

Volume: XXVII / No. 01

(Private Circulation for Members Only)

September 2020

Indian Tooling Industry: Time to make room for improvement



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working on the new design for the 7 series, they also know what is the best mold steel that will meet their high quality requirements-THRUHARD SUPREME HH"





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Sharpen your tools



he Government of India has stated that the Indian manufacturing sector has the potential to reach US\$ 1 trillion by 2025 and contribute almost 20% of the total GDP. Also, the government has introduced some productionlinked incentive plans for some sectors. These figures and plans are encouraging for tool makers, as India will definitely need a strong tooling support in order to achieve these numbers.

It is a well-known fact that the tooling industry forms the backbone of the manufacturing industry. A strong tooling industry indicates a strong manufacturing industry. To put things in perspective, all the major manufacturing hubs across the globe boast of an equally strong tooling industry. India, however, is a notable exception.

There are many factors that impact the growth of the tooling industry in India. And, some of these factors, for instance, policies and payment structure, are beyond the control of tool makers.

Indian tool makers, mostly comprising MSMEs, certainly need to do a lot in terms of capacity and efficiency improvement. They must speed up their technology adoption process, invest in skill development and start working in a collaborative manner to aim for bigger orders. However, for this, they need the OEMs' support.

The OEMs need to trust the Indian tool makers and source tools from them. Apart from this, the payment structure needs a major overhaul. Tool makers spend huge sums to carry out certain projects. And, without a proper payment structure, their survival will be tough. This hampers their growth, as they avoid taking risks and don't opt for new projects in the absence of finances.

Another factor, which is the biggest factor, is policy reform. Policy support is needed on various fronts in order to ensure cost competitiveness. Indian tool makers do not enjoy the kind of financial support like their foreign counterparts do. Finding cheap land is another major concern. Additionally, some of the critical components, such as tool steel and 5-axis machines, are not available in India. Importing them would mean that they would have to bear the brunt of paying a huge import duty.

A strong tooling industry is vital for the growth of the manufacturing industry and economy. It's high time that this strategic industry is given its fair share of attention by the

These are some of the challenges that are slowing the growth of the tooling industry.

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Business Update

Ashok Leyland receives an order for 1400 ICVs from Procure Box

ASHOK Leyland, the flagship company of the Hinduja Group and India's leading commercial vehicle manufacturer, received a large order from a logistics start-up company, Procure Box. The company has placed an order of 1400 intermediate commercial vehicles [ICVs] for its fuel distribution business across 750 districts in the country. The order encompasses the most successful Ashok Leyland product—the Ecomet and will be executed in the next 5-6 months.

Anuj Kathuria, Chief Operating Officer, Ashok Leyland, said, "This order from Procure Box is a testimony to Ashok Leyland's commitment to reliability

and quality. Over the last few years, Ashok Leyland has made significant efforts to increase its market share in the ICV segment and our efforts have given rich dividends. With this order, our orderbook for ICVs has enhanced significantly and is a testament to the reliability, durability and robustness of our vehicles. We have once again demonstrated in BS-VI era, that our customers have utmost faith in the brand to deliver vehicles of superior performance with our iGen6 technology, along with reliability, driver comfort and best-in-class features. We remain dedicated to provide an efficient, clean, safe, accessible, and affordable value proposition to our

customers." Raman Kandhari, Founder and Chief Executive Officer, Procure Box, said, "At Procure Box, it's very important to us to demonstrate our commitment to our customers with the action of ontime delivery, which is why we have tied up with the best product in the industry from Ashok Leyland. This order is a testimony of our commitment to offer the best services and thus create value for our customers."

With the addition of 1400 new Ashok Leyland ICVs, the logistics start-up and its associates will become the top fuel bowsing and gas cylinder logistics company in the industry.

Mr Samudra said: "This is an

thyssenkrupp inaugurates new engineering office in Pune

THE thyssenkrupp group recently inaugurated its new engineering office in Pune. The new office of thyssenkrupp Industrial Solutions (India) Pvt Ltd, amongst the leading engineering companies in India for chemical plants and projects, was inaugurated by Dr Sami Pelkonen, CEO, thyssenkrupp Business **Unit Chemical & Process Technologies** Germany (tkISCPT)and Mr P D Samudra, CEO & MD and Member of Board, thyssenkrupp Industrial Solutions India.

Speaking at the virtual ceremony of the inauguration of the new office, Dr Pelkonen said: "The thyssenkrupp group is a well-known name in India. Its India operations have been a unique success story over four decades in the chemical process



India and abroad coupled sectors. thyssenkrupp Industrial Solutions India is with the professional also the largest subsidiary relationship it has with of thyssenkrupp Industrial its customers makes it Solutions – Chemical a jewel in the crown of Process & Technologies thyssenkrupp Industrial Solutions Chemical & globally, and is playing a very important role for Process Technologies. Our a wide variety of Indian ultra modern engineering office will continue to and international projects covering fertilisers, provide world-class services polymers, petrochemicals, to our Indian as well as refinery units, electrolysis, foreign customers. The new cryogenic storages, etc., in office will accommodate the chemical sectors and approximately 350 plants for metallurgical engineers out of the total sectors, etc. Its track record strength of 1,400 employees of 750-plus of large, medium of thyssenkrupp Industrial and small size projects in Solutions India."

important milestone in the history of our organisation. In addition to our initiatives at our Head Office in Mumbai, we had made a small beginning with our Pune operations in 1997 at Bibwewadi on the outskirts of Pune City with less than 50 engineers. This means we are relocating our Pune office after growing steadily over two decades. Our Pune operations have been independently executing projects with minimum support from our Head Office in Mumbai and have several successfullyimplemented projects to their credit. They have implemented EPCM services as well as EPC projects in the past 20 years. We very much look forward to continuing to serve our valuable customers from our new set up in Pune."

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Business Update

and clusters, partnering

availability easier, and

approach to domestic

manufacturing."

with states to make land

adopt a more competitive

On increased localisation in

the automotive segment,

Mr. Goyal opined, "Best-in-

class make and design, use

of innovative technologies,

intelligent product pricing

the desired results. Skilling

can go a long way in getting

smart packaging and

is another aspect that

SIAM convention charts roadmap to augment localisation and harness export potential of the Indian auto industry

THE Society of Indian Automobile Manufacturers (SIAM), hosted its 60th Annual Convention virtually recently, titled "Re-Building the Nation, Responsibly". During the convention, the panelists spoke about the possible ways that can help foster increased localisation in the Indian automobile sector, improve the ease-ofdoing business scenario in the country and the steps that are to be undertaken to create 'Brand India', so as to harness the country's export potential. They deliberated on viable pathways, which will lay the groundwork for a truly Atmanirbhar automotive sector.

Applauding the Government's Atmanirbhar Bharat mission, Dr. Pawan Goenka, Past President, SIAM and Managing Director, Mahindra & Mahindra, commented, "The auto- industry today is a shining example of Atmanirbhar Bharat. Apart from the last year, the sector has been growing at 16% CAGR over the last 25 years and that is truly an impressive number to reckon with. The sector has made sizeable investments in R&D and currently employs around 37 million people in the entire value chain. Going forward, we will look at ways to augment our exports, reduce imports, create more jobs and up our investments in R&D. In the automotive components space, our imports are to

the tune of 1 lakh crore and we are looking at reducing the number in 4 to 5 years. For this to happen, we need to rethink, restrategise, re-organise and implement steps such as reducing current logistics

e produce world-class exportfit products indigenously, in 4 to "We need to build globalopen, scale plants in the auto - sector that are at par with and international standards. We as should aim at improving the tics scale and quality of what we



costs, relaxing duties and taxes, entering into FTAs and similar other trading pre-requites with bigger automobile markets."

> Talking about numbers, Dr. Goenka added, "India is currently the largest exporter to Central and South America. 40% of our export volume currently goes to these markets, followed by central and East Africa. However, it is important to note that, exports now account for 16% of our total output, which indicates a lot of room for expansion."

Praising the automobile industry's resilience, adaptability and innovation potential, Guest of Honour, Shri Piyush Goyal, Hon'ble Union Minister of Commerce & Industry and Railways, Government of India, commented that, in order to

and are producing and export it 'As to the rest of the world. The ing key is to create a sustainable ger value chain."

> Also, talking from a demand perspective, Mr. Goyal, commented, "In the COVID 19 era, we have seen the demand for shared mobility fizzing away, which was once the talk of the town. Current trends indicate that people will continue to buy cars, try out self-drive, autonomous and EVs, and therefore, as a corollary, the automobile sector's health would eventually improve. We are a listening Government and we will continue to do all that we can to help the auto-

ion industry. We will also look ur, at devising innovative le models to boost exports. erce Some of these that are currently prevalent include, the credit guarantee model, er to creating automotive hubs needs to be looked into, if we are to ace in domestic manufacturing. Upskilling and reskilling should be treated as a priority and an industry-academia partnership is one of the best available models to achieve this goal." Applauding, Mr. Wadhera for his exemplary leadership and steering the industry

amidst these turbulent times, Mr. Deepak Jain, President, ACMA and Chairman and Managing Director, Lumax Industries, while summing up the session stated, "I have personally witnessed many marathon meetings across many industry sectors and Government on localisation. I am also very grateful to Piyush ji for recognising the auto component industry as a champion sector that maximises its potential in exports."







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Business Update

HCL CAMWorks[®] announces partnership with CIMTechnology

HCL Technologies (HCL), a leading global technology company, recently announced a CAMWorks partnership with CIMTechnology LLC, a leading provider of Wire EDM (Electrical Discharge Machining) software. As part of the agreement, CIMTechnology's Wire EDM programming software will be exclusive to CAMWorks. This will provide CAMWorks users access to more advanced Wire EDM programming functionality for precise and intricate part cutting

The partnership between CAMWorks and CIMTechnology will allow customers of both companies access to a culmination of technology and a wider range of CNC programming options for automated control of machining tools (such as drills, boring tools, lathes) and 3D printers.

CIMTechnology have specialised in Wire EDM for more than 30 years. Their Wire EDM technology was previously sold through OEM partners as stand-alone systems or as technology added to current programming systems.

In the 1990s, CIMTechnology established their business by writing and selling the Impact CAD/CAM System for Wire EDM through Sodick, as

well as developing Brother's PC-based conversational programming system for their drilling and tapping centers.

CAMWorks products include a range of milling and lathe (machining) solutions, in addition to Wire EDM. Technologies such as feature-based programming, knowledge-based machining and TechDB allow users to automate their CADCAM functions. CAMWorks is also fully integrated with SOLIDWORKS®, which means that users can work within the familiar user interface of SOLIDWORKS as they programme the CNC code for their parts.

August 2020 U.S. Cutting Tool Orders Down 0.2% from July 2020

CUTTING tool consumption totaled \$136.1 million, according to the U.S. Cutting Tool Institute (USCTI) and The Association for Manufacturing Technology (AMT). This total, as reported by companies participating in the Cutting Tool Market Report collaboration, was down 0.2% from July's \$136.3 million and down 33.5% when compared with the \$204.7 million reported for August 2019. With a year-to-date total of \$1.3 billion, 2020 is down 23.4% when compared with August 2019.

According to Bret Tayne, President of USCTI, "Sales of cutting tools declined more than might have been anticipated through the summer months. However, in light of the reports of flattening growth in both manufacturing and the broader economy, these statistics are not entirely surprising."

"Cutting tool orders continue to remain soft in August 2020 but appear to have found a bottom. Orders of \$136M were only -0.2% below July orders of \$136.3M but were still -33.5% below August 2019. Year-to-date orders remain weak at down -23.4%. The weakness is a continuation of



This graph includes the 12-month moving average for the durable goods shipments and cutting tool orders. These values are calculated by taking the average of the most recent 12 months and plotting them over time.

the order decline that began in the spring of 2019, impacted by inventory liquidation, and exacerbated by the Covid-19 pandemic which virtually shut down the U.S. economy," commented Eli Lustgarten, President of ESL Consultants. He later added, "The good news is that U.S. manufacturing has now undergone over four months of improvement with the ISM PMI over 50 (Sept 2020 was 55.4) with the recovery led by automotive (largest buyer of cutting tools), appliances, electrical, and general manufacturing. Any improvement in demand will likely be moderate and volatile near-term, reflecting the ongoing severe weakness in key markets such as aerospace and energy as well as uncertainty of the

strength of economic growth after the big U.S. GDP rebound in Q3 2020."

The Cutting Tool Market Report is jointly compiled by AMT and USCTI. It provides a monthly statement on U.S. manufacturers' consumption of the primary consumable in the manufacturing process - the cutting tool.

Historical data for the Cutting Tool Market Report is available dating back to January 2012. This collaboration of AMT and USCTI is the first step in the two associations working together to promote and support U.S.-based manufacturers of cutting tool technology.



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Business Update

Kubota's best-selling MU4501 (45 HP tractor) to be Made in India

MU4501 (45 HP tractor), which is the most popular tractor from Kubota, will now be manufactured in India. With a 4-cylinder, 2434 cc engine, this tractor is extremely powerful and performs outstandingly. By far, it is highly preferred by Indian farmers.

The production of the MU4501 in India is the first step towards making Kubota self-reliant in India and a step towards materialising the "Make in India" campaign. The MU4501 tractor will be "Made in India" with the same quality and safety parameters that Kubota is known for across the world. Kubota is committed to providing technologically advanced products, which can enhance the farm productivity and thereby increase the Indian farmer's income.



Commenting on the launch Mr. Akira Kato, (MD - Kubota Agricultural Machinery India Pvt. Ltd., said, "In the coming years, we will further look for steadily enhancing the production lineup, which will be mainly focusing on the advanced technology and precision manufacturing, which is the legacy of Kubota's 130-year-old and Japan's No.1 tractor brand."

The local manufacturing of MU4501 surely opens the gateway to facilitate Made in India, while other Kubota tractors, agricultural machinery and engines are imported currently.

Kubota has contributed towards the growth of the Indian farmer and the agriculture industry and has been always recognised for its core values, which are guality, great products and service.

With the introduction of the MU4501 to be Made in India, Kubota is deepening its footsteps in the Indian agriculture industry and it's offering a reaffirmation to the Indian farmers that they have a reliable partner whom they can trust for their livelihood.

DMG MORI focuses on green production of all machines worldwide

DMG MORI will manufacture all machines completely climate-neutral from 2021 onwards - from raw materials to delivery. DMG MORI's manufacturing solutions also provide the highest energy efficiency at the customers' premises. In addition, DMG MORI machines play a key role in the production of green technologies.

"Climate protection concerns each and every one of us. Technological leadership and environmental protection go hand in hand. DMG MORI, therefore, takes on complete responsibility," says Christian Thönes, Chairman of the Executive Board of DMG MORI AKTIENGESELLSCHAFT. "From 2021, the entire value chain of our manufacturing solutions - from raw materials to delivery of our machines to the customer - will be CO2-neutral. This makes DMG MORI one of the first industrial companies worldwide to have a climate-neutral 'Product Carbon Footprint'. We also consistently improve the energy efficiency of our machines. In the production of environmentally friendly technologies, we are an innovation leader."

Since May 2020, the "Company Carbon Footprint" of DMG MORI, which covers its own value creation, has been climate-neutral. DMG MORI avoids emissions in all areas, among others, through modern heating, ventilation and cooling concepts. At the same time, DMG MORI uses self-generated regenerative energy and purchases

DMG MOR

AKTIENGESELLSCHAFT

exclusively green electricity at almost all locations. The remaining CO2 emissions, which cannot be avoided so far, are compensated by investments in sustainable, certified climate protection projects.

DMG MORI bundles its integrated initiatives for climate-neutrality into:

GREENMACHINE: In addition to its own climate-neutral value creation, DMG MORI will also offset CO2 emissions that arise in the supply chain from 2021 onwards, for example in the production of raw materials

such as cast steel. From January 2021, customers worldwide will receive completely climate-neutrally produced machines from all DMG MORI production plants.

GREENMODE: For many years, DMG MORI has been optimising the energy and emission efficiency of its machines through specific CELOS apps, consumption-optimising components such as LED lighting, the recuperation of braking energy and intelligent control of all units. DMG MORI products also protect the environment and conserves resources during operation at the customer's premises.

GREENTECH: DMG MORI advances the production and further development of green technologies. Customers use DMG MORI machines to produce highly innovative components, e.g. parts for wind power plants, hydroelectric power plants, fuel cells or electric mobility. For many years, DMG MORI has built up specific know-how to support its customers worldwide in Excellence Centers.



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Technology Update

New MM GRIT 22 Solid Carbide Groove Milling Heads

ISCAR is expanding the MULTI-MASTER family by introducing MM GRIT 22 interchangeable solid carbide groove milling and 45 deg. chamfering heads.

The new heads are available in a nominal 21.7 mm diameter. Two main design features differentiate them from the existing groove milling heads. They are:

TORX socket on the head face
 Heads made from IC 908 submicron carbide grade.

The TORX socket ensures clamping the head with the use of ISCAR keys having exchangeable blades with TORX tip for better control of the clamping torque. In addition, the socket enables the application of an adjustable torque



wrench (3340289 TORQUE WRENCH 5-50Nm 9X12) as an option for secure and accurate tightening of the heads.

Manufacturing the groove milling heads from IC 908 carbide grade expands their application field, improving performance of groove milling operations, especially when machining workpieces from hardened steel and cast iron, and ferritic and martensitic stainless steel (ISCAR material groups 9, 11-13, 38 and 40).

The new MM GRIT 22 heads have the same MULTI-MASTER T08 thread as the existing items, so they can be mounted in the same shanks.

The next step in expanding MULTI-MASTER grooving and 45 deg. chamfering products will be introducing interchangeble milling heads MM GRIT 16 and MM GRIT 18 heads that have smaller outer diameter.

ISCAR is confident that introducing the new groove milling heads will increase applicability of the family and will contribute to advancing MULTI-MASTER products in the market.

New carbide inserts for productive and efficient steel turning

SANDVIK Coromant is upgrading its range of turning inserts for machining ISO-P steels. The tooling specialist has launched two new carbide grades that are designed for external and internal machining of low-alloyed and unalloyed steels. The new inserts, called GC4415 and GC4425, deliver increased toughness, heat resistance and predictable wear.

GC4415 and GC4425 are ideal for manufacturers operating in mass and batch production set-ups machining low alloyed (P 2.1 to 2.6) and unalloyed (P 1.1 to 1.5) steels, respectively.

Grade GC4425 is shown to outperform competing inserts in a majority of steel turning applications. It features improved wear and heat resistance and toughness, which significantly



expands the application range. Both it and GC4415 can be used for finishing to roughing, in applications with continuous cuts and light interruptions.

Meanwhile, GC4415 is designed to complement GC4425 when enhanced performance and more heat resistance is needed. In addition, the materials' new post-treatment is found to boost performance in intermittent cutting operations, avoiding any sudden breakages and enabling both insert grades to outperform over a broad application range.

"Generally speaking, every manufacturer wants to achieve the following goals: increased metal removal rates, more pieces per edge, reduced cycle times, minimised waste and optimised inventory use," said Johan Anderstedt, Global Product Manager Turning at Sandvik Coromant.

"For manufacturers with a batch production set-up, this also means having the flexibility to machine multiple steel materials with the same grade. Our new GC4415 and GC4425 grades can help you achieve this even with tough and complex ISO-P materials," added Anderstedt.

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Technology Update

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Fast assistants for industrial production: the new SCARA robots from KUKA

WITH the new KR SCARA jointed-arm robots, KUKA is supplying reliable assistants for industrial production that excel in applications like in small parts assembly, materials handling and inspection tasks. In the payload category up to 6 kg, it is hard to find a match for the KUKA SCARA robots.

The new KR SCARA horizontal jointed-arm robots from KUKA are ultracompact and, at the same time. deliver maximum costeffectiveness. With a reach of 500 or 700 millimeters, an extremely short cycle time of just 0.36 or 0.38 seconds and an attractive price, the KR SCARA robots are ideal for pushing ahead with automation in cost-sensitive markets.

SCARA robots with utmost repeatability and short cycle times Thanks to the streamlined design and the integrated media supply, both robot variants demonstrate their abilities in numerous tasks, such as small parts assembly, materials handling and inspection. The internallyrouted media supply for air, power and data not only makes the KUKA SCARA

robot reliable in operation, but also enables smart adaptation for a wide range of tasks.

The KUKA SCARAs are highly precise in operation and economical in maintenance The high efficiency of the SCARA robots makes them the perfect choice for enabling automation, even service requirements, high energy efficiency and extremely high availability ensures a low total cost of ownership. Fitted out with intelligent features and teamed up with the latest generation of control technology in the form of the KR C5 micro, the fast assistants perform tasks reliably and guickly. "With the KUKA SCARA, we are supplying an overall package that is so far one of a kind. It is light and streamlined and, at the same time, fast and powerful. Moreover, it comes at an attractive price and quickly pays for itself," summarizes Robert Fodor, Head of Platform Mechatronics Portfolio at KUKA.

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Indian Tooling Industry:

Time to make room for improvement



plays a critical role in the manufacturing value chain by providing dies and moulds needed for mass production of various parts. It thus forms the backbone of industrial growth. As per the latest estimates, the market size of the Indian tooling industry stands at ~INR 15,000 crore, with more than half of the total demand attributed to the automotive and auto components sectors. Most major global auto manufacturing hubs have a strong domestic tooling industry with India being a notable exception, where a significant portion of tool demand is still met via imports.

tooling

industry



In Focus

he global markets are abuzz with a variety of products. However, these eventually phase out owing to factors such as saturation, competition, low demand and plummeting sales. These factors have undoubtedly shortened the products' lifecycle, but they have also provided a growth trajectory for the tooling industry. Countries that have equipped their tooling industry with superior capabilities and capacities are poised to grow. But the Indian tooling industry is lagging behind. Hence, it's important to facilitate the growth of Indian tool makers and enable access to new customers beyond national borders. Tooling localisation would also result in many economic benefits such as employment creation, development of indigenous machine makers, a boost to R&D and more efficient supply chains. But Indian tool makers are facing several challenges, which have created roadblocks that are hampering their growth plans. Let's take a look at some of the key challenges.

Major obstacles for Indian tool makers

There are six major obstacles that are impeding the growth of Indian tool rooms. They are:

- Access to adequate finance options
 Lack of export incentives
- ▶ High import duty on machines and raw materials
- ▶ Finding skilled manpower
- ▶ Imports from China and south Asian countries



Key Hurdles to Growth of Indian Tool Rooms

What can be the potential solutions?

For this, we have to look at some of the developed countries that are also manufacturing powerhouses. However, the challenges faced in India are unique. There are certain things that the government can do and many things that can be addressed by the individual companies. Some of the potential solutions are:

Easy finance options: Availability of loans to Indian tool rooms or any manufacturing SMEs at subsidised interest rates can help them become cost competitive. This will

help them take more orders and even expand facilities, thereby helping the industry generate more employment and fostering economic development.

Development of tooling clusters: In order to carry out mould manufacturing operations, tool makers have to outsource jobs. For example, a Pune-based tool maker may have to get the mould base from Chennai, get heat treatment done in Mumbai and designing done at Bengaluru. This makes the whole manufacturing process more time consuming and expensive. In such a scenario, a cluster would help such manufacturers carry out operations with ease.

Introduce tool making in engineering curriculum:

Various technical institutes teach tool making, but none have a specialised branch for the subject. This is a necessary step if we are looking to create future-ready manpower for tool rooms. Experts from the industry can be roped in to train the students. The industryacademia partnership would be beneficial for both, as it will facilitate the development of R&D as well as groom students for the job.

Reduction in import duties of materials and machines:

Items such as tool steel and multi-axis CNC machines are not available in India. These are critical in the mould making process. Any kind of support in importing of such components would help Indian tool makers become competitive.

Special status to tooling industry: The tooling industry is often referred to as the "mother industry". It forms the backbone of the manufacturing industry and if given its due importance, it can actually help promote the government's 'Make in India' campaign.



Country-wise patents in tools & dies (2000-2011)

The demand for tooling in India is poised to grow in the near future. Several automotive OEMs are focussing on increasing localisation in their tooling procurement. Hence, the demand side factors are favourable for Indian tool rooms. In order to capitalise on these factors, Indian tool rooms need the state's support to address the outstanding issues through policy interventions in the upcoming budget. Some of the concerns can be completely addressed in the short term, while others need long-term planning and careful execution (the Union budget being the first step in this regard). The tooling industry is critical to enabling manufacturing in the country and the upcoming budget is an opportunity to initiate reforms that are long overdue.

Importance of tool rooms in economic development

India is one of the fastest growing economies in the world. The Indian GDP has grown 2.7 times in just 10 years, reaching from ~1 trillion USD in 2008 to ~2.7 trillion USD in 2018. As per government estimates, India has the potential to reach 5 trillion USD by 2024-25. The Indian manufacturing industry currently constitutes ~15% of the GDP. Under the 'Make in India' initiative, the government plans to increase this to 25% of GDP by 2025. Clearly, the manufacturing sector is key to attaining the ambitious target of economic growth. Here's taking a look at how tool rooms play an important role in the country's economic development:

A mother industry: Tool rooms play a critical role in the manufacturing value chain by providing the dies and moulds needed for mass production of various parts. The tooling industry forms an integral part of the production process in almost every industry and is considered the mother of all manufacturing units in the country.

The total demand for tooling across the manufacturing sector is estimated at 18000 crore. This translates into average spending norms on tooling to industry turnover at ~0.5%. Over 60% of the demand is from the auto and auto ancillary sector, which accounts for over 40% of the manufacturing sector in India. Hence, the importance of tool rooms in the economy cannot be overstated.



Tooling in Manufacturing Value Chain

An enabler in global manufacturing hubs: The global demand for tool producing companies has been rising over the last few years, except during the economic crisis of 2008 and 2009. All major manufacturing hubs have a well-developed tooling industry that forms the backbone

In Focus

of industrial growth in these geographies. For instance, countries with the highest vehicle production figures are also the ones leading in tooling production (India being a notable exception). In Asia, manufacturing as a percentage of the GDP is much higher in global tooling hubs as compared to India. This also shows that a strong tooling sector is a key contributor to a country becoming a leading manufacturing destination.

The demand for tooling is on the rise globally. Besides economic growth, there are two main reasons for this increase: Firstly, the increase in variety of products and shorter lifecycles of these products are directly linked to the increased demand for tools. Secondly, globalisation is resulting in an internationalisation of production sites, which calls for multiple tools and spreads the demands worldwide.

This presents a big opportunity for tool rooms in established manufacturing hubs to grow beyond traditional markets and expand their customer base. Tool rooms from countries such as China, South Korea and Japan are taking advantage of this trend and are supplying to production facilities in other countries, including India. If provided with proper support, Indian tool makers can also mirror the growth trend of their peers and bring about import substitution.

- ► Development of domestic machinery manufacturers
- ▶ Research & development gets a boost
- ▶ Reduction in supply chain inefficiencies and risks



Manufacturing as % of GDP in tooling hubs and comparison with India

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The journey ahead

The tooling industry in India is at a crossroads. The Indian manufacturing sector is poised to grow significantly in the near future and the demand for tools will increase to support the higher production volumes. However, whether this demand is met by domestic toolmakers or whether imports are able to tap into a larger share of the pie depends on several factors, many of which are beyond the control of toolmakers.

A look at the automotive sector will put this into perspective. After localisation of vehicle production and component production, tooling localisation is the next frontier. Several major OEMs are taking active steps in this regard. A major PV OEM has increased tooling localisation from 60-65% to 80-85% in their direct procurement over the last 2 to 3 years. It is also instructing their tier-1 suppliers to utilise Indian toolmakers if they are cost competitive, meet the quality requirements and are able to deliver in time.

Tool rooms in India have to enhance their capacities and capabilities if they want to take advantage of the expected increase in demand. In fact, many of them are already doing it. More than 80% of tool rooms have invested in upgrading their manufacturing setup in the last 3 years and more than 50% have invested in skill development of their workforce. This shows that tool rooms are doing their bit. However, there is a need for policies to ensure cost competitiveness in the face of stiff competition from imported moulds and dies. Inverted duty structure and duty-free imports make it difficult for domestic toolmakers to compete on an equal footing. They face higher financing costs than their global counterparts and do not have access to a large pool of skilled labour or outsourcing firms that can support them in manufacturing tools efficiently. These hurdles to growth need to be tackled to ensure that Indian players get a fair chance to compete with their global counterparts.

Indian tool rooms have the potential to be at par with Chinese and Korean toolmakers, but they need help from the Government of India. Many of these issues can be resolved by policy interventions in the upcoming Union budget. Some of the issues such as lack of skilled labour and outsourcing ecosystem cannot be completely resolved in the short term, but the Union budget can become the first step in this regard. The benefits may not be realised immediately, but significant improvement can be expected in the medium term (3-5 years) if the recommended steps are taken up for implementation in the budget. The Indian tooling fraternity sincerely hopes that the Government of India pays due attention to this sector and initiates strong measures to support the die and mould makers in their growth journey. \approx

Tooling Market Trends (Demand Side)

- Captive tooling supply has not changed much in the last 2 years. However, imports have captured a larger portion of incremental demand than commercial tool rooms.
- While plastic moulds continue to be the largest segment in the Indian tooling industry, it has grown at a slower rate compared to other segments over the last 2 years.
- Automotive remains the key sector accounting for ~60% of tooling demand, but the share of consumer durables segment has witnessed a slight increase.
- Shortening of product life cycles, shift towards lightweight materials, rising market for electric vehicles and introduction of BS-VI norms are the major demand side trends that are impacting the tooling industry.

Tooling Market Trends (Supply Side)

- >50% of tool rooms surveyed have recorded a revenue growth in the last 3 years. This shows that the economic slowdown has not impacted the tooling industry to a great extent, as new product development is still taking place.
- 46% of tool rooms surveyed have diversified further into non-automotive segments, so as to reduce business risks associated with dependence on only one customer segment.
- 87% of tool rooms surveyed invested in upgrading their manufacturing setup, whereas almost half of them invested in skill development of workforce.
- The use of new materials as well as changes in manufacturing processes to make production more efficient are the key trends on the supply side.

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Management Mantra

How to take stock of your inventory?



nventory is the term used for the goods available for sale and raw materials used to produce goods available for sale. Inventory also includes spare parts, packing materials, tools & gauges and every material, which contributes towards the manufacturing of goods and packing of the end product till it is in finished condition.

It is generally categorized under raw and packaging materials, semi-finished, goods in work-in-progress condition, finished goods, inventories in transit and consignment inventory.

Inventory control, also known as stock control, refers to the process of managing a company's warehouse inventory levels. The inventory control process involves managing items from the moment they are ordered; throughout their storage, movement and usage; to their final destination or disposal. Many systems, processes, and technologies have been developed over the years to help companies streamline the supply chain processes involved in inventory control systems. Accounting control of inventories is concerned with the proper recording of the receipt and consumption of the material as well as the flow of goods through the plant into finished stock and eventually, to customers.

It is also concerned with the safeguarding of the undertaking's property in the form of raw materials, work-in-progress and semi-finished products. Operating control of inventories is concerned with maintaining inventories with the optimum level keeping in view the operational requirements and financial resources of the enterprise.

Importance and advantages of an Inventory Control System:

- (i) Reducing risk of production shortages
- (ii) Reducing order cost
- (iii) Minimise the blockage of financial resources
- (iv) Avoiding lost sales
- (v) Achieving efficient production scheduling
- (vi) Gaining quantity discounts
- (vii) Taking advantage of price fluctuations
- (viii) Tiding over demand fluctuations
- (ix) Deciding timely replenishment of stocks

Methods of Inventory Control

Inventory control is concerned with the periodic

review of materials in stock. It detects materials not required for planned production, among other purposes and if the obsolete materials continue to occupy storage space until they are removed from stores.

The inventory control methods give us a means for determining an optimal level of inventory as well as an estimate of how much should be ordered and when. There are several methods suggested for inventory controls.

The following are some of the most important systems used:

(a) ABC System: A firm using ABC system segregates its inventory into three groups — A, B and C. The 'A' items are those in which it has the largest rupee investment. This group consists of the 20 per cent of items accounting for 90% of the firm's rupee investment. The 'B' group consists of the items accounting for the next largest investment, i.e., the 30 per cent of the items accounting for about 8 per cent of the firm's rupee investment. The 'C' group typically consists of a large number of items accounting for small rupee investment. This group consists of approximately 50 per cent of all the items of inventory but only about 2 per cent of the firm's rupee investment.

The common procedure for categorization of items into 'A', 'B' and 'is:

- The categorization can be made by comparing the cumulative percentage of items with the cumulative percentage of usage value.
- All the items are to be ranked in the descending order of their annual usage value.
- The cumulative percentage of items to the total number of items is also marked in another column.
- The cumulative totals of annual usage values of these items along with their percentages to the total annual usage value are to be noted along-side.

(b) Budgetary Control System: Budgetary control is a tool of management used to plan, carry out and control the operations of business. It establishes predetermined objectives and provides the basis for measuring performance against these objectives. Under this system, the number of units of the materials to produce a finished product and the level of inventory to be maintained and the quantities to be purchased during the period is all pre-determined.

When these plans are projected in advance, they are called budgets. Control over inventories is exercised on the basis of budgeted figures. Successful inventory

budgeting depends upon the sales forecast. The budget on control system has the advantage of the co-ordination on the inventory consumption level and the expected consumption.

This system integrates and ties together all activities of the enterprise — right from the planning to control. Control helps to eliminate or reduce unproductive activities and minimizing waste. It is an effective method of controlling activities of the business unit since it provides standards against which actual performance is measured.

(c) Minimum-Maximum System: This is one of the oldest methods used in most businesses for controlling inventories. It is essential that proper control should be exercised on the level of the inventory to be maintained. Efficient management of inventory demands that both over and under investment in stock be avoided.

If higher levels of inventories are maintained, the stock level will be influenced by obsolescence, change in fashion and improvements in technicalities. Too much capital tied up in inventories results in a lower rate of return and the possibility of substantial loss from decline in market value.

Too small a quantity is likely to reduce the value of the business and proper servicing of the customers. According to this, a maximum level of inventory based upon the demand and the minimum level to prevent out-of-stock conditions for each item of stock are established. An order is placed when the minimum level is reached, which will bring the quantity to the maximum level.

(d) The Economic Order Quantity Approach:

The Economic Order Quantity (EOQ) refers to the optimal order size that will result in the lowest total of order and carrying costs for an item of inventory given its expected usage, carrying cost and ordinary cost. By calculating an EOQ, the firm attempts to determine the order size that will minimize the total inventory costs.

Finding Economic Order Quantity

The EOQ model assumes that the finished goods are sold at a constant rate over time. The important decision in inventory management is to balance the cost of holding inventories with the cost of placing inventory replenishment orders. When the holding costs and ordering costs are balanced, the inventory costs are minimized and resulting order quantity is called the EOQ.

Management Mantra

Total inventory cost = Ordering cost + Carrying cost Total ordering cost = Number of orders x Cost per order = ₹ U/O x F Where u = Annual usage Q = Quantity ordered f = fixed cost per order

Total carrying cost = Average level of inventory x price per unit x carrying cost. Total carrying cost = $\overline{\mathbf{T}} \mathbf{Q}/2 \mathbf{x} \mathbf{P} \mathbf{x} \mathbf{C}$ = ₹ OPC/2 where Q = Quantity ordered P = Purchasing Price per unit C = Carrying cost

Inventory Level and Order Point for Replenishment



From Fig. 1, it can be noticed that the level of inventory will be equal to the order quantity (Q units) to start with. It declines to level 0 by the end of period 1. At that point, an order for replenishment will be made for Q units. In view of zero lead time, the inventory level jumps to O and the same procedure follows in the subsequent periods. As a result of this, the average level of inventory will remain at Q/2 units, the simple average of the two end points O and Zero.

From the above, we know that as order quantity increases, the total ordering costs will decrease, while the total carrying cost will increase in proportion to the magnitude of the order quantity.

From Fig. 2, it can be seen that the total cost curve reaches its minimum at the point of intersection between the ordering cost curve and the carrying cost line. The value of Q corresponding to it will be the economic order quantity Q0.



Inventory Storage & Preservation

Storage and preservation are an important part of the storekeeping function. When materials remain idle in the store, these materials should be taken care of and looked after properly. Otherwise, these materials may perish due to natural chemical reactions like rusting by moisture, melting by heat, etc., and also may get affected by insects, rats, etc.

Materials should be stocked in the appropriate place according to the nature of the materials. For example:

- >> Stationery, electrical, civil engineering, cleaning and similar items may be stocked in the steel racks.
- Medicine items may be stocked in the fridge.
- >> Perishable items may be stored in the cold rooms. >> Explosive, film, fuse items may be stored in the AC room.
- >> Attractive items may be stored in shelves under lock and key.

Daily and periodical cleaning should be carried out. Daily and periodical verification of stock should be carried out to ensure correctness of stock. Proper method of handling should be followed to avoid damages to the materials.

Preservation materials should be applied to protect the items. Hazardous materials should be segregated and stocked in a separate storehouse away from other storehouses. Safety precautions should be taken and safety appliances should be provided. There should be separate entry and exit for movement of materials.

Management of Movement of materials & goods

Proper planning and execution is key for materials management in a stores environment. There should

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be perfect coordination between Procurement, Stores, Production and Accounts departments to ensure efficient Materials Management. The Stores are copied of every purchase order raised and the tentative dates of supply of materials. This helps the Stores Management in organising space for storage.

All materials' receipt and issue documents should be updated in the operating system on a real-time basis to ensure accuracy of inventory. Stores Management also controls the movement of materials to and from the subcontractors. They should also keep full control on the inventory level at the sub-contractor's location. In respect of finished goods inventory, receipt recordings are against the final QC cleared note of Production department and issue is against the Invoice to Customer or Delivery order. In respect of a trading unit, GIN from Source Vendor forms the inward document and Sales Invoice forms the issue document.

Management Mantra

Inventory or Stocks is a critical element in the Current Assets presented in the company's financials. Many efficiency ratios are linked to inventory movements. Companies, as a yearly exercise, generate aging report of inventory and identify the dead and nonmoving inventory for which provision is made in the accounts and plans for its disposals. Inventory is also one of the key elements in cash flow statements. It is also used as collateral in securing loans from banks. In such cases, the companies have to submit the inventory status as of month-end to the banks. The companies should also insure the inventory adequately.

Management of Inventory is a critical function in every organisation. It is always in the radar of every management, which runs the business efficiently. \approx

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Opinions & More

'The Indian market is developing rapidly'

The Indian industry is growing and the latest trends and developments suggest that Industry 4.0 is definitely taking over. But is the industry ready to face it? TopSolid, with its state-of-the-art range of products, is set to help the Indian industry transition to the phenomenon that is set to change the face of the manufacturing landscape, say Richard Lamure, CEO, and Arnaud de Boisboissel, Business Unit Manager (Asia-Pacific) TopSolid.

Q TopSolid SAS has recently announced the opening of a new strategic partnership, TopSolid India, how do you plan to tap the growing Indian market?

Richard Lamure: The trends and strong demands of the Indian industry such as Industry 4.0, automation, data management, and connectivity, not only request a global approach, but also professional and sharp teams to guide customers' projects. The Indian market is developing rapidly. The country's economy offers a lot of growth opportunities, specifically, for precision tooling, defence, electronics (mobile handset market and telecom gear) and railways. These are sectors, which TopSolid has worked very closely with in Europe. But to work closely with highlevel technical support and training localisation in India, we needed to have an India-specific strategy in place. As a result, TopSolid India was born. We formed TopSolid India with our reliable and trusted partner DCPL. TopSolid India plans to focus on important industrial cities. We will reach out to trade associations such as TAGMA, auto clusters and vocational schools to further the company's cause.

Tell us more about TopSolid and its products for design, manufacturing, mould making and metal forming industries.

Richard Lamure: TopSolid's entire suite of products is developed and continually upgraded to support all domains of mechanical engineering industries—right from design to manufacturing.



CEO, TopSolid

There are around 50,000 licences in use across the alobe in sectors such as precision tooling, marine, aerospace, precision medical and automobile sectors. In fact, TopSolid SAS' footprint represents more than €100 M with 600 people worldwide daily committed to support customers.

Q What do you think are the key drivers of the tooling industry? How does your company aim to support the manufacturing industry here? Arnaud de Boisboissel: The Indian tooling industry is maturing rapidly not only in terms of quality but also scale of operations. The automobile, electrical switchgear, pipe and pipe fittings, FMCG, white goods and household industries' demands are increasing by the day. And, the toy sector is bringing up exciting opportunities. We expect to witness growth in the electronics sector, viz., the mobile handset manufacturing segment, and plan on setting up a manufacturing base in India. The growth potential is immense and we are committed to serve this increasing demand.

Q What do you think are the current technology trends witnessed in the industry? Please take us through them.

Arnaud de Boisboissel: As Mr. Richard Lamure mentioned, Industry 4.0 is the growing trend. In fact, I should say that in India, it's already a reality. The latest improvements and developments are proof of this. For years, we have been providing integrated solutions, which are data management oriented, in connection with industry standards. I believe that we are well positioned to lead the industry.



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Opinions & More

Q Could you tell us more about your iconic product, TopSolid'Mold. How can it help mould makers attain high efficiency and accuracy? Arnaud de Boisboissel: TopSolid'Mold was developed keeping user requirements in mind and considering the valuable feedback from global tool makers in Japan, Europe, and America. Special care has been taken while developing TopSolid and its modules to ensure seamless flow of the entire digital chain-right from mould design to machining, electrode and wire cut. It has numerous user-friendly features to support standard libraries, standardisation, and customisation to match the customers' demands. We are glad to address the ever-growing needs of advanced tool makers with multinational presence such as PANASONIC from Japan, SOCEM and ARAYMOND from Europe, DBM Reflex and BELGA MATRIZES in North & South America.

What makes TopSolid products unique, given the fact that there are many CAM solution providers across the globe?

Arnaud de Boisboissel: TopSolid'Mold and its related tooling modules aim at offering integrated global solutions on one platform to address the dynamic needs of the tooling industry. CAM is just one part of the digital chain—starting from conceptualisation, designing of moulds to proveouts. TopSolid addresses 2D, 3D, and 5-axis on a single platform with best-in-class simulation (CNC machine, job, tool holders and clamping elements). Besides, it has access to libraries of cutting tool manufacturers.

It is important to note that the TopSolid team works closely with several reputed machine manufacturers to develop certified post processors. Operating-level personnel using TopSolid can work stress-free in tool rooms, as they do not need to worry about repetitive tasks or machine collision. Instead, they can focus on productivity and efficiency while running operations.

Clearly, going digital is the way forward for all industries. How is TopSolid gearing up to help companies achieve their digital goals?

Arnaud de Boisboissel: This is fully part of TopSolid's strategy and Industry 4.0's direction. TopSolid's philosophy is to help companies work digitally and eliminate the redundant steps in design and manufacturing. The entire process can be made paperless, while minimising the need for human intervention. Its various modules help in integrating various functions, thereby compressing the total throughput time.

Q How can manufacturers optimize on technology to carry out operations amid the COVID-19 outbreak?

Arnaud de Boisboissel: Using technology and technology-driven solutions are the only alternatives in the current situation. Owing to the scarcity of skilled manpower to get the jobs done, it is become more important to look at technology to fill in the gaps. To meet customers' standards, TopSolid has incorporated the best practices of the industry into its highly customizable products. These not only help in minimising repetitive tasks but also in automating the process to a great extent.

However, the transition to automation must be done in phases. Automating the process and minimising human intervention are needed in order to reduce waste and improve productivity. Being a truly integrated platform for design and manufacturing helps in reducing the unnecessary steps of duplication and preventing loss of information when using different software for design and manufacturing. All the relevant information and data can be retrieved and used to monitor quality and traceability.

Q What are the key growth drivers in India? What are your plans for the Indian market?

Arnaud de Boisboissel: There are several growth drivers in India, but the most important ones are the country's pro-development government, and availability of skilled and knowledgeable manpower. Currently, many countries have understood the importance of diversifying and they are considering setting up their manufacturing base in India. Some have already done so. I think that the availability of reasonably good infrastructure and quick scalability will help India attract global investments.

India is one of the largest growing industrial markets in the world. By establishing this strategic partnership with TopSolid India, we aim to provide full support to the industry with our range of customisable products. We want to help companies achieve optimised working levels and assist them by customising our products to help them meet their individual company standards. \approx

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Opinions & More



'The roadmap for India to become the global manufacturing hub is already set'

"Economists have estimated that it would take a couple of years to reach the pre-COVID economic status, but with the current tempo, the Indian engineering industry might arrive at that point in less than six months," says Vivek Nanivadekar, Executive Director, FIBRO India Precision Products Pvt. Ltd.

Q Can you tell us about your company?

FIBRO India, a 100% subsidiary of FIBRO GmbH, was established in 2008. Initially, our company operated from a rented space, but, in 2013, we acquired our own premises to work from. In 2017, we expanded to incorporate our second phase of operations, which included manufacturing of rotary tables for the automation industry. Over the years, we added newer products to our manufacturing list depending on the domestic as well as international markets' demands. Staying in line with our company's motto, FIBRO India focusses on producing quality products with 'German Precision, Crafted in India'. Our headquarters in Germany offers us all the encouragement and technical support we need in order to do so.

Q The pandemic has affected businesses globally. How is FIBRO India dealing with the current business environment?

Everything was going well till 2018. However, in 2019, owing to various factors, the global economy began to witness a decline in growth. And, the COVID-19 outbreak, only worsened the scenario. The world is already facing the consequences of the pandemic. Fortunately, for us, we had already started re-strategising our business plans from 2019 itself. For instance, we decided to focus on e-commerce and developed our web shop to help customers place their orders from anywhere. We also started capitalising on digital marketing to grow our presence on social media and conduct webinars to educate customers on our new offerings. Additionally, we began developing products required by the market but were not made in India.

These strategies proved very beneficial during the lockdown. The webinars on our new product offerings received an overwhelming response. We started receiving orders for those products as soon as the industry resumed operations. We then took up similar products for development to expand our range of offering. In fact, we recently launched our new Aerial CAM unit on the digital platform.

For the time being, we put on hold our investment plans and instead of buying machinery and equipment to manufacture some components in-house, we have asked our vendors to supply those critical components to us.

Also, many companies have been downsizing their staff, but FIBRO India has not done so. Rather, we are looking to equip our company with additional talented employees.

Q What lessons has the lockdown taught you?

The most important lesson we learnt is that except manufacturing, most other operational functions such as sales and marketing, purchase, and accounts design, among others, can be performed on the digital platform without being present in the office/factory premises. And now, with the 'Smart Factory' in place, manufacturing operations can be held on the shop floor with minimum physical presence. In fact, post COVID-19, this is going to be the new normal for the manufacturing industry, apart from the use of masks, sanitisers, and maintaining social distancing. A lot is already beginning to change. Even many MSMEs, which were reluctant to adopt automation, are turning to low-cost automation solutions to deal with the situation.

Opinions & More

Q Do you have any suggestions for the government to help the economy revive?

The government is already taking commendable steps to support the MSME sector. For starters, it has redefined the criteria for MSMEs—a move that will help many borderline industries expand. The government has also directed banks to extend the credit limits without asking for additional documentation. Economists have estimated that it would take a couple of years to reach the pre-COVID economic status, but with the current tempo, the Indian engineering industry might arrive at that point in less than six months.

Q COVID-19 has adversely impacted the global supply chain. Businesses across the world are struggling to get on track. How could India rise up to the challenge?

The pandemic has certainly disrupted the flow of the global supply chain. Its impact on the manufacturing sector is clearly evident. But, on a brighter note, it has also opened doors for our local industries to develop. India will face new challenges, but we have to work towards overcoming them to make 'Atmanirbhar Bharat' a reality. It will take some time for the 'Vocal for Local'initiative to materialise, but, once it does, it will see the rise of start-ups contributing manifold to the economy and result in the creation of many more employment opportunities.

As a step in this direction, the government has already undertaken initiatives to cut red tape by making most of the processes online. This has ensured that MSME owners do not end up wasting time visiting government offices for sanctions.

As per the 'Doing Business' 2020 report, India jumped 14 places to the 63rd position in the ease of doing business rankings. This certainly indicates that India is able to attract FDI in the manufacturing sector. But this is only one side of the coin. The government still has to tackle major roadblocks such as equipping the country with skilled manpower, infrastructure, uninterrupted stabilised power supply, roadways, seaways and airports, etc. It has already taken up the implementation projects in roadways and development of ports, but it will take a few more years for it to complete. The roadmap for India to become the global manufacturing hub is already set.

Q What can Indian tool makers learn from the current scenario?

Indian tool makers have a lot to learn. The most important lesson is that tool makers need to train the young aspiring tool makers the tricks of the smart manufacturing trade. Tool making is one of the most creative fields and should be able to attract young talent.

Recently, I read a newspaper report which stated that more than 30% seats in engineering colleges are vacant. This indicates that there are no jobs for engineers and hence, it is no more as lucrative a career option as it used to be. It is a simple demand and supply equation. There is more supply of engineers but not much demand for them.

The quality of education is another big issue. The government has already announced a new education policy to be implemented from 2022. This means that it will take at least 10 years for quality engineering graduates in all disciplines to be made available for the industry. But, better late than never. So, for now, it's best that every industry trains their workers/ engineers and staff for at least 6 to 12 months before they are expected to start delivering results.

Q How do you foresee the future of Indian manufacturing industry?

As per the fourth census of MSMEs report published in 2012, MSMEs are the second largest employers after agriculture, accounting for 72% services and 28% manufacturing jobs. They also account for 45% of total industrial production, 40% of total exports and significantly contribute to the GDP. I believe some good incentives like low-cost finance, increased duty drawback, etc., would certainly make MSMEs more cost competitive and help them compete with other countries like Vietnam, Indonesia, and China in the international market.

Considering the current international economic and political situation, multinationals are planning to set up multiple manufacturing locations in different countries so that their businesses remain unaffected. As such, they would establish a supply chain in different countries. India can certainly take advantage of this situation. \approx

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Techno Focus

Industry 4.0: Challenges and perspectives for the factory of the future and intelligent machining



What is Industry 4.0? Concept and origin of Industry 4.0 A concept first highlighted at the Industrial Technology Fair in Hanover, Germany, in 2011, Industry 4.0 is a reference to the first three industrial revolutions.

The first industrial revolution took place in the 18th century after the invention of steam engines, allowing mechanized production. The arrival of the electricity grid led to the rise of the second industrial revolution at the end of the 18th century. Finally, the automation of production in the 20th century led to the third revolution.

The idea behind Industry 4.0 is to reverse the trend of globalization to the advantage of European industries by encouraging factories to acquire the latest technological tools, all connected via the Internet and the Cloud.

In the new factory, the idea is to put the factory at the service of the operator, not the operator at the service of the factory. Since people are the central factor in this plan, every effort is made to improve the ergonomics, productivity and safety of each workstation. As the evolution of production methods has led the operator to carry out more and more procedures, the objective of the ultraconnected factory is to dematerialize all these phases, so that people are focused on tasks with high added value. To do this, each machine will be connected and communicate with the network. The information will be transversal to be distributed between the different departments. Information will be disseminated smoothly and efficiently from the customer's purchase order, through all stages of the manufacturing process, to the shipment of the finished product.

Industry 4.0 components: What are they?

The connected factory, or factory of the future, is not going to revolutionize everything. It will use existing equipment, improve it, and then place it at the heart of a network where all the information can be shared.

For this purpose, certain tools are essential to support the These include:

The Internet of Things: This will allow the development of newly manufactured products, thereby, opening up new market opportunities.

Techno Focus



- 3D printing: This opens up new production possibilities, and offers ability to adapt to the competitive production of small series.
- Collaborative robots (Cobots): As operator assistance, the cobot will improve the productivity, safety and efficiency of some workstations.
- Augmented reality: By juxtaposing information related to certain procedures (notably maintenance) to the individual's visual field, augmented reality will allow you to rapidly intervene by following the displayed procedures.
- Cyber-physical systems (CPS): They allow new features to be added to physical elements for the purpose of process control and management. They become a key element in the information chain.
- Industrial big data: The gigantic database of the factory of tomorrow will evolve into "Smart data" with the introduction of artificial intelligence. It will notably improve predictive maintenance.

Challenges and perspectives for the factory of the future

The challenge of the 4.0 factory will be to increase productivity while adapting to a new way of consuming. Today's consumer buys more and more and tends to focus on customizing objects. So, one of the main challenges of the factory of the future will be to combine productivity with mass customization and reduced series.

To do this, it will be necessary to facilitate the use of programming software to save time, so that the individual can use them quickly. One of the objectives will be to process the information in a very short time, while maintaining flexibility in the parameters.

The machining of the future will require the implementation of an intelligent system, capable of self-assessment and correction. The goal of Industry 4.0 is to create "intelligent machining"



— the collection of know-how and process data, combined with artificial intelligence, for the benefit of production.

How does TopSolid fit into Industry 4.0?

Although the concept of "Industry 4.0" appeared only a few years ago, TopSolid did not wait for the fourth industrial revolution to follow this logic of the factory of the future.

TopSolid has been offering a fully integrated digital chain for years via its suite of CAD/CAM software suite, thereby, providing total interconnectivity from design to construction.

TopSolid continues its evolution towards the CAD/ CAM of the future, which involves:

- Intelligent design: In addition to 3D models already well recovered at the geometric level, the recovery of machining information (PMI) and tolerances, as well as taking into account milling and turning operations.
- More automation: Predictive calculations, vibration calculations, deformation of parts due to clamping; refined tool life management (with calculated cutting conditions); families of similar parts (adapting to customized mass production); automatic range generation.
- Using the Cloud: Collecting the company's BigData, deporting greedy calculations, constantly updating the software.
- Putting people at the heart of the 4th industrial revolution: Change management, setting up certified training courses for the mutual benefit of companies and their employees. ~

Case Study

CAMWorks Automates 3 Axis Mold Programming

ave you ever needed to programme a complex 3 axis mold and wished there was an easier, faster way? With CAMWorks technology database or TechDB and Tolerance Based Machining (TBM), complex molds can often be programmed in less than 5 minutes!

How, you might ask? Here's how... CAMWorks captures the best practices of your top CNC programmers, mold makers, and machinists and automatically reuses them to automate the CNC programming process. Users can programme molds and save their machining strategies back to the technology database or TechDB[™] and automatically apply them to similar parts or molds as needed.

In addition, CAMWorks can read the surface finish symbols and automatically apply the correct machining strategies to meet the surface finish requirements specified by the Model Based Definition or MBD data. This cutting-edge technology is called Tolerance Based Machining or TBM. Using CAMWorks, the TechDB and TBM, complex molds can often be programmed in less than 5 minutes and the toolpaths are fully associative to the SOLIDWORKS model. So, if a change is made to the design, the toolpaths will update automatically!

CAMWorks is the only CAM system that provides the technology necessary to automate the CNC programming process for molds in an easy-to-use system, fully integrated solution inside SOLIDWORKS.

Capture Your Best Practices

In this example, a mold for a PVC fitting is programmed using CAMWorks. Once programmed, the machining strategy is saved back to the TechDB[™]. All of the tools, feeds & speeds, depths of cuts and other machining parameters are stored in a single, easy-to-apply machining strategy. The machining strategy can then be applied automatically based on the type of material being machined, size of the cavity or core, and other geometric criteria.



Mold for PVC Fitting

Case Study



Tolerance Based Machining

The toolpaths will be generated correctly regardless of the cavity or core shape! Subsequent operations (such as rest-roughing) will recognise the work-inprocess, and machine only the areas where there is remaining material. By storing various strategies, you can capture your best practices and build a library of machining strategies that can used to machine virtually any mold cavity or core in any material!

The CAMWorks toolpaths for machining are also fully associative with the design model. So, if the design of the mold changes, the toolpaths will update automatically.

Use MBD data to Further Automate the Process

In this example, a mold for a PVC fitting is programmed using CAMWorks. Once programmed, the machining strategy is saved back to the TechDB[™]. All of the tools, feeds & speeds, depths of cuts and other machining parameters are stored in a single, easy-to-apply machining strategy. The machining strategy can then be applied automatically based on the type of material being machined, size of the cavity or core, and other geometric criteria.

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The CAMWorks toolpaths for machining are also fully associative with the design model so if the design of the mold changes, the toolpaths will update automatically.

The Bottom Line

Thanks to the automation in CAMWorks, CNC programmes become consistent, the machinist knows what to expect in the CNC programme, and more easily identifies any issue that might arise. New programmers can become immediately productive and benefit from the best practices of experienced CNC programmers, mold makers, and machinist. The bottom line is even the most complex molds can be programmed in just a few minutes, reducing the delivery lead time and programming effort. Furthermore, thanks to standardization using the same proven tools, feeds & speeds, and machining strategies... the quality of the molds improves and tooling costs are reduced.

Note: The same technology described in this post can be used to automate the CNC programming process for medical devices, aerospace, automotive, commercial equipment, and other types of CNC-machined parts. \approx Case Study

Case Study

An all-round success: Expert deburring and honing of rotors and stators

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Introductory remarks

Burrs are considered to be an annoy-ing accessory when punching, preci-sion cutting and machining. In practice, there are various processes to remove them, but which is the right one for you? - electromechanical deburring, high-pressure water-jet deburring, me-chanical deburring with deburring mil-lers, drag finishing, thermal deburring, barrel finishing and brush deburring. René Gerber AG is quite clearly in fa-vour of the latter and finds brush de-burring a truly exciting process. Thus the company aims to advance the de-velopment of this technology in order to constantly offer an even better solu-tion to its customers.

Solution

The Gerber brushing, polishing and deburring machines are used when it is necessary to deburr workpieces with indentations or pockets with high preci-sion and to round them off in a defined narrow tolerance range. At the same time, the surface roughness is quite significantly improved by the process. This technology is incorporated in a large number of precision components where absolute absence of burrs and an undamaged surface are a must. In this process, a brush, which is coated with an abrasive or which consists of bristles with incorporated abrasive grit, is allowed to slide over a sharp-edged workpiece. The result of this is an edge rounding. Since no secondary burrs arise during honing / deburring with brushes, the rounding is absolute-ly reproducible through the setting parameters.

Brush deburring of milled, turned, sintered and punched parts with the BS Power

The high performance BS Power transfer brush deburring system has one of two planetary brush heads and can simultaneously deburr and polish workpieces reliably and uniformly up to a diameter of 400 mm or also on both sides up to 180 mm. Neither heavy burrs nor the smallest contours consti-tute a barrier. The planetary brush heads were developed by Gerber and each have three large disc brushes with a diameter of 260 mm, forming a rotational circle of 570 mm. The ma-chine is universally applicable. Higher parts such as rotors, planetary gears and housings etc. can be reliably deburreds with this technology The BS Power is designed for high perfor-mance, so that heavily burrs resulting from punching, laser cutting, milling or turning are rapidly and reliably re-moved.

Its smaller sister, the BS Eco fills the gap as an efficient and cost-effective solution for smaller quantities with a diameter of up to 250 mm. The system is compact and reliable and optimally combines three work steps, selective deburring, edge rounding and surface polishing in one process. \approx





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Material:

Sintered steel

Industry: Automobile supplier

Task formulation: Deburring and honing of the sinter burrs

bebuilting and norming of the sinter bu

Brushes:

3x Tynex Ø250 interspersed with silicon carbide

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