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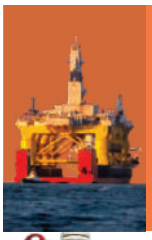

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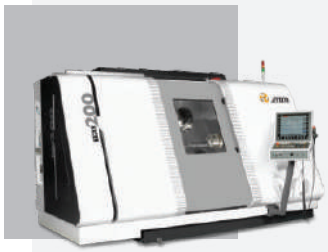

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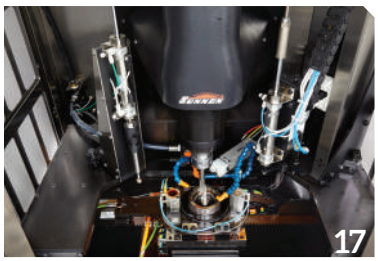

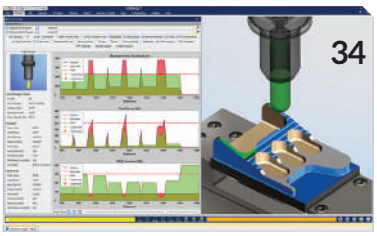

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ECONOMIC REBOUND GOOD NEWS FOR MANUFACTURING

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

Dear Readers,

Last year brought forth a testing time for industries and individuals. On a brighter note, the country's economy, Manufacturing, and the Machine Tool industry, having shown great resilience in the face of acute adversity, are already on the recovery path. The vaccines for Covid-19 have also made their way out from research labs and entered public domain, providing the much-needed relief and confidence.

The Government of India, stepping in at the right time, has played its part, by giving impetus to capital expenditure in the budget, creating a new path for medium- to long-term growth. As per Press Information Bureau, the capex budget was raised sharply from ₹4.12 lakh crore to ₹5.54 lakh crore, a record increase of 34.5 percent over the last financial year. Larger outlays in various sectors of Manufacturing and Corporate Tax, which is the lowest in the world for setting up new manufacturing units, are growth drivers of economy and in supporting these, the budget has made a fair effort to ignite investment-led growth. The increase in budget outlay for Railways, Power, Infrastructure, and so on is expected to increase the demand for capital goods and machine tools.

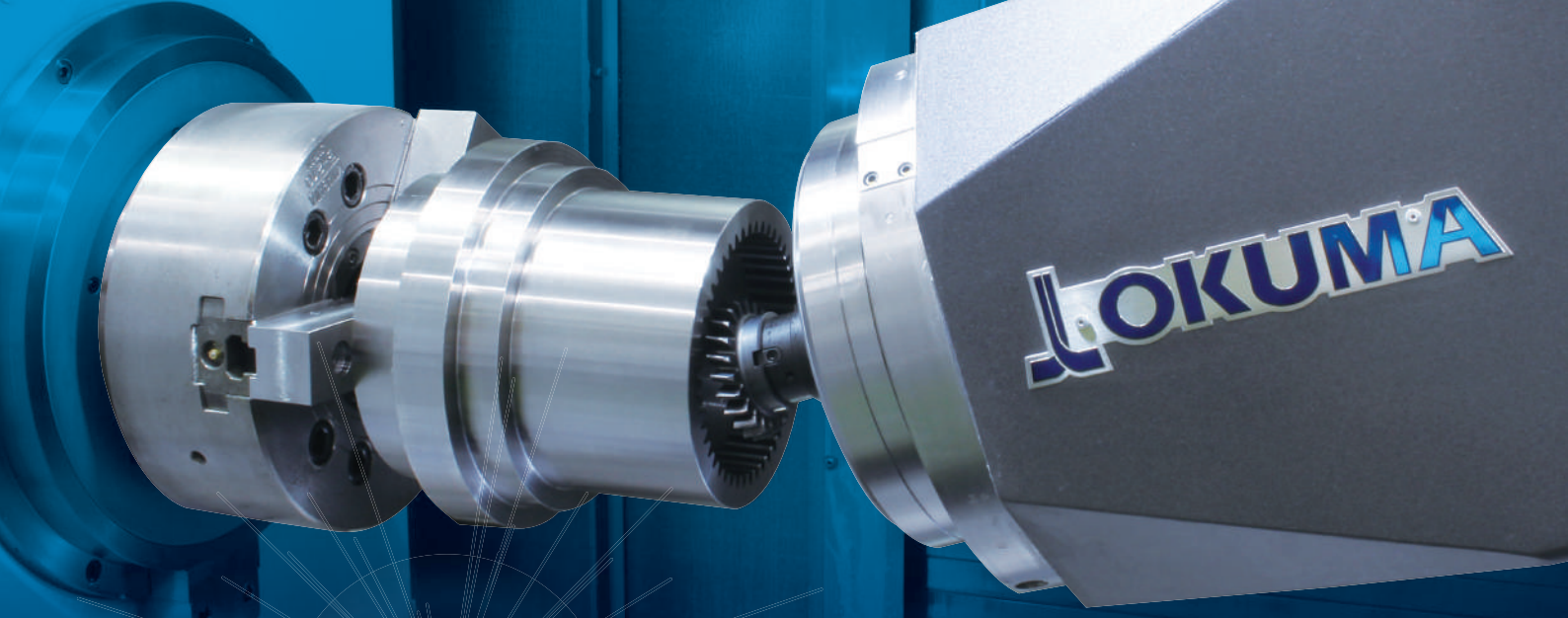
IMTEX will be one of the first major shows to be organized post the pandemic lockdown, and the success of the show will pave way for many more events.

India is slowly recovering from the pandemic, and almost all activities are back to the pre-Covid levels in a short period. One primary factor for the rebound has been the pent-up demand, and PLI in the Auto sector, bringing in business to champion sectors, besides the relaxations in FDI. The Machine Tool industry now needs to expand its wings to tap the opportunities in the emerging sectors and explore new areas of growth.

Indian Machine Tool Manufacturers' Association (IMTMA) is organizing 'IMTEX 2021 & Tooltech 2021' in June this year, with Bangalore International Exhibition Centre (BIEC) being ready to host the show with all SOPs in place. IMTEX will be one of the first major shows to be organized post the pandemic lockdown, and the success of the show will pave way for many more events. I am sure we all are keenly awaiting to physically interact with our customers, which was unfortunately restricted for close to a year due to the pandemic.

Well, as we move to the new financial year in April, things are likely to change. I firmly believe that IMTEX 2021 and other initiatives of IMTMA will provide a suitable platform for the Machine Tool and Manufacturing industries to network and exchange knowledge and scale up business activities.

Wishing you all the very best.



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V ANBU
DIRECTOR GENERAL & CEO
INDIAN MACHINE TOOL
MANUFACTURERS' ASSOCIATION

The business sentiment across the industry sectors has been strengthened with the International Monetary Fund (IMF) revising the growth forecast for India's economy to 11.5 percent in 2021.

Dear MMI Readers,

Our Modern Manufacturing India (MMI) magazine stood firm in the face of a series of unprecedented challenges imposed by the global coronavirus pandemic last year. We are proud that we could, through MMI, successfully manage to bring up-to-date information from the manufacturing and exhibition worlds to you.

While some decisions that businesses took during the period were quick fixes for solving urgent needs, the rest would perhaps change business models over the longer term as entities recover from the various stages of the crisis they find themselves in.

My heartfelt thanks to each and every one of you, the readers of MMI, for your continued interest and support.

Well, the business sentiment across the industry sectors has been strengthened with the International Monetary Fund (IMF) revising the growth forecast for India's economy to 11.5 percent in 2021. As we step into the new financial year in India, things are expected to change with the economy likely to record good figures in the medium to long term, and we may find an era of growth.

MMI, with its in-depth research and analysis, endeavors to bring valuable information for its readers. This month's edition focuses on medical machining. The opinion piece by IMTMA offers an insight into the opportunities for the Machine Tool industry in the Medical Equipment manufacturing. As we continue to share inspirational stories from across the world, we also reach out for your feedback, which we value the most, to better understand your needs.

Readers can download previous issues of MMI from the IMTMA website.

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BAD TIMES ARE THE BEST TEACHER

Almost a year ago, Prime Minister Shri Narendra Modi announced a nationwide lockdown for 21 days to contain the spread of coronavirus across the country. The challenges posed by the year 2020 were beyond anticipation or imagination. In hindsight, though, it proved to be a transformative period for all of us.

It taught us to be resilient in the face of adversities and that each challenge offers an opportunity to persevere, learn, adapt, and evolve into more stronger and compassionate beings.

It made us reflect on things that we took for granted all along and showed us their real value. Be it our freedom to move about, our family and friends who were always around but hardly had our presence, and above all, their well-being, something that never occurred to us with such urgency.

Thankfully, advanced communication technologies kept us connected, irrespective of geographical distance and circumstances.

In the beginning months post the lockdown, we spoke about returning to our normal lives only to soon realize that there was no going back to the normal. And as humans normally do, we adapted to the changed ways and called it the 'new normal'. Organizations across the globe acknowledged that their workforce could work from home and accepted that managing by objectives is more productive than managing by the clock.

> *"Articulating what we are thankful for is a radical act in the midst of a hard time. Turning our attention to the things we do have rather than what we do not is a tough task, but a crucial one."*
>
> *– Melissa Kirsch*

We are almost three months old in 2021 and realize the worst isn't behind us with the Covid-19 mutant strains making rounds now. At this juncture, where things are far from being predictable, what is sure is our grit and spirit to surmount the unfavorable.

The industry too has proven its strength by remaining unfazed during the worst and waiting calmly to cross over to the other side. Its tenacity has been exemplary to say the least. We, in the last few issues of MMI, have been trying to capture the same by talking to the industry leaders and sharing their experiences with you.

We await your feedback as always on this issue too!

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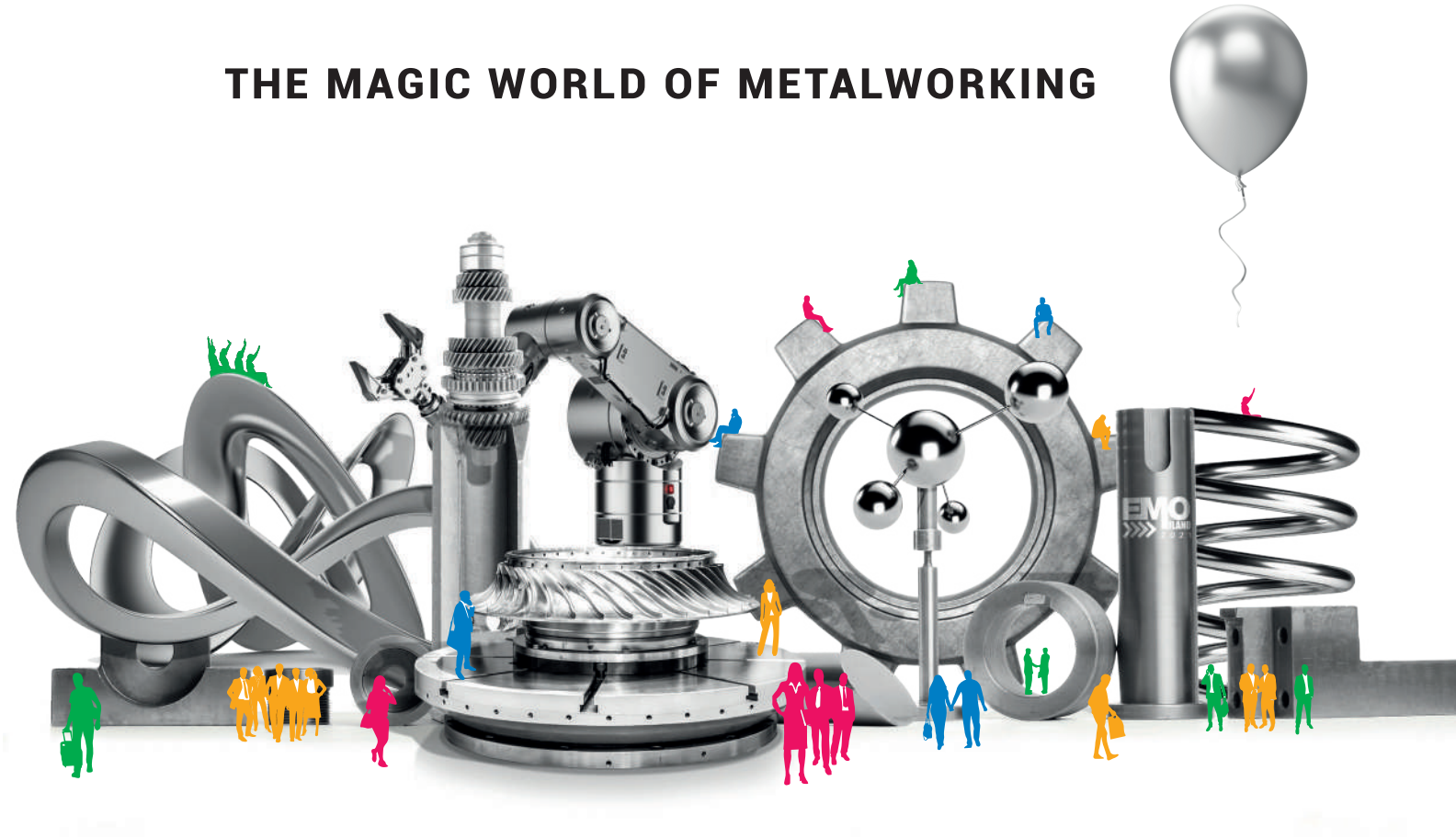

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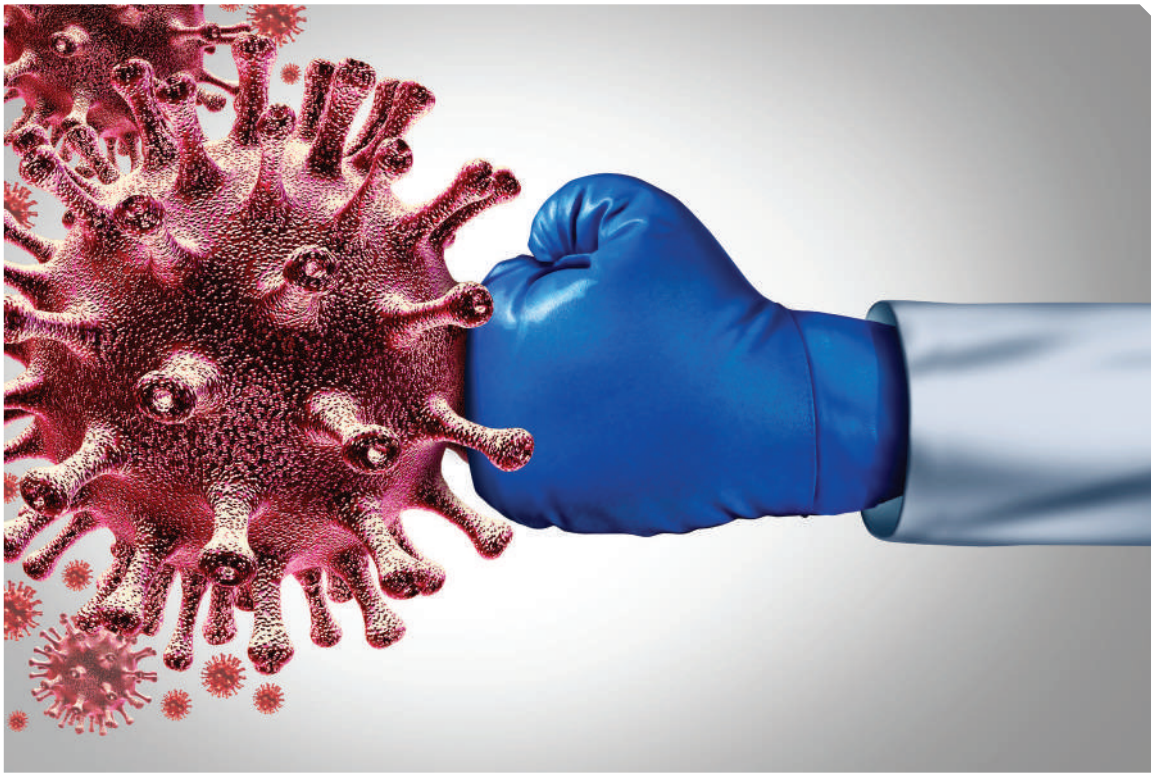
HEALTHCARE TO BOLSTER MACHINE TOOL INDUSTRY

India's Healthcare sector has proved its mettle by emerging strong after a series of challenges last year posed for us. For it to continue in the same spirit, our Machine Tool industry has to up its game to cater to the sector's demands and for the country to become self-reliant.



Source: Magic Wand Media

In the words of our Hon'ble Prime Minister Shri Narendra Modi, last year was a trial by fire for India's Healthcare sector but today the country is experiencing a new high as the world has taken note of its inherent strengths in battling the novel coronavirus pandemic.

The Government of India is advocating 'Atma-nirbharta' in the Healthcare sector with its budgetary allocation of ₹2,83,846 lakh crore for the Healthcare and Wellness sector, including ₹35,000 crore for Covid-19 vaccines. India's 'Atmanirbhar Swastha Bharat Yojana' announced by the Government, with an outlay of ₹64,180 crore, aims to develop the country's primary, secondary and tertiary healthcare over a period of six years.

As these developments take place, the spotlight is back on beefing up India's Machine Tool industry to serve the demands of the Healthcare sector by manufacturing products locally. In a way, the pandemic has brought forth manufacturers' abilities to the fore. Companies have responded collectively in building the equipment needed to combat the pandemic.

India, the vaccine capital

Businesses managed to establish a wide network of testing infrastructure and in its race to find a vaccine, the country emerged as a front runner and started exporting vaccines. Rightly so, India is now seen as a vaccine capital of the world.

It is widely accepted that the healthcare cost in India is significantly lower as compared to the developed nations. This is

Source: IMTMA

precisely why foreign nationals travel to India to avail affordable medical treatment. At the same time, the demand in healthcare facilities is also creating new opportunities. Technology, software development and design aptitudes are playing a larger role in taking manufacturing to the next level and creating demand for machine tools.

High precision and accuracy of equipment used for surgeries is vital for favorable results in treatment and quicker recovery rate of patients. India currently imports large volumes of medical instruments for critical care, imaging and high-end surgeries. This equipment, when manufactured indigenously, carries distinct advantages, primarily the affordability in the price-sensitive Indian market.

Plans in place

India has been a major market for medical devices and this is expected to increase with the Central Government's initiatives like Ayushman Bharat, which aims to offer affordable healthcare services to all. Having realized the potential, the Government has charted out a roadmap for endorsing medical equipment manufacturing. It is laying out the red carpet for investors by enacting new rules and regulatory processes for ease of doing business, removing trade barriers and offering new solutions.

Medical device manufacturing parks are being set up in Telangana, Andhra Pradesh, Tamil Nadu, and Kerala under the 'Make in India' initiative. As these parks become fully functional, indigenous medical devices manufacturing will increase. This, coupled with the Government selectively enabling 100 percent FDI in medical devices manufacturing through automatic route, is expected to create opportunities for the Machine Tool industry.

IMTMA is advocating its member companies to seriously consider developing machine tools which could support the growth of the Medical Equipment industry as it has been identified as one of the champion sectors. As we scale up our efforts to strengthen the MSMEs, numerous job opportunities are likely to arise. IMTMA is organizing IMTEX 2021 in June this year which will be a grand opportunity for medical equipment manufacturers to acquaint themselves with the advancements in machine tools for the Medical industry.

IMTMA is organizing IMTEX 2021 in June this year which will be a grand opportunity for medical equipment manufacturers to acquaint themselves with the advancements in machine tools for the Medical industry.

FOR A SUSTAINABLE ENERGY FUTURE

Energy leaders from the Asia Pacific region deliberate and arrive at seven key trends for a successful transition towards a sustainable energy future.

Source: Magic Wand Media

As the world's fastest growing economic region today, Asia Pacific is witnessing increasing urbanization, rising population and monumental energy needs. With Asia Pacific accounting for more than half of global energy consumption, and with 10 percent of the population still lacking access to basic electricity, the question is how to bridge into an affordable, reliable and sustainable power supply, while improving energy access.

Following is the round-up of the key trends for a sustainable energy future as perceived by the thought leaders of the region. They have put spotlight on the regional challenges and the opportunities that can emerge out of it:

1 Access to reliable, affordable, and sustainable energy supply is a necessity for economic growth

"In the Philippines, about 95 percent of the society is energized. The biggest issue for us is the affordability of tariffs followed by concerns of energy security as our energy infrastructure is in the hands of the private sector. Therefore, we need to find the balance between accessibility, affordability, and sustainability. As regards to our country's sustainable future, we have issued a moratorium for green power plants. We have also signed various MoUs to develop Hydrogen solutions and are looking at the electrolysis technology for power generation."

H.E. Alfonso G Cusi
Energy Secretary
Department of Energy (Philippines)

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H.E. Alfonso G Cusi
Energy Secretary
Department of Energy (Philippines)

2 Ramp up the contribution of renewables for long-term sustainability

"Under our National Grand Energy Strategy, we hope to bring more renewable into the energy system of about 23 percent of the energy mix by 2025, its equivalent to additional 38GW renewable powerplant by 2035. We have a lot of resources that are fossil-based such as coal deposits, oil and natural gas as well as enormous renewable potential are our primary energy sources. In the

"To reduce petroleum consumption, we have about 5,200 diesel power plants right now scattered across 2,130 locations in Indonesia and we are serious on the journey of converting diesel plants to renewable energy to possibly reduce up to 0.7mil tonnes of carbon emissions."

H.E. Arifin Tasrif
Minister for Energy and Mineral Resources (Indonesia)

Source: Siemens Energy AG

> "With more than 50 percent of our portfolio based on decarbonized technology and over 20 percent revenue generated from Asia Pacific, Siemens Energy has been – and will be – committed to supporting countries on their individual paths toward decarbonization."
>
> **Dr Jochen Eickholt**
> **Member of the Executive Board**
> **Siemens Energy AG**

next 10 years, we want to leverage on technology to build up capacity and infrastructure including 18 priority transmissions, 7 smart grid projects and renewable energy. Another program to reduce petroleum consumption, we have about 5,200 diesel power plants right now scattered across 2,130 locations in Indonesia and we are serious on the journey of converting diesel plants to renewable energy to possibly reduce up to 0.7mil tonnes of carbon emissions."

H.E. Arifin Tasrif
Minister for Energy and Mineral Resources (Indonesia)

3 Utilize technology for efficient and cleaner use of energy

"Asia Pacific is not only the fastest growing region but also the fastest transforming market. With more than 50 percent of our portfolio based on decarbonized technology and over 20 percent revenue generated from Asia Pacific, Siemens Energy has been – and will be – committed to supporting countries on their individual paths toward decarbonization. We drive the shift from nuclear and coal to gas and provide grid technologies to support the integration of renewables."

Dr Jochen Eickholt
Member of the Executive Board
Siemens Energy AG

> "We see green hydrogen as a key means to achieving this ambition (of wanting to export our renewable energy to the world) and firmly believe that South Australia can become a hydrogen supplier of choice to the Asia Pacific region."
>
> **Hon Dan van Holst Pellekaan MP**
> **South Australian Minister for Energy and Mining**

4 Embrace emerging and cleaner energy resources like Green Hydrogen

"We see green hydrogen as a key means to achieving this ambition (of wanting to export our renewable energy to the world) and firmly believe that South Australia can become a hydrogen supplier of choice to the Asia Pacific region. We have been a leader within Australia with our vision to become a world-class hydrogen supplier - as the first Australian jurisdiction to showcase our hydrogen vision through the 2017 Hydrogen Roadmap, and which was reinforced by the release of our Hydrogen Action Plan in 2019. The action plan outlines 20 specific actions across five important themes, with the objective of scaling-up renewable hydrogen production for domestic consumption and international export."

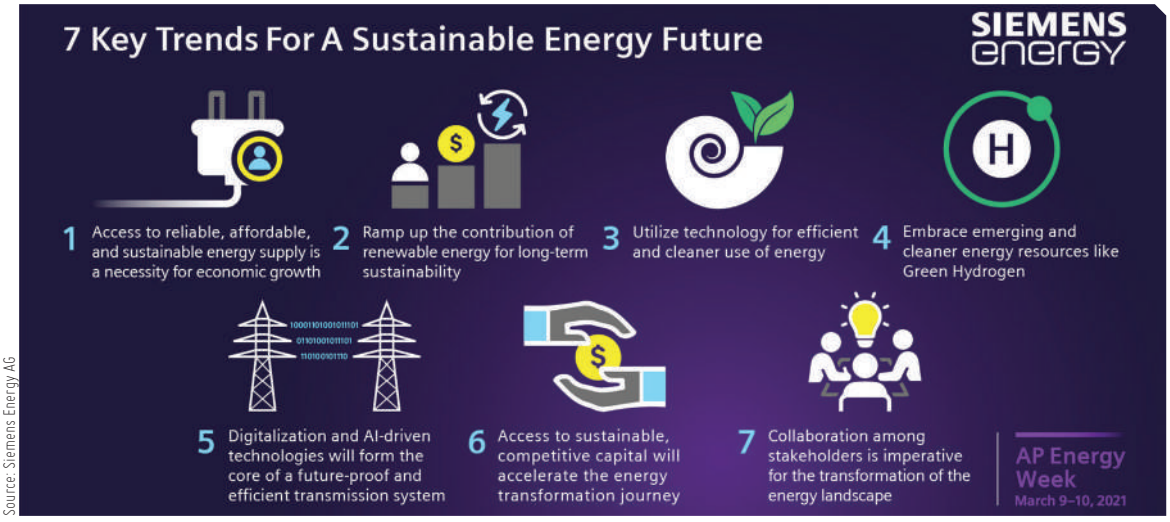
Hon Dan van Holst Pellekaan MP
South Australian Minister for Energy and Mining

> "Digitalization is the definition of the future. It helped us maximize our asset management and performance especially during the pandemic, to support decision-making and analytics in addressing the changing loads of our distribution transformers."
>
> **Ronnie L Aperocho**
> **Senior Vice President**
> **Networks Meralco Philippines**

5 Digitalization and AI-driven intelligence will form the core of a future-proof and efficient transmission system

"Digitalization is the definition of the future. Utilities will stand

With 10 percent of the population of the Asia Pacific region still lacking access to basic electricity, an affordable, reliable and sustainable power supply is the need of the hour.



Source: Siemens Energy AG

> "To successfully drive the transformation of energy systems worldwide, sufficient financial resources are needed. Private capital as well as the appropriate political framework conditions are needed. The good news is collaboration is growing enormously."
>
> **Christian Bruch**
> **President & CEO**
> **Siemens Energy AG**

> "Popular opinion believes that policies and regulations provide the most impact to decarbonization. For Malaysia, solar will be the most sought-after renewable source followed by wind power, while battery storage will be the game changer of the energy of the future."
>
> **Dato' Nor Azman bin Mufti**
> **Managing Director**
> **TNB Power Generation**

> "The public and private sectors must work in tandem. The private sector capital will accelerate investment and companies will translate emerging business strategies into viable business models, developing bankable projects and driving technological innovations."
>
> **Francesco La Camera**
> **Director General**
> **The International Renewable Energy Agency (IRENA)**

With prices of renewables declining and with grid stabilization technology advancing, ramping up the contribution of renewable sources makes economic sense.

to gain exponential benefits from digital solutions. On our end, digitalization helped us to maximize our asset management and performance especially during the pandemic, to support decision-making and analytics in addressing the changing loads of our distribution transformers. There are ample technical solutions that we can ride on but these require capital investment that requires regulatory approvals, and close collaboration with stakeholders on what projects to pursue and prioritize. In order to drive execution to become much cheaper, we will need the strong support from regulators and the government, as well as a close collaboration within the energy sector. The power to make Mother Earth a better place is in our hands."

Ronnie L Aperocho
Senior Vice President
Networks Meralco Philippines

6 Access to capital at reasonable costs will accelerate the energy transition journey

"To successfully drive the transformation of energy systems worldwide, sufficient financial resources are needed. Take Europe, where we need an estimated €30 trillion by 2050 to decarbonize all our systems. To accomplish this mammoth task, private capital is needed, as well as the appropriate political framework conditions. Again, it's all about collaboration. The good news here – this is growing enormously."

Christian Bruch
President & CEO
Siemens Energy AG

"In my view, achieving any nett zero carbon goals will require a complete supply chain of understanding, collaboration and agreement between the different parties, namely, legislators, government and consumers. The conversion from fossil fuel to renewable energy requires political will, legislations and policies in place, the willingness to push for change and agreement of consumers to pay a higher premium (with renewables). For power generators like TNB, we are more than happy to support and transform if there is some subsidy to defray the costs of our investment. Popular opinion believes that policies and regulations provide the most impact to decarbonization. For Malaysia, solar will be the most sought-after renewable source followed by wind power, while battery storage will be the game changer of the energy of the future."

Dato' Nor Azman bin Mufti
Managing Director
TNB Power Generation

7 Collaboration among stakeholders is imperative for transformation of the energy landscape

"To get to a sustainable energy future we have to join forces. Public sector and private sector must work in tandem for two main reasons. First, private sector capital will accelerate investment and there is a need for more public-private partnerships. Second, companies will translate emerging business strategies into viable business models, developing bankable projects and driving technological innovations. IRENA continues working with all stakeholders to accelerate energy transitions around the world."

Francesco La Camera
Director General
The International Renewable Energy Agency (IRENA)

Joining forces

With prices of renewables declining and with grid stabilization technology advancing, ramping up the contribution of renewable sources makes economic sense and will also drive long-term sustainability for the region. Governments can contribute with policies and regulations driving this change, and the industry could translate emerging business strategies into practical busines models, develop reliable projects and drive technological innovations. To accelerate the energy transition, all stakeholders must join forces and work towards the transformation.

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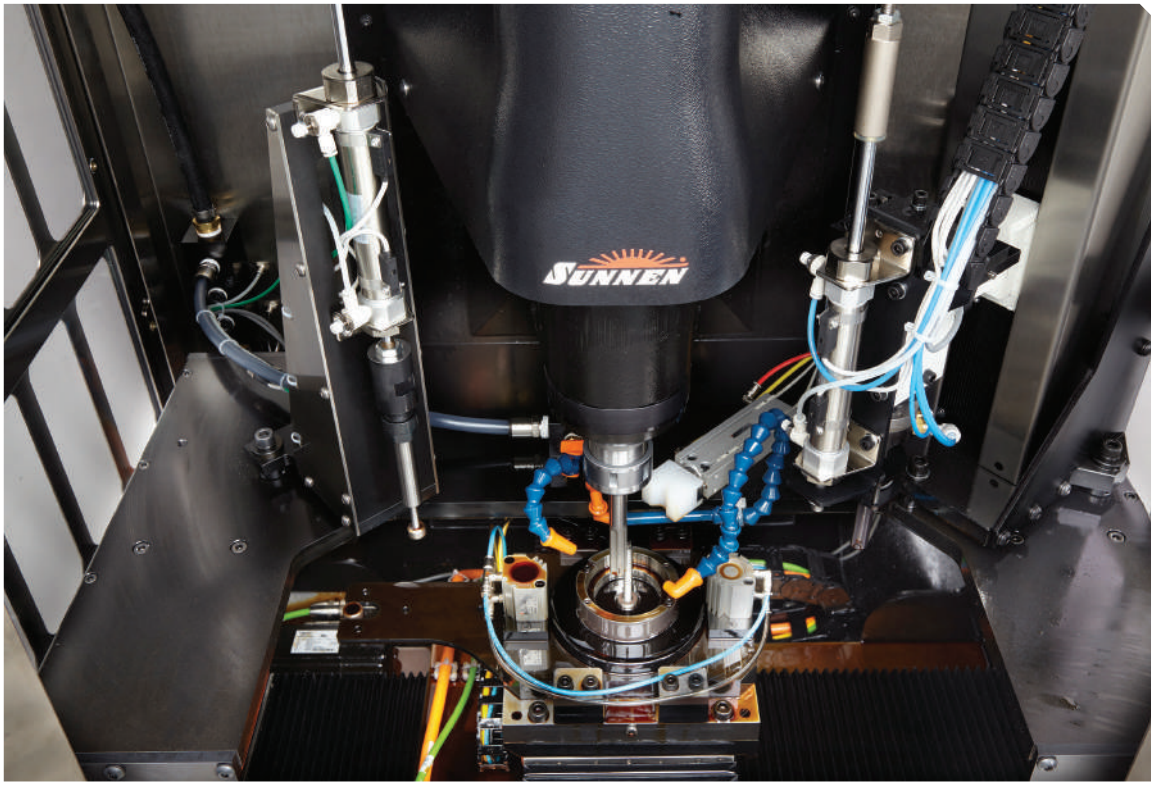
HONING SKILLS THAT MATTER

A leading honing equipment manufacturer answers a few common FAQs on honing, a process which is typically performed to bring bores to a precise size or achieve a specific surface finish.



Source: Sunnen

According to Sunnen, honing is typically required to achieve bore diameter tolerances of ±0.0002 inch or tighter with high-quality surface finishes.

As one of the most common machining operations, holemaking presents manufacturers with plenty of options. Depending on bore diameter and surface finish tolerance, a shop might choose drilling, milling, electrical discharge machining (EDM) or a combination of those CNC machining processes and achieve quality results. For example, the hole created by a 0.5-inch drill might range from ±0.002 inch or be as much as 0.006-inch oversized, but a subsequent reaming operation can produce a smoother surface finish and a hole diameter within ±0.0002 inch. Reaming or boring milled holes can achieve similar results, while EDM is even more precise, producing a bore diameter within ±0.0005 inch.

However, there are good reasons to turn to honing for applications with the most stringent requirements for surface finish and precision. According to Sunnen, a manufacturer of honing equipment that provided the information for this article, EDMed holes typically require further processing to smooth surfaces. The process is relatively slow as well. Optimized milling processes followed by boring, or reaming may produce high-quality results, but not always consistently. Honing achieves all three goals: that is, the process consistently and reliably achieves bore diameter tolerances of ±0.0002 inch or tighter with high-quality surface finishes.

Honing is a sizing and finishing operation in which a revolving tool (mandrel), fitted with abrasives, strokes in and out of a bore. During the process, the abrasives are expanded, removing minute amounts of material to bring the hole to its proper size and finish. The resulting finish consists of microscopic peaks and valleys arranged in a crisscross or 'crosshatch' pattern. The valleys allow oil retention between mating components during operation, such as pistons within an engine cylinder.

Although the process has been performed for many years, honing technology has evolved, and some manufacturers still have

DEREK KORN
Editor-in-Chief
Production Machining
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productionmachining.com

Source: Sunnen

Tooling for honing is selected based on application requirements.

Honing can correct errors caused by previous machining processes because it does not require chucking or alignment and is indifferent to bore length.

questions about it. Here are five of the most common:

1 What applications commonly call for honing?

Engine cylinders and cylinder sleeves require honing for proper piston ring sealing. Diesel engine fuel system components are often honed because honing enables tighter control of the clearance between the bore and its mating part. The resulting higher fuel system pressure means more fuel is atomized and less unspent fuel is used, resulting in improved fuel efficiency and engine performance as well as lower carbon emissions.

Cartridge valves, used in hydraulic applications such as heavy equipment, agricultural machinery, and aerospace flight and landing gear control systems, are typically honed. This provides tight clearances between the valve body and spool to reduce the sealing area required. Honing also creates the proper surface finish for the oil seals, which, combined with reduced clearances, prevents oil leaks.

Honing also improves the bore diameter size and surface finish of gun barrels prior to the rifling operation. This ensures uniform rifling for a better shot. The process is also useful for gears, small engines, brake drums, compressors, oil and gas flow meter tubing, and many other applications.

Source: Sunnen

Like other machining operations, honing lends itself to robotic automation for high-volume applications.

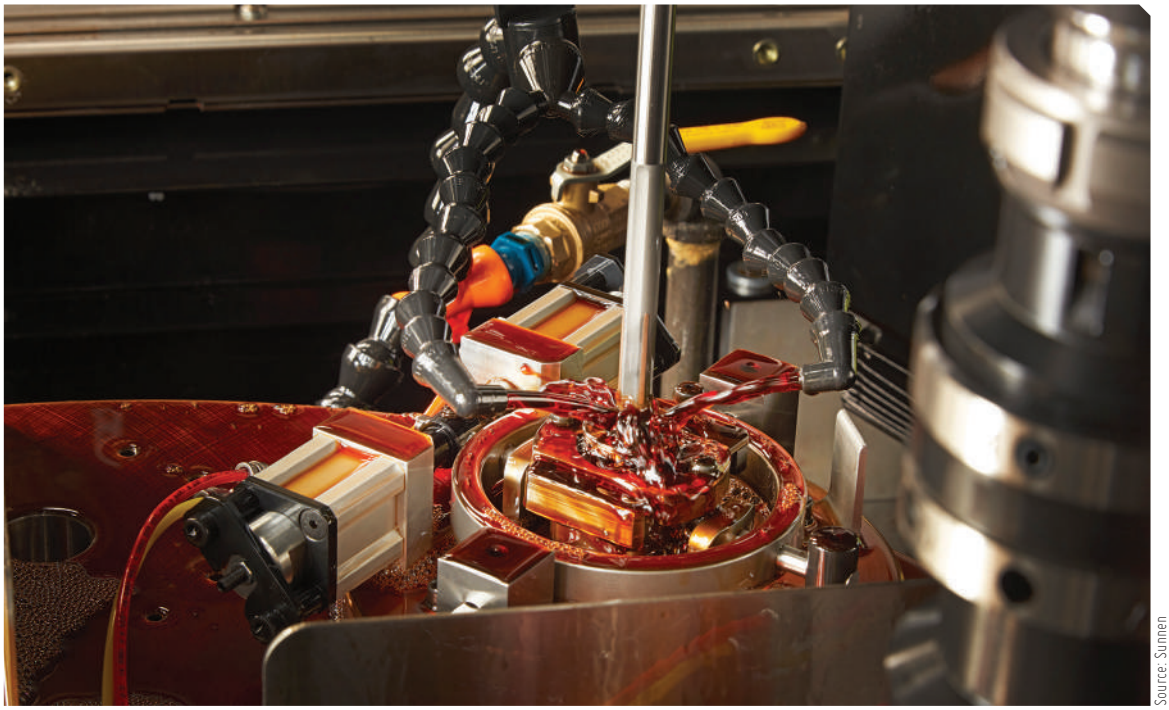
2 What unfavorable bore conditions can honing remedy?

Quite a number, including bore diameter size, bellmouth, waviness, taper, rainbow, barrel shape, reamer chatter, boring marks and out-of-round holes. The improved shape of the bore after honing almost always results in mating components operating more quietly and efficiently. Honing can correct errors caused by previous machining processes because it does not require chucking or alignment and is indifferent to bore length.

Other machining processes, such as grinding and boring, might fracture the metal's subsurface to a depth of 0.002 inch. In addition, tool wear can cause work-hardening of the bore surface during machining. Honing is a gentler process, generating very little heat so as not to distort the bore.

3 What types of surface finishes can honing achieve?

Surface finish, texture and appearance can be precisely controlled. The angle of the crosshatch pattern can be adjusted by varying the spindle speed and stroke speed of the honing tool. Some applications call for a steep crosshatch angle in the bore, while others require a shallow



Source: Sunnen

Honing oils are available in many different formulations and have various levels of viscosity.

angle. The depth or roughness of the crosshatch pattern depends on the relative size of the abrasive grit in the honing stone. The larger the grit, the rougher the finish. A mirror finish with almost imperceptible surface texture can be achieved with very fine grit abrasives.

As mentioned earlier, the crosshatch pattern created during honing is beneficial for applications such as engine cylinder bores to ensure some oil is retained on the bore surface for proper piston ring lubrication and piston ring sealing. Oil will not adhere well to a smooth or glazed cylinder bore surface, leading to premature wear and possible engine failure. If desired, a second honing operation using specialized tools can follow initial honing to create a plateau finish in which the peaks are uniformly clipped at a consistent level while leaving the valleys untouched. Most engine cylinders today are honed with this plateau surface finish, which increases the bearing area of the bore surface. This means conventional piston ring 'break-in' processes are not required and the microscopic peaks that are honed off before the engine is assembled do not end up in the engine oil upon startup.

4 What is involved in establishing an effective, consistent honing process?

Like CNC machining, a number of questions must be answered when developing an optimized honing process. What is the part material, size and shape? What is the production volume? How much material needs to be removed? What are the finished workpiece bore tolerances and surface finish requirements? Answers to those and other questions determine the proper machine, fixtures, tooling, abrasives and honing oils or coolants, as well as honing process parameters such as spindle and stroking speeds and feed rate. The honing stone is selected based upon the type of material to be honed, tolerances to be achieved and the amount of material to be removed. There are as many types of abrasive honing stones available as there are types of milling or turning cutters, differentiated by grit material, grit size and bonding agent.

5 How does lubrication affect honing?

Honing oils and water-based coolants provide needed lubrication, washing away cut material and bringing new abrasive grit to the surface of the stones to maintain optimum cutting action. Quality oils, saturated with surface active agents, provide the necessary lubricity to increase honing pressure and use harder abrasives at faster cutting rates. Similarly, lubricity agents combined with sulfur extreme-pressure additives prevent workpiece welding and tearing while keeping stones clean, resulting in a very consistent surface finish. Specially formulated honing fluids are also available for use in severe applications in which problems such as galling can occur. Honing oils are available in many different formulations with various levels of viscosity.

Honing improves the bore diameter size and surface finish of gun barrels prior to the rifling operation. This ensures uniform rifling for a better shot.

VIEW FROM THE TOP

A round-up of the industry experts' views on the overall impact of the Union Budget for the Indian Manufacturing sector, and how innovation and R&D can facilitate its journey towards self-reliance...

Source: Gears and Gear Drives (India) Pvt Ltd

Seshagiri Ramchandra
Managing Director & CEO
Gears and Gear Drives (India) Pvt Ltd

Budget favorable to industry

No doubt that the Budget has been designed for the overall growth of the economy. Although the industrial economy is expected to grow at 8 plus percent this year, $1 trillion is an ambitious goal.

The policies to invest in sectors such as Infrastructure, Power, Agriculture, and Transport are all welcoming signs. Since the onset of Covid, the new norm has been to use digital platforms for connecting and networking. Hence, the virtual business development opportunities are promising.

Some of the gaps to be addressed are training and retraining in skill development, and the adoption of automation in the manufacturing ecosystems that can scale up production levels.

Intensive training on the quality management systems, willingness to consistently spend on R&D, and the use of cutting-edge technologies in manufacturing are the need of the hour. The industry and academia tie-ups, especially for MSMEs, and the availability of certified raw materials without minimum order quantities are also to be put in place.

There will be a boost to the export of Defence equipment and the development of the Health sector, given the global goodwill generated due to the export of Covid vaccines. Industries including Machine Tools, Industrial Machinery, Pharmaceutical equipment, Aerospace and Defence, and Agri Machinery are slated to grow fast.

Innovation and R&D are important

We need to change our mindset and realize how important innovation and R&D are for our growth. While we are good at 'Juggad' solutions to cater to the local demands, we must now invest in R&D for us to move upwards in the value chain. Associations and institutes involved with R&D should conduct webinars to raise awareness on the same.

Source: Mikronix Gauges Pvt Ltd

Abhay Hanchanal
CEO
Mikronix Gauges Pvt Ltd

So far so good

I believe that the Budget will have a positive impact on the next few years. There are two major steps that, according to me, can help us be better in manufacturing. These are:

Planned Infra Spending: India not just needs major improvement in infrastructure, but it needs it desperately in the shortest timeframe possible. The present Government has a reasonable track record of implementation so we can expect quick results that can bolster growth in the industries such as Cement, Heavy Vehicles, and Steel, which can further boost other interconnected industries.

Introduction of Vehicle Scrappage Policy: Though the details are awaited, we are hopeful to soon have clarity on this. This can have a highly positive impact on auto manufacturing and, in turn, on manufacturing in total as the major dependence is on the Auto industry.

The introduction of any cess in the form of Covid cess etc. would have caused a big concern in the industry as an additional burden. Not adding it is a positive step.

R&D is key to self-reliance

Spending on R&D in the Manufacturing industry or any other industry is negligible in India. We need to correct this.

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The Government can promote, assist and incentivize R&D centers, and offer SMEs to compensate their R&D expenses for creating this shift. There is no doubt that unless we increase our budget for R&D and invest ourselves in it, becoming self-reliant will remain a distant dream.

Source: Milacron India Pvt Ltd

SV Divgi
CEO
Milacron India Pvt Ltd

India's innovation quotient to up

The Finance Minister has done a commendable job of announcing a bold yet thoughtful Budget that addresses the immediate need to power the economic growth engine, putting in place the building blocks for long-term growth and self-reliance by adequately funding core sectors, without overburdening the common man with new taxes and levies.

With this Budget, the 'Atma Nirbhar Bharat' takes the center stage once again and the message is clear – Innovate or Perish. This Budget will position India as a super power in terms of R&D, innovation, manufacturing, IT and services. The digital India push, setting of R&D centers, setting up of Fintech Hub at GIFT city, and allocation of ₹50,000 crore towards National Research Foundation will work towards boosting India's Innovation Quotient on the global map and is a welcome move. This will further motivate the Indian Manufacturing sector to invest in R&D to compete with the likes of China and other countries in the global environment.

Constant innovation to move ahead

At Milacron, we lay emphasis on continual improvement. Be it through regular Kaizens, or through the R&D teams working together with the global teams. We innovate continuously, thereby providing new technologies and better performance machines to our customers at the most competitive prices. Our machines are now accepted in the USA, Europe, and South Americas. Our recent product launches are focused on sustainability in the plastic sector and our patented Mono Sandwich and LPIM technologies enable customers process recycled materials to produce products at reduced cost. We are fully convinced that investment in R&D and continuous innovation is the only way forward for the Indian Manufacturing industry.

Source: VDMA India Services Pvt Ltd

Rajesh Nath
Managing Director
VDMA India Services Pvt Ltd
German Engineering Federation (VDMA)

A vision for 'Atma Nirbharta'

The Union Budget 2020-21 was presented amidst the challenges of a global pandemic and swinging economy. The Union Budget has come at a time when the economy is recovering from the aftermath of Covid-19. With GDP contractions for the first time in several years, the challenges before the government were unprecedented and manifold. In the words of the Finance Minister, the Budget lays down a vision for 'Atma Nirbharta' or self-reliance and will further strengthen the resolve of Nation First. The Budget is focused on giving the much-required impetus to the Indian economy and at achieving the vision of the Indian Prime Minister for India to become a $5 trillion economy by 2024-25.

PLI, a positive push

Another important Budget announcement included the production linked incentive scheme (PLI). This will serve the purpose of providing incentives to producers. This will help the nation to grow as a hub for manufacturing and exports. This move should draw investments from global players. The scheme is also looking at encouraging local companies to set up new units or expand existing units in the country. This scheme suggests that eligible industry players will get incentives of 4 to 6 percent of production value after they are able to achieve their production and investment value target every year.

Source: EPLAN Software & Service

The global EPLAN Virtual Fair is taking place for the sixth time on April 28–29, 2021. (Photo from 2020)

EPLAN Virtual Fair 2021 to Run for Two Days

The global EPLAN Virtual Fair is taking place for the sixth time on April 28 and 29, 2021. The event will cover two full days across different time zones, and will include live talks, topic-specific and country-specific webcasts and software demonstrations of the new solutions found on the EPLAN Platform.

The EPLAN Virtual Fair is opening its digital doors this year for the sixth time and for two full days in a row for the first time. Visitors can expect a wide range of topics covering professional engineering and integrated, end-to-end processes. Live talks for c-level executives, customer best practices and a new partner area offer attendees constructive inspiration. Topic-specific and country-specific webcasts and software demonstrations of the new solutions found on the EPLAN Platform provide incentives and outlooks for further developments, including in cloud contexts.

The EPLAN Virtual Fair has a globally established format and this time has a new, clear design with numerous topic-specific expansions for management and users alike. "After the success of the past years, we are expanding the EPLAN Virtual Fair to cover two full days across different time zones," says Haluk Menderes, Managing Director, EPLAN Software & Service. The reason behind the change is that there are more topics to cover and visitor interest is on the rise. With almost a 20 percent increase in participants from more than 70 countries in 2020, the importance of this major virtual event is clear.

Comprehensive program

Top-class leadership talks at the management level on the ecosystem of industrial automation, the potential to be found in industrial panel building, and the topic of roundtrip engineering are just a few of the many themes being covered throughout the multifaceted conference program. This year those themes are being supplemented with new live talks for industry management pertaining to Automotive, Energy, Building Automation, Maritime and Process industries.

There will be six different live demonstrations on software topics each day, and experts will be providing practical insights into EPLAN Platform innovations. The opportunities of the new cloud services as part of EPLAN ePulse are also on the program, not to mention the efficiency potential that can be found in control cabinet and switchgear system engineering. There is also some fun element added with various online games where attendees will be able to (virtually) compete against one another. The prizes include three online update trainings for the EPLAN Platform.

Partners to get their own presence

There is a newly created community area, offering all the companies participating in the EPLAN Partner Network the possibility to participate with their own 'onsite' presence. It is set up to be a small trade show within the Virtual Fair. Numerous opportunities for networking are yet another reason for visitors from around the world to attend: a live chat, this time including a 1:1 video chat, offers everyone interested the chance to talk shop and exchange ideas across national borders in a virtual space. For registration go to: **www.EPLAN-software.com/virtual-fair**

Source: EPLAN Software & Service

"After the success of the past years, we're expanding the EPLAN Virtual Fair to cover two full days across different time zones," says Haluk Menderes, Managing Director, EPLAN Software & Service.

Source: EPLAN Software & Service

Leadership talks at the management level are being supplemented with new live talks for industry management. (Photo from 2020).

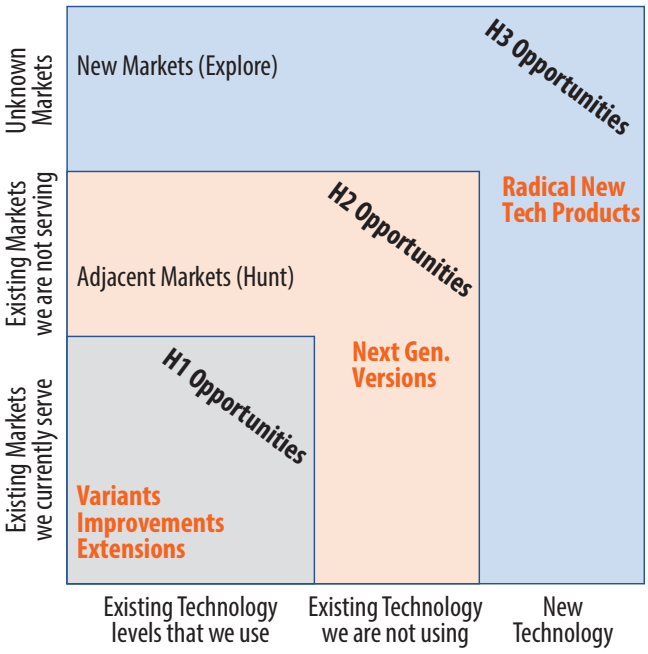
THE CHOICES WE MAKE, MAKE US

We are all getting back to our business leaving behind the pandemic disruption. It will be business as usual, but an awareness has set in that things have changed. It will take some more time to get in tandem with the changed scenario but meanwhile the best we can do is look for tools and frameworks that could help us read the situation from different perspectives and choose how to move forward.

We are being persistently asked to be innovative, use technology, and be strategic but without a direction not all opportunities get leveraged. Then when can we improve products by adding features? When do we bring in new products and enter new product categories? What is better innovation? And when do we use technology?

Innovation and the use of technology can create growth, reduce cost, and help disrupt. With all that, we need to be clear about our goals and expectations. Only then we, with our tools and frameworks, and with the help of our teams can achieve them. However, whenever we consider goals and outcomes for today and the future, timeframes and horizons automatically dawn on us. The point to ponder here is do we really possess the clarity on the framework and the process from the perspective of technology and markets so that we can make the best use of opportunities and convert them into business profits.

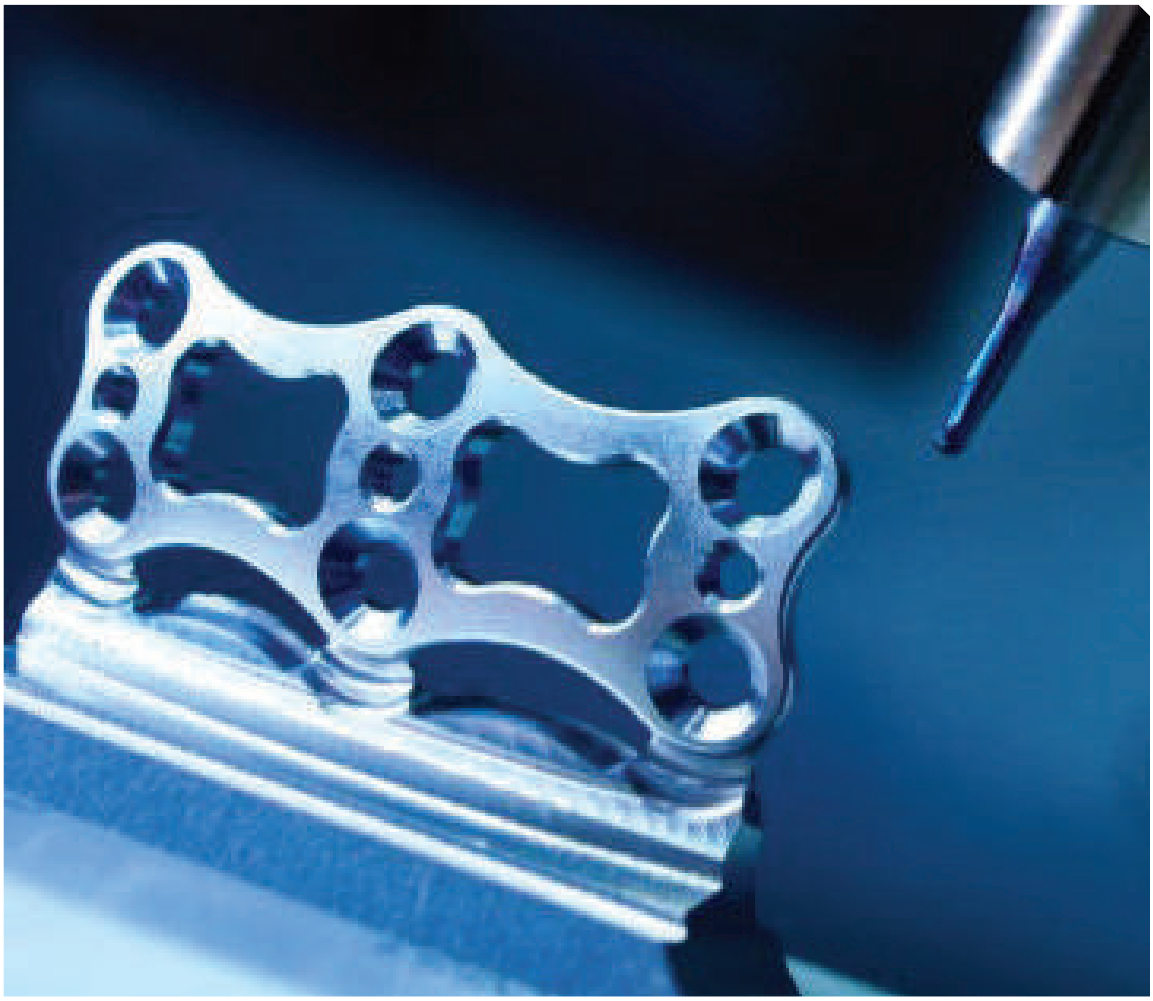
The concept of using horizons as a framework is an interesting tool that has been used and adapted to suit specific needs. The representation here is from the work of Christian Terwiesch and Karl Ulrich which I have adapted with technology and market as the X and Y axes respectively and, which could help us understand and make choices for product development.



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

STRIKING WITH PINPOINT PRECISION

Machining orthopaedic implants, instruments, and tooling places special demands on machining centers. Here is what to look for to achieve the highest quality and most efficient machining processes.



Source: Modern Machine Shop

Machining parts for the Orthopaedics industry is demanding. Whether it is joint implants, surgical instruments, moulds or forging dies, the materials are difficult, the geometry is complex, and the quality standards are second to none. Moreover, the business grows more competitive by the day, and manufacturers must be both technically proficient and production efficient to remain viable suppliers to this market.

Well-known machine tool builder Makino has specialized in serving the Medical industry for many years, and along the way has acquired a great depth of process knowledge in 3D machining of common Medical industry materials such as titanium alloys, cobalt chrome, and stainless steel, as well as hard tool steels 60 HRC and beyond. Here is what Makino recommends producing these difficult parts to the highest levels of quality and efficiency.

Achieving high-quality surface finishes

Achieving dimensional accuracy is important to a point with

Source: Modern Machine Shop

orthopaedic implants but the biggest challenge is usually the surface finish. For this reason, post-machining hand finishing is still usually required with belt grinding, polishing, and buffing. And it is time consuming. These finishing processes can take 45 minutes for a single part. Unfortunately, no practical machining process today eliminates the need for hand finishing of these parts, but a high-performance machine and stable machining process can dramatically cut that time and machining cycle time as well.

How do you do that? Improved surface quality can be achieved through the combination of engineered cutting parameters and proper toolpath strategies. For example, on a performance-based machining center, moving from a 25 Ra surface finish up to a 32 Ra could reduce your cycle time by 50 percent for a femoral implant, providing consistent, predictable results. Providing a precise and predictable surface finish allows end users to develop more efficient and effective secondary finishing processes, which can reduce these operations by as much as 50 percent.

To help find the sweet spot of machine time vs finishing time, Makino application engineers have developed strategies that first look at the required output surface finish and then create machining parameters accordingly. That, of course, could be done with any machine. But to move the needle to a more efficient process overall is to apply machining technology that is very fast, accurate and stable over long process runs so you can reduce finishing without having to pay a heavy penalty in machining time.

Five-axis machining is a given

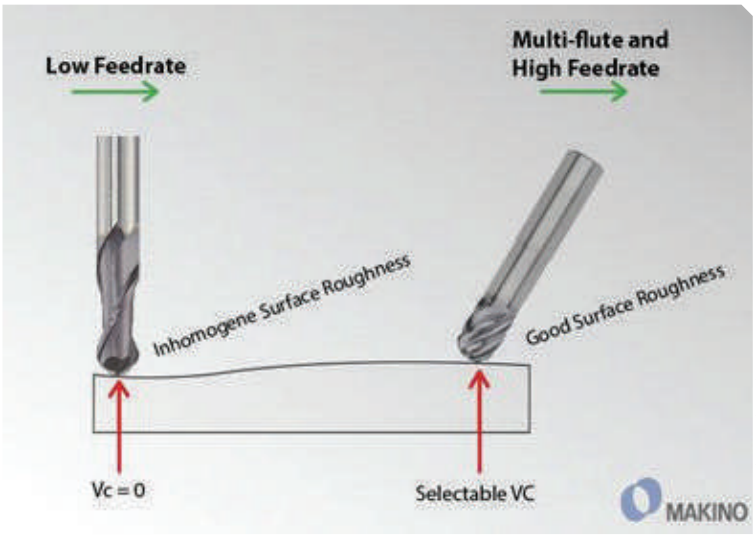
Generating 3D part and tooling shapes common in the Orthopaedics industry essentially dictates the need for five-axis machining. This can be accomplished with a 3-axis mill fit with a tilt/rotary table in a 3+2 configuration, but there typically will be a sacrifice in speed, surface finish and precision compared to a fully integrated five-axis machine.

On a good two-axis auxiliary table, you might typically see positioning accuracy of ±3-5 arc sec. and 30 to 50 rpm in speed. By comparison, Makino's DA300 five-axis machining center, which is used widely in the medical industry, uses direct drive servo technology on its tilt/trunnion table and can achieve positioning accuracy and repeatability of ±2 arc. sec. on the tilt and a contouring speed of 100 rpm. The rotary axis is accurate to ±1 arc. sec. and can achieve 150 rpm. Combine that with X-Y-Z axes that can feed up to 1968 ipm and a 20,000 rpm spindle and you have a much more capable platform for high-speed 3D machining.

Being able to accurately feed and articulate the tool to workpiece so quickly also enables much more efficient use of cutting tools. With simultaneous five-axis machining you can maintain a constant tool vector to a 3D workpiece surface, which with a ball nose end mill should not be a vertical orientation. When feeding a ball mill vertical to a workpiece surface, you are essentially dragging the tip of the tool across that surface at zero rpm, which is hardly an efficient cutting process.

By tilting the tool relative to the surface, you utilize the effective flute length, of the tool efficiently. This effectively increases the surface footage of the tool and can boost metal removal rates by as much as 40-50 percent, yet still generate better surface finishes and blends.

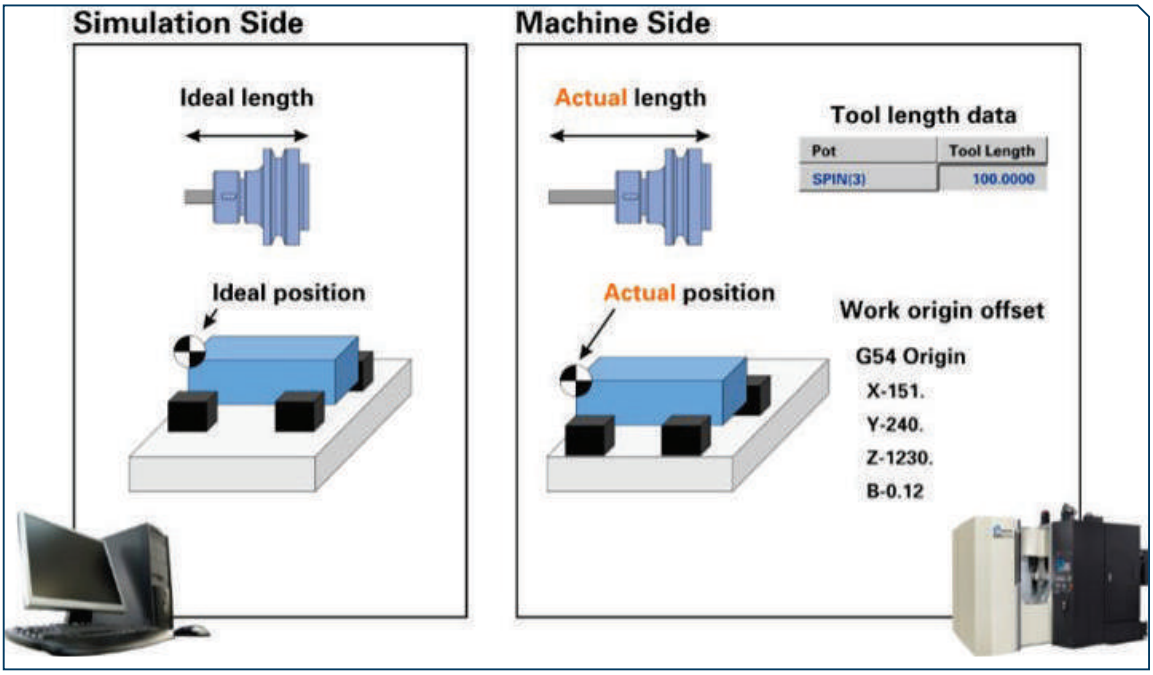
It is also important not to scrimp on the quality of the tooling. Precision ground tools generate less vibration to produce better surfaces, and last longer too. Toolholders are also extremely important to minimize tool runout, which also degrades tool life and finish quality. For high-speed machining in these difficult materials, a shrink fit may not be mandatory, but it is recommended. You can get a payback in the range of 20 percent improvement in tool life.



Source: Modern Machine Shop

On the left, trying to cut with the tip of the tool where there is not any velocity. By tipping the tool, you use a larger portion of the of the diameter to get good cutting conditions.

The biggest challenge in machining orthopaedic implants is usually the surface finish. For this reason, post-machining hand finishing is still usually required with belt grinding, polishing, and buffing. And it is time consuming.



Source: Modern Machine Shop

With Collision Safe Guard, you import a part program simulation into the Pro 6 CNC; then CSG applies actual tool and workpiece offsets and looks ahead in the program to discover any interference issues with the real-world setup. It then stops the machine before a collision occurs.

The combination of rigidity, speed, accuracy and freer cutting action renders a machining process much more capable of efficiently generating surface blends and matches with dramatic reductions in cycle time and post-machining finishing work.

Critical CNC functions for 3D machining

It is this combination of rigidity, speed, accuracy and freer cutting action that renders a machining process much more capable of efficiently generating surface blends and matches with dramatic reductions in cycle time and post-machining finishing work. However, this increased machining speed and multi-axis freedom of movement create two new concerns. How do you reduce the risk of tool collisions at high feed rates? And how do you manage the tool path so that you achieve the quality surfaces that you think you programmed in CAM? Makino addresses these concerns with additional software features available on its Pro 6 control:

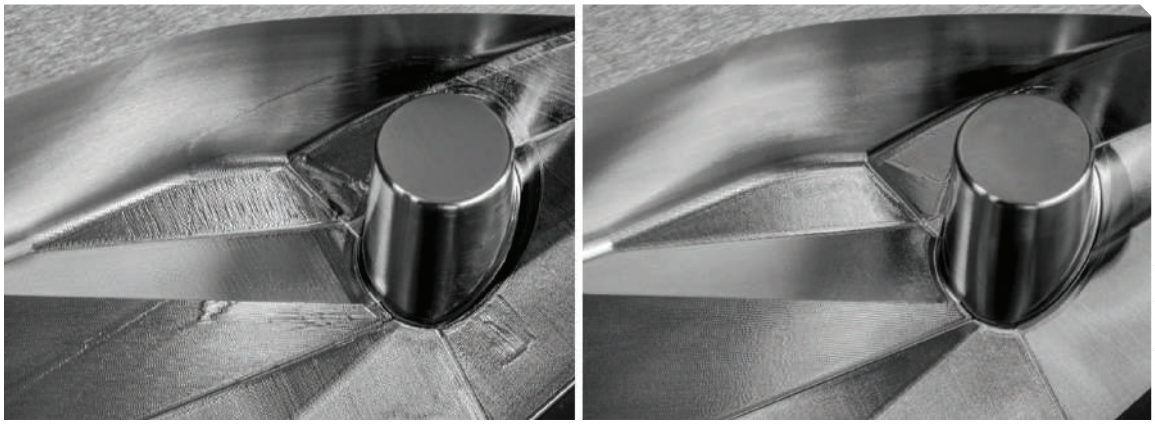
Collision Safe Guard (CSG) — Because of the dynamic nature of moving both the spindle and the workpiece in a five-axis environment, unintended tool, workpiece, and fixture collisions are a real danger. For this reason, it is recommended that a full solid model simulation of the part program be done in an application such as CGTech's Vericut. Makino's proprietary Collision Safe Gaurd (CSG) then takes that model a step further and replicates the full simulation in the machine control, also considering the workpiece and tooling offsets and other physical setup alterations made at the machine. The actual workpiece, fixture, and tool features (length and diameter) can easily be discovered with an automatic probing routine. Then the software looks ahead in the part program, and when collision points are detected, it shuts down the machine before a crash occurs.

SGI Smoothing — There are a variety of factors that can mar the surface finish of a workpiece: dwells, axis over-shoot/under-shoot, sudden axis stops and reversals, vibration and more. Makino's proprietary Super Geometric Intelligence (SGI.5) software mitigates these conditions by providing optimum feed rates that generate higher quality surfaces while also reducing cycle time.

SGI can maintain high feed rates based upon a blend of chordal tolerance, block length, number of points, look-ahead and M-codes, establishing tolerances to maintain higher feed rates even during abrupt directional changes in the tool path. Rather than having to program for the worst-case scenarios, you can establish a faster feed rate and the control will automatically compensate where corners or intersections could compromise the accuracy of the cut. Or, in applications using high-feed milling techniques, this capability will better ensure the actual toolpath is sustained at the programmed feed rate.

Maintaining process stability

It is one thing to machine to high standards under optimal conditions, but quite another to do it all day long and over extended periods of time. For successful medical machining, that means achieving process



Source: Modern Machine Shop

This comparison shows the quality of surface finish without (left) and with SGI Smoothing.

stability that is maintainable without undue human intervention. Two critical and interrelated factors here are the inherent geometric accuracy of the machine and the thermal stability of the machine.

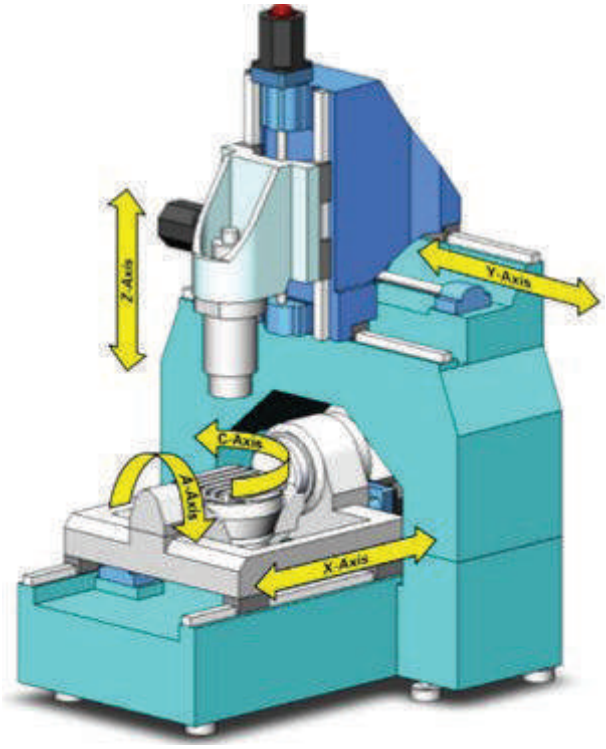
Common practice for machine tool builders is to address geometric inaccuracies in the machine with electronic compensation in the control. For example, say the run of an X axis isn't perfectly straight or there is pitch, yaw or roll as the axis traverses from one limit to the other. These inaccuracies can be mapped and compensated for in the CNC's motion. However, this methodology can become increasing unstable as the machine heats up because the compensation may no longer be accurate in a state of thermal distortion with some machines.

Makino's answer for this is to build machines with symmetrical designs that minimize thermal distortion and apply active thermal management systems to keep the machine thermally stable in the first place.

A variety of factors combine to deliver high positioning accuracy (±0.000060") in the DA300 and other models designed for medical machining, including core-cooled, fine-pitch ballscrews with 0.05 micron scale feedback. The high-speed spindle enables fast machining of fine features with small tools. The spindle is also thermally controlled providing optimum performance over extended periods, ensuring exacting cutting conditions from start to finish to produce tight-tolerance, high-quality workpieces.

Stable processes enable unattended machining

Today's medical manufactures are under increasing pressure to become more efficient without sacrificing quality. Doing that effectively requires investing in more capable equipment, which, of course, comes at a cost. From a financial perspective, the top companies are thinking much more like high-volume production manufacturers with greater consideration of factors such return on investment, equipment utilization rates and labor costs. You cannot just be good at making parts anymore; you must



Source: Modern Machine Shop

Symmetrical machine design is an important factor in mitigating the ill effects of thermal distortion. Also important is providing equal support across the entire axis travel ranges, as show in this rendering of Makino's DA300 five-axis machining center.

Today's medical manufactures are under increasing pressure to become more efficient without sacrificing quality. This requires investing in more capable equipment, which comes at a cost.

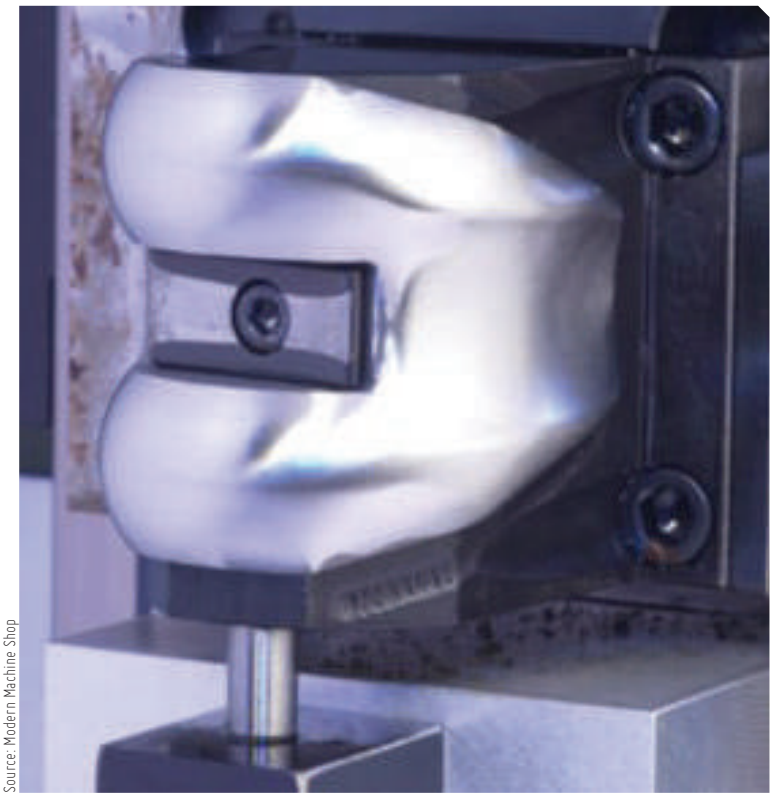
Source: Modern Machine Shop

Once process stability is achieved, it becomes possible to automate medial parts machining. Shown here is Makino's DA300 integrated with an Erowa automatic pallet changer.

Automation is becoming increasingly common in leading medical manufactures that can bring high production-like efficiency to an orthopaedics manufacturing shop.

also be efficient to be successful as a business.

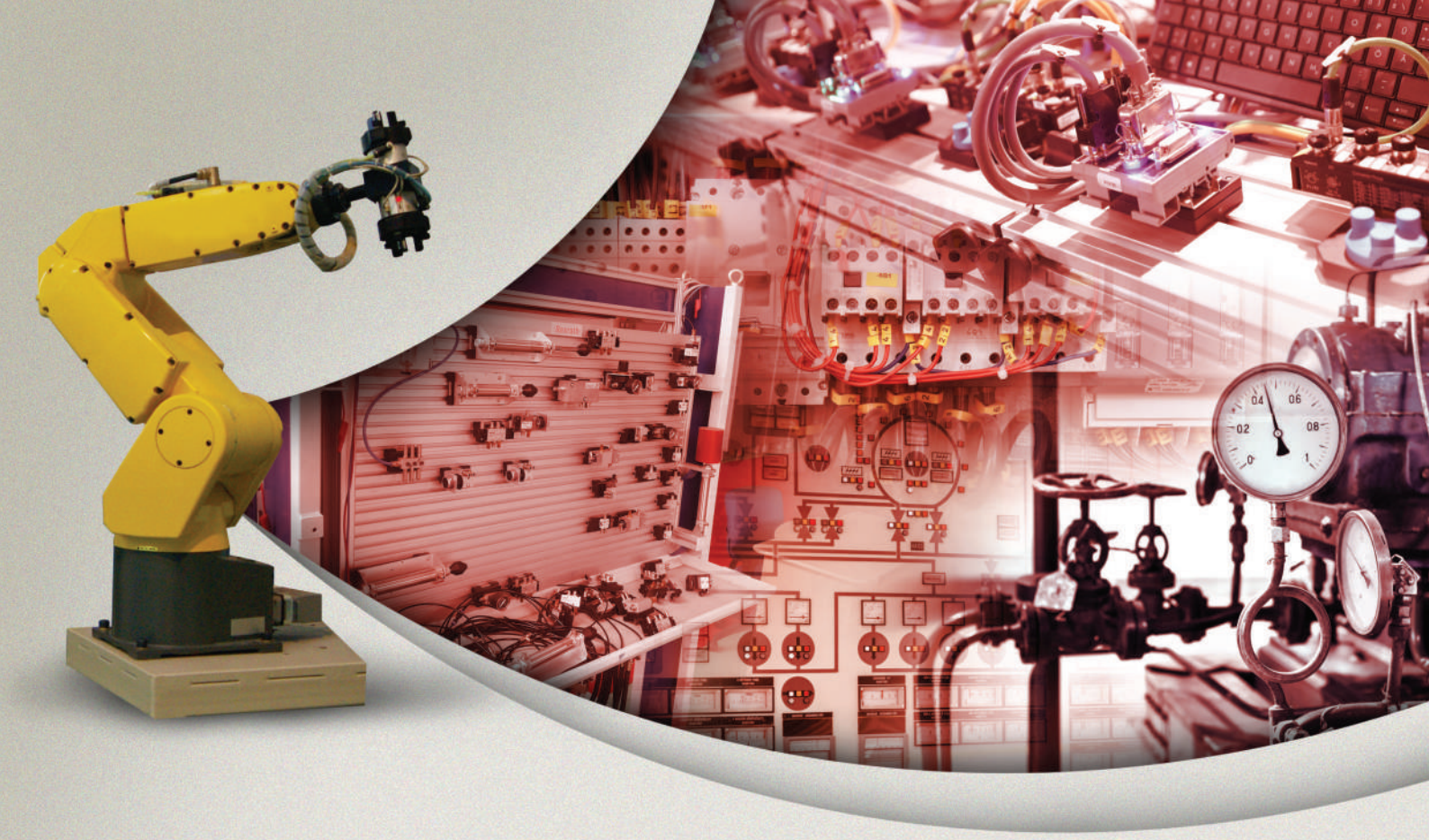
Makino's background in production machining is very helpful in this regard as they bring this thinking to how they approach medical manufacturing solutions. It is not just about machining 3D surfaces faster and to higher standards, though that is indeed important. It is also about compressing the total time to manufacture medical parts and getting the most out of your considerable investments in technology and skilled people.



Source: Modern Machine Shop

Rigid workholding is an important factor in achieving low-vibration process consistency and can be challenging with the organic workpiece shapes in medical machining.

It is little surprise, then, that automation is becoming increasingly common in leading medical manufactures and that Makino's five-axis machining centers are all designed for easy integration with both third party and Makino-built automation solutions. For example, the DA300 and other 5-axis machines are designed to integrate with Erowa's robotic loading systems. These systems can bring high production-like efficiency to an orthopaedics manufacturing shop, even the ability to machine unattended. That is a great way to maximize five-axis machining processes plus get the most out of your technology and people. It is also a great formula for building a very profitable medical manufacturing business.



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STEERING THE SHIP

In the following insightful conversation with MMI's Editor-in-Chief Soumi Mitra, Dr Reji Mathai, Director, ARAI, talks on the institute's focus, the expected rise in the demand of EVs, India as a hot bed of opportunities for global OEMs, and a lot more…

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Please help our readers understand ARAI's role in the current rapidly transforming automotive scenario.

Dr Reji Mathai: The Automotive Research Association of India (ARAI) is a premier research, testing and certification institute of the Automotive industry, affiliated to Ministry of Heavy Industries, Government of India. ARAI works on future technology development, regulation roadmap and provides policy inputs to the Government of India with the objective of protection of environment, sustainable transportation and road safety. With more than five decades of service to the Indian Auto industry and the nation, ARAI strives hard for development and growth of environment-friendly and safer vehicles on the road. The institute tracks international technological developments and works on developing India specific solutions, including India-specific regulations.

Source: ARAI

Dr Reji Mathai, Director, The Automotive Research Association of India (ARAI)

Nomura Research Institute Consulting & Solutions India has predicted a stronger growth of the Indian Auto industry in 2021-22, with electric vehicle sales, especially two-wheelers, also likely to see positive movement. What is your view on the same?

As we adapt to the new normal of Covid-19 pandemic, Indian Auto industry is expected to grow in an accelerated way as predicted by global experts. With the announcement of PLI scheme by the Indian Government, the FAME II scheme and state EV policies, the adoption of electric vehicles (EVs) by Indian consumers is expected to rise. The current fuel prices are also driving consumers to consider EVs as an option. The Auto industry and various startups are working on the development of new EV models and we are observing new players coming in the market, especially in the electric two-wheeler segment. As India is predominantly two-wheeler transportation market, rise in the sales of electric two-wheelers is naturally expected.

With the announcement of Tesla's entry by the Union Minister Nitin Gadkari and the electric push given by his ministry, there is a general buzz around electric cars in India. Hence, 2021 is slated to be the year of electric cars in India.

Global OEMs see India as an opportunity to expand their businesses and, with favorable policies, we can see excellent growth in this sector. Long-term roadmap of government policies for EVs will be an enabler for manufacturers to set up base in India. The well-planned roadmap will also provide tier I and II suppliers to scale up the capacities. The need is to collaborate to achieve economies of scale.

Hence, the future in this sector is going to be exciting.

The Indian Automotive industry is based on conventional engines. For the large-scale adoption of electric vehicles, the entire ecosystem has to be transformed. How is ARAI helping the industry to smoothly transition this change especially that ARAI has set up a Centre of Excellence for electric mobility for the handholding of the vehicle manufacturers, component manufacturers, tier I and II suppliers. Kindly elaborate on this.

ARAI, with the support of the Department of Heavy Industry, has set up a dedicated test center at its Chakan campus, keeping in view the need faced by the Auto industry on the developmental front, testing and certifications of EVs and their components such as motors, batteries, chargers, etc. This center is operational for the last two years and is providing services to the industries that are in the development of the entire gamut of EVs - from 2-wheelers to buses. For a smooth transition to electric mobility, the ARAI Academy is focused on skill development and conducts domain training programs, specialized PG diploma courses, etc.

ARAI has also been helping startups in the EV space. How is that done?

The Government of India's 'Startup India' campaign has led to the growth of the startup ecosystem in the country. Various startups are venturing into the Automotive sector, particularly in the electric mobility domain. Apart from providing development and testing services, ARAI has been going an extra mile to handhold startups in the technology development, understanding of regulations, homologation process, etc.

Source: ARAI

"In India, the Machine Tool industry is quite mature and robust. We have a strong expertise in electrical systems, power electronics, and automation. Hence, the industry will be able to meet the requirements of the EV Manufacturing industry on the similar lines of the IC Engine Vehicles Manufacturing industry."

Dr Reji Mathai
Director
The Automotive Research Association of India (ARAI)

Kindly apprise us of the role of TechNovuus and how it contributes to help the Auto sector?

TechNovuus is an online platform developed by ARAI to bring all the stakeholders such as vehicle manufacturers, components manufacturers, startups, R&D institutes, academia, and students on the same platform to address the technological problems faced by the industry. This platform is developed under the guidance and support of the Department of Heavy Industry of Government of India. The stakeholders registered on this platform can post their challenges/problems and the expert community, with the support of the startups, R&D institutes, and academia, can work on solving those. TechNovuus platform will go a long way in the development and growth of technological innovations in the Auto sector.

Ensuring battery safety in EVs is one of the key challenges. What are the standards and test procedures developed that suit the Indian environmental conditions?

Battery safety is of paramount importance in EVs. Hence, in India too, the Automotive industry standards are formulated in line with the latest technological developments and challenges, international harmonized standards, and India-specific conditions. For example, AIS 038 Rev-2 for passenger cars and commercial vehicles and AIS 156 for two-wheelers and three-wheelers have been formulated, which comprehensively include battery safety in EVs.

It is being strongly felt that the Government should incentivize both manufacturers and consumers to shift to EVs since a supporting infrastructure is needed for their widespread adoption. Please share your take on the same.

Presently, the Government of India is implementing Phase 2 of FAME India scheme, which provides incentives to the buyers of EVs. Thus, it is a demand side incentive. The Government is also working on production link incentives (PLI) scheme, which will provide supplier side incentive also. The details of PLI scheme are still awaited.

Do you think the Indian machine tool manufacturers are enough equipped with skill, knowhow, and infrastructure to cater to the requirements of the EV manufacturing industry?

In India, the Machine Tool industry is quite mature and robust. We have a strong expertise in electrical systems, power electronics, and automation. Hence, the industry will be able to meet the requirements of the EV Manufacturing industry on the similar lines of the IC Engine Vehicles Manufacturing industry.

The Government of India's 'Startup India' campaign has led to the growth of the startup ecosystem in the country. Various startups are venturing into the Automotive sector, particularly in the electric mobility domain.

MEETING EXACTING STANDARDS

Mahr Metrology India has successfully positioned itself in the list of top suppliers of testing and measuring equipment in the country. Vouched by its customers for user-friendly, high-quality products and remarkable after-sales support, the company has been expanding its footprint across a wide range of industries...

Source: Mahr Metrology India

Mahr GmbH, the parent company of Mahr Metrology India Pvt Ltd, started its journey way back in 1861 in Esslingen, Germany, manufacturing, and trading in high-precision Metrology Systems including Contour Testers, Height Gauges, Gear Testers, Digital Micrometers and more.

In India, its 100 percent-owned subsidiary company got incorporated in 2007 with Chennai as the Head Office location and branch offices spread across the country. Today, its branch offices are located in Bangalore, Delhi, Pune, and Ahmedabad.

R Ganesan, Managing Director, Mahr Metrology India, takes us through the company's growth years since its inception until its present stature. "It's been 14 glorious years of accomplishments. We have had a consistent and sustainable growth owing to our highly loyal customer base. They keep coming back to us since we understand what they want and offer them just that. They are extremely satisfied with our products' quality and their user-friendly nature, and remarkable after-sales and application engineering support."

However, the secret to the success of any business is its ability to adapt to the latest technological changes. Hence, to continue evolving and offering customers the cutting-edge products, Mahr India, for the last five years, has joined hands with highly efficient business partners to promote its range of Hand Tools, reaching out to customer segments PAN India.

Expanding footprint

Although Mahr is a dominant player for providing solutions in the Automotive/Ancillaries industry, in the last six-seven years, it has started focusing on Non-automotive segments like Aerospace, Defense, Medical, Machine Tools and Cutting Tools. In terms of revenue, the Automotive segment still remains the top generator for the company contributing around 60 percent. "Due to the recent 'Make in India' push by the Government, there is a strong momentum taking place in the Defense sector, which, we believe, will fetch us more share in the coming years. The Aerospace industry is also gaining importance due to the recent Government policies," shares Ganesan.

He continues to add that the Indian customers are well receptive to the company's globally hit products such as Reference Form Tester and New Generation Contour Measuring machines. At present, Mahr is offering 80 percent of its standard products and 20 percent as customized solutions to its Indian customers. "We are in the process of increasing tailor-made

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solutions for our customers here in the coming years. In India, customers prefer to buy MarSurf and Marform product ranges due to quick delivery period," he adds.

Innovation is key

Mahr has come up with SMAHRT series of measurement devices that covers Integrated Wireless technology for workshop handheld instruments. Helping us understand how innovative is it from the company's previous offerings, Ganesan says, "Our Wireless integrated devices are based on RFID technology and are widely accepted in the Indian market due to their durability along with IP ratings 65 and above, which is a key demand in the market. Our instruments are available with integrated set-up, designed for shopfloor dust and oil/coolant exposure. Instruments user interface software Marcom Professional is a powerful software with options to get the data in Excel or communicate to SPC software for further analysis of the data. MarCom Professional comes along with the package at no extra cost."

When asked regarding the competition with other domestic players and how does the company ensure staying ahead, Ganesan adds, "Product efficiency and cost-effectiveness are our biggest selling points. For example, our Digital Caliper comes with a 3-year battery life. Hence, the reliability of result repeatability and reproducibility extended for one year. Millimess 1003 dial can last up to 10 years with the given accuracy in the catalogue. Hence, considering these factors, we are much ahead of the rest."

Source: Mahr Metrology India

"It's been 14 glorious years of accomplishments. We have had a consistent and sustainable growth owing to our highly loyal customer base. They are extremely satisfied with our products' quality and their user-friendly nature, and remarkable after-sales and application engineering support."

R Ganesan
Managing Director
Mahr Metrology India Pvt Ltd

Focus on customer

Mahr's mission statement has been customer orientation, which means all of its actions are to be oriented towards the customers' wishes. Ganesan elaborates on this, "'Exactly' is the DNA we all carry within while dealing with the end-user. This is our USP backed by the cutting-edge technology that we keep upgrading year on year. For example, we have a product that is supplied with Mercedes Benz Standard (MBN), which is the indication of Mahr and Mercedes Benz collaboration at the R&D level for new product releases and improvement in catering to future technology demands."

The company has always put customers' needs first and is ever prepared to exceed their expectations. Ganesan reveals that new product ranges have been introduced in the past few years and the market has responded well to them, especially Form Testers, Gear Testers, and Roughness and Contour Measuring Systems including the MarSurf CD/VD/GD series, which is the recent highlight.

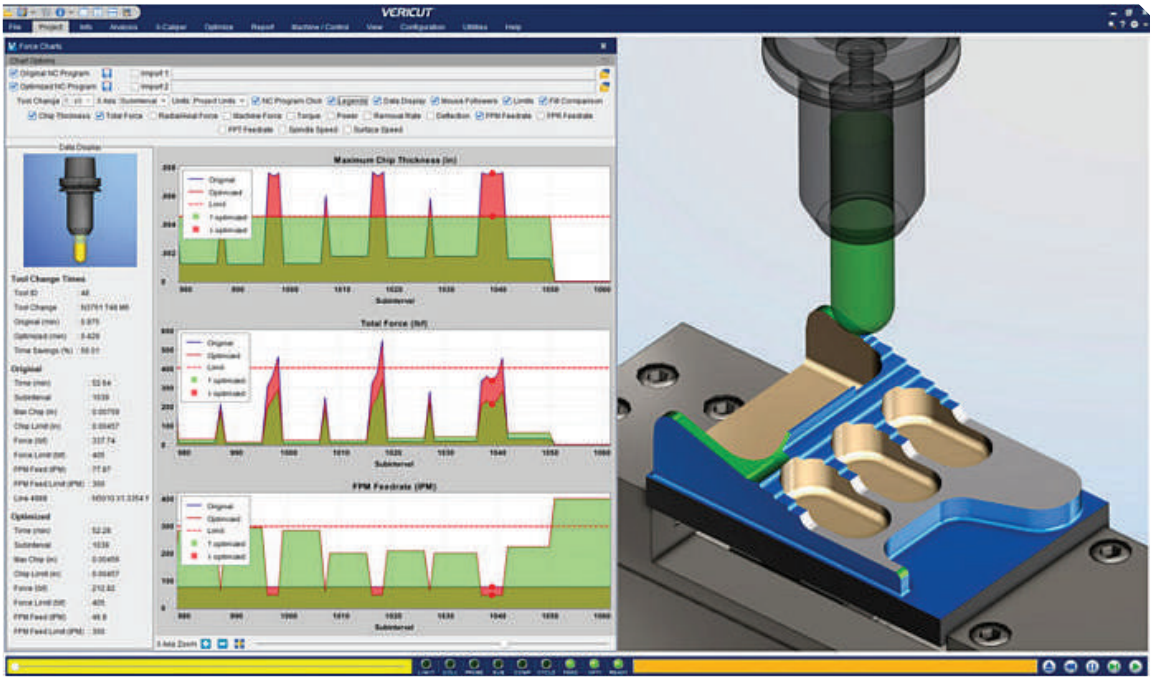
"We have also upgraded the Digital Micrometer and Caliper series with a more reliable design and quick measurements and integration of Wireless transmitter to cater to the Industry 4.0 demands. A few products are also to be launched soon in the Indian market. They got delayed due to the Covid-19 pandemic. So, we are entering an exciting new phase in the coming years," he shares summing up.

Mahr's wireless integrated devices are based on RFID technology and are widely accepted due to their durability along with IP ratings 65 and above, which is a key demand in the Indian market.

Source: Mahr Metrology India

OPTIMIZING PROCESSES THROUGH SIMULATION

Simulation ensures programs are error free and all operations work together as intended, but optimization ensures the whole process is operating as efficiently as possible to save time and money. Here's knowing how has VERICUT CNC simulation and verification software from CGTech helps to achieve that...



Source: CGTech

As machining gets more complex and customers expect more for less, there is room for improvement in any manufacturing process. These improvements, which are not just about reducing costs, might include reduced NC program runtimes, increased throughput, making parts cheaper or getting a product from start to finish and out to market faster. There are some significant warning signs that will indicate when process optimization is clearly a must in a manufacturing business – missing delivery dates? Losing out on bids or not as competitive as rivals? Lost contracts and unsatisfied customers? Or declining profits?

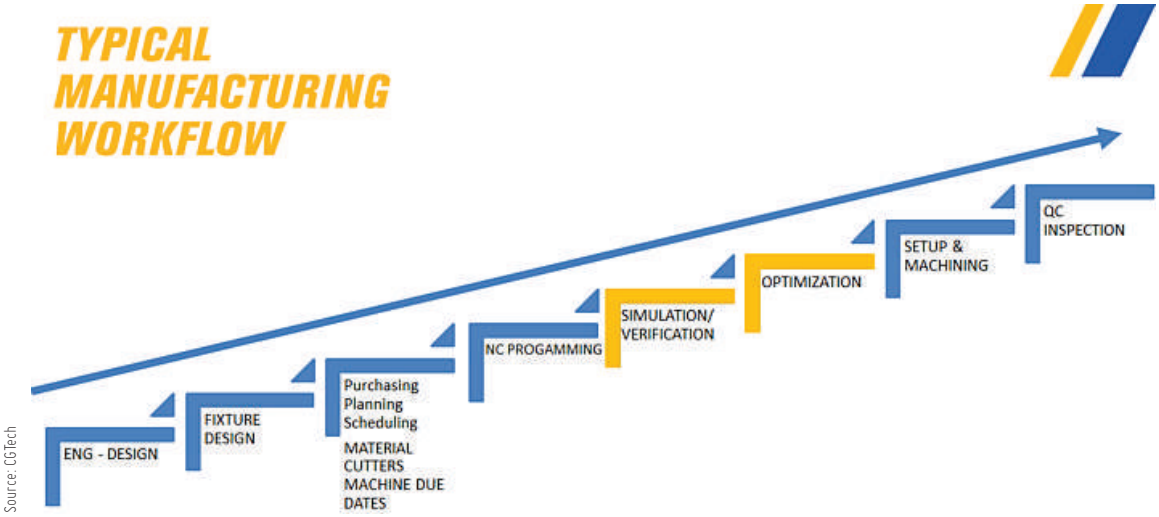
Every level of the manufacturing process that a job goes through requires careful planning and communication and the aim of manufacturing is to make it through each step as quickly and efficiently as possible, with the least cost incurred. In a typical manufacturing workflow, VERICUT resides between CAM programming and machine set-up.

Manufacturing workflow with VERICUT

CAM programmers know that modern machines move so fast it is pretty much impossible to stop them before a crash occurs. VERICUT CNC simulation and verification software does a superior job at finding problems lurking in NC programs and warning of unexpected machine behavior, even those occurring between multiple set-ups. It lets programmers resolve these issues before they reach the shopfloor, crash the machine and waste valuable machine time.

With VERICUT, the shopfloor can be confident that programs will run correctly. Verification will show if there are any errors or any areas that cannot be reached by the machine or the tools due to fixturing interference. Machinists do not have to worry about crashes, and they do not have to waste time proving out because it's already been done between the VERICUT and programming stages.

Source: CGTech



Source: CGTech

Having access to the free VERICUT reviewer at the machine tool to check the simulation against reality at any time is a huge benefit to both the shopfloor and programmers as it avoids the 'what happens next' disturbances during one off or first off production.

There is also a positive ripple effect for other departments that coordinate with programming. Engineering and design can learn through verification if parts can be manufactured or if changes need to be made before metal cutting. Planning and scheduling will have more accurate cycle times and they will not have to schedule prove-out times on the machines. The quality control and inspection team can expect higher levels of conformance and fewer issues which makes it easier to approve parts and get them delivered. These are all areas where VERICUT is helping save time and money.

Silent killers of NC manufacturing

But there are also the hidden issues, inefficiencies and missed opportunities to optimize processes that erode profit margins. Things like poor cutting methods, non-optimal feedrates in new and existing NC programs, over- or under-utilizing cutters and/or machine tools, all of which can be draining money with every part made. Some companies work really hard and diligently optimizing programs but there are opportunities and savings to be had for all machine shops. This is where Force and Force analysis charts come in.

Force analysis and charts

VERICUT Force recalculates feedrates to maintain ideal constant chip thickness while simultaneously reducing feedrates when needed to maintain safe cutting forces and spindle power, and it does this for each tool. Force is based on calculations and proven cutting data that has been gathered from tooling manufacturers, material specifications and dyno testing.

It uses very specific cutting parameters, takes into consideration what kind of material is being used, as well as tool type and geometry. It couples this with the cutting conditions that VERICUT collects to give the best data that can be used to analyze and optimize the NC program.

Force charts visualize what is happening during the machining process and expose areas of opportunity that exist in each NC program, such as erratic chip thickness, chip thinning and inefficient CAM paths that can all be resolved by optimizing feedrates. The charts also show areas of concern, for instance where the force exceeds what the tool is capable of, such as excessive cutting conditions or potential for chatter, broken/chipped cutters, or damage to part of the machine. In these instances, VERICUT Force will lower the federate to keep the force under the limit of the tool's capability.

Source: CGTech

The impact of optimizing is dramatic, including reduced machining time and longer tool life, which will help the shopfloor by giving more machine capacity and maybe even postponing the purchase a new expensive machine. There will be less post machine clean up because produced parts will be better quality, saving even more time per part. Programmers are going to benefit from having correct speeds and feeds information to achieve consistent machining results. All these positives reach all the way back to the quoting and estimating and mean manufacturers can be more aggressive and competitive with schedules and bids. Simulating, verifying, and optimizing simultaneously with VERICUT Force equates to a cumulative effect on process optimization, resulting in significant time and money savings.

VERICUT CNC simulation and verification software does a superior job at finding problems lurking in NC programs and warning of unexpected machine behavior, even those occurring between multiple set-ups.

FOR SUSTAINABLE HEALTHCARE

An interesting account of how Blaser Swisslube's Synergy 735 and Vascomill CSF 35 helped Sigma Surgical in India achieve tool cost savings and stable processes...

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Ahmedabad-based Sigma Surgical Pvt Ltd is an upcoming leader in the Indian Medical Implant and Surgery Instrument sector. The company produces bone screws, bone plates, spinal implants more out of Titanium and Stainless Steel (316 LVM), as well as surgical instruments. Founded by JJ Gothi in 1998 with just three employees, Sigma Surgical has grown consistently and is currently well known in the industry for its high-quality implants. Now under the leadership of Mehul Gothi and his vision of providing international quality implants at affordable price to Indian customers, the company is set for the future with its state-of-the-art facility.

Challenges to overcome

However, there were certain hurdles that needed to be surmounted for the smooth running of operations. One of the issues Sigma Surgical would face was its previous coolant. The company, hence, did not have a stable process and suffered from unpredictable tool wear. "In the Medical segment, there are various challenges including the difficult to machine materials, as well as the know-how transfer from the suppliers. Therefore, stable processes are key," explains Mehul Gothi, CEO, Sigma Surgical.

The company faced other difficulties such as component cleaning and cleaner machined parts. The unpredictable wear of inserts was varying to such an extent that it did not allow the team to plan and work accordingly. There was also a gap as some tools showed a higher tool wear than the other. This also resulted in component rejection and affected the productivity negatively. "Defined tolerances for produced parts in the Medical segment are very strict. Hence, more rejections lower the output of finished parts," he adds.

"Amol Pawar, Regional Sales Representative, Blaser Swisslube, approached us and explained how to analyze the production situation and what we can expect further down the road in regard to optimization and cost savings," shares Gothi.

Pawar introduced the team to the comprehensive Blaser ap-

Source: Sigma Surgical Pvt Ltd

Sigma Surgical Pvt Ltd Facility

Challenge

Sigma Surgical's coolant was a challenge that led to unpredictable tool wear affecting the stability of the process.

Solution

With Blaser Swisslube's Synergy 735 and Vascomill CSF 35, the company was able to reduce tool costs by almost 50% and achieve a stable process.

proach and offered to run a test with the Blaser coolant solutions. The produced part for the test was a Twin Lock BCP Screw and Proximal Tibial Plate made of titanium.

Since 1936, Blaser Swisslube has stood for lubricant solutions that offer measurable added value and are gentle to people and the environment. The family-owned Swiss company develops, produces and sells a comprehensive range of metalworking fluids for a variety of industries. With a team of application experts, customized services and excellent products, Blaser Swisslube helps manufacturers fully capitalize on the potential of their machines and tools and turn the metalworking fluid into a key success factor – a Liquid Tool.

Holistic approach of Blaser

Taking a holistic view on the production process, the Blaser coolant specialist recommended to perform the tests with Vascomill CSF 35 on the Swiss type turning machine and Synergy 735 on the 5-axis VMC. From his experience he knew that Vascomill CSF 35, a specially designed cutting oil, will be great for this turning application in the Medical segment. The oil is very low in emissions and ensures a highly clean working environment, which was important to Sigma Surgical.

"Synergy 735 is an innovative formulation which outstands with an excellent surface quality and extremely low foaming" informs Pawar. With Synergy 735, the tool life of the drilling application on the 5-axis machine was raised from 8.5 to 13.7m. Before the change to Vascomill CFS 35, the tool life on the Swiss type turning machine varied from 57 to 72m. Later, 120m was achieved consistently.

The increased and consistent tool life resulted in the overall cost savings of ₹2.5 million per year. Even though the coolant costs of Vascomill CSF 35 and Synergy 735 were higher than the previous product, the investment quickly paid off.

For Sigma Surgical, its workforce plays a highly important role and its safety is the company's first priority. "Hence, we prefer investing in tailored training programs. The standout feature of Vascomill CSF 35 is the flash point of 310°C. Our facility is now smoke- and mist-free. This has helped us to maintain a pleasant and safe work environment for our team," shares Gothi.

Source: Sigma Surgical Pvt Ltd

"I am now convinced that a right coolant solution has a positive effect on the entire production process and the overall costs. Also, the excellent after-sales service from Blaser has been an added advantage."

Mehul Gothi
CEO
Sigma Surgical Pvt Ltd

Before the change to Vascomill CFS 35, the tool life on the Swiss type turning machine varied from 57 to 72m. Later, 120m was achieved consistently.

Source: Sigma Surgical Pvt Ltd

Proximal Tibial Plate

Collaboration to follow

Gothi is convinced that a right coolant solution has a positive effect on the entire production

Sigma Surgical and Blaser Swisslube India will work together to ensure that in Sigma's bigger production plant, the production processes continue to run smooth and stable with Blaser coolant solutions.

process and the overall costs. "I have now experienced first-hand how important it is to use an optimal coolant for the entire process," he notes. Also, the excellent after-sales service from Blaser was an added advantage. Going forward, Sigma Surgical and Blaser Swisslube India will work in close collaboration to ensure that with a bigger production plant, Sigma expands its production with additional machines within the next two years and the production processes continue to run smooth and stable with Blaser coolant solutions.

Source: Blaser Swisslube India

(L-R) Amol Pawar, Regional Sales Manager, Blaser Swisslube India, along with Mehul Gothi, CEO, Sigma Surgical Pvt Ltd

Synergy 735

Synergy 735 is a full-synthetic, water-miscible oil-free metalworking fluid that offers excellent surface quality and cleanliness. Spotless surfaces, thanks to neutral pH, even with sensitive aluminum alloyscan be achieved. It is extremely low foaming and ideal for high-pressure systems. The crystal-clear coolant allows a clear view of the machining process.

Titan Gilroy from Titans of CNC loves it. "This coolant is an absolute game changer. I get amazing tool life in all super alloys and it is perfectly clear in color. My team loves it, I love it and have now switched all 17 of my CNC machines to Synergy 735. I deem it as the best coolant in the entire world."

Gilroy is the owner of TITANS of CNC, a CNC manufacturing workshop in Texas, US. He has founded his online platform TITANS of CNC Academy to offer free training for those interested in machining, students and many more in the field of CAD, CAM and CNC. Titan designed the curriculum used by the trainers and students. The online portal is the first training platform of its kind and now has fans and visitors from all over the world.

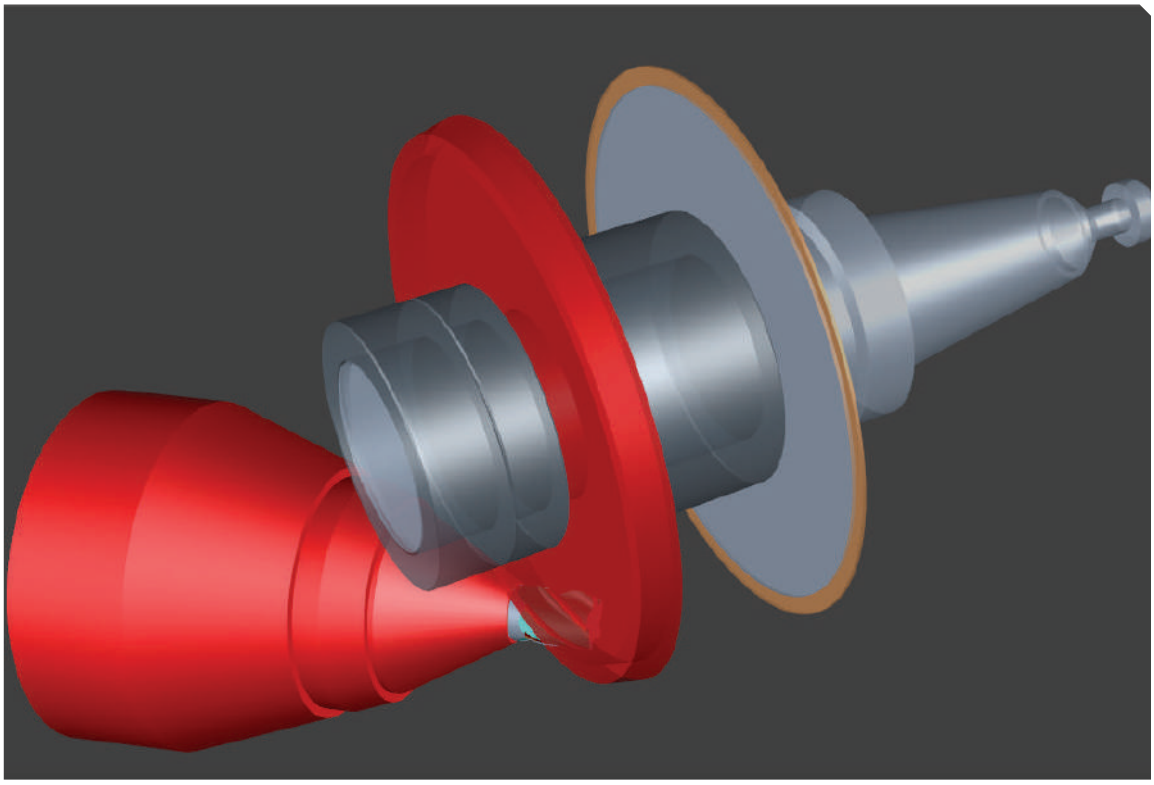
Vascomill CSF 35

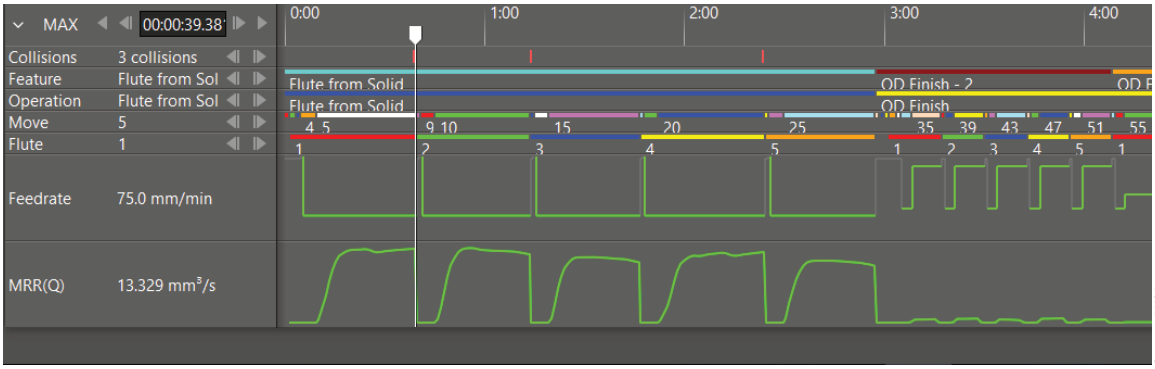
Vascomill CSF 35 is a cutting fluid based on ester oil for flooded applications and for minimal quantity. It can be used in operations including milling, turning, reaming, threading, gear tooth forming, shaving, slotting, sawing and punching on materials such as steel alloys, stainless steel, titanium, titanium alloys, aluminum, aluminum alloys, cast iron and non-ferrous metal.

Since it is ester oil based, its benefits include renewable raw materials, good skin compatibility, and being more readily biodegradable as a mineral oil. Its reduced emissions result in a cleaner workplace. Also, its lubricating properties lead to good surface quality and higher tool life.

LEVERAGING THE BREAKTHROUGHS

Smaller tool manufacturers are eventually doing away with their doubts regarding industrial automation and are embracing it owing to the wide range of advantages it offers.





Source: ANCA

Source: ANCA

Industrial automation is changing the way cutting tool manufacturers operate. Machines have taken on the heavy lifting at each stage of production letting workers get on with less repetitive tasks. And while automation may sound costly and complex to implement, it's not reserved just for big business. There are dozens of ways a small cutting tool manufacturer can embrace automation for a more efficient and innovative factory.

Benefits of industrial automation

- Cost reduction happens through reduced labor costs and increased machine uptime. The drive for automation is being accelerated by the unavailability of skilled labor, where machines can fill the gaps.
- Automation is an important step to help people meet regulatory obligations concerning the limits of weekly work hours without compromising machine utilization.

- Reduced material handling makes running smaller batches much more cost-effective.
- Streamlining of existing processes and systems across the business.
- Elimination of mistakes in material management.
- Automating in-process measurement raises the quality of tool production and can nearly eliminate waste, meaning more profit.

Standing on the giants' shoulders

Bigger companies indeed have more buying power. When it comes to industrial automation, they have scope to ask for tailored developments to suit specific needs or to make these in-house adjustments. But as new technology and solutions are developed in response to these requests, the industry as a whole will benefit.

Just because a technology is off the shelf, doesn't mean it is 'standard'. Our industry is constantly evolving as new solutions are found and applied. While their technology development may have been developed at the request of a large customer, as soon as it's scalable it can be rolled out to suit most businesses. At ANCA, this includes many of its innovations including 3D simulation software, its in-process measurement system Laser Plus, and RoboTeach, which makes robotic loaders accessible and easy to program.

The addition of laser etching on a Robot loader is another example that has increased the functionality of the grinding machine by including what would otherwise have been additional downstream steps in the process of making tools.

Vendors recognize that a small tool manufacturer's priority is maximizing his factory's efficiency – machine uptime versus setup time. They know that he needs software and accessories that will help him keep things ticking over without wasting time and money reloading materials.

A small cutting tool factory relies on every working part being up to scratch including its people. Automation removes the risk of human error, creating a safer working environment that's less likely to be disrupted.

Approaching where to start

Chances are there will be no obvious trigger when it comes to adopting industrial automation. Many smaller businesses won't have planned to develop the level of automation they have. Some may have started only after an increase in labor and setup costs forced them to look for ways to run more smartly. But that is ok, one can build one's automation solution piece by piece – as long as they have an agreed vision.

It may be as simple as being observant and seeing which steps in one's production process have the greatest cost. Unlike other efficiency drives, there is no harm in approaching this piecemeal. One has to start by attacking the area of their business that will provide them with the greatest value. For instance:

Looking for industrial automation solutions that reflect how one operates: At the smaller end of the tool cutting market, there's a good chance one is producing small batch lots and changing geometry multiple times a day rather than leaving the machine running constantly making the same tool all day. In this world, innovation is often a secondary need to maximizing day-to-day productivity. For example, looking for solutions that allow the operator to step away from the machine and carry out other tasks rather than being there all day. Automating geometry changes and existing manual material management processes can make a real change to how much they can do elsewhere and help them maximize machine uptime versus setup time. Time, after all, is money.

Automating production but also considering automating processes: One may not have the business budgets to request tailored solutions, but out-of-the-box solutions are available that can be used to manage inventory, integrate with ERP to manage job orders, and even pack ready for dispatch. Many will work effectively with their existing processes even if they have never automated them before.

Industrial automation can help focus on people: A small cutting tool factory relies on every working part being up to scratch including its people. Automation removes the risk of human error, creating a safer working environment that's less likely to be disrupted. Furthermore, changing government legislation is limiting how many hours employees can work. Automation is the obvious solution to maximize machine time when people are not present. Applying industrial automation solutions that connect one more to their customers will allow them to see in real-time what they're low on, what's in high demand, or what's coming up in their production that will suit their requirements. This also allows them to explore other areas of production and manufacture tools knowing with confidence what their customers want.

Everyone can afford and benefit from existing industrial automation solutions: Automation can take the pain out of being a small tool shop. A new factory of the future will be able to produce multiple kinds of tools without getting bogged down in manual operations.

We can all benefit from streamlining systems and processes. What is needed is focusing on one's specialty and leveraging the technology that's already out there. There are better ways to use time. Grind the wheel, don't reinvent it.

Source: U-Tech Group

Aerial view of U-Tech Group's Assembly Line

UNITING FOR SUCCESS

U-Tech Group's meteoric rise to success is a culmination of focus, determination, and a constant strive towards it. Its separate business units for sales and manufacturing are independent entities that work in synergy for the group to achieve its future goals.

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This was in the late 90s when the Indian economy was booming, and Indian machine tool builders were looking for quality products to go into their machines. As European products were expensive, the less expensive Taiwanese products were fast gaining acceptance. It was during this time that a chance meeting with a Taiwanese company resulted in U-Tech Associates that could bring quite a few machine tool products to India.

"All components that go into machine tools like ATCs, Pallet Changers, Spindles, Rotary Tables, Telescopic Covers, Coolers and Chillers, Chip Conveyors, Filtration products, etc. were brought by us to the Indian manufacturers. The machine tool manufacturers in India helped and supported us in expanding our product lines," shares HA Udaya, Managing Director & CEO, U-Tech Group.

Overtime, the company realized that imported products were expensive as compared to some of the Indian makes available then. "As a logical step, we started manufacturing the products locally. Our associates in Taiwan supported us with the technology and supply of critical parts. In a span of 4 to 5 years, we were manufacturing most of the products, barring a few which were still cheaper to import," he adds.

U-Tech Group has associated itself with many Japanese and European machine builders and aims to be the preferred supplier for the top ten machine builders in the world.

The supply of products was in small numbers till about 2015, which started increasing since then. The biggest breakthrough for U-Tech, shares Udaya, happened in 2018 when Bharat Fritz Werner (BFW), India's leading machine tool builder, entered into an agreement with the company to manufacture and supply all its requirements. "This called for major investments and two of our manufacturing units came up in 2019. Although we are still relatively new, we today are one of the top three manufacturers of these products in India. Our products are not just well-accepted by machine builders in India, but also other MNCs who bring machines to India. These imported machines go with our products as OE," shares Udaya proudly.

It would be more appropriate, he continues, to address the entity as the 'U-Tech Group' since along with U-Tech Associates, the group now comprises two more companies in the machine tool related business – U-Tech Seva and U-Tech Utpadan. "U-Tech Associates is the marketing and sales setup for all the business we do. U-Tech Seva focuses on after-sales service and supply of spares for all the products we sell. U-Tech Utpadan is the manufacturing unit of U-Tech Group," he informs.

On a high growth path

The only major product the group still sources is the ATC from Taiwan, which it started selling in India from the year 2000. "We are currently one of the major suppliers of these products in India. We now locally manufacture all other products. These are supplied to machine builders as OE and to all engineering, auto parts manufacturers and other manufacturing units," states Udaya.

"In a short span of 5-6 years, we have turned from being a marketing company into a full-fledged manufacturing company. U-Tech Group's Anant Deshpande, Executive Director; Raghupati, Director, Fab Shop; and Santosh, Director, Assembly Shop, have made this changeover possible; our facility has emerged as one of the best in this segment," he adds.

Source: U-Tech Group

> "We are currently one of the major suppliers of ATCs in India. We now locally manufacture all other products. These are supplied to machine builders as OE and to all engineering, auto parts manufacturers and other manufacturing units."
>
> **HA Udaya**
> **Managing Director & CEO**
> **U-Tech Group**

Strong together

U-Tech Group, while big on vision, innovation, and quality, believes in the power of being small and efficient. Udaya elaborates on this principle that has led to such rapid growth of the group, "We are striving hard to be at the pinnacle in our line of business. Well-aware that it's a long way to go, we are determined to achieve our objective."

The group wanted to foray into exports and has already started in a small way. For this, it has associated itself with many Japanese and European machine builders and aim to be the preferred suppliers for the top ten machine builders in the world.

"Whenever we spot a new business opportunity, we start it off as a separate unit headed by a designated business head, preferably a U-Tech stakeholder. As an example, U-Tech Seva was formed to concentrate on providing after-sales service and supply of spares. This unit head has the responsibility of providing pan India service in less than 24 hours," he says.

"Similarly, our business units for sales and manufacturing are independent, focused outfits, fulfilling their obligations, while at the same time, working towards the overall group objectives. We plan to achieve

Source: U-Tech Group

A Dual Chip Conveyor and Tank – total system

Coolant Tank Assembly Line

Product placed in the Assembly Line

our goals by being a group of fast-action compact units working together in synergy," adds Udaya.

Pandemic challenges

Covid-19 and its subsequent lockdowns posed a gamut of challenges for all. Udaya shares the ones U-Tech had to deal with and how were they coped with, "With the seemingly insurmountable economic and social challenges, the toughest we realized was the responsibility of taking care of our people. Many who were tested positive with Covid had to be provided with the necessary help. The office and factory remained closed for long stretches due to Covid spurts. When the units opened, there was the challenge of making everybody adhere to the pandemic protocols. We ensured there was no spread of the disease and adapted to work from home in possible cases."

And then, there was the financial challenge of keeping the company afloat for months without revenues. "Fixed costs could not be avoided. We ensured that barring all senior staff, everyone else got their salaries on time. To our relief, everyone cooperated. As reserves were being rapidly used up, belts needed to be tightened. Supplier payments were also delayed but, luckily, we found understanding there too," he adds.

The recovery phase has now begun, he further adds, "With the economy picking up, the order books are filling up. A semblance of normalcy should hopefully be seen in the coming few months."

Source: U-Tech Group

Compact Band Filter

Retaining talent in SMEs

Although the SME sector has grown dynamically over the last five decades and contributes a substantial portion of the country's exports, creating millions of jobs annually, it still suffers from a burden of challenges. Udaya tells us about the way U-Tech achieved breakthroughs through the hurdles it faced, "Apart from the financial challenges an SME faces, the other major challenge is to attract talent and retain people. Good people with talent find opportunities in MNCs or bigger industries. SMEs cannot match packages offered by MNCs. So, we find it very difficult to get the right people."

He adds that SMEs end up becoming training centers, "We hire people and train them for a few years. They then find jobs in larger setups and leave. To overcome this issue, we handpick the talent and make them partners whenever we start a new company."

This has worked to a very great extent for U-Tech. People who joined the Group as engineers are today part owners of its companies. It is beneficial in both ways, believes Udaya, "They, as owners, are eligible for profit sharing and the company retains the talent."

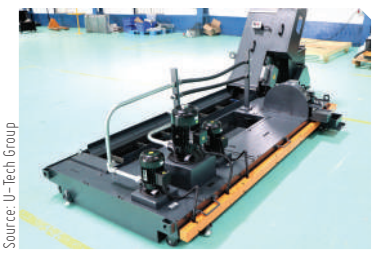
Positive outlook

Udaya staunchly believes that India has the potential to become a manufacturing powerhouse. However, he feels that those who invest and take risks in setting up new enterprises or scaling up their existing facilities should be supported by fulfilling their requirements on priority.

"With the production linked facility announced, we are seeing several companies investing in India to manufacture smart watches, mobile phones, laptops etc. Many of them are Indian companies. They are investing in crores and employing lakhs of people, which is a boost to the Indian economy. The Government needs to support them to make it all work," he adds.

"With the Chinese products taking a beating the world over, countries are looking at us to fill the gap. It is a big opportunity for India to show its manufacturing mettle. If not now, when then?," he sums up with a rhetoric question.

Apart from the financial challenges an SME faces, there is a challenge to attract and retain talented people. Since SMEs cannot match packages offered by MNCs, they find opportunities there or in bigger industries.



Source: U-Tech Group

Chip Conveyor

One lot of Compact Band Filters ready for export to the UK

Scara Chip Shredder

BACK TO THE ROOTS

Leading technology platform for agribusinesses AgNext Technologies strives to solve the problem of food quality to accelerate transactions and build sustainability. Company CEO & Founder Taranjeet Singh Bhamra shares the gaps in the market that prompted him to foray into the agricultural space and transform it like never before...

Source: AgNext Technologies

Taranjit Singh Bhamra, CEO & Founder, AgNext Technologies, was passionate about agriculture right from his childhood days. This passion manifested in the form of Agriculture Engineering from India's top Engineering University - IIT Kharagpur that offered him exposure to numerous cases where data driven technologies were used in agriculture, for example, Crop Simulation. However, applications were incremental and needed revolutionary transformations for practical applications in agriculture.

His dissertation on Crop Nutrient Modeling and early work on molecular analysis in food, way back in 2001-2002, convinced him that data, ingested through various revolutionary technologies, will emerge as the game changer for agriculture. It is the ingestion of data that morphed into a revolution called AgNext many years later, after his stints globally.

The eye-opener

For three years, post IIT Kharagpur, he had first-hand experience of the challenges at the grassroots level in agriculture, wherein he was associated with food manufacturing operations and commodity procurements and followed it up with an MBA from IIM Calcutta.

While he was working as a project manager for a food

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manufacturing company in early 2004, he visited the local mandi in Shahjahanpur, Uttar Pradesh. What he saw there changed him immeasurably.

"I saw a farmer and his young son come to sell their produce on a bullock cart. I remember seeing the arhitiya (middleman) pushing them away saying their produce lacks quality after barely looking at it. For the next six days, the father and son stood in the sun and rain waiting for the arhtiya to buy their produce. They eventually had to sell it to him at a fraction of the cost. Seeing the middleman break them in this manner hit me hard because no technology existed to accurately ascertain the value of their produce and a family's livelihood was being determined on very dubious grounds. But I did not have any money or influence at the time to help them," shares Bhamra.

Addressing the issues

By the end of 2016, AgNext Technologies got founded in Chandigarh and the startup was also incubated at IIT-Kharagpur. AgNext has innovated a technology platform for agribusinesses aiming to solve the problem of food quality to accelerate transactions and build sustainability. Its breakthrough proprietary solutions using AI, Spectral Science, Computer Vision, and IoT Sensing are changing the approach of agribusinesses towards procurement, trade, production, and consumption of commodities like milk, tea, grains, animal feed and spices.

In his eyes, the biggest concern in Indian agriculture is the lack of trust in key transactions starting at the procurement stage where produce is assessed on subjective grounds. Over the years, this mode of assessment has become a tool with which traders and middlemen exploit farmers. "Thus, they have no incentive to improve their practice. For food processing businesses, traders, and other allied players in agri-commodities, this is a bigger concern because they are purchasing millions of tonnes from farmers without any proper qualitative assessment. Finally, for consumers, this is obviously a problem because of concerns surrounding adulteration," points out Bhamra.

Source: AgNext Technologies

"Our breakthrough proprietary solutions using AI, Spectral Science, Computer Vision and IoT Sensing are changing the approach of agribusinesses towards procurement, trade, production and consumption of commodities like milk, tea, grains, animal feed and spices. Further, this also helps companies to have regional and farmer-wise quality estimations, in turn enabling companies to provide traceability solutions to consumers."

Taranjit Singh Bhamra
CEO & Founder
AgNext Technologies

Such interventions have the highest propensity for absorption of technology in agriculture value chains, and both buyers and sellers alike benefit by imbibing the technology. "With the right technology in place, farmers can obtain accurate prices for their produce and greater incentive to improve their farm practices for better quality crops. For businesses, this technology helps save money and increase profitability because now they know what they are paying for. Finally, for consumers, we ensure quality by accurately ascertaining whether there are adulterants or not," he explains. Being at IIT Kharagpur incubation center gave the startup access to a significant talent base in the field of computer vision and molecular analysis, through which the team was able to harness new age devices and artificial intelligence-based methodologies to process data.

Qualix - a game-changing technology

AgNext has been a category innovator, providing a technology platform called 'Qualix' for rapid commodity assessment solutions across procurement, trade, production, storage, and consumption of food and Agri value chains. The Qualix AI engine uses spectrometry, computer vision, and IoT Sensing solutions, delivered through an integrated hardware and software interface for accurate and instant quality analysis. "Our technology has the ability to instantly test trading and safety parameters for grains, oilseeds, tea, spices, coffee, milk and animal feed, particularly at the procurement stage. Further, this also helps companies to have regional and farmer-wise quality estimations, in turn enabling companies to provide traceability solutions to consumers. Also, this enables companies to pay farmers based on fair-trade practices and the right quality of commodity they are bringing in for procurement, increasing trans-

AgNext received the Best AgriTech Startup of India award from the Union Agriculture Minister, Narendra Singh Tomar, during the Outlook Agriculture Conclave & Swaraj Awards 2020.

parency in the value chain," Bhamra explains.

AI-Based Spectral Analysis — AgNext has innovated and integrated portable, on-field devices connected with Qualix platform that help in instant spectral analysis of agri commodities in the form of liquids, solids, powders, grains or leaves, pretty much covering the whole spectrum nature offers. "Our technology can instantly analyze the chemical composition of commodities like grains, oilseeds, pulses, milk, spices and animal feed. We are only using the technology created years ago by Sir CV Raman for which he had won the Nobel Prize," he shares.

The spectrum of food taken by the spectroscopy is like an MRI scan of the body. "Like the MRI scan can analyze the body, our spectroscope can analyze the contents in the food in just 30 seconds. By contents, it means the amount of carbohydrates, fat, protein, etc. Similarly, it can also detect adulteration. For example, if there is urea or detergent in milk, our technology can detect it in 30 seconds," adds Bhamra.

AI-Based Image Analytics — The startup has built a technology which works with on-premise embedded cameras for instant quality assessment using computer vision. Across India, majority of crops are assessed manually and with the naked eye, leaving room for multiple inconsistencies, manual fatigue and manipulations leading to losses across agriculture value chains. "For example, the quality of tea leaves is done by a person who spreads them on a table and makes a subjective assessment. But what we do is a computer-based analysis by taking a picture of the sample. The software analyzes the sample and based on that, they can fix the price. Similar technologies apply to grains like corn, barley, wheat, rice and others to assess the physical parameters like weevilled, shriveled, broken, clean, damaged etc.," he explains.

AgNext has created a singular platform called Qualix Technology through which multiple agri-commodities can be assessed in just 30 seconds.

Source: AgNext Technologies

AI-Based Sensor Analytics — "We pioneered the first applications for LoRA WAN-based IoT applications in India, which provide quality estimations in multiple agriculture processes in spatial arrangements, like curing, food storage, warehousing and logistics," states Bhamra.

AgNext has built STQC calibrated sensors for temperature, humidity, gaseous emissions, and other parameters key for various agriculture industries like curing solutions, grain silos, warehouses, food processors and storage services. These provide real-time alerts on control parameters and data analytics for actions to be taken as devised by the research institutions for better management of food quality.

Well-received by industry

The startup has raised a total of $4.2 million funding till date from Omnivore and Kalaari venture funds to expand its research and build this technological platform. The industry has well accepted this new technology that promises to solve the subjectivity and delay in quality procurement, leading to various value losses across the value chain and to stakeholders. Having clients such as Arya Collateral, NAFED, Goodricke, and Rossell Tea attests to the fact that the feedback from the industry has been extremely positive.

"Quality-based trading requires a lot of technology, so we are providing a unique platform to the world. Physical, chemical, and ambient assaying caters to all industry needs. Till now we have partnered with nodal agencies and industry leaders to build and market this technology like Tea Research Association of India, ITC, SourceTrace and many others and currently, we are working across seven states impacting 1.5 million tonne of procurement through our system," shares Bhamra with evident pride.

For India's 'Chai' industry

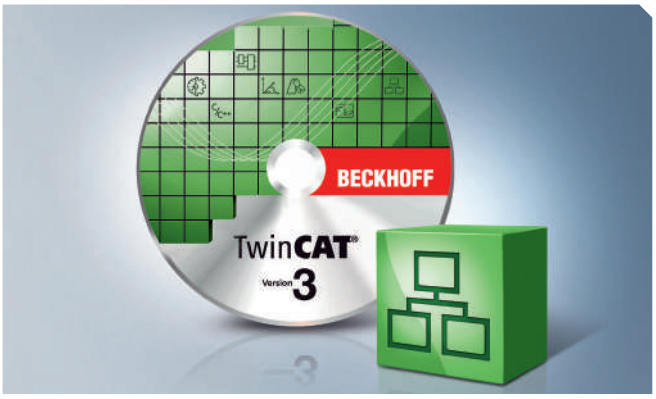
Determining Fine Leaf Count (FLC) is imperative to the tea industry. AgNext has deployed TragNext, a platform for rapid and accurate estimation of FLC. Using AI and Image Recognition Software, AgNext can identify leaves from various classes coming from garden harvest as leaves, buds, Banjhi, shoots and the rest. Leaves are first dried and separated using a patented technology and then photographed with a high FPS camera. In the post-processed inverted binarized image, each component is identified and extracted separately using AI, and then the images are processed for FLC as per industry standards. A set of final stats show how many leaf and bud configurations are in every shoot, allowing for a percentage of FLC to be displayed on the device and mobile. All this gets done at a fraction of time, gives access to more sampling for better evaluation and removes subjectivity digitizing the entire procurement and payment process from there on. This technology has been deployed in tea estates of Goodricke, Rossell Tea, CISTA, Bokahola Tea, Tea Board of India and many other leading tea companies.

Automation Software

TwinCAT simplifies integration of Siemens S7 PLC controllers

The PC-based Control Automation software update from Beckhoff.

The openness of PC-based control and the resulting array of connectivity options with other systems number among the fundamental advantages of TwinCAT automation software from Beckhoff. A new add-on now also enables easy and efficient communication with Siemens S7 controllers.



Source: Beckhoff Automation Pvt Ltd

TwinCAT 3 software now offers efficient connectivity with S7 controllers.

TwinCAT 3 offers numerous options for connecting TCP/IP-based third-party systems to the main control program: OPC UA, MQTT, HTTPS and Modbus are only a few prominent examples of an entire range of communication protocols. The TwinCAT S7 Communication (TF6620) function now expands this broad spectrum to include the S7 communication protocol.

This product implementation enables reading and writing of variables from an S7 controller. The PLC application program carries this out directly – either via dynamically parameterizable PLC function blocks or via easily configurable I/O mapping. No additional hardware is required and the local TCP/IP network serves as the transport medium.

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3D Printing Systems

New TruPrint 3000 from TRUMPF

New 3D printer from TRUMPF helps fabricators move into mass production

The medium-format machine uses powder-bed-based laser melting to produce parts with a diameter of up to 300mm and a height of up to 400mm. It can handle all weldable materials including steels, nickel-based alloys, titanium and aluminum.

The new TruPrint 3000 can be equipped with a second laser that almost doubles its productivity. "The multilaser option significantly reduces part costs – that's how we help our customers make the move into mass production," says Klaus Parey, Managing Director, TRUMPF Additive Manufacturing.

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Two 500-watt lasers scan the machine's entire build chamber in parallel. This makes production much faster and more efficient regardless of the number and geometries of the parts. With the Automatic Multilaser Alignment option, the system can automatically monitor the multilaser scan fields during the build stage and calibrate them to each other. With each laser scanning a contour, the process does not lead to any kind of weld seams.

Source: TRUMPF (India) Pvt Ltd

The new medium-format machine uses powder-bed-based laser melting to produce parts with a diameter of up to 300mm and a height of up to 400mm.

Improvements in inert gas supply and melt pool monitoring

The TRUMPF experts have transformed the movement of inert gas through the TruPrint 3000. The way in which it flows through the machine from back to front is now even steadier and more uniform. As well as boosting the quality of printed parts, this also allows the operator to remove excess powder from the part while it is still inside the machine. Previous models required the operator to take the part out and remove the powder at a separate station. The new machine is designed to process the powder in a shielded environment, using an inert gas to prevent the powder from becoming contaminated during the build. This is a major advantage for sensitive industries such as Medical Device Manufacturing.

Source: TRUMPF (India) Pvt Ltd

The new TruPrint 3000 can be equipped with a second laser that almost doubles its productivity.

SHAPING THE FUTURE OF MANUFACTURING

The VDMA Robotics + Automation Association of German Mechanical Engineering Industry Association (VDMA) recently organized 'Robotomation – Symposium for Robotic Automation trends in Manufacturing' at The Taj City Centre, Gurgaon, that focused on the global robotics and automation trends available for the manufacturing industry. Highlights...

Source: VDMA India

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It has become imperative for organizations to find ways to bridge the skill gap to stay ahead of the curve, which can be achieved by either recruiting the right people with the right skills, or by helping their existing employees stay relevant by upskilling them. The gradual integration of robotics and automation in the workplace has begun, transforming the nature of roles and functions in its wake. Hence, employers realize the need for the construction of a system that can support human and robotic interaction with automation driving significant changes in the workplaces.

Against this backdrop, the Symposium focused on the worldwide robotics and automation trends for the Manufacturing sector. Despite the prevailing circumstances around the pandemic, around 200 delegates from the Automotive, Tyre & Wheel Making, Machine Tool, Food & Beverage and Water industries attended the event.

'Make in India' focus

In his keynote address on 'The Global Robotics and Automation Boom', Patrick Schwarzkopf, Managing Director, VDMA Robotics + Automation & Member - Executive Board, International Federation of Robotics, focused on India's progress in harnessing the benefits of robotics and automation technologies for its Manufacturing sector. The country has witnessed dynamic growth of industrial robotics – CAGR (compound annual growth rate) of over 15 percent p.a. between 2014 and 2019 in installations.

Dr Joerg Polster, Minister & Head - Economic Cooperation,

Embassy of the Federal Republic of Germany, New Delhi, (through video conferencing) highlighted 'Make in India' and 'Self-Reliant India' (Atmanirbhar Bharat) policies that are poised to play a major role in the Automation industry. He underlined the growing importance of automation with the pandemic today and the world markets going more local in comparison to global manufacturing trends.

Rajesh Nath, Managing Director, VDMA India, said, "It is worth bearing in mind that artificial intelligence, automation, IoT, and robotics are becoming more prominent. The pace of technological advancement and the rate at which professionals update their skills are already causing the skill gap to become more expansive. Further the viral outbreak has further accelerated the digital transformation within the global business ecosystem."

Automotive industry largest adopter

Presently, the Automotive industry is the largest adopter of robotic solutions in India. The passenger vehicle segment clocked a growth of 11.14 percent in January 2021 at 2.76 lakh units, thus remaining in the positive territory for the sixth straight month, against 2.48 lakh units in the corresponding month a year ago.

Two-wheeler volumes rose by 6.63 percent to 14.30 lakh units in January 2021, compared to 13.41 lakh units in January 2020. While motorcycle sales increased by 5.1 percent to 9.16 lakh units as against 8.72 lakh in January 2020, scooter sales were up 9.06 percent at 4.54 lakh units from 4.17 lakh units a year ago. The total vehicle sales increased by 4.97 percent to 17.32 lakh units last month as against 16.50 lakh units in the year ago period.

Source: VDMA India

Other segments including Food and Beverage, Consumer Packaged Goods, Electronics and Logistics industries are also starting to adopt automation and robotics at a much faster pace.

Leaders opine

Chairing the event, BB Gupta, President & Business Head, Auto Components Business, JBM Group, spoke on 'Emerging trends in the Automotive industry with the adoption of Robotics & Automation'. Vinnie Mehta, Director General, Automotive Component Manufacturers Association of India (ACMA) on the 'Rebound of Automotive Industry Post Covid'.

Well-known VDMA members such as Baumer India, Dürr India, FESTO India, Gudel India, KUKA India, Pepperl+Fuchs Factory Automation, SICK India, and Zimmer Automation presented their take on application-oriented technology. Other partners included Cotmac Electronics, DiFacto Robotics and Automation, Fluro Engineering, Schmalz India & Wenzel South Asia. There was a dedicated B2B exhibition space for the companies to showcase their technologies to the participants.

The two rounds of technology-oriented presentations were led by Manoj Yadav, General Manager, KUKA India; and Ravi Agarwal, Managing Director, Pepperl + Fuchs Factory Automation, who spoke on 'Key Applications, Challenges and way forward for Robotic Automation in Auto OEMs and Tier 1 Industry' and 'Sensors for Smart Manufacturing', respectively.

Automation on the rise

An interesting panel discussion on 'Role of Robotics + Automation for the Manufacturing Industry' was moderated by Nath. The panel composed of industry experts such as Rajachandran Madhan, Director, Indo-German Science & Technology Centre (IGSTC); Achintya Lahiri, National Head- Packaging Development and Engineering, Hindustan Coca-Cola Beverages Pvt Ltd and Rajiv Wahi, Chief Executive-International Business (EAM), Escorts Ltd, who drew attention to the increasing use of automation in manufacturing and even in their own factories. They stressed on the adoption being economical and viable for the SME and MSME industries, and highlighted the need to educate the Indian workforce on the adoption of automation.

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