVID-19. Now, learning from him, there are dozens of vegetable vendors in our area who have started taking orders through WhatsApp, but this guy stands out. What's so different about his approach? He understood the consumer behavior and acted accordingly, changed his business model keeping in mind the current situation, and opted for digital modes. He found opportunities in this challenging time.

What I want to highlight is that our Indian toolmakers should also come forward and take a new approach to do business. The current scenario demands a change in the way they have been doing business be it manufacturing, selling, marketing, or sourcing. They have to walk through uncharted territory and adopt the new normal of the business. It can be anything – Adopting digital technologies, diversifying to other sectors, and new business models, among others.

The April edition of TAGMA Times talks about 'The implications of COVID-19 in Tooling Business'. Check the section 'In Focus'.

I hope you like the April edition and do not forget to share your feedback with us.

Happy Reading!

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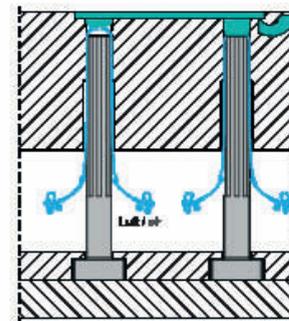
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## COVID-19 UPDATE

### Ashok Leyland Engineers shift gears to make Covid-19 Ventilators

**ASHOK** Leyland, flagship Company of the Hinduja Group and India's leading commercial vehicle manufacturer, today announced a slew of initiatives in the Ventilator Making and Distribution efforts. The Company, through its strong country-wide network and its digital tools, has been at the forefront, fighting against Covid-19 over the last few weeks in terms of providing GenSets, operating free Community kitchens, providing Personal Protective Equipment (PPEs), masks and vehicles for sanitation of streets and campuses. The Company has also been assisting numerous people caught in the implications of the Lock Down, including Truck Drivers, Migrant Workers, Underprivileged and Daily Wage earners.

Ashok Leyland was approached by the Government of India and the Government of Tamil Nadu to work with and support Ventilator Makers and help them improve supply chain and output capacity. In response, the Company took a holistic approach to address the entire gamut of requirements in Covid-19 Patient Breathing Assistance,



rather than working with just one party and one product. This included first mile, mid-range and high end ICU ventilators required for patients at different stages of disease progression. This approach ensures maximum availability of ventilation at optimum costs.

After discussing with various clinical experts and intensivists, the company identified the gap that there was no ready solution available for relevant and robust first mile ventilation. Working to fill this gap, a team of 50 Ashok Leyland Engineers have been working since end-March and have now readied a simple yet intelligent ventilator, at low

cost but with all the essential features to aid First Mile ventilation including the necessary sensors and controllers for volume and pressure monitoring, and safeguards. The ventilator development is now complete. Testing, certification and clinical trials will conclude in the next few weeks, with mass manufacture of this system, starting in May, 2020.

In the mid-range and high-end ICU ventilator segments, Ashok Leyland is working with two Chennai based Ventilator manufacturers viz. Kriti Kare India Pvt Ltd, a manufacturer of the ACUvent ventilators since 2014 and Phoenix Medical Systems Pvt Ltd, a 30-year-old firm who are market leaders in infant, maternal care products, assistive devices, and have developed an adult ventilator to support the nation in this moment of crisis. Under this arrangement, Ashok Leyland is offering help with component sourcing, supply chain, logistics, man power for production planning and in line-quality which will help both the ventilator manufacturers to overcome the challenge of large-scale production in a short duration of time.

### ANCA joins the fight against COVID-19 – manufacturing components for life-saving ventilators

Coming to the aid of a medical system crushed world-wide by the COVID-19 pandemic, ANCA has joined an important consortium to rapidly manufacture invasive ventilators within Australia. This initiative directly addresses the critical supply of mechanical ventilation equipment to support COVID-19 patients requiring ventilation to survive. Banding together with other Australian manufacturing businesses, the consortium can harness various industry capabilities to make more ventilators sooner.

Building on over 45 years of innovation, ANCA has taken its industry know-how to pivot to COVID-19 related

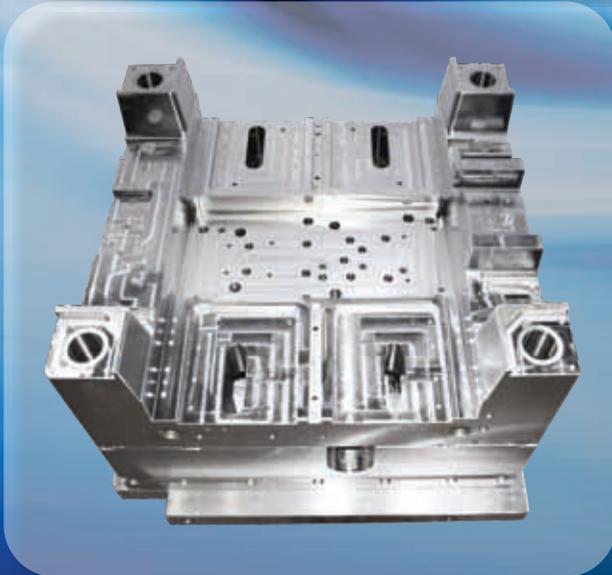
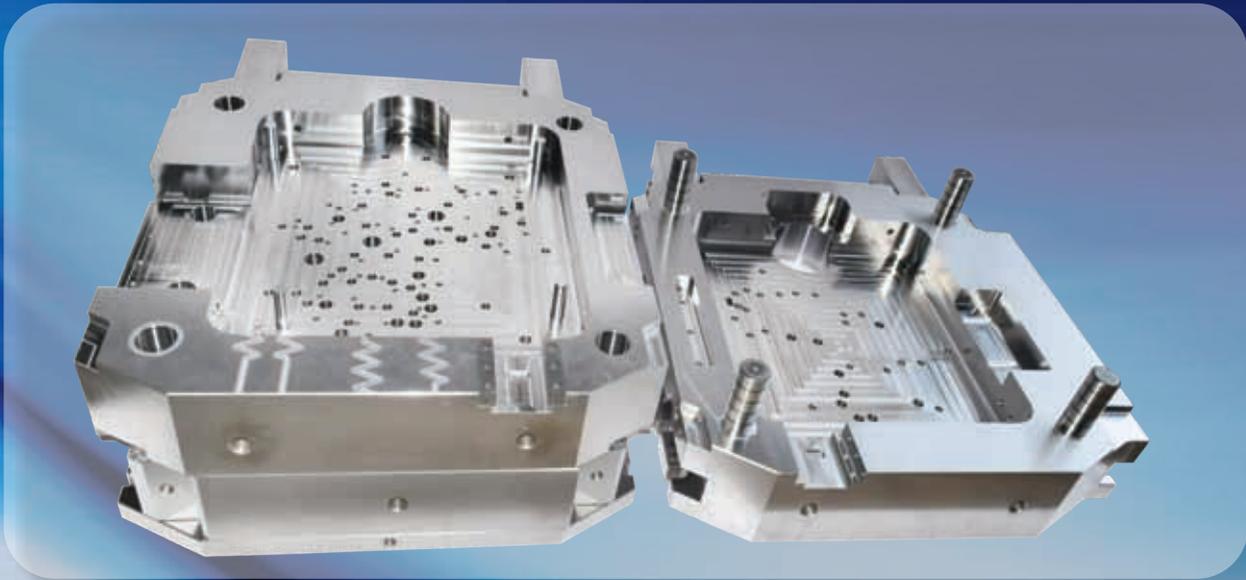


manufacturing to support national efforts to produce more ventilators. ANCA's dedicated project team will draw on the skills and experience of engineers and manufacturing production teams to support this venture while maintaining business-as-usual production, service and support for its global customers.

Co-founder and managing director, Pat Boland said: "ANCA is an advanced manufacturer that supplies to a wide range of industries, a key one being the medical industry. In fact, ANCA has been classified in the US as an essential industry because so many of our customers are manufacturing medical components."

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## Business activities significantly hit; recovery may take more than a year: CII CEOs Snap Poll

**THE** country-wide lockdown imposed on 23rd March, while necessary, has had deep ramifications on economic activity. According to the CII CEOs Snap Poll on Impact of COVID-19 on Economy and Industry, while a majority of the firms continue to anticipate a significant decline in their topline, they now foresee a delay in economic revival and demand recovery. The survey saw the participation of more than 300 CEOs, of which nearly two-thirds belonged to MSMEs.

The lockdown brought economic activity to a grinding halt and the survey findings indicate that a significant majority of the firms (65%) expect revenues to fall more than 40% in the current quarter (Apr-Jun 2020). For financial year 2020-21, the expectations of a fall in revenue are staggered, with 33% of the firms anticipating a revenue fall of more than 40%, closely followed by 32% of firms expecting a revenue contraction ranging between 20% to 40%.

While three out of four firms have identified that a 'Complete shutdown of operations' was a major constraint being faced by business, more than half of them have also indicated 'Lack of demand for products' as a hinderance to business activity.

Further, the survey results reveal that we may experience a protracted slowdown in economic activity as a major proportion of the respondents (45%) feel it will take more than a year to achieve economic normalcy once the lockdown ends. With respect to their own companies, however, the respondents anticipate a slightly quicker recovery, i.e. within 6-12 months with 34% of the respondents indicating the same. Further, a major proportion of the respondents anticipate normalcy in domestic demand conditions within 6-12 months, post lockdown. Additionally, it is pertinent to note that according to a large proportion of the firms, a recovery in domestic demand, for their product or services, may

precede the recovery in foreign demand for the same.

On the jobs and livelihoods front, more than half of the firms (54%) foresee job losses in their respective sectors after the lockdown ends. A major share of respondents (45%) expect 15% to 30% cut in jobs. However, allaying some concerns, nearly two-thirds of the respondents reported that they have not experienced a salary/ wage cut in their firms so far. Among those who have witnessed a wage cut, the duration of the same is 'Undecided' for a majority.

Taking cognizance of the deteriorating industry expectations, Mr Chandrajit Banerjee, Director General, CII said "While the lockdown was necessary to mitigate the impact coronavirus on the population, its has had dire implications for economic activity. At this hour, the industry awaits a stimulus package for economic revival and livelihood sustenance besides calibrated exit from lockdown."

## Mr Rakesh Sharma, ED, Bajaj Auto takes over as IMMA's President

**THE** International Motorcycle Manufacturers Association (IMMA), the voice of the global motorcycle industry, has elected Mr Rakesh Sharma, Executive Director, Bajaj Auto from of its member organisation SIAM, the Society of Indian Automobile Manufacturers for a 2-year mandate, as President of IMMA.

Mr Sharma had been previously holding office as Vice-President in IMMA, elected in May 2019.

On being elected, Mr Rakesh Sharma said "Indeed these are very challenging times and I take up this prestigious appointment fully conscious of the role the motorcycle industry has to play both as a key industry and a responsible member of the society. Whilst we are facing numerous difficulties, we can

also see that in due course new but different opportunities will emerge. The role of national, regional and global associations such as SIAM and IMMA is now more important than ever and we will work hard to ensure we play a strong and responsible role in the recovery."

Mr Rakesh Sharma joined Bajaj Auto in October 2007 as President (International Business) and is currently the Executive Director. He is a member of the Board of Commissioners of PT Bajaj Auto Indonesia, a subsidiary of Bajaj Auto Ltd and the Chairman of the Exports Council of SIAM.

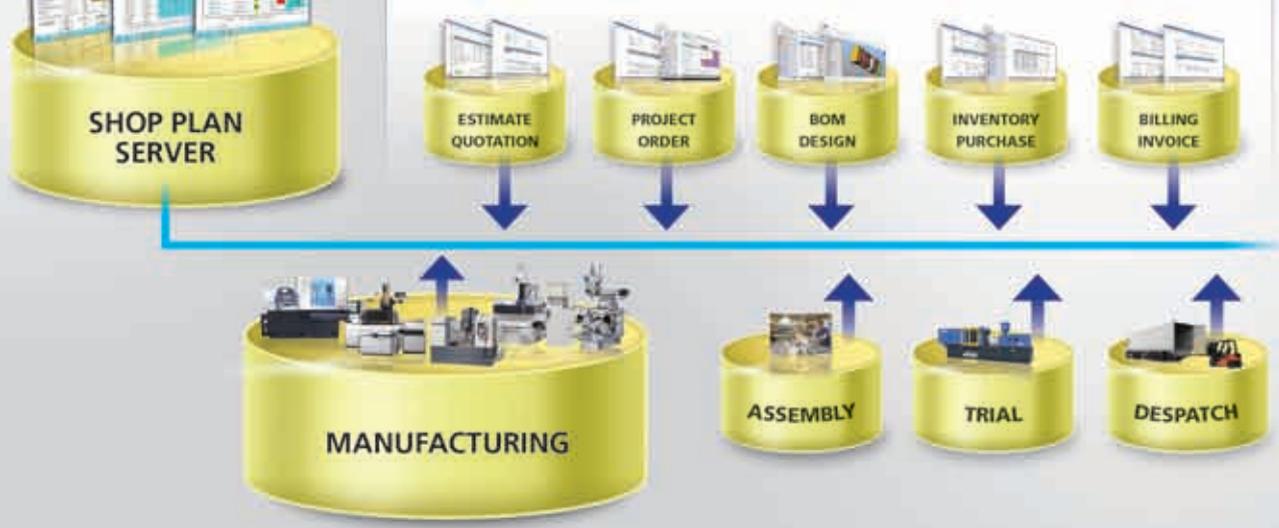
In his new role, Mr Sharma succeeds Mr Johannes Loman, Director of PT Astra International Tbk and Executive

Vice President Director PT Astra Honda Motor (AHM) Indonesia, and President of FAMI - Federation of Asian Motorcycle Industries and President of AISI, the Indonesian Motorcycle Industry Association.

Mr Loman stated, "IMMA aims to advance the sustainable growth of the two-wheeler industry in every region of the world. We are fortunate to have Mr Sharma with his wide international experience in the two and three- wheeler industry, to steer IMMA through the difficult time and be the trusted global voice of the motorcycle manufacturers. I look forward to work with Mr Sharma in my role as FAMI representative in IMMA's Steering Committee".

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## India's GDP likely to grow between – 0.9% to 1.5% in FY21: CII

BY the time the second phase of lockdown ends on 3rd May, it will have extended for 40 days. Consequently, the cost to our economy has continued to mount even as the COVID-19 curve is being flattened. "Given the extent of the damage to the economy from the disruption to business, the GDP growth in FY21 will likely be the lowest in many decades", highlighted Mr Chandrajit Banerjee, Director General, Confederation of Indian Industry. The economic costs of the lockdown are rising each passing day with the impact being felt across sectors. The situation requires immediate, across the board intervention from the government.

Under lockdown, economic activity has slowed down significantly across most sectors. In manufacturing, only food processing, pharmaceuticals and medical equipment are operational, while construction and mining activities have halted completely. Within services, majority of trade, transportation and hospitality remains closed, while financial, IT and government services remain partially operational. Even in power sector which can operate, significant reduction in demand owing to lockdown is having an adverse impact.

Any significant revival in investment activity is unlikely as capacity utilization levels may remain suboptimal. Consumption demand is

likely to remain lacklustre as people's incomes have been impacted. On the external front, as economies across the globe continue to struggle with the pandemic, global trade may decline by 13 to 32 per cent in 2020, as estimated by the World Trade Organisation. "Given the situation, government intervention becomes critical not only to sustain the economy but also to prevent any humanitarian crisis," said Mr. Banerjee.

In a paper titled 'A plan for economic recovery', CII has laid out its growth expectation under three scenarios.

In the baseline scenario, GDP is expected to grow at just 0.6 per cent on an annual basis as economic activity is expected to remain constrained due to continuing restrictions on the free movement of goods and people beyond the lockdown period. This will lead to disruption in supply chains, slow pick-up in investment activity, labour shortages in the short-run and muted consumption demand on account of reduced household incomes.

In the optimistic scenario, which envisages a faster pick-up post the lockdown

period, GDP is forecasted to register a growth of 1.5 per cent in the best case.

In case of a more prolonged outbreak, where the restrictions in existing hot-spot regions get extended, while new regions are identified as 'hot-spots' leading to intermittent stop and start in economic activity, GDP is likely to decline by -0.9 per cent.

"There is no doubt that the economy is going through turbulent times, and India will have to spend, for navigating its way out of the current crisis. At this stage, the government must do

whatever it takes to tide over the crisis," said Mr. Banerjee.

The urgent fiscal interventions, as suggested by CII should include cash transfers amounting to Rs 2 lakh crore to JAM account holders, in addition to the Rs 1.7 lakh stimulus already announced. CII has also suggested additional working capital limits to be provided by banks, equivalent to April-June wage bill of the borrowers, backed by a Government guarantee, at 4-5% interest.

In addition, the CII paper has suggested the creation of a

fund or SPV with a corpus of Rs 1.5 lakh crore which will subscribe to NCDs/ Bonds of corporates rated A and above. The fund can be seeded by the Government contributing a corpus of Rs 10,000-20,000 crore, with further investments from banks and financial institutions such as LIC, PFC, EPF, NIIF, IIFCL et al. This will limit Government exposure while providing adequate liquidity to industry.

For MSMEs, CII has suggested a credit protection scheme whereby 75-80% of the loan should be guaranteed by RBI, i.e. if the borrower defaults, RBI should buy the loan and repay the bank upto 75-80% of the loan, so the risk to the lender is limited. SIDBI could provide the guarantee for loans to industry and trade while NABARD could provide the guarantee for loans to agro-processing sectors.

"Without an increase in government spending in the near-term to drive an economic recovery, government revenue will dwindle, and high deficits will continue to be a problem in future", said Mr Banerjee in conclusion.



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## TVS Motor Company Completes Acquisition Of Norton

TVS Motor Company, a reputed manufacturer of two-wheelers and three-wheelers in the world, today announced the successful acquisition of Britain's most iconic sporting motorcycle, "Norton", in an all-cash deal for a consideration of GBP16 million by acquiring certain assets of Norton Motorcycles (U.K.) Limited (in administration) through one of TVS Motor's overseas subsidiaries. This will be one of the most interesting acquisitions of a storied motorcycle maker in recent times and will reflect TVS Motor Company's and India's rapidly rising prominence in the international two-wheeler market.

Founded by James Lansdowne Norton, in Birmingham, in 1898, Norton Motorcycles is among the most popular

British motorcycle brands of all time and is one of the most emotive marques today. Since the 20th century, Norton Motorcycles is renowned for their classic models and eclectic range of luxury motorcycles ranging from authentic retro classic reboots of the famous Commando to their contemporary 200 bhp, 1200cc V4 super-bikes.



Commenting on the acquisition, Mr. Sudarshan Venu, Joint Managing Director, TVS Motor Company said, "This is a momentous time for us at TVS Motor Company. Norton is an iconic British brand celebrated across

the world, and presents us with an immense opportunity to scale globally. This transaction is in line with our effort to cater to the aspirations of discerning motorcycle customers. We will extend our full support for Norton to regain its full glory in the international motorcycle landscape."

TVS Motor Company is excited about the existing and upcoming products at Norton Motorcycles including Commando, Dominator and V4 RR. Confident of the strong synergy between both the brands, we believe that Norton Motorcycles can leverage TVS Motor Company's global reach and supply chain capabilities to expand to new markets.

## KUKA wins major order from German car manufacturer for 5,000 robots

THE Augsburg-based automation specialist KUKA and the Munich-based automotive company BMW AG have signed a framework agreement for the supply of around 5,000 robots for new production lines and factories.

The KUKA industrial robots will be used around the world at the international production sites of the BMW Group for the manufacture of the current and future generations of vehicle models. The various robot models from KUKA

will be used primarily in body-in-white production and other technologies.

Innovative products from the KUKA portfolio The scope of supply also includes other innovative products from the KUKA portfolio such as KUKA linear units. These linear units significantly increase the workspace of the robot. They are controlled by the same controller as the robot. This allows them to be integrated into work sequences without the need for additional

equipment. Energy supply packages developed by KUKA are also included in the scope of supply.

"Thanks to its expertise, KUKA has been a long-standing and experienced partner to the automotive industry," said Peter Mohnen, CEO of KUKA AG. "For more than 40 years now, BMW has relied on KUKA technology from Augsburg. We are delighted by the successful continuation of this partnership."

## Faradion bags 1st order from ICM Australia

THE AFaradion Ltd. has announced its first order from ICM Australia. Sodium-ion batteries, owing to its exceptional superiority over lithium-ion batteries, are likely to revolutionise the automobile/mobility, storage and mobile sectors across the world.

Faradion's Sodium-ion technology provides similar performance to conventional chemistries, while replacing expensive materials such as

cobalt and lithium with the far more abundant sodium. Unlike lithium-ion batteries, Faradion's sodium-ion batteries have exceptional thermal stability and safety. Further they can be safely transported and maintained at zero volts.

India is one of the largest markets for mobile devices across the world. Recently the country has also demonstrated significant progress in

the adoption of EV (Electric Vehicle) technology, making it a priority market for Faradion. Further, as the world seeks out alternatives to China-dependent Lithium-ion batteries, Faradion's Sodium-ion based technology offers a promising solution. In line with this, Faradion is actively exploring manufacturing presence in India for its Sodium-ion batteries for diversified applications.



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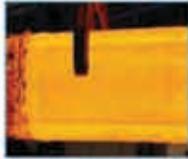
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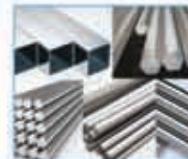
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### InnovMetric Releases PolyWorks® MS 2020 for 3D Dimensional Analysis and Quality Control

**INNOVMETRIC**, the global leader in smart 3D metrology software solutions, recently introduced PolyWorks® MS 2020, the latest release of its 3D dimensional analysis and quality control solution. PolyWorks MS 2020 offers multipiece editing capabilities that accelerate the preparation of robust inspection projects and facilitate data analysis. This new major release also extends the universality of its digitizing hub by adding support for new measurement instruments, and increases CNC CMM productivity by accelerating the execution of measurement sequences.

“Successfully deploying the PolyWorks enterprise platform in the market is not only about closing major business deals. It’s also about accepting a great responsibility,” said Marc Soucy, President of InnovMetric. He added, “Every year, we’re on a mission, as our customers expect us to improve their daily performance, offer the new dimensional controls that they need, and expand the universality of our platform by adding and enhancing our 3D measurement hardware interfaces. With PolyWorks 2020, we’re right on target once again.”

### Schunk launches versatile clamping force tester

**WHAT** do the tire pressure of a car and the clamping force of a lathe chuck have in common? Both should be checked regularly to ensure the maximum process safety and efficiency in daily use. The new versatile clamping force tester IFT is designed for this purpose.

It can be used on 2, 3, and 6-jaw chucks up to 6,000 RPM regardless of the chuck manufacturer, and at a maximum clamping force of 90 kN per jaw. Adjustable measuring extensions allow variations in clamping diameters between 72 mm, 88 mm, and 108 mm. Data evaluation is done with wireless data transfer with an app on a tablet computer or with other terminals. The battery life of the measuring head is



more than 90 minutes, and it takes less than 3 minutes to recharge.

#### **Static or dynamic measurement**

The clamping force tester can be used for static measurement such as determining loss in clamping force under speed, or for individual adjustment of the required initial clamping force for individual machining

operations. SCHUNK recommends regularly checking the clamping force at the beginning of a serial operation, and also between the maintenance intervals again and again. It is the regular verification that ensures the optimal safety. If possible, the clamping force should be measured in a state that is how the lathe chuck is used in an individual clamping situation. If for example, top jaws with clamping steps are used, the operator should measure the clamping force in the same way on the same jaw step as he will apply it to the workpiece later. If the measurement reveals that the clamping force is below the target value, SCHUNK recommends that the operator intervene immediately to ensure safety of the ongoing operation.

### Sandvik Coromant joins forces with Microsoft to shape the future of manufacturing

**SANDVIK** Coromant has embarked on a unique venture with Microsoft to drive forward the development and digitalization of the manufacturing industry. Combining Sandvik Coromant’s expertise in machining with technical solutions from Microsoft, the collaboration will seek to link up parts of the production chain to create solutions for the next generation of manufacturing. The contract also includes an acceleration of the internal digitalization network for Sandvik Coromant.

Sandvik Coromant’s CoroPlus® offering, developed in part with Microsoft, is based on Azure IoT Suite, Cortana Intelligence Suite and Dynamics 365 for Field Service. Among other things, the offering connects people, machines, tools and data on a single platform to offer Sandvik Coromant’s customers a better basis for decision making, and provides an overview of the various developments in the manufacturing process. This can enable savings, for example, by reducing machine downtimes.

“We see this collaboration with Microsoft as key to the success of our digital strategy. We have a historic relationship with them and look forward to continuing our journey, creating value by working together to develop and implement solutions for the manufacturing industry to guarantee efficiency, sustainability and growth. This unique partnership represents a new way for our companies to work together more closely to develop our competence,” explained Nadine Crauwels, President of Sandvik Coromant.



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## Mazak Helps Kentucky Manufacturer Produce Surface Disinfection System

IN response to a neighboring company's request for a collaboration, machine tool manufacturer Mazak Corporation provided some much-needed materials and production capacity for the development of a new UV-C LED surface disinfection system. Designed by AquiSense Technologies in Erlanger, Kentucky, the PearlSurface system uses an extremely powerful UV light to sterilize N95 face masks and other personal protective equipment (PPE) used by hospital staff as well as high-touch surfaces on such items as phones, tables and keys. With Mazak's assistance, the company completed a prototype of the system and its UV source containment box within just 12 days.

According to Mazak Vice President of Manufacturing Ben Schawe, AquiSense had an enclosure design and needed a prototype made as quickly as possible. At its 536,000-square-foot manufacturing facility in Florence, Kentucky, Mazak produced several prototypes in under two weeks. In fact, Mazak engineers were able to offer several suggestions that made the PearlSurface's design more appropriate for production at scale.

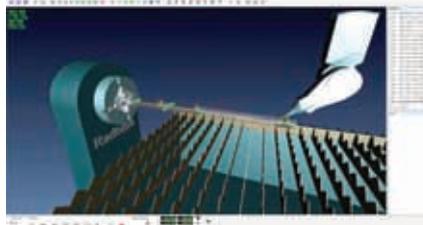
To test the new technology, Northern Kentucky hospital system St. Elizabeth will deploy the PearlSurface in its facilities to sanitize used N95 masks. Instead of using the masks only once as recommended, healthcare providers

must often wear masks multiple times due to shortages. Unlike solutions that sanitize large groups of masks, which result in masks being shared by multiple people, the UV-C LED will allow these individuals to keep and reuse the same masks, further reducing risk. "The Mazak team was extremely excited and honored to be involved in such a critical project, especially one that will result in preventing countless individuals from being infected," said Dan Janka, president of Mazak. "Whether help is needed on the other side of the country or across the street, we all must do our part – U.S. manufacturers included – to work through these trying times together."

## New RADAN Provides Ultimate Nesting for Punching Machines

**RADAN** 2021 takes an important step for manufacturers operating punching machines, and who want to optimise batches of nests. It is now possible to use Radnest Ultimate on punch.

Product Manager Olaf Körner says optimising nests with the module can reduce the number of raw material sheets by eight per cent in a year. "Manufacturers spending hundreds of thousands of pounds a year will find that gives them massive savings." He says many manufacturers would notice the material saving, but also, having



more parts on a sheet takes less time to produce the batch. "Another welcome additional saving."

Set-up sheets can now be automatically generated and sent to each machine,

saving around 50 minutes in an average day of producing up to 80 nests. The NC code for the job goes to the machine, and the set-up sheet to the operator. "Now it's done through a simple tick box, and the sheet is always up to date, with no chance of omissions or errors."

The latest release overcomes the issue of hazardous holes – created when pieces of metal are left in a dangerous position after a hole has been cut in a tube. Extra cuts can now be carried out, dividing the slugs into smaller chunks which fall out more readily.

## Hoffmann Group launches "GARANT Master Alu" series for high-performance cutting of aluminium

**WITH** its new "GARANT Master Alu", the Hoffmann Group is launching a completely redeveloped line of solid carbide milling cutters, designed for high-performance cutting of aluminium.

As such, customers can now also benefit from the particular performance, process reliability and efficiency of the top-class "GARANT Master" cutters when machining aluminium, as well. This range was established in 2015 with the introduction of the "GARANT Master Steel" solid carbide milling cutter and includes high-performance



milling cutters for steel, stainless steel, titanium and aluminium, as well as various high-performance drills. The new "GARANT Master Alu" line of solid carbide milling cutters has been designed to maximise precision and cope with the most stringent high-performance cutting requirements.

The range has tools to handle any application: a balanced single-cutter milling cutter, a finishing cutter, a roughing end mill with knuckle profile (SlotMachine) and a pocket milling cutter (PickPocket) – the latter also comes as a torus cutter.

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# TAGMA Partners with various companies to help industry in skill development



**T**he COVID-19 pandemic has generated enormous uncertainty around the world. According to the International Monetary Fund (IMF), the global economy is expected to shrink by over 3 per cent in 2020 – the steepest slowdown since the Great Depression of the 1930s. One of the most affected industry is manufacturing industry with factories around the world were in stand still for about 45 days on an average. Travel ban has also disturbed the global supply chain and the impact can be felt in every single economy, industry and companies.

In this challenging time, TAGMA India partnered with many organisations to initiative series of webinars on various topics related to tooling industry. Calling it

'TAGMA Digital Initiative', the association partnered with various companies and jointly organised more than 20 webinars in the month of April.

Talking about the initiative Mr DK Sharma, President, TAGMA India said, "TAGMA Digital Initiative is a unique initiative to help companies reach out to maximum number of audience and helping industry professionals learn about the latest development in the industry. This is challenging time that no one has even faces in our generation, however, one should be optimistic and work on skill development. I appreciate proactiveness of all our partner companies and thank them for coming ahead and helping the industry in being productive."

# Digital Initiative

## Highlights of some of the webinars:

### Objectify organised series of webinars on Additive Manufacturing

To promote the adoption of additive manufacturing and spread awareness among the toolmakers, Objectify Technologies and TAGMA partnered to launch a series of webinars. With the theme '3D Printing: Prototype to Production' the webinar series took place from April 6th till 14th.

"Being a front runner in the Indian 3D printing industry, we feel it's our responsibility to share our experience with fellow 3D printing enthusiasts, thus helping in terms of skill development. Keeping our vision in mind and considering the current lockdown, we launched Innovators @Home, a series of five Webinars to share our experience in 3D Printing for the industry enthusiasts is association with TAGMA India," said Ankit Sahu, Co-founder, Objectify Technologies.

Innovators @Home held between April 6 - April 14, aimed to help young 3D printing fanatics as well as experienced professionals to gain in-depth knowledge about Additive Manufacturing aka 3D printing technologies and what it can offer. In the five sessions, the series covered topics like — Overview of 3D Printing Since its Inception, Working Principle of Additive Manufacturing, Application Areas, Materials Used, Latest Innovations, Classification of Additive Manufacturing Process, Challenges & Demand, and Future Prospects of Additive Manufacturing.

The highlight of the Webinars was the diverse set of attendees. The series witnessed more than 850 registrations, which included 27% newbies, 26% interested, 9% hobbyists, 17% professionals, and 21% experts.

"I thank Mr. DK Sharma, President TAGMA India and the entire team of TAGMA for their support. During this challenging time, it's the collective effort that will help us all grow. Let us all do our bit to help the industry in skill development," concludes Ankit.

### Voestalpine High Performance Metals India conducted multiple technical webinars

The Covid-19 (Corona) pandemic has created a truly unprecedented situation affecting all of us over the last weeks. During this time, we are doing our best to secure the health and well-being of our stakeholders. Majority of us are working from home to minimize the health risk and we need to continue it till the situation returns to normal.

Our esteemed brands BÖHLER and Uddeholm roused to this occasion and with the motive of taking more responsibility of our customers processes we have arranged various webinars for our customers during this Covid-19 lockdown period. We were able to cover from basic steel manufacturing to advanced Additive manufacturing as per end use/application in our Webinars followed by question answers sessions. The success of these webinars can be counted with the fact that put together around 1800+ participants participated in our various webinars.

### The list of various webinars conducted are:

1. BÖHLER Webinar – Current Industry Trends in High Speed Steel Industry
2. BÖHLER Webinar – Additive Manufacturing (3D Printing) Solutions for Plastic Injection Moulding
3. BÖHLER Webinar – Tool Steel Solution in Advance Cold Work Application
4. BÖHLER Webinar – Heat Treatment Solution for Cold Work Application
5. BÖHLER Webinar – Success and Innovation in Aerospace Industry
6. Uddeholm Webinar \_ Dievar for Die Casting
7. Uddeholm Webinar \_ Polishing for Uddeholm Steel
8. Uddeholm Webinar \_ Mould Materials for Plastics
9. Uddeholm Webinar \_ Tool Steel for Cold Work Applications
10. Uddeholm Webinar \_ AM and Components for Die Casting Industry
11. Uddeholm Webinar – Importance of Quality Heat Treatment

These webinars were conducted with a motive to share best practises in Die & Mould and component manufacturing industry and also to stay connected to our esteemed customers in this time of crisis.

### Mastercam India recently conducted a webinar on Efficient Manufacturing for Toolmakers, in association with TAGMA India

The webinar was promoted by TAGMA as part of the 'TAGMA Digital Initiatives', and saw an attendance of nearly 200 delegates from Die and Mould companies from across the country.

Mr. Sitansu Mohanty, Technical Director at Mastercam APAC presented innovative strategies on efficient machining and techniques like Dynamic Motion technology and automatic 3+2 toolpath generation, amongst many other features that help Toolmakers optimise their machining processes.



Mr. Umakant Deshmukh, Director – Bespoke Projects and PP customisation, spoke on the science behind chip generation. He explained the differences between traditional and new-age High speed machining with the implications and benefits of using Radial Chip Thinning techniques to increase material removal rates.

The hour long presentation was followed by a rich Question and Answer session, with many Toolmakers asking some very interesting questions, with equally fascinating answers by the presenters, in response to the queries.

The webinar ended with a vote of thanks to the delegates who attended the event, and to TAGMA India for promoting the event within the fraternity.

Recorded session of this webinar is available upon request; please email [marketing@mastercamapac.com](mailto:marketing@mastercamapac.com) with your complete name, mobile number & address, and the team from Mastercam will reach out to you with the link.

### **Swedish ME Steel organised webinar on ‘Toolox - Prehardened tool steel for reducing manufacturing time of tools’**

**Swedish ME Steel** conducted a webinar on **Toolox - prehardened tool steel for reducing** manufacturing time of tools. The webinar covered the different areas of the prehardened tool steel - Toolox and how it can increase the productivity and lower the manufacturing time using conventional tool steel. The webinar also covered various application and case studies from across the globe.

#### **Key Takeaways from this webinar:**

- ▶▶ Quality of Manufacturing process.
- ▶▶ No heat treatment required – Saves Money and time.

- ▶▶ Prehardened version of (P20, H13 and D2)
- ▶▶ Suitable for Multiple applications (Injection moulding, Press tools)
- ▶▶ Case studies from across the globe.

### **TechSense organised webinar on Casting Defects and its solutions**

TechSense organized online technical webinars on Understanding the root causes of Casting Defects and its solutions. This webinar touched upon the basic engineering principals responsible for the various defects observed in die casting industry. The primary objective was to make people aware of the application of the basics of engineering to co-relate and understand the root causes of these defects and their solutions.

The webinar was organized with the support of TAGMA India, Alucast and GDC Tech forum in four parts due to the depth of the subject and received huge response from the Die casting as well tooling industry.

The session was taken by industry expert Mr. Rajesh R Aggarwal, founder of TechSense Engineering Services, who has more than 30 years of experience in tooling and foundry industry.

TechSense is continuously organizing these technical online webinars to guide and support the tooling and die casting foundry industry.

### **PROLIM Solutions organised four webinars**

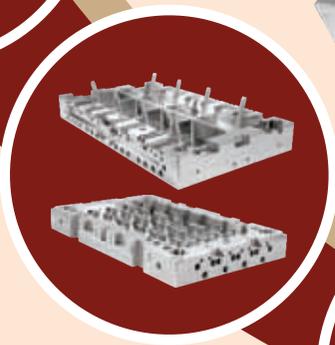
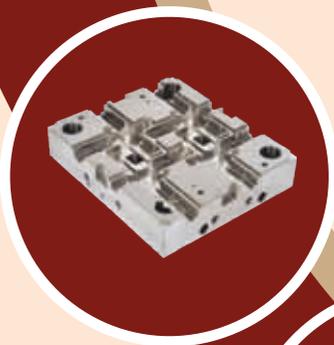
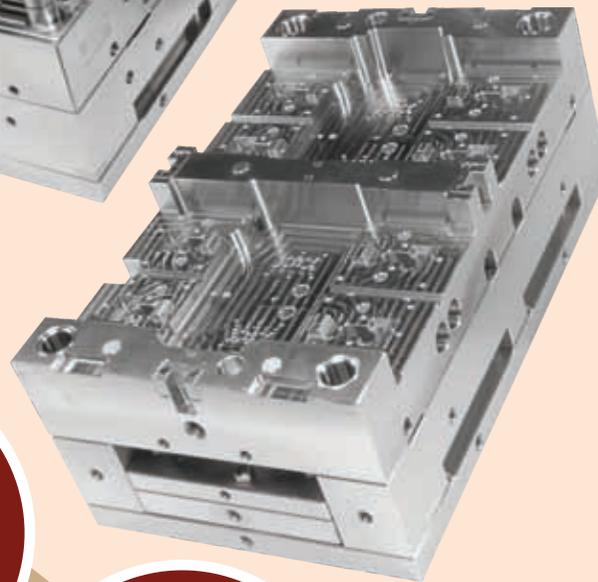
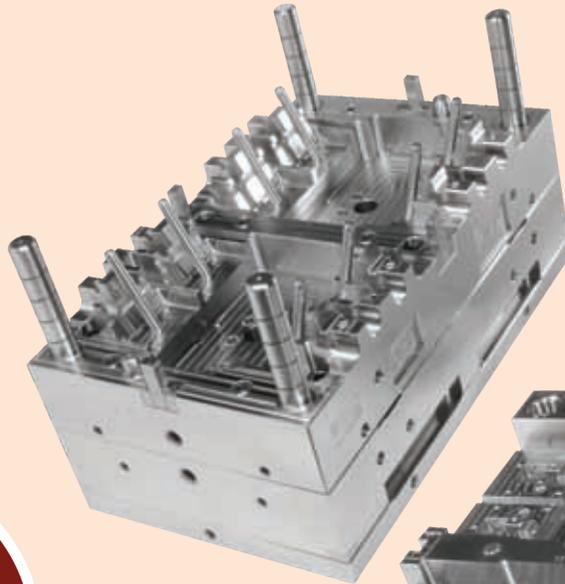
PROLIM Solutions partnered with TAGMA India to deliver insightful webinars. The webinars were highly relevant for tooling community and helped all the attendees gain new perspectives. Topics which were taken up for LIVE discussion were:

1. How to Improve Profitability: Does Your

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# Digital Initiative

- Organization face Delayed Delivery of Tools or Costly Reworks of die/moulds?
2. How to Reduce the Time and Cost Required for Mold Design: Automated Step by Step Design Process is the answer
  3. How to bid fast and accurately: Slow RFQ Response Rate & Inaccurate Tool Cost Estimation can be dangerous. How Integrated RFQ/Cost Management Can Help Tool & Die Manufacturers?

4. How to reduce Machining Time for your customers: NX CAM Unique Advantages to Reduce Machining Time

TAGMA received tremendous response for each of these webinars. There were positive feedbacks and requests for sharing the links to the recordings. The webinar received more than 900+ registrations and over 600+ people attended these sessions and interacted during the LIVE sessions.

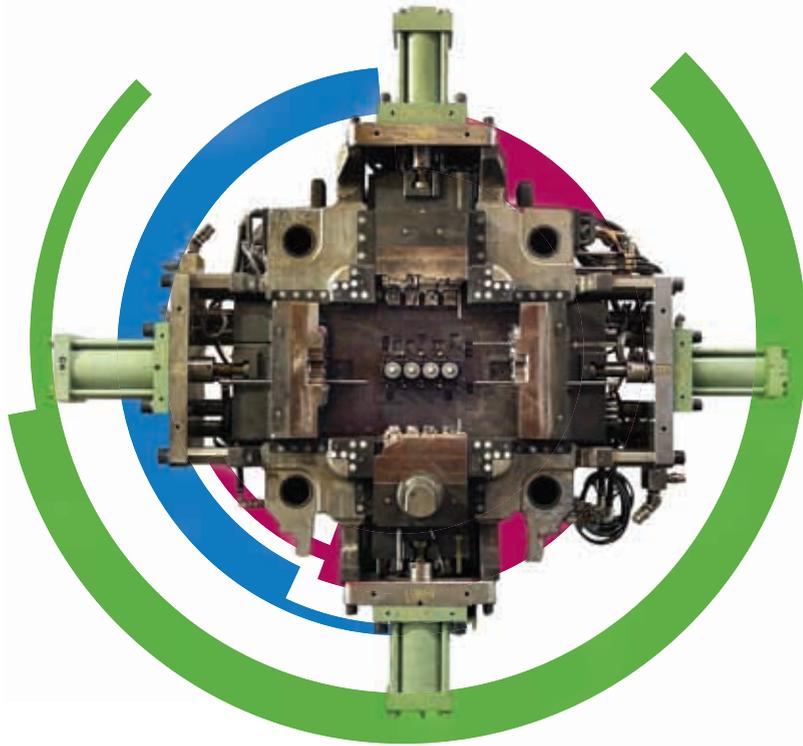
## TAGMA Digital Initiative - Webinar with Industry Partners

Date	Subject	Industry Partner
06.04.2020	"Session 1 - Additive Manufacturing/ 3D Printing 101"	Objectify Technologies
08.04.2020	"Session 2 - Tools and Rules of Additive Manufacturing"	Objectify Technologies
10.04.2020	Webinar 3: Innovators @ Home   Session 3	Objectify Technologies
14.04.2020	"Does Your Organization face Delayed Delivery of Tools or Costly Reworks of die/moulds? How to Improve Profitability?"	Prolim Solutions
15.04.2020	"Toolox - Prehardened Tool Steel for reducing manufacturing time of tools"	Swedish ME Steel Pvt Ltd
	"Uddeholm Webinar for die casting Industry on High performance core pin & Sub insert and Additive Manufacturing"	Uddeholm
	"Understanding the root causes of Casting Defects and its solutions - Part 1"	TechSense
16.04.2020	"Reduce the Time and Cost Required for Mold Design By an Automated Step by Step Design Process."	Prolim Solutions
21.04.2020	Understanding the root causes of Casting Defects and its solutions - Part 3	TechSense
	"Slow RFQ Response Rate & Inaccurate Tool Cost Estimation? How Integrated RFQ/Cost Management Can Help Tool & Die Manufacturers?"	Prolim Solutions
	"Mastercam Webinar - Efficient Manufacturing for Toolmakers, in association with TAGMA India"	Mastercam
22.04.2020	"Live Webinar: For Plastic Injection Moulding on Additive Manufacturing Solutions"	voestalpine
23.04.2020	"Live Webinar for High Pressure Die-casting on Importance of Quality Heat Treatment"	Uddeholm
	"NX CAM Unique Advantages to Reduce Machining Time Which Is Expected By Your Customers"	Prolim Solutions
27.04.2020	Understanding the root causes of Casting Defects and its solutions - Part 4	TechSense
28.04.2020	CAD CAM Galaxy - Deliver top quality injection molds 40% faster End-to-end digitalization for mold development	CAD CAM Galaxy
29.04.2020	Webinar on usage of Prehardened steel in cold forming applications	Swedish ME Steel
	Current Industry Trends in High Speed Steel	Bohler
30.04.2020	Innovate & Accelerate your Tool Design and Manufacturing	Pharos Innovations

In its quest to help industry in this challenging time, TAGMA India has decided to continue this activity in the month of May & June as well. If you want to organise a webinar please email

us at [tagma.mumbai@tagmaindia.org](mailto:tagma.mumbai@tagmaindia.org). Also, if you want to get the video/audio link of the previously conducted webinars, please write to us. 🌈

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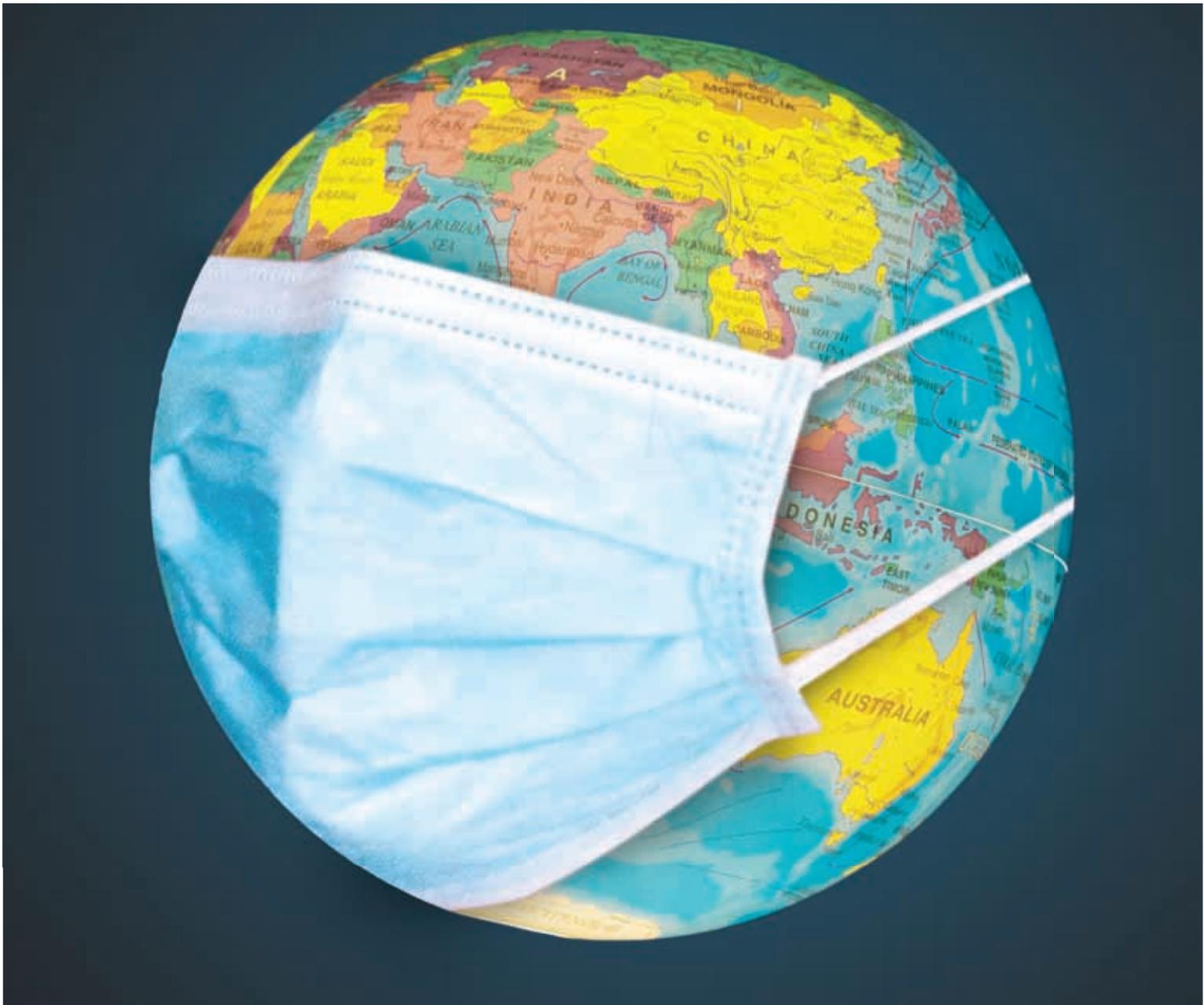
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# COVID-19: What it Means for Tooling Industry?

The disruption caused by COVID-19 has severe operational, social, and financial consequences for manufacturing. It is forcing manufacturers to rethink risk management and contingency plans, workforce safety protocols, manufacturing operations, and new ways of working opportunities, all at the same time. In this report, we highlight the current scenario, challenges faced, possible opportunities, and the way forward.



## In Focus

**F**or the Indian tooling industry, the year 2019 was not a great one. But several companies started displaying positive signs after the festive season from November. Everyone believed 2020 will provide them the much-needed growth with BS-VI finally stabilising in April 2020. However, as fate would have it, out of nowhere, something hit the world economy and changed everything. COVID-19, the Novel Corona Virus surfaced in early January, everyone assumed it will be restricted to China. However, it changed from March and now more than half of the world population is in lockdown. Something that no one expected. This has left the small companies clueless about their future.

### The Present Situation

The alarming rate in which COVID-19 has spread across the world has baffled everyone. To minimise the spread of the virus, countries around the world have locked down entire economic activities. Citizens are advised to stay at home and maintain social distancing if they have to go out for essential goods. As the Indian Government announced the first lockdown on March 24, 2020, it led to several uncertainties in business across the sector. The Indian manufacturing industry, particularly automotive and its associated industries which were anyways fighting recession have hit hard and left with no certainties about the coming days. The ongoing lockdown has put a lot of strain on the manufacturing industry, which contributes almost 20% of the GDP. Of this, 50% is contributed by the auto industry. We all know, the auto industry was not in great shape prior to the lockdown, with sales down by more than 15% and production cuts of the order of 5 to 10% or more.

### The Challenges

In today's globalised world, there is hardly any place that has remained unaffected by the severity of the Novel Coronavirus. To prevent the spread of COVID-19, the Indian government imposed a nationwide lockdown on March 24, 2020. Every business, except products and services that fall under the essential category, are on standstill with no clarity on when and how they will be able to resume the operation.

While manufacturing is a slow-moving and conservative industry, COVID-19 has led to new challenges that require manufacturers to innovate at a speed they never have before. Supply chain disruptions, social distancing on high-touch assembly lines, limited ability to travel and the need for oversight add significant complexity to today's processes.

**“**I see the business sentiment to continue to be like this for at least a year. However, in the long run, we will have tremendous opportunities and we must be prepared. We have to work on our design skills and enhance efficiency to compete with the global players.

**DK Sharma, President, TAGMA India**

According to the Asian Development Bank (ADB), "Growth in India will understandably remain subdued in 2020 after a disappointing 2019. India suffered a sharp slowdown last year, from 6.1% in fiscal 2018 to 5.0%, as a credit crunch that originated in the non-banking financial sector severely hampered bank lending. COVID-19 has not yet spread extensively in India, but measures to contain the virus and a weaker global environment will whip up headwinds, offsetting support from corporate and personal income tax cuts as well as financial sector reforms which are meant to revive credit flows. GDP growth in India is forecast to slow further to 4.0% this year before strengthening to 6.2% in fiscal 2021."

This slowdown will have a direct impact on the tooling industry as its growth is highly dependent on the state of the manufacturing sector, especially automotive. While there were some companies that were proactive in adopting the new change and act according to the demand still had some work. For example, some companies started making medical equipment, face shield ventilator component, and other related products. Several others started exploring opportunities in other sectors such as medical, aerospace, and railways. However, it will continue to be a challenge to get back to normal.

Most tooling companies are SMEs and have to spend on salaries, electricity bills, property tax, machines, and infrastructure EMIs and other operation related expenses without having any actual production and business.

### The Opportunities

The pandemic has impacted the manufacturing sector due to lockdowns across several countries around the world. As per a report published by the World Economic Forum (WEF), factory activity contracted sharply across most Asian countries in March including Japan, South Korea, and China. While China is known as the manufacturing hub of the world, the current crisis has led to supply chains being disrupted for several firms that had their manufacturing base in the country. Taking this opportunity, Japan has announced a \$2.2 billion monetary support for its businesses to shift its manufacturing and production out of China.

“As a result of COVID-19, the supply chains are completely disturbed and this has become a point of extreme concern for global firms to look for new manufacturing avenues as a part of a de-risking strategy for the future.

**BP Poddar, VP, Sales & Marketing, FEMCO India**

Mr. BP Poddar, VP, Sales & Marketing, FEMCO India says, “As a result of COVID-19, the supply chains are completely disturbed and this has become a point of extreme concern for global firms to look for new manufacturing avenues as a part of a de-risking strategy for the future. Several industry segments have realised the downsides of being excessively dependent on any single country and are looking to expand in different geographic locations.”



It would be very early to state, but it looks like in the long run this pandemic can prove to be a big business booster. With trade and supply chains in a standstill, companies have no option but to source tools and components from Indian suppliers. Indian service providers can be the biggest beneficiary once things are normal. Toolmakers in India are well aware of the situation and they have been investing in infrastructure and skill development for the last few years. However, it's not enough and more and more companies should start investing. We must come out of our comfort zone and grab this opportunity.

“Localisation has been the biggest buzz word among the Indian automotive companies for the last few years and they have been looking for domestic suppliers not just for tools but also for various components in order to save time and money. Many automotive companies are still importing tools from China, Taiwan, and South Korea, however, they all have a plan to gradually decrease it and source 100% of the tools from the domestic suppliers. With this pandemic that has shattered the world and disrupted the global supply chain, I see this localisation movement getting a further push,” says Mr. DK Sharma, President, TAGMA India.

If companies shift their production to India and localisation continues to stay strong among the Indian automakers, which is highly likely, there is a good chance for Indian tool makers. Any kind of production booth in the country will directly benefit the tool makers. However, domestic tool makers need to build capacity and efficiency to match the demand. The Indian government is trying very hard to attract investments from mobile manufacturers to make India a hub for mobile manufacturing. To serve such an industry, Indian tool makers need to upgrade their infrastructure and skill.

### Being Productive During the Lockdown

There are several things a toolmaker can do to be productive and ensure employees are engaged. Here are a few suggestions:

*Skill development:* Toolmaking is often referred to as an art which means there are works of precision, detailing, and involves complexity. All this calls for excellent design skills. Design is one department that sets you apart. This lockdown can be spent on learning design skills. There are a number of webinars and courses offered by various companies and experts. Encourage your employees to participate and gain from these sessions.

*Explore digital marketing:* Digital marketing is one area that has been overlooked by most of the Indian tool makers. However, the game has changed. The internet, especially social media has brought us closer than ever. Companies are searching for vendors online, they are sharing requirement online, machine demonstration is happening online. This is exactly why it becomes important to set up a social media channel and engage with your industry professionals.



*Work on content development:* Someone has rightly said, “Content builds relationships. Relationships are built on trust. Trust drives revenue.”

Maybe your website needs a makeover – not just in terms of design but also from a content point of view. An insightful content with constant updates will drive

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### “Policies must be supportive of creating demand in society”

**Organizations should start thinking differently. Old keys won't open new doors. Digitalisation and Digital Transformations will become eminent and absolutely necessary,” says B P Poddar, Sr. Vice President – Marketing, Femco India.**

Organizations should start thinking differently. Old keys won't open new doors. Digitalisation and Digital Transformations will become eminent and absolutely necessary.

Evolving challenges can be addressed by creating an Elastic Digital Workplace. Implementations will differ for each organisation, but they should be based on the following foundations: to protect and empower people, serve customers, attend to core needs, and to establish business continuity.

Efficient, simple automation wherever possible must be integrated to have consistent efficiency. This will reduce dependency on labour to a great extent.

The industry must consider a high level of flexibility in manufacturing equipment. Equipment must be considered with a high level of reconfigurability. Organisations must think and consider chaotic manufacturing.

**Q What are the measures that you have adopted for your company to utilise this time?**

Companies have utilised this time very effectively. Digital platforms are playing a pivotal, the management, workforce, staff members are virtually connected. Technical, operational, and soft skills are some of the several training activities that are being conducted across companies. These training activities helped in reducing psychological stresses to some extent.

**Q The most important lesson you have learned during the COVID-19 outbreak ...**

The most important lesson that I learned is – Nothing is the same and CHANGE is the only reality. Organisations must be on toes all the time and have a high level of flexibility in navigating businesses during such times. Organisations must consider innovation and R&D as a top priority.

**Q Manufacturing's new normal post-COVID-19...**

Virtually all companies are still determining how we change the way we work, short- and long-term. But speed is the essence, as our workforces and communities try to function and perform while struggling to cope with what is happening in their daily lives.

Look beyond and go ahead. Faster adaptation of new technologies and new processes will provide help organisations to bounce back from any crisis such as COVID-19. The world will not be the same again for industries, societies, or individuals.

**Q According to you, what kind of policy changes or support does MSMEs need during such time to revive?**

Policies must be supportive of creating demand in society. The economy depends on consumption. It's clear that policymakers must form policies around increasing consumption. Further, low-interest rates and tax benefits will support MSMEs.

**Q There has been lots of discussion about the disturbing supply chain globally and now companies are looking to diversify their resources to multiple countries instead of depending on one country. Do you think such a scenario will benefit India?**

COVID-19 pandemic and geopolitical disruptions can turn into greater opportunities. Think beyond mitigating the impact of the crisis, and about opportunities that may ascend for India from global disruptions. In the middle of difficulty lies opportunity.

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China-US trade war had already made global companies nervous about keeping the majority of their manufacturing in China. The COVID-19 pandemic has further encouraged and augmented their plans to broaden the horizons of their manufacturing capacities beyond China.

As a result of COVID-19, the supply chains are completely disturbed and this has become a point of extreme concern for global firms to look for new manufacturing avenues as a part of a de-risking strategy for the future. Several industry segments have realised the downsides of being excessively dependent on any single country and are looking to expand in different geographic locations for spreading manufacturing facilities.

This offers a lot of opportunity for India. We must create a manufacturing-friendly environment and offer level playing fields to global manufacturing companies for setting up their shops in India. To emerge as a strong contender, India must act proactively to create an environment that is favourable to global manufacturing so that World considers India as a trusted supply chain partner. India needs to capitalise on this opportunity. Vietnam, Indonesia, Thailand, Malaysia, Cambodia, Singapore have also emerged as noticeable viable options as manufacturing.

**Q What policies will be required to attract maximum investment in the country?**

India to become a preferred global manufacturing hub, we must carefully study what made China highly successful in the last two decades. We must learn from China's experience and create an encouraging and advantageous ecosystem.

Following aspects must be seriously taken into consideration so as to emerge as a global manufacturing powerhouse:

1. World-class infrastructure
2. Logistics
3. Government policies must support various sectors and must facilitate greater foreign investment – reforms in tax, labour laws, land availability, transparency and stability
4. Strong R&D
5. Innovation
6. Skill enhancement
7. Ready large pool of skilled human resources – availability of specialised resources
8. Greater automation – merging IT and OT is becoming a greater norm.

**Q What should tool makers and other manufacturing SMEs do to tackle the situation?**

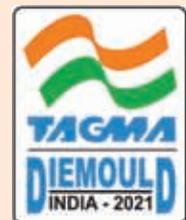
As mentioned, SMEs must think far ahead and adopt new technologies, new processes. SMEs also think seriously of a collaborative, sustainable approach within the industry. 🌈

## Announcement Regarding Die Mould India

**To All Exhibitors,**

The postponement of the 12<sup>th</sup> edition of Die & Mould India International Exhibition was announced in March 2020 along with the revised dates of the exhibition. However, due to the unprecedented turn of events, owing to COVID-19, the global scenario has drastically changed, affecting the entire world. India is no exception, with all major cities and towns, under the impact of COVID-19.

In view of the above, the chances of holding DMI 2020 looks grim in the year 2020. We have received requests from Exhibitors requesting postponement of the exhibition in 2021. Hence, in the best interest of all the stakeholders, TAGMA Executive Council has decided to further postpone the 12<sup>th</sup> edition of Die & Mould India International Exhibition, rescheduled in August 2020 to April 2021.



**The exhibition will now be held from 28<sup>th</sup> April to 1<sup>st</sup> May 2021  
at Bombay Exhibition Centre, Goregaon, Mumbai**

We look forward to support from all the stakeholders to cooperate with us in our decision. We are confident that we all will emerge victoriously and there will be positive stride for the entire industry.

Regards,  
**D K Sharma**  
President  
TAGMA India

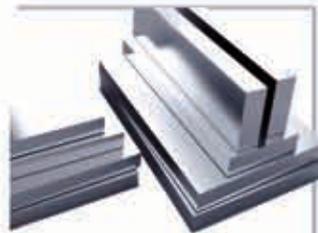
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# “Innovate and be aggressive”

**“I have always been optimistic that India stands to gain, but only if we act fast and act bravely. We need to innovate, we need to create products that can be consumed locally as well as exported,” says Amar Kulkarni, Vice President – Sales, PolyWorks India Pvt Ltd**

work will begin only when shopfloors start functioning again. We have a great team of young and dynamic people, there have been a lot of “fun at home” activities apart from work which has helped keep the mood upbeat.

**Q In this challenging and uncertain times, how are you trying to keep yourself productive?**

Indeed these are uncertain times and came with very little time to respond with a systematic action plan. Several activities have been undertaken, we are also developing the necessary aptitude to adapt to the changes. One of the major challenges is to balance work and family time while working from home. On the other hand, reaching out to customers digitally has enhanced our speed and outreach. In all, we are still adapting to the changes. We will focus on productivity and efficiency when the time is right.

**Q What are the various measures you have adopted for your company to utilise this time?**

As our work is software-driven, we are constantly in touch with our customers. A high number of customers identify our offering as a solution to their current problems, everyone wants to be digitally connected and that’s exactly what we offer. So I can say we’ve been busy demonstrating our software products as well as training for customers. However, most of this is of academic interest since the real

**Q The most important lesson you have learned from the COVID-19 outbreak ...**

For me, the lesson is that your best plans can go awry in the most unexpected way. One has to be prepared to adapt to changes very fluidly.

**Q What will manufacturing’s new normal be after COVID-19?**

I think social distancing is here to stay for a while. But I think digital communication will be the new normal. Suppliers will not be asked to visit unless there is something that cannot be solved online. According to me, Web meetings, video calls, mixed/augmented reality tools are here to stay. Also, I think manufacturing companies will now be looking at micro-automation, to minimise human dependency to some extent.

**Q What policy changes or support MSME needs in such a challenging time to revive?**

Liquidity will be one of the biggest challenges. I think any government measure to churn liquidity back into circulation is most welcome. Within the supply chain, I believe that purchase transaction should avoid credit so all downstream parties that are at high risk, are protected. If we can build



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an engine that works by the financial transaction at the point of sale, MSMEs will recover much faster. Right now, any delay in payments to MSMEs adds to the pressure brought in by the shortage of orders.

**Q There have been discussions about the disturbing supply chain globally and now companies are looking to diversify their resources to many countries instead of depending on one country. Do you think such a scenario will benefit India?**

I have always been optimistic that India stands to gain, but only if we act fast and act bravely. We need to innovate, we need to create products that can be consumed locally as well as exported. Surely some turbulence will be caused by the shifts in the global economic supply chain coupled with changes in value systems of buyers. It's too early to strategise, but if we can be innovative, Indian companies could cause disruptions that bring in new businesses.

**Q What kind of policies will be needed to attract maximum investment in the country?**

At such times, mere policy changes won't be

enough. We need a shift in perspective. A complete transformation is now possible.

We must develop a quality standard that can be boasted of and pitched as a selling point. Just like the Swiss made a name for high precision, India must make a name for high quality. In the coming days, buyers will place their values very differently. Buyers will want to be sure they get the maximum result. If they're assured of high quality, it takes the focus off "cheap production" or "cheap manufacturing" then the popular "frugal engineering" and overall engineering strengths can help further.

"Made in India" should mean high quality.

**Q What can tool makers or any manufacturing SMEs do to tackle the situation?**

Innovate and be aggressive. Try and experiment with all things new. New products, new industries, a new approach to engage customers/ suppliers, and new ways to go to market. Now is the time. There is not much to lose, but there could be very high gains if we hit the right spot. 🌈

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### “Industry should be ready to capitalize the opportunity”

World won't be same after COVID – 19. There will be irregular production schedules and one must be prepared for it. Large production numbers will be luxury. One has to manage cash flow , inventories and production cycles with small batch sizes,” says **Sachin Nirgudkar, Director, Industrial Interface India**

**Q In this challenging time, how are you trying to keep yourself productive?**

Yes, its indeed a unique situation we are facing. Apart from economic uncertainty, we will also have our social fabric altered. The new norms of “Work from Home” are different and one must follow some schedule to be productive and effective. Two main soft-skills needs to be honed, time management and communication. This will help you in improving your productivity.

**Q What are the various measures you have adopted for your company to utilise this time?**

We have to quickly adopt new norms of work from home. Adequate infrastructure was arranged for this like laptops, high speed internet connections to make sure communication is clear and effective.

Constant communication with our customers at all levels to keep them informed about our company plans and also understand their requirements. Also new roles were defined. Admin / HR were given additional responsibilities of communicating with government bodies to understand lockdown procedure and arrange adequate manpower when permitted. Also, great emphasis was on “how to restart operations” with safety and social distancing norms.

**Q A most important lesson you have learned from the COVID-19 outbreak**

Most important is “As an organization we need to be agile. We anticipate similar shocks in future and our organization should be able to deal with it. We need to develop mindset of every team members to be agile in thinking.”

**Q What will manufacturing's new normal be after COVID-19**

World won't be same after COVID – 19. There will be irregular production schedules and one must be prepared for it. Large production numbers will be luxury. One has to manage cash flow, inventories and production cycles with small batch sizes.

**Q What policy changes or support MSME needs in such a challenging time to revive back?**

Main support required is in terms of credit and working capital finance. Also support required for labour welfare schemes.

**Q There has been lots of discussion about the disturbing supply chain globally and now companies are looking to diversify their resources to many countries instead of depending on one country. Do you think such a scenario will benefit India?**

It will benefit India to certain extent. But bigger challenge is, our industry should be able to utilize this opportunity. We have internal issues with manufacturing industry which needs to be addressed first before venturing or claiming global opportunities.

**Q Also, what all policies will be needed to attract maximum investment in the country?**

We are still not manufacturing friendly country. Our laws need to be industry friendly. Labour reforms, land reforms need to be implemented on priority. Also, availability of natural resources must be ensured for industry to flourish.

**Q What tool makers or any manufacturing SMEs should do to tackle the situation.**

**Consolidate:** Consolidate your operations, do not pursue new initiatives or expansions.

**Concentrate:** Concentrate on your core business and key customers. Keep them happy and satisfied.

**Competitive:** Improve your competitiveness, improve efficiency, reduce rejections

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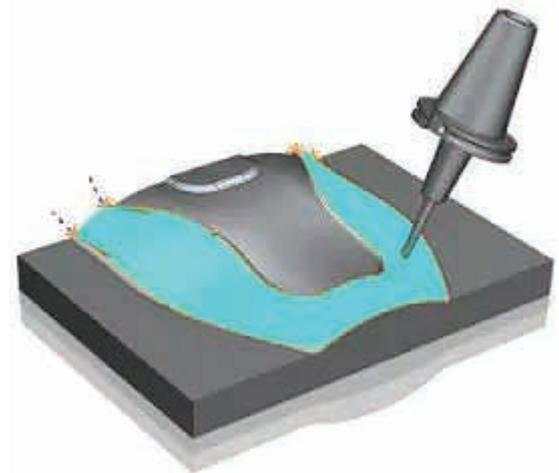
# Six Ways to Make 5-Axis Machining More Productive



For a lot of shops, the limitation in 5-axis machining is not so much in their equipment, but in their ability to efficiently generate part programs that make the best use of today's machining centers and cutting tools. But with advances in CAM software, those imitations are falling quickly if shops are willing to avail themselves of the newest programming technology.

CAD/CAM developer Siemens Digital Industries Software has made the continuing development of five-axis machining capabilities with its NX CAM software a priority and has a lot to say about what strategies will best enhance both the programming and machining processes. Whether you do die/mold work, aerospace, medical, energy or production machining, here's more on what you should look for in the newest innovations in this very productive technology.

## 1. Guiding Curves tool paths follow the flow of surface topography for smoother surfaces



■ Guiding Curves applies tool paths directly on the machining area with full control of the tool path flow

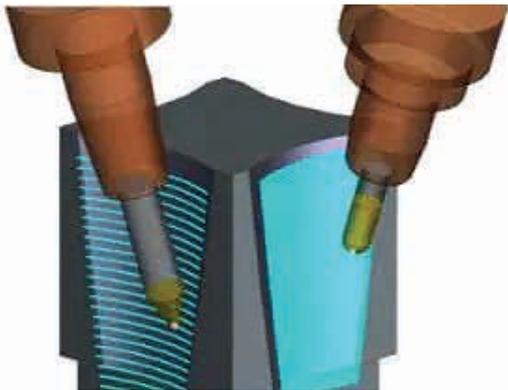
Guiding Curves is a finishing operation that lets you create 5-axis tool paths directly on the machining

All manufacturers are under pressure to make their operations more efficient. That means getting more from your investments in both production equipment and people. Automation is increasingly part of that equation but for many shops, the topmost priority is getting more from the equipment they already have.

One area where shops are seeing significant returns is with five-axis machining centers. It's not just about machining complicated parts more quickly and to higher quality standards. It's also about doing more to finish a job in a single setup. Being able to get at multiple sides of a part as well as 3D intricate workpiece features can pay huge dividends in reduced total cycle times while delivering better dimensional accuracy, surface finish, and tool life.

area with full control of the tool path flow. No more creating projection surfaces in CAD and then trying to figure out which direction to project the tool path on the machining area. You have access to precise tool axis control whether you want to stay normal to the surface, interpolate between several tool axes, lock an axis and so on. It also automatically provides tool path smoothing as the path moves from one position to the next.

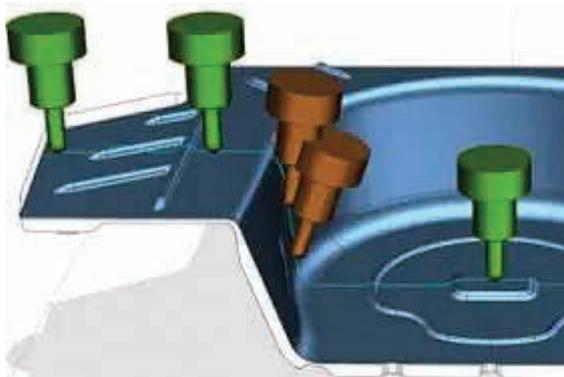
## 2. Barrel Cutters more efficiently shape curved and sloped surfaces



- Barrel cutters (left) more efficiently machine sloped and slightly curved walls with much larger stepdowns in comparison to ball nose end mills (right).

Barrel cutting tools are used for a variety of machining operations, but what they are really good at are roughing and finishing flat and slightly curved walls in 5-axis machining. Because of the shape of the barrel tool you can get the same and usually better surface finish with a much bigger step down. By using these tools for advanced cutting strategies you can reduce machining time of some features by as much as 70% compared to machining with ball nose end mills.

## 3. Automatic 3-to-5 Axis Tilt avoids toolholder collisions

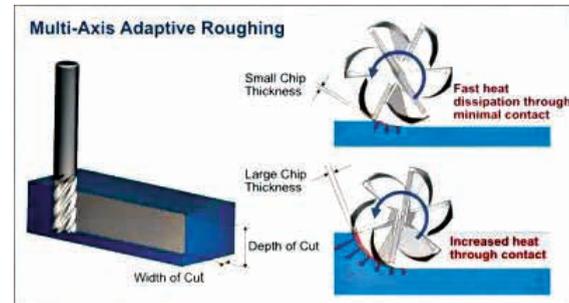


- Automatic 3-to-5-Axis Tilt adjusts the tool vector for situations where the toolholder or spindle would collide with adjacent surfaces.

One of the great advantages of 5-axis machining is the ability to tilt the tool away from pocket or cavity walls to avoid tool holder or spindle collisions. This allows the use of much shorter tools which enables more aggressive machining yet with reduced vibration and better surface finish. This is an ideal strategy for parts with deep cavities and fine features next to tall walls. With a 3-to-5 axis tilt feature in CAM, you can program the tool path in a more familiar 3-axis mode and the software will then automatically adjust the tool vector for situations where the tool holder would collide with adjacent surfaces.

JK Machining, a Michigan-based manufacturer of top-quality class 101 molds, is leveraging this 5-axis cutting method. Using shorter tools and higher cutting speeds, JK slashed their machining time by as much as four times. Additionally, the reduced chatter helps them machine high-quality surface finish. Go here for more on JK Machining.

## 4. Multi-Axis Adaptive Roughing reduces cycle times



- With a smaller stepover but much larger depth of cut, Multi-Axis Adaptive Roughing enables faster feeds and higher metal removal rates.

Whether dealing with a mold cavity or a prismatic shape, the fastest way to remove material is with a high-speed, adaptive roughing cycle. First off, with a 5-axis process, you can get closer to the semi-finish shape of the part which can significantly reduce finishing cycle times. Add adaptive milling and the total cycle time reductions can be dramatic.

With adaptive milling, you reduce the radial depth of cut (stepover) to less than 25% of the tool diameter but significantly increase the axial depth of cut. Because chip thickness is now much smaller than the centerline feed per tooth, you can substantially increase the feed rate. This results in light, fast cutting action, enabling more aggressive cutting and faster metal removal rates, which can reduce machining time by up to 60%. It also generates less heat and vibration in the cutting zone, which in turn supports secure, predictable cutter wear.

# Machining Mantra

The key to making this process work is the ability to maintain a constant cutting force throughout the roughing routine. For example, running a tool into a corner suddenly increases material engagement and causes cutting forces on the tool to spike. This and other rapid changes in cutting force create shocks that can lead to chipping, poor surface finish, and substantially reduced tool life. With Adaptive Milling, the toolpath is automatically altered to maintain a constant chip load which results in faster, smoother cutting. The technique is particularly beneficial in roughing cores and cavities in tool steels as well as pocketing in HRSA materials such as Inconel and titanium. It combines high metal removal rates in these difficult materials and longer, more predictable tool life.

## 5. Turbomachinery Milling machines impellers and blisks in half the time



■ Turbomachinery Milling simplifies programming of multi-bladed rotational parts such as impellers, blisks, blades and shrouded turbines.

Siemens NX software's Turbomachinery Milling simplifies the NC programming process for machining complex 5-axis multi-bladed rotational parts such as impellers, blisks, blades and shrouded turbines. With a suite of process-specific functions specifically designed for these kinds of parts, NX CAM's Turbomachinery Milling enables optimized part programs to be created more quickly with substantially shorter cycle times, better surface finish and longer tool life.

### New advancements to Turbomachinery Milling include:

- ▶ Multiple Stripe Cut Level Support which allows for precise dividing and blending of surface segments on turbomachinery blades. The stripe cut levels feature allows the tool path of the blade to be broken into top, intermediate, and bottom sections that can be independently controlled and then seamlessly blended between the separate cutting operations.
- ▶ Multiple Stripe Cut Level Support allows the segmenting of blades to optimize machining for those surface zones

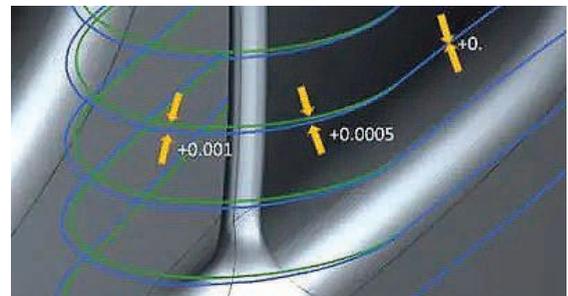
- ▶ Tangent Barrel Tool Support brings the same benefits that barrel cutters provide to mold and prismatic part machining to blades and other spline curved walls. These surfaces can be machined more than 50% faster compared to finishing with ball nose end mills, and with better surface finish and tool life.



■ Multiple Stripe Cut Level Support allows the segmenting of blades to optimize machining for those surface zones



■ Tangent barrel cutting with Siemens NX Turbomachinery Milling



■ Custom Stock Offsets allows precise control over the amount of material left behind.

- ▶ Custom Stock Offsets allow you to adjust the amount of material left behind on the blade for precise control of stock removal in semi- or final-finishing operations. This advanced function, used by aerospace engine manufacturers that have stringent tolerance requirements, enables highly-accurate machining that can compensate for the thin blades' flexible deformation during the cutting operations.



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Max.Workpiece weight(Kg)	6000Kg
Oil Tank Capacity	1000L
Filter precision	5um
Best surface roughness	Ra≤0.2um
Min. electrode wastage	≤0.01%
Working efficiency	≥800 mm <sup>3</sup> /min
Operation system	Windows
Machine net weight	10000kg
Machine dimension	3100*3800*3100 mm

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## 6. Turn Milling provides better utilization of multitasking machines

Not all 5-axis processes happen on 5-axis milling centers. Particularly with larger round casings, shafts and other difficult-to-machine components, executing 5-axis machining on a turn-mill center often will be the most efficient way to machine complicated workpieces in a single setup.



■ Turn-milling is an excellent technique for machining circular or conical shaped surfaces with feature obstructions.

Turn-milling is an excellent technique for machining a lot of material quickly out of circular or conical shaped surfaces with feature obstructions – such as bosses and split seam flanges. These operations can be accomplished with indexable, solid, ceramic, carbide, round, high feed, and wiper tools. This makes turn milling an ideal solution for roughing and finishing with excellent surface tolerance and finish when a wiper inserted tool is used.

With turn-milling, cutter positioning in relation to the part surface is critical. It is important in most applications to cut the material on the leading edge of the cutter. This will prevent back cutting of the part surface, improving cutting conditions that can prolong tool life.

### What's next for multi-axis machining?

One emerging alternative is using robots for machining certain kinds of parts. Why? For one, robots enable cost effective machining of much larger workpieces where you can bring the machining envelope to the part rather than the other way around—for example, to drill holes in an aircraft

wing or fuselage. Robots are also able to execute post-machining operations such as polishing and deburring that would otherwise require manual work, and improve the accuracy and quality of those operations as well. This enables both machining and finishing in a single automated process. In an automated work cell, robots can be used both for machine tending and machining, or maybe replace a very expensive machine tool altogether.

But are robots accurate and rigid enough for real machining operations? The latest generation of robots has made great strides in this regard with the ability to perform accurate high-force machining, and development is ongoing. In one project Siemens is working with the Technical University of Munich to the machine to very high levels of precision (see video). Employing a digital technology called simulation-based force compensation, they have been able to achieve tool path accuracy of 100 microns ( $\mu\text{m}$ ). With results like this robotic machining is poised to serve a growing range of applications.

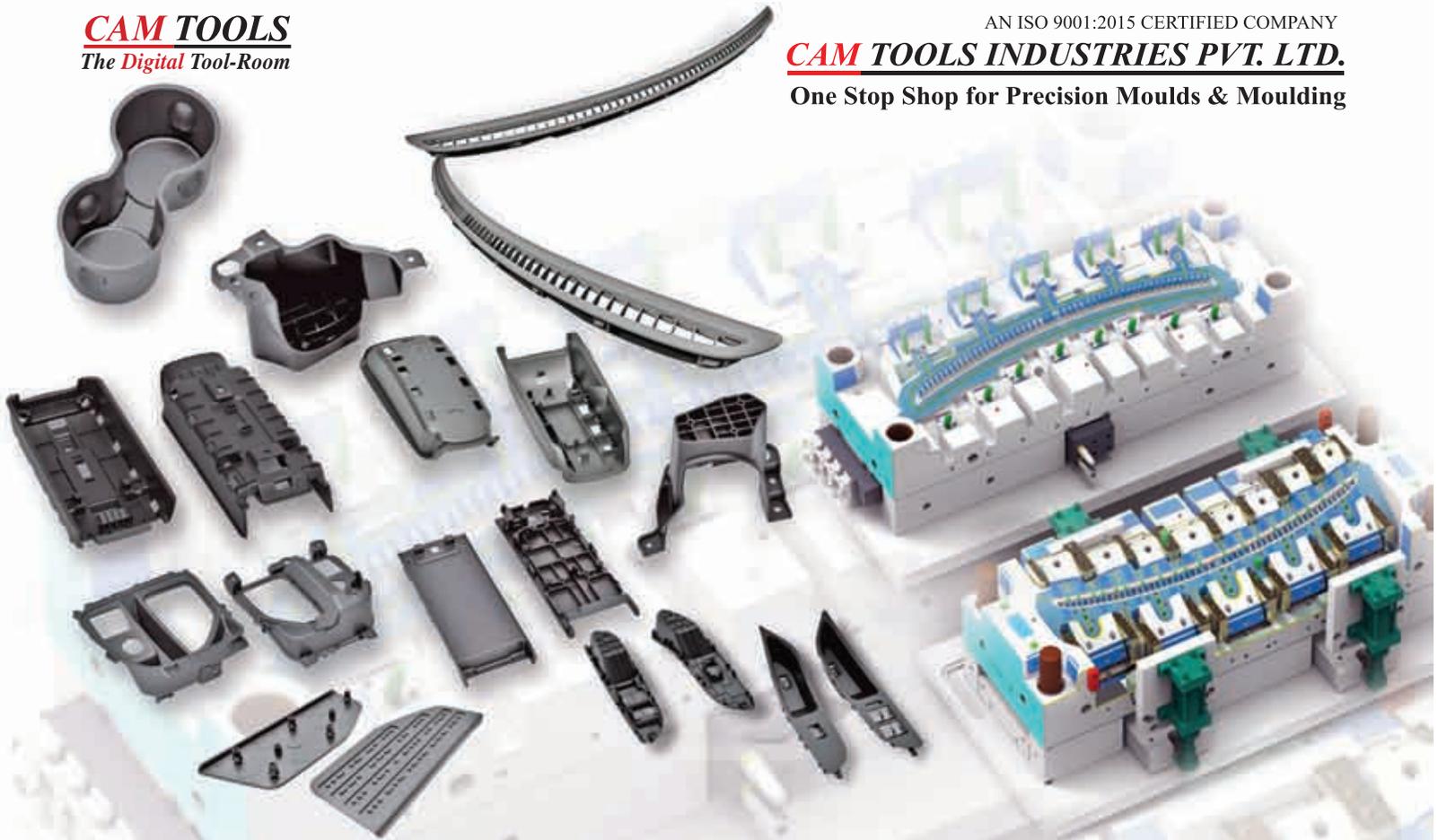
### The Best Process for the Job

Whether you are a job shop or a product line manufacturer, mastery of 5-axis machining can provide a strategic advantage to your business. You can produce complex parts with fewer operations and setups. In many cases, you can reduce machining time and improve tool life, while improving part quality. And you can cut production costs and deliver parts faster.

There was a time when making the most of an investment in multi-axis machining could be severely limited by the time and difficulty required to create efficient programs that truly capitalize on the capabilities of this equipment. That time has passed. With today's best CAM technology you can realize the full promise of 5-axis machining with an ROI that surpasses many other machining methods. 🌈

### Article Courtesy:

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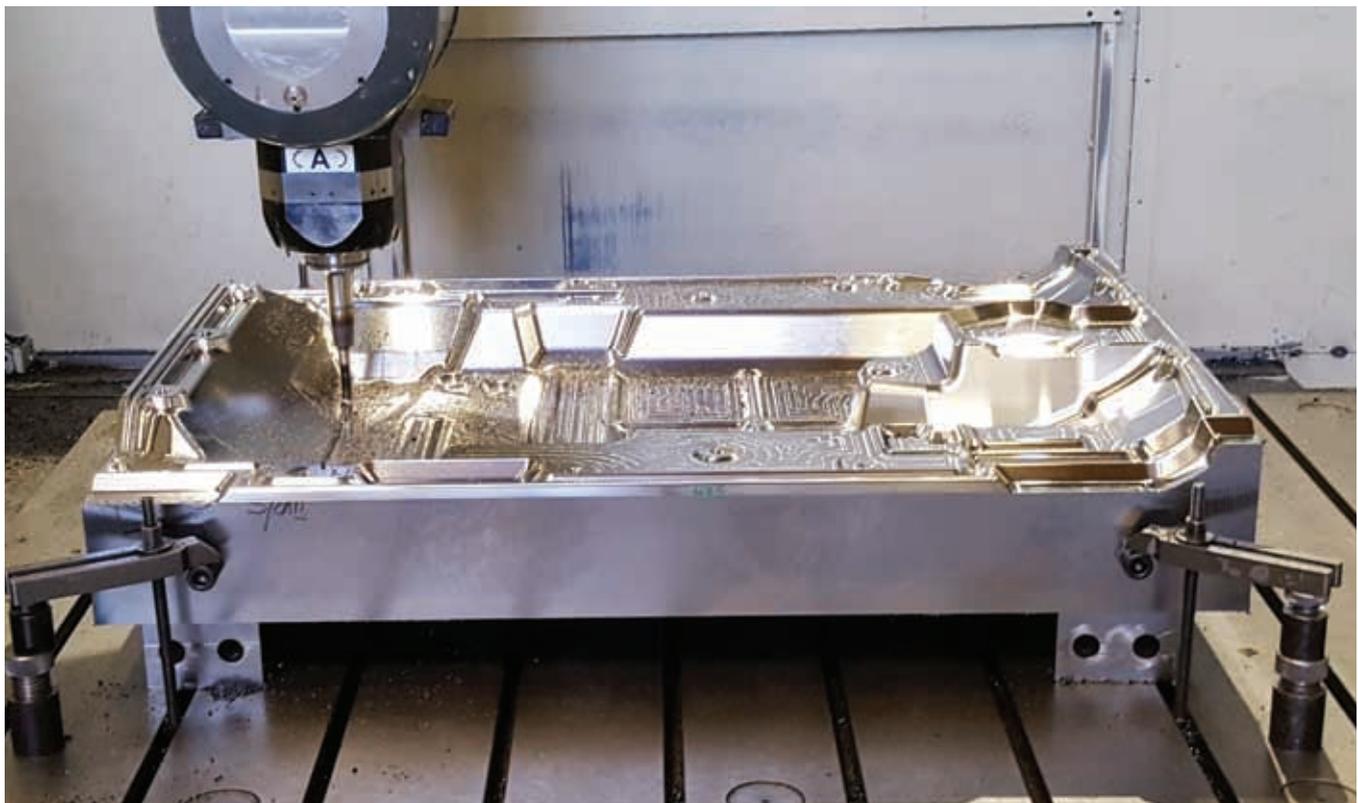
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# WORKNC Automates Mold Maker's Weekend Production

Julien SA's Finishing Machining Times Slashed From 32 Hours To 14



**A** mold maker serving the automotive industry says WORKNC software gives them a distinct advantage, setting them apart from their competitors with superior lead-times, quality and expertise. And as a Beta tester for WORKNC, they found that a new item of functionality, subsequently introduced into the latest release – 2019 R1 – slashed their finishing machining times by more than half on certain parts.

Operating from three sites in France and one each in Turkey and Slovakia, Julien SA manufactures molds for interior linings, boot compartment trim, and roof linings, along with parts for soundproofing, foamed parts, and aluminum and textile thermal barriers.

They mainly produce single order parts, or two to three small series molds for foam parts. Based at the 10,000 square-metre head office in Le Creusot, France,

Programming Manager Sergio Couto is responsible for preparing production and implementing the product manufacturing process. His department takes the lead on a range of aspects such as technical issues, monitoring and quality control for tooling production.

Although they make a small number of molds for the aerospace industry, most of their customers are major automotive groups who need tight turnaround times. Using WORKNC's powerful CAD and CAM capabilities, he says practically nothing is impossible from a technical point of view.

The software is installed on seven computers on the company's network, and drives three 5-axis machine tools: a Breton, Durango and Rambaudi; and four 3+2 machines: a Goglio, FPT, Anayak and Soraluces.

Explaining how WORKNC is an integral and vital part of their full production operation, he says the process begins after their programming team receives an assessment from the engineering office with the purchase order. "Firstly, we analyse the CATIA file of the part to be produced, allowing us to isolate items which need to be precise, and to determine what's feasible.

"With the aid of WORKNC's CATIA interface we can re-establish the CATIA construction tree, which is crucial, as that data is of paramount importance to our business. WORKNC is one of the rare applications which allows this."

**“It means the workshop operates 24/7. From midday on Friday and over the weekend, it is fully autonomous, with automatic tool changing and head rotation. We couldn't do that without WORKNC.”**

**Sergio Couto,  
Programming Manager – Julien SA**

They then turn their attention to the number of parts they need to produce, and create the models in WORKNC, adding offset allowances, and any other details required for accurate machining.

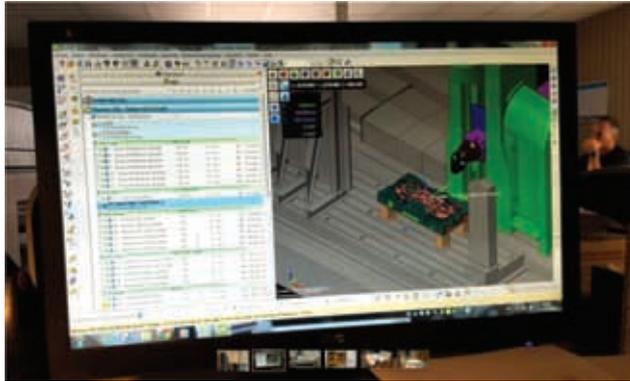
"The next step is to prepare the production phase and run toolpath calculations. We establish machining schedules and adapt WORKNC toolpaths to the specific machine being used."

However, Sergio Couto says that occasionally they don't know which machines will be available, meaning they need to generate generic toolpaths. "This highlights the importance of Machining Contexts in WORKNC, because we often have to switch to another machine at the last moment."

The final phase is in the workshop, where WORKNC's simulation function validates the process before the machines start cutting metal. And he says WORKNC's



# Case Study



powerful programming allows them to undertake lights-out machining. "It means the workshop operates 24/7. From midday on Friday and over the weekend, it is fully autonomous, with automatic tool changing and head rotation. We couldn't do that without WORKNC."

As a Beta tester for WORKNC, Julien SA trialed a new finishing strategy which allows users to break free from previous constraints caused by tool shapes, and it has slashed their machining times by more than half. As a result of the trials, WORKNC 2019 R1 adds the Z-Level pattern to the Advanced Toolform technology, allowing for tool shapes like barrels, ovals and parabolic to be calculated over the part surfaces, including negative allowances.

Sergio Couto says the results of using the Advanced Toolform strategy with circular-segment cutters compared to traditional methods, are indisputable, having reduced their finishing machining times from 32 hours to 14.

WORKNC, part of the Production Software business of Hexagon Manufacturing Intelligence, is fully integrated into every machining phase – analysis, comparison, simulation, machining and verification. "Today, we also use it to transmit data to the workshop, through WORKNC Viewer.

## Key benefits achieved

- Set the business apart from their competitors with superior lead-times, quality and expertise
- Using WORKNC's powerful CAD and CAM capabilities practically nothing is impossible from a technical point of view for the business
- Allows them to re-establish the CATIA construction tree, which is crucial
- WORKNC's powerful programming allows them to undertake lights-out machining meaning the workshop operates 24/7

Summing up the benefits of using WORKNC, Sergio Couto says toolpath calculation times are no longer an issue. "We manufacture some large parts – 2m x 1.5m – and it's very rare that calculation times are longer than eight hours for all roughing, finishing, rest material, corner re-machining and mechanical operations such as drilling and pocket machining. And it's a user-friendly application that's so easy to learn...even for our employees who've never done any programming before."

The company has also invested in a mobile measuring arm from Hexagon, to make precise measurements at different stages of the manufacturing operation. They use it to make immediate decisions to either modify or continue the process when a doubt arises, which he says guarantees security, saving time. "This all helps with the precision we need to actually manufacture the part, ensuring it's of high quality, and that it can be cleanly and accurately trimmed, which is particularly important for its final appearance, as many of the parts coming out of our molds are visible to the end user in the vehicles." Concluding, he explains why they first invested in WORKNC in the 1994, and how it has developed since then: "In the 90s mold makers started receiving files from India and China, in which radii and planar surfaces didn't conform to the original part, and it was no longer possible to program with CATIA. Even back then, WORKNC could rapidly generate a toolpath, irrespective of a part's complexity, and imperfect surfaces.

"WORKNC has developed in line with requirement of milling operators, who had previously programmed toolpaths directly onto the machine tools. We have total confidence in working with it on a daily basis, and it helps us to take issues such as holidays, sickness absences and machine downtime in our stride. It means we can set ourselves apart as a mold makers, ahead of our competitors." 🌈

# Preventive Measures of Probing System After the Lockdown

1) Power On the m/c.

2) Call the probe in spindle

3) Select the Probe ON program or type Probe ON M code in MDI and execute.

4) Check the LED sequence at Probe and Receiver for battery Ok or not.

5) On probe continuous RED LED blinking means battery charge is empty and to be replaced.

Colour	LED (7)			
		Standby		
GN	GN	GN	GN	Stylus initial position
RD	RD	RD	RD	Stylus deflected
GN	BU	GN	BU	Stylus initial position - battery low
RD	BU	RD	BU	Stylus deflected - battery low
RD				Battery empty

6) Use the Blum recommended batteries only.

7) Check the runout on stylus ball with using the Lever dial indicator 0.002 mm.

8) If runout more 0.01 mm, set the runout without damaging the centring screws.

9) Use master gauge (Calibrated ring gauge) for calibration.

10) Execute the probe calibration programs for X,Y and Z axis.

Article Courtesy: Blum-Novotest Measuring & Testing Technology Pvt. Ltd.

# What Mold Do You Fit Into?



**T**he plastics industry, understandably so, is a rather diverse industry; not unlike other large global industries. It is comprised of companies and organizations of all shapes and sizes, usually differentiated by organizational structure or revenue. Aside from the typical size comparisons of companies, the diversity extends outward in a great number of ways and categories (i.e., output product type, machine type, injection/extrusion/blow, industries serviced, supplier/mold maker/machine manufacturer/part molder, etc.); so much so that I wouldn't pretend to be able to

cover even a small fraction of it in this post. What I do want to chat about this month is more in line with the self-assessment or self-classification of the company that you currently operate. In essence, let's talk about "What is your buying type"?

Now I'm not referring to a business's stereotypical purchasing process (usually listed at somewhere between 6 to 8 steps). I'm talking about the type of behaviors or patterns that drive your plastics organization to make purchasing decisions (outside of the actual triggering event) and what type of

purchases may result from those decisions.

While this may seem like a rather deep topic for a Milacron Machine Minute, it is no less an important consideration that should not be overlooked or at the very least self-assessed and recognized. However, I will not go into the pros and cons of each buyer type. Instead I will venture that you are all smart enough to see the pitfalls and positives of each buyer type and their potential purchasing decisions.

**Here are 5 types of buyer mentalities and some of the correlating purchasing types:**

**1. Profit or Gain:**

This buyer classification bases many of its buying decisions on the desire to:

*Save money; make money; economic conditions; more profit; more sales; longer wear if available*

This buyer type usually wants to stretch out their plastic machinery dollars by fixing existing machinery, or rather retrofitting or rebuilding existing machinery close to or at new machinery standards or features.

This buyer type can also be prone to buying cheaper material or machinery in the short term to prop up short term profits or if it fits with their supplier cycle type. Often these purchasers are in custom molding or more rapidly developing segments of the industry.

**2. Fear of Loss:**

This buyer classification bases many of its buying decisions on the desire to:

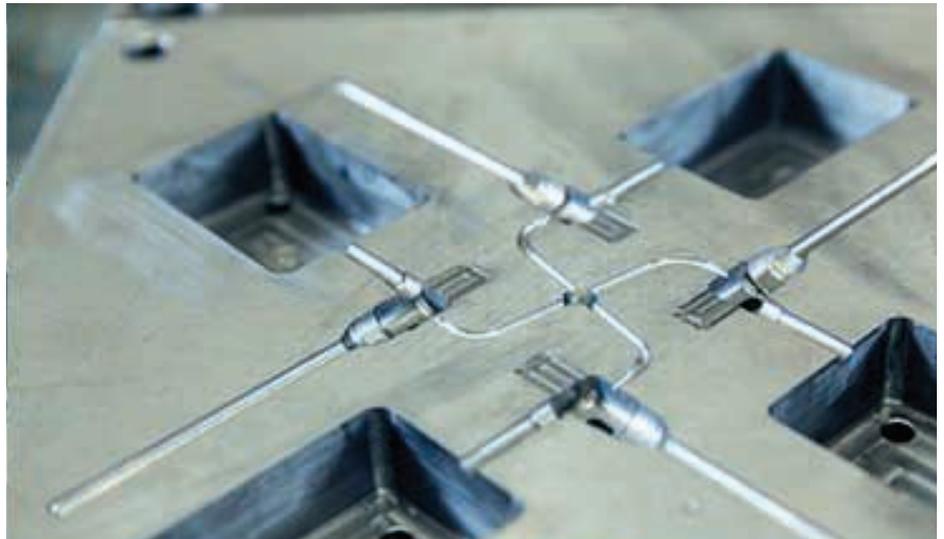
*Reduce costs; prevent loss; guarantee; safety; save time; protect property, long wear; security; no risk; no blame; insurance.*

This buyer type is very careful and cautious in their consideration and purchasing of machinery and auxiliaries. They are usually a bit more conservative in their buying and sourcing processes which can lead to longer decision making timelines in order to vet compatibility and appropriate integration with existing internal systems and processes.

This buyer type is prone to buying for longer term and sometimes more versatile production lines with cost being central only second to quality/durability.

**3. Comfort and Pleasure:**

This buyer classification bases many of its buying decisions on the desire to:



*Achieve or maintain comfort; improved employee morale; keep and attract better employees*

This buyer type is sometimes misunderstood for some of its purchasing decisions, in that while comfort and convenience are somewhat central to their motivations in purchasing; they are still based on solid business foundations of progress and profit. Many of the purchasing decisions for this buyer type are underpinned by the need to incorporate newer technologies and systems to make existing processes or procedures more streamlined, easier to maintain, more efficient and less laborious. Another interest for this buyer type is that of automation and full system or cell development, and not just a singular component.

This buyer type very much embodies the phrase; “working smarter, not harder” while enjoying the principle advantages of newer technology and automation.

**4. Avoidance of Pain:**

This buyer classification bases many of its buying decisions on the desire to:

*Protect; relief from pain; less work; save time; security; safety; no worry; reduce loss*

This buyer type is rather similar to the previous in terms of working smarter and eliminating pain points in their workflow process. However this buyer type is equally if not more so motivated by the loss of time and loss of money due to downtime. While fear is a heavy motivator for this buyer type, it is no less significant as this buyer type works continually to streamline efficiencies in their existing systems while attempting to stave off future problems.



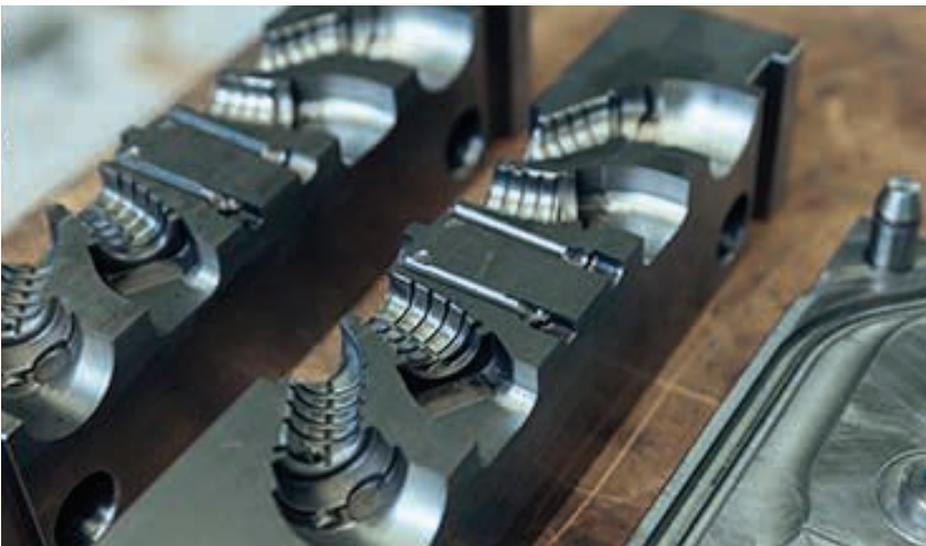
This buyer type is very much interested in maintenance plans, and full service contracts with suppliers to eliminate potential future shortfalls in equipment or market changes.

## 5. Pride and Prestige:

This buyer classification bases many of its buying decisions on the desire to:

*Social acceptance; desire to possess; high quality; learning; advancement; admiration; imitation; self-improvement; honors; recognition; leadership; improved product; beat competition; higher sales; good public image*

This buyer type is generally motivated to be at the top of each category in their industry segment and to be viewed as such, but not at cost or loss to their bottom line. This buyer type wants the best of everything and from every supplier. They also want to be seen by the industry as the promoter



for themselves but as a promoter for their industry segment as a positive application of technology, automation, processes and supplier chain management.

This buyer type looks at purchases that will not only meet their current needs, future needs but also at the brands they purchase from and value or advantage (real or perceived) they will bring in attracting new business.

## Wrapping it Up

While most plastics manufacturers will not fit neatly into any one particular buyer type, it's important to understand what drives and motivates you as a business in the plastics industry. This sort of shallow dive into the behavioral economics of how and why we buy from other plastics industry suppliers and manufacturers, can help us understand where we are (categorically speaking) and what we might want to change.

Change you say? Not every molder or manufacturer wants to change their buying behaviors let alone sees the need to change. There are a number of different ways companies have approached the sourcing and purchasing of machinery and materials in this industry with varying degrees of success and failure. It's also probably fair to say that there isn't any one perfect buyer type or mentality either. However, I would argue that not every company is looking at the full lifecycle and management of the machinery they purchase either, and how much more they can get or could get from their machinery purchases.

Understanding this should definitely inform you as to why you are buying the machines and services you are currently purchasing. While the majority of the plastics industry is very much a cost-consensus industry, there are undoubtedly other factors to consider and that are being considered when making buying decisions. 🌈



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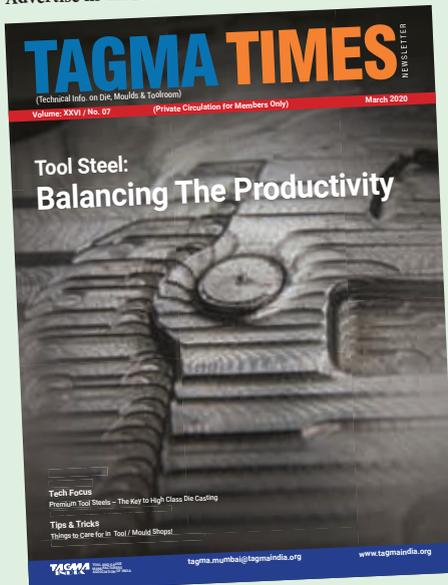
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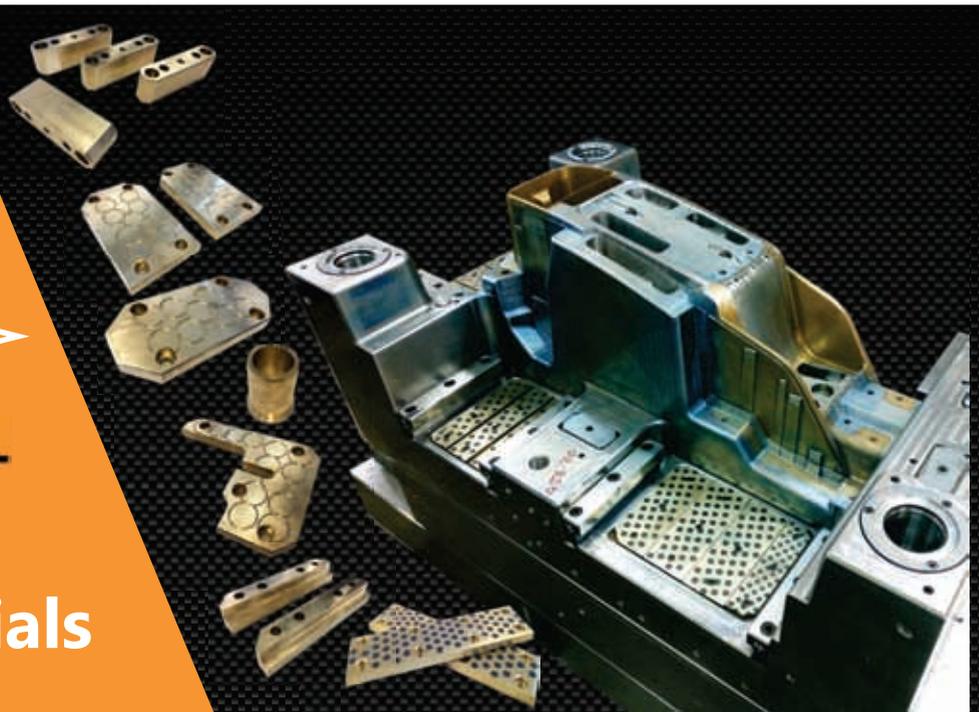
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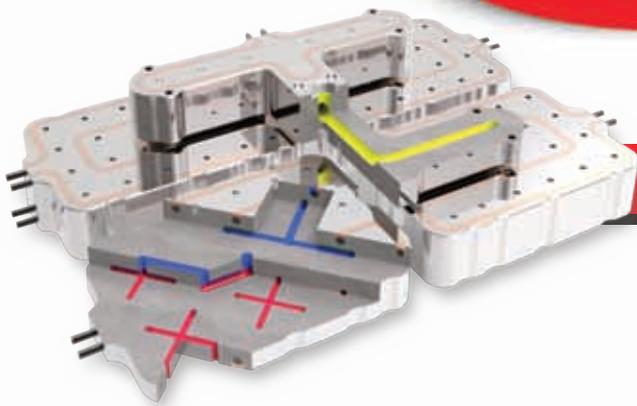
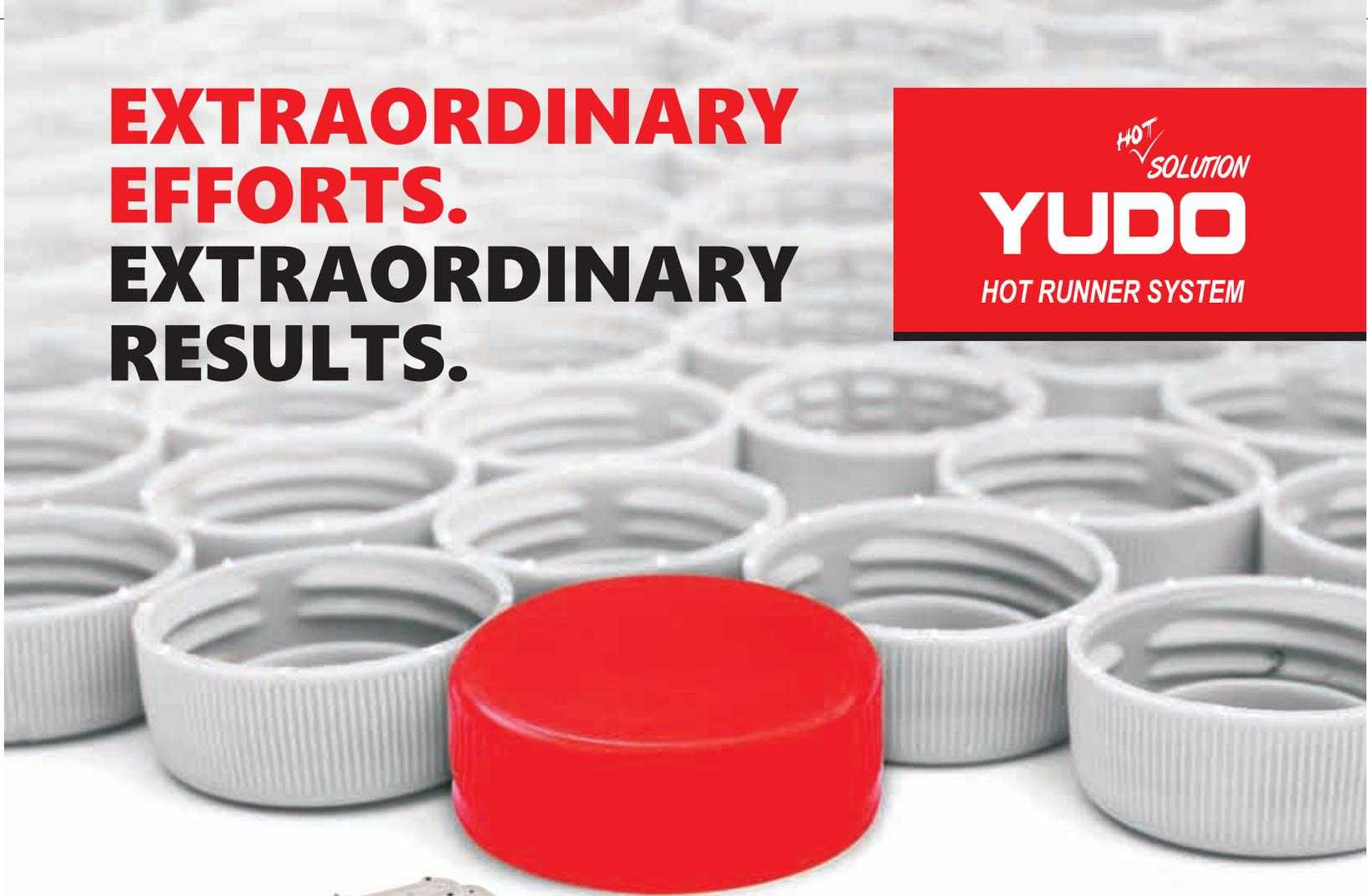
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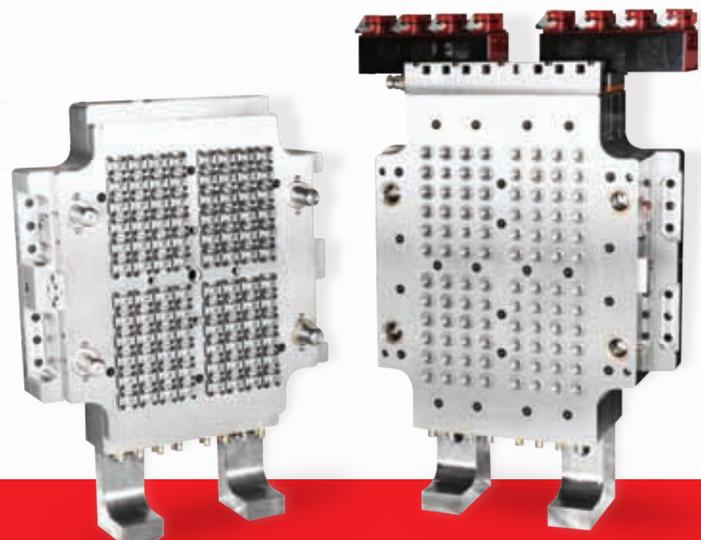
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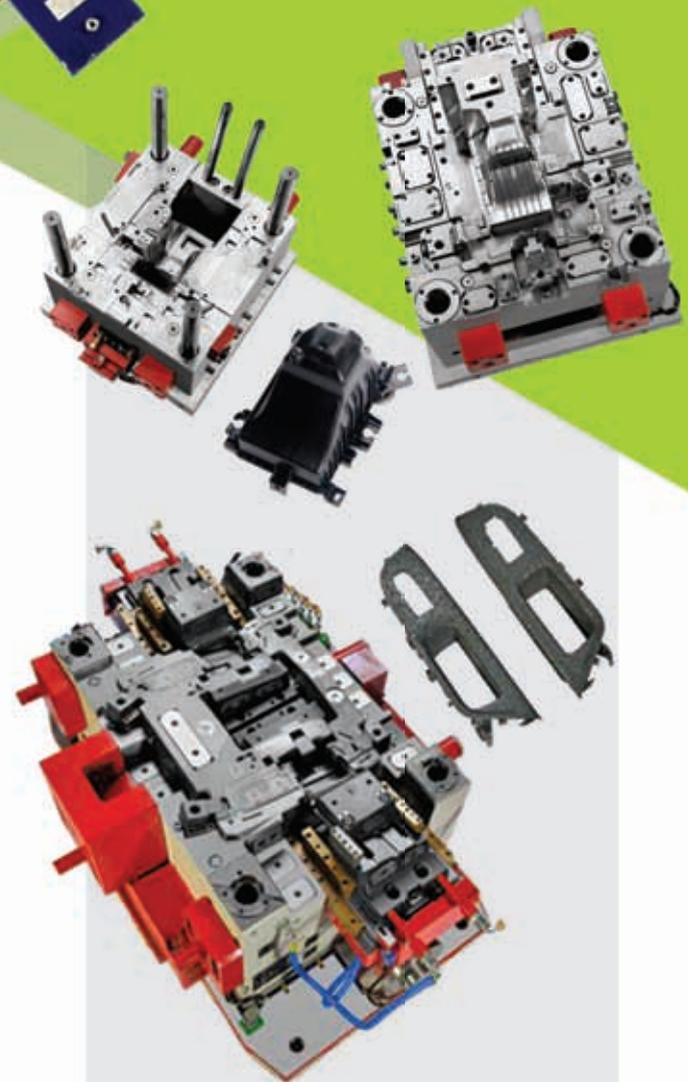
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