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May 2021





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Ashim Sharma

Partner & Group Head Business Performance Improvement Consulting (Auto, Engg. & Logistics), Nomura Research Institute

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EDITORIAL



A healthy start

he COVID-19 pandemic has posed quite a challenge to our modern healthcare systems. While some months were defined by pure chaos, the others were spent in pursuit of bringing innovative solutions to the market, especially in healthcare. The necessity to find a way out witnessed the development of effective vaccines, and medical devices. This, in turn, created opportunities for the manufacturing industry. Manufacturers in India, who were earlier focused on meeting the demands of several other sectors, sensed an opportunity in manufacturing medical devices. And the various policies announced by the Government of India have provided them with the much-needed boost.

Manufacturers, who have been catering to the needs of the healthcare sector, are already aware of the requirements. But those who want to venture into the healthcare sector need to be aware of what they are getting into. So first, let's understand the basics. Healthcare manufacturing comprises the making of medical equipment, devices, tools and accessories, which can assist the medical fraternity and patients in treating various illnesses. Over the years, medical technology has evolved at a fast pace, creating the need for highprecision, accurate, reliable, flawless, and lightweight medical devices. Hence, to deliver such advanced equipment, manufacturers will have to seek the necessary certifications, ensure they have the required infrastructure, and also get a thorough understanding of the legalities involved. After all, when it's a matter of healthcare, there can be no compromise.

Currently, "India imports at least 80 per cent of its requirement of medical devices, with the US, Germany, China, Singapore, and Netherlands being top exporters of such devices to the country," a news report informed. It's time to bring down this figure! While it may sound like an uphill journey, nothing ventured is nothing gained. Apart from the 'Make in India' campaign, the Government of India approved the scheme on "the promotion of Medical Device Parks for financing Common Infrastructure Facilities in 4 Medical Device Parks with financial implications of INR 400 crore" to support medical technology innovation and manufacturing. Besides this, with an objective to boost domestic manufacturing, and attract large investments in the medical devices sector, the Department of Pharmaceuticals had launched a PLI Scheme for the Promotion of Domestic Manufacturing of Medical Devices. The 'In Focus' section covers all this and more...

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D. K. Sharma, Immediate Past President, TAGMA India & Member-MSME PPP Apex Committee

> **D. M. Sheregar,** President, TAGMA

D. Shanmugasundaram, Vice President, TAGMA There are good business opportunities for Indian toolmakers in the healthcare sector. This is probably the right time to make that gradual shift you have been thinking of.

Happy Reading!

Nishant Kashyap Editor nishant@antechmedia.in



NEW FUNCTIONS TRIED AND TRUSTED HOT RUNNER CONTROLLER

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Tech Update

Meusburger's exclusive, reliable and environmentally friendly sealing

IS your screw plug leaky? With the exclusive sealing cone variant from Meusburger, you can prevent exactly that. Installation effort is 80% easier compared to conventional products thanks to the elimination of the Teflon sealing tape and the immediate tightness of the holes.

A huge time-saver and the perfect fit

Bothering with the sealing on screw plugs is often very time consuming. The laborious application of sealing bands (Teflon sealing tape) can be avoided by using the plastic screw plug from Meusburger. A lot of time is therefore saved both in this step and during revisions, as cleaning the thread is no



longer necessary. Compared to the conical screw plugs, the sealing cone variant seals the mould perfectly. During machining, just the thread chamfer is made slightly larger, so the screw does not protrude. This is not only more practical,



but also looks much better!

A screw plug with collar and sealing washer means increased machining effort and requires more space. But this can be avoided by using the plastic screw. In addition, the screw can be easily screwed in or out.

The environmentally friendly option

The screw plug by Meusburger is made up of 95% recycled plastic, this means valuable resources are saved. It is ideal for sealing holes for liquid and gas. The screw is suitable for up to 10 bar pressure and temperatures up to 95°C. The Meusburger range covers a wide variety of thread sizes including the M10x1, which is one of the most common variants.

BIG KAISER introduces BIG CAPTO rough boring tool

BIG KAISER Precision Tooling, a global leader in highperformance metalworking equipment, has introduced the Series 319 SW rough boring head with the BIG CAPTO

connection. The new SW BIG CAPTO Rough Boring Head makes it possible to perform rough and finish boring processes seamlessly with the finishing heads it has offered for years. BIG KAISER currently offers the widest range of rotating BIG CAPTO tooling of any provider.

In accordance with ISO 26623-1, the polygon shape of the taper and onepiece body construction provides for highly repeatable accuracy and torque transmission, an ideal fit for rough boring work. The SW BIG

CAPTO achieves high repeatability, in part, thanks to the flush fit of the polygon taper with the spindle. The combination of a self-centering 1:20 taper and the long taper edge ensures stable runout accuracy.



BIG KAISER is a worldwide leader in high-precision tooling systems and solutions for the metal-cutting industry that guarantee extreme accuracy and repeatability. Its products are of the utmost quality — manufactured with materials and craftsmanship that enable superior performance. As a member of the BIG DAISHOWA Group (Osaka, Japan), BIG KAISER has grown into a well-recognized global tooling provider, with manufacturing facilities in North America, Switzerland and Japan. In addition,

BIG KAISER is the North American representative of Speroni tool measuring machines, Sphinx high performance drills, mptec measuring stands, Tekusa spindle cleaners and the UNILOCK zero point workholding system by Innotool.

The SW BIG CAPTO is available in sizes C3, C4, C5, C6 and C8.

The diameter range is ø.984"-8.000".

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IT'S COLD WORK TOOL TIME

A HERRY AND A HERRY A

One success factor for tools that is often overlooked, is the material itself. It is critical to tool life and therefore to the cost effectiveness of production. The optimal material for any stamping and cutting requirements is available from voestalpine BÖHLER Edelstahl. Its products range from standard materials to high-performance powder-metallurgical steels. High wear resistance and compressive strength combined with toughness are the outstanding properties of BÖHLER HIGH PERFORMANCE tool and high-speed steels. They can extend tool life several times over, especially for highly demanding fine-blanking applications.





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Tech Update

Tata Technologies and Dassault Systèmes lead a joint webinar in association with TAGMA to introduce Digital Manufacturing in Tooling

TATA Technologies, a leading global engineering services and product development firm, along with Dassault Systèmes, the 3DEXPERIENCE® company, organized a joint webinar in association with TAGMA (Tool and Gauge Manufacturers Association India) on 'Tooling Experiences from 3DEXPERIENCE CATIA-From Design to Production'.

The Tool and Gauge Manufacturing fraternity was introduced to Digital Manufacturing in Tooling. Participants were given know-how on how they can increase competitiveness through Integrated Tool Design Concepts that will assist in realizing shorter time-to-market in a lean and flexible end-to-end process from Design to Production.

The collaborative tooling solutions of Dassault Systèmes enable toolmakers to:

- Innovate constantly to manufacture a huge variety of ever more complex products, with the right quality and at the right cost
- Deliver tooling quickly in order to reduce design-to-manufacturing iterations
- Maximize efficiency and reliability of the tooling process regardless of human-related or resource contingencies.

The intention of empowering the tooling industry was well received from all quarters. This surely paved the way to generate first time right tooling.

InnovMetric launches PolyWorks|DataLoop™ PLM Connectors

INNOVMETRIC, the global leader in smart 3D metrology software solutions, recently announced the release of new PolyWorks|DataLoop PLM Connectors to interconnect Product Lifecycle Management systems and the PolyWorks[®] smart 3D metrology digital ecosystem.

PLM Connectors enable product engineering, manufacturing, and 3D measurement teams to leverage shared product definition and 3D measurement data. Having quick access to the latest information facilitates new product development and increases the efficiency of quality assurance processes. Supported PLM systems include Siemens Teamcenter®, PTC Windchill, and CONTACT CIM Database.

"We have made it our key mission to support the digital transformation of our customers' 3D measurement processes. Our new PLM connectors play a critical role to this end by ensuring a perfect digital interoperability between a customer's PLM system and PolyWorks solutions," said Marc Soucy, President of InnovMetric.

He added, "For

PolyWorks|Inspector[™] users, this means they can directly import their CAD models and data from the PLM system. For designers and manufacturing specialists, they can now access 3D measurement results from their PLM interface. PLM connectors make the dream of fast and secure digital data exchanges between the PLM and 3D measurement ecosystems a reality!"

Universal digital access to CAD and 3D measurement data

PLM connectors ensure digital access to CAD and 3D measurement data for all PLM and PolyWorks users, eliminating the mistakes and lost time resulting from manual data exchanges:

PolyWorks|Inspector users can search for CAD models and assemblies stored in the PLM and import any revision directly.



PLM users can access 3D measurement data and results in a single click through light inspection project objects linked to projects stored in a PolyWorks|DataLoop 3D measurement database.

Digital PLM processes boosted by 3D measurement data

PLM connectors help enhance the quality of products proactively by integrating valuable 3D measurement data into digital PLM enterprise processes, such as:

Engineering change: Access 3D measurement data from the PLM to troubleshoot design and manufacturing issues and check on the success or failure of a fix.

- Revision traceability: Document the causes of engineering changes through hyperlinks that point to relevant 3D measurement data and discussion threads.
- Approval process optimization: Improve the efficiency of existing PLM-based approval processes by linking CAD revisions to their corresponding 3D measurement data.
- Continuous improvement: Analyze your enterprise's current manufacturing process capability to improve the next product designs.



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Industry Update

Economic activity down in April, May but shock less severe than 2020: Fitch

FITCH Ratings recently said the shock to economic activity from the latest wave of COVID-19 pandemic will be less severe than the one in 2020, but recovery is likely to be delayed as economic activity dropped in April-May.

The global rating agency said there are growing indications that the latest wave of COVID-19 infections will add to risks among financial institutions (FIs). "We expect the shock to the economic activity from the latest wave of the pandemic in India to be less severe than in 2020, even though caseloads and fatalities are much higher... Nonetheless, indicators show activity dropped in April-May, which is likely to delay the country's recovery, and the number of newly recorded cases remains extremely high," Fitch Ratings said in a report. and for regression only.

and companies and individuals have adjusted behaviour in ways that cushion the effects. "There is a risk that disruption could persist longer and spread further than our baseline case assumes, particularly if lockdowns are introduced in more regions, or nationwide," it added.

Fitch had, in April, said that the surge in COVID-19 cases could add to headwinds

facing India's banks and non-bank financial institutions (NBFIs) if it led to a resurgence in asset quality pressures. The latest data suggest that this risk is mounting, the agency said. "There are growing indications that India's latest wave of COVID-19 infections will add to risks among FIs by sapping near-term momentum from the economic recovery," it said.

Fitch Ratings had, in April, said that the resurgence of COVID-19 infections may delay India's economic recovery but won't derail it, as it kept the sovereign rating unchanged at 'BBB-' with a negative outlook. It projected a 12.8 per cent recovery in GDP in the fiscal year ending March 2022 (FY22). The Indian economy is estimated to have contracted 8 per cent in the last fiscal, which ended March 2021.

Courtesy: PTI News

GM to invest \$40 million at Pontiac Stamping Plant for Flexible Fabrication Technology

GENERAL Motors recently announced its plans to invest \$40 million at its Pontiac Stamping Plant. The investment will be used to renovate the existing facility, and install new, highly flexible fabrication machinery and presses to support future electric vehicle production and various product applications.

It said currently authorities are

implementing lockdowns more narrowly,

Renovation work will begin immediately. GM anticipates the investment will create 20 new positions.

The "Flex Fab" sheet metal fabricating technology will enable repeatable, custom and precise stamping, reducing costs for low-volume applications. Flex Fab will



require little or no additional tooling investments to fabricate new stampings for future products.

"This investment will bring the latest in flexible, sheet metal fabrication technology to the Pontiac team," said Phil Kienle, GM vice-president of North America Manufacturing and Labor Relations. "Our manufacturing capabilities create a competitive advantage for GM, and I am confident the team at Pontiac Stamping will continue delivering excellence in all areas of the business as they deploy this new equipment."

Pontiac Stamping currently employs 191 hourly and 31 salaried employees. The hourly workforce is represented by UAW Local 653. The plant began production in 1926 as part of the Oakland Motor Car Company and became part of the Pontiac Motor Division in 1932.

General Motors is a global company focused on advancing an all-electric future that is inclusive and accessible to all. At the heart of this strategy is the Ultium battery platform, which powers everything from massmarket to high-performance vehicles. General Motors, its subsidiaries and its joint venture entities sell vehicles under the Chevrolet, Buick, GMC, Cadillac, Baojun and Wuling brands.

Industry Update

Credit support measures announced for individuals, small businesses and Small and Medium Enterprises (MSMEs)

RBI Governor Mr. Shaktikanta Das recently announced a series of measures to support the nation's fight against the second wave of COVID-19 infections. "Alleviating any constraint from the financing side for all stakeholders - government, hospitals and dispensaries, pharmacies, vaccine/ medicine manufacturers/importers, medical oxygen manufacturers/suppliers, private operators engaged in the critical healthcare supply chain, and, above all, the common man who may be facing sudden spike in health expenditure requires a comprehensive targeted policy response. Small businesses and financial entities at the grassroot level are bearing the biggest brunt of the second wave of infections," said Mr. Das.

The measures form the first part of a calibrated and comprehensive strategy against the pandemic, said the Governor.

Term liquidity facility of INR 50,000 crore to ease access to emergency health services: Term liquidity facility of INR 50,000 crore with a tenure of up to 3 years, at repo rate, to ease access to emergency health services, for ramping up COVID-related health infrastructure & services. Banks can give fresh lending support to a variety of stakeholders under this facility. This lending facility will be available up to March 31, 2022. Banks will be given incentives to provide credit under this facility.

Special long-term repo operations for small finance banks: In order to provide further support to micro, small and other unorganised sector entities, 3-year repo operations of INR 10,000 crore at repo rate, for fresh lending up to INR 10 lakh per borrower; facility is available up to October 31, 2021.

Lending by Small Finance Banks (SFBs) to Micro Finance Institutions (MFIs) for on-lending to be classified as priority sector lending: In view of fresh challenges, SFBs are now permitted to regard fresh on-lending to MFIs with asset size up to INR 500 crore, as priority sector lending. This facility will be available up to March 31, 2022.

Credit flow to MSME entrepreneurs: To further incentivise inclusion of unbanked MSMEs into the banking system, the exemption provided in February, 2021 wherein scheduled banks were allowed to deduct credit given to the new MSME borrowers from Net Time & Demand Liabilities for calculation of CRR, is now extended to December 31, 2021.

Stress Resolution Framework 2.0 for individuals, small businesses and MSMEs: The following set of measures have been announced to relieve the stress faced by most vulnerable categories of borrowers – namely individuals, borrowers and MSMEs:



a) Individuals, borrowers and MSMEs with aggregate exposure up to INR 25 crore, who have not availed of restructuring under any previous frameworks, who were classified as standard on March 31, 2021, will be eligible to be considered under Resolution Framework 2.0. Restructuring under new framework can be invoked till September 30, 2021 and will have to be implemented within 90 days after invocation.

b) For individuals and small businesses, who have availed restructuring of loans under Resolution Framework 1.0, where moratorium of less than 2 years was permitted, lending institutions can now increase the period and/or extend residual tenure up to a total period of 2 years.

c) In respect of small businesses and MSMEs restructured earlier, lending institutions are now permitted to review working capital sanction limits, as a onetime measure.

Rationalisation of KYC norms for enhanced customer experience: Steps being proposed include: a) Extending the scope to video KYC for new customer categories such as proprietorship firms, b) Conversion of limited KYC accounts to fully KYC compliant accounts, c) Introduction of more customer-friendly options in KYC updating and d) enabling the use of KYC Identifier of Centralised KYC Registry (CKYCR) for V-CIP and submission of electronic documents as identify proof.

Floating provisions and countercyclical provisioning buffer: Banks can now use 100% of floating provisions held by them, as on December 31, 2020, for making specific provisions for NPAs; such utilisation is permitted up to March 31, 2022.

Relaxation of overdraft facility for states: Maximum number of days of overdraft in a quarter for state governments has been increased from 36 to 50 days. The number of consecutive days of OD has been increased from 14 to 21 days; facility available up to September 30, 2021.

Mr. Das concluded that the second wave is not insurmountable. Stating the immediate objective, which is to preserve human life and restore livelihoods through all means possible, the RBI Governor stated that RBI is battle-ready to ensure financial conditions remain congenial and markets continue to work efficiently. In this, the RBI is committed to go unconventional and devise new responses as per demand, he said.





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Industry Update

Cabinet approves Production-linked Incentive Scheme 'National Programme on Advanced Chemistry Cell Battery Storage'

THE Cabinet, chaired by Prime Minister Narendra Modi, has approved the proposal of the Department of Heavy Industry for implementation of the Production-linked Incentive (PLI) Scheme 'National Programme on Advanced Chemistry Cell (ACC) Battery Storage' for achieving a manufacturing capacity of 50 Giga Watt Hour (GWh) of ACC and 5 GWh of "Niche" ACC with an outlay of INR 18,100 crore.

ACCs are the new generation of advanced storage technologies that can store electric energy either as electrochemical or as chemical energy and convert it back to electric energy as and when required. The consumer electronics, electric vehicles, advanced electricity grids, solar rooftop, etc., which are major battery consuming sectors, are expected to achieve robust growth in the coming years. It is expected that the dominant battery technologies will control some of the world's largest growth sectors.

While several companies have already started investing in battery packs, though the capacities of these facilities are too small when compared to global averages, there still is negligible investment in manufacturing, along with value addition, of ACCs in India. The demand for ACCs is currently being met through imports in India. The 'National Programme on Advanced Chemistry Cell (ACC) Battery Storage' will reduce import dependence. It will also support the 'Atmanirbhar Bharat' initiative. ACC battery storage manufacturers will be selected through a transparent competitive bidding process. The manufacturing facility would have to be commissioned within a period of two years. The incentive will be disbursed thereafter over a period of five years.

The incentive amount will increase with increased specific energy



density & cycles and increased local value addition. Each selected ACC battery storage manufacturer would have to commit to set-up an ACC manufacturing facility of minimum 5 GWh capacity and ensure a minimum 60% domestic value addition at the Project Level within five years. Furthermore, the beneficiary firms have to achieve a domestic value addition of at least 25% and incur the mandatory investment INR 225 crore /GWh within 2 years (at the Mother Unit Level) and raise it to 60% domestic value addition within 5 years, either at the Mother Unit, in-case of an Integrated Unit, or at the Project Level, in-case of the 'Hub & Spoke' structure.

The outcomes/ benefits expected from the scheme are as follows:

- Setup a cumulative 50 GWh of ACC i manufacturing facilities in India under the Programme.
- ii. Direct investment of around INR 45,000 crore in ACC battery storage manufacturing projects.
- iii. Facilitate demand creation for battery storage in India.

- iv. Facilitate Make In India. Greater emphasis upon domestic valuecapture and therefore reduction in import dependence.
- v. Net savings of INR 2,00,000 crore to INR 2,50,000 crore on account of oil import bill reduction during the period of this Programme due to EV adoption as ACCs manufactured under the Programme is expected to accelerate EV adoption.
- vi. The manufacturing of ACCs will facilitate demand for EVs, which are proven to be significantly less polluting. As India pursues an ambitious renewable energy agenda, the ACC Programme will be a key contributing factor to reduce India's Green House Gas (GHG) emissions, which will be in line with India's commitment to combat climate change.
- vii. Import substitution of around INR 20,000 crore every year.
- viii. Impetus to Research & Development to achieve higher specific energy density and cycles in ACC.
- ix. Promote newer and niche cell technologies.



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Medical device manufacturing has transformed over the years. The industry is constantly evolving to meet the advanced needs of those seeking medical care. For this, medical device manufacturers must stay updated on the current industry trends. A window of opportunity has opened for Indian toolmakers, who are already manufacturing medical devices as well as those who are looking to venture into the industry. The question that remains is...

Are you ready to re-examine your options?

he COVID-19 pandemic has caused considerable disruption in the global supply chain, but it has also created an unprecedented increase in demand for medical devices. "There is a huge gap in the current demand and supply of medical devices in India and this provides a significant opportunity for manufacturing devices in India. At present, many medical device manufacturers (domestic and international) are chasing this massive under penetration of medical devices in India as a significant growth opportunity," reported the India Brand Equity Foundation (IBEF), a Trust established by the Department of Commerce, Ministry of Commerce and Industry, Government of India.

Healthcare and medical device sectors have witnessed substantial growth over the past decade. "India is among the top 20 markets for medical devices worldwide. The market is expected to increase at a 37% CAGR to reach US\$ 50 billion in 2025, from INR 75,611 crore (US\$ 10.36 billion) in 2020," added the report.

Technological advancements so far...

Change is the only constant! And this holds true for various industries across the spectrum. Technological advancements are transforming the way industries, including medical device manufacturing, operate. Medical device manufacturers across the globe have been regularly updating their designs and development processes to become more efficient and remain competitive. Let's take a look at some of the trends that are shaping the future of medical device manufacturing:

Additive Manufacturing or 3D Printing

Additive Manufacturing (AM) or 3D Printing is increasingly gaining popularity as an innovative advancement in medical devices manufacturing. It has found applicability in so many areas. For instance, 3D Printing can help in complex surgeries, as it can create 3D prototypes of a patient's affected part (such as ankles, teeth, etc.). This gives surgeons the opportunity to visualize the patient's treatment plan and practise on

In Focus



A 3D model of a spine/neck.

it rather than only relying on theory to do so. 3D Printing can also help create prosthetics with additional features at an affordable cost, making it a more significantly accessible option. Another wonder of 3D printing is bioprinting. With bioprinting, medical professionals can manufacture organic parts, such as bones, skin, and internal organs. Today, bioprinting is being looked at as a possible solution to meet the demands for organs' transplants, treating skin injuries, grafting skin and other cosmetic needs.

The medical world's relatively new entrant, 3D Printing, is set to make a significant impact. As the medical world battles newer challenges by the day, 3D Printing is increasingly being explored to overcome these challenges.



KUKA LBR Med Medical Robotics

High-intensity focused ultrasound surgery with robotics

HIFUSK from the Scuola Superiore St'Anna in Italy recently developed a non-invasive surgical procedure based on high-intensity focused ultrasound and the KUKA lightweight robot, LBR Med. In this way, previously unmet medical needs in the treatment of pathological tissues, such as cancer tissue, can be met, said a press release issued by KUKA Robotics.

This combination of a robot and non-invasive ultrasound enables precise surgical treatment without incisions, anesthesia, or ionization energy. Robotic control and machine learning ensure a safe procedure, even if target movements change during therapy.

"Robotics is playing an increasingly important role in medicine and offers a wide range of possibilities," said Dr. Kristina Wagner, Vice President KUKA Corporate Research. "Digitalization and automation can support and relieve the burden in the healthcare sector."

Rehab robot supports physiotherapists

A robot-based medical device, ROBERT, supports physiotherapists in their work. Technical assistants can be used, in particular, when people have to keep their distance from each other in order to prevent



The set-up takes a maximum of five minutes. Afterwards the patient trains independently. $\textcircled{\sc life}$ Science Robotics

the coronavirus from spreading. "The demand for our product has increased significantly because hospitals would like to reduce the direct physical contact to patients. With our solution, we want to help to mobilize patients faster and more efficiently, while relieving the burden on physiotherapists," says Keld Thorsen, CEO of Life Science Robotics, based in Aalborg, Denmark. This medical product, in which LSR integrates the lightweight robot LBR Med from KUKA, has also been FDA-cleared for sale in the USA since March 2020 by the U. S. Food and Drug Administration (FDA) authorities.

In Focus

Investments

To further incentivise investments in manufacturing medical devices, in May 2020, the government announced incentivisation plans of at least INR 3,420 crore (US\$ 4.9 billion) over a period of five years, and these funds will be offered to manufacturers only if they invest in set-ups to manufacture key medical devices. Some major investments and developments in medical devices are as follows:

- By 2022, the Gautam Budh Nagar, Noida, is expected to have Northern India's first medical tools and system manufacturing park. The park is likely to be developed in Sector 28 of the Yamuna Expressway Industrial Development Authority (YEIDA) Space by the Yamuna Expressway Authority. In March 2021, YEIDA is expected to introduce a mission scheme worth ~INR 5,000 crore (US\$ 685.35 million), of which INR 100 crore (US\$ 13.71 million) is likely to be funded by the central authorities.
- In February 2021, Punjab's Industry and Commerce Minister Mr. Sunder Sham Arora announced that a park for medical devices was proposed in Rajpura, Punjab, across an area of 210 acres, with an estimated project cost of ~INR 180 crore (US\$ 24.67 million).
- In January 2021, the Tamil Nadu government proposed to build a medical devices park (spanning 350 acres) near Oragadam in Kancheepuram district. The proposed cost for developing this project is INR 430 crore (US\$ 58.92 million).
- In March 2021, Transasia Bio-Medical Ltd., a Mumbai-based in-vitro diagnostic company, announced plans to invest INR 150 crore (US\$ 21 million) to set up a manufacturing unit at the Medical Devices Park in Sultanpur, Telangana. The company plans to manufacture state-of-the-art hightechnology analysers in the unit to address biochemistry, immunology, hematology, and molecular testing in addition to COVID-19, HIV, dengue, and TB testing for domestic and export markets.
- Japan-headquartered Omron Healthcare, which established its Indian arm in 2010, is drawing growth plans for India that may include setting up a manufacturing unit in India and expanding its retail footprint. By the end of 2021, the company plans to have 10 retail outlets in India and plans to create a centre in Warangal as part of its expansion into Southern India, where it anticipates a potential contribution of 40% of its sales in FY 2020. The company expects an INR 220 crore (US\$ 30 million) turnover in India during that period.
- New Delhi-based SS Innovations, promoted by renowned robotic cardiothoracic surgeon, Dr. Sudhir P. Srivastava, will commercially launch India's first and cheapest robot surgical system in the next 4-6 months. The company plans to manufacture 100 units in 2021 of its new 'Mantra' multi-arm surgical robotics system, which was indigenously developed over the last three years, and sell >1,000 units in the next five years.

Source: ibef.org

During the corona crisis, it is more important than ever to have enough qualified personnel and hospital beds available. "Basically, with ROBERT we are improving efficiency in the healthcare system," Thorsen points out and adds: "The longer a patient lies untrained in bed, the longer the rehabilitation takes and other complications such as muscle reductions and blood clots can occur." ROBERT works individually and flexibly and very precisely. It can perform exactly the same movements over and over again – without interruption, fatigue or time restrictions.

There are two possible ways to use ROBERT – either for active training or passive training if the patient is still too weak. As part of the active training the set up only takes a maximum of five minutes. After that, the patient can train on its own as long as it is recommended, including breaks. This relieves the physiotherapist, who gains time and can look after other patients. In addition, the patient can be mobilized more frequently, regardless of whether a therapist is currently not available or is not allowed to have intensive contact with patients.

Medical device software gets complex

Over time, the use of more advanced devices will gain prominence. The software used to operate these devices will also get complex. There's a possibility that the software could directly be implanted into the device itself rather than onto any network. Manufacturers of such devices will need to familiarize themselves with how such devices function and understand the software behind it.

Boost to domestic manufacturing

The medical devices sector in India suffers from a considerable cost of manufacturing disability vis-à-vis competing economies, *inter alia*, on account of lack of adequate infrastructure, domestic supply chain and logistics, high cost of finance, inadequate availability of power, limited design capabilities, low focus on research and development (R&D) and skill development, etc., informs a government press release issued in February this year. To boost medical devices manufacturing, the following policies have been proposed:

Production-Linked Incentive (PLI) Scheme for promotion of domestic manufacturing of medical devices

With an objective to boost domestic manufacturing, and attract large investment in the medical devices sector, the Department of Pharmaceuticals had launched a PLI Scheme for the Promotion of Domestic Manufacturing of Medical Devices to ensure a level playing field for domestic manufacturers of medical devices with a total financial outlay of INR 3,420 crore for the period 2020-

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In Focus

21 to 2027-28. Applications under four different target segments, including 'Cancer care/Radiotherapy Medical Devices', 'Radiology & Imaging Medical Devices (both ionizing & non-ionizing radiation products) and Nuclear Imaging Devices', 'Anaesthetics & Cardio-Respiratory Medical Devices including Catheters of Cardio-Respiratory Category & Renal Care Medical Devices', and 'All Implants including Implantable Electronic Devices' were invited.

According to the IBEF report, "The government also approved applications for nine eligible projects that are expected to lead to a total committed investment of ~Rs. 729.63 crore (US\$ 100.01 million) by the companies (e.g., Siemens Healthcare Private Limited, Allengers Medical Systems Limited (AMSL), Allengers OEM Private Limited (AOPL), Wipro GE Healthcare Private Limited, Nipro India Corporation Private Limited, Sahajanand Medical Technologies Private Limited, Innvolution Healthcare Private Limited, Integris Health Private Limited) and generate ~2,304 jobs."

>> Setting up of medical devices parks

The Union Cabinet chaired by Prime Minister Shri Narendra Modi last year approved the scheme on "the promotion of Medical Device Parks for financing Common Infrastructure Facilities in 4 Medical Device Parks with financial implications of INR 400 crore. Medical device is a growing sector and its potential for growth is the highest among all sectors in the healthcare market. It was valued at INR 50,026 crore for 2018-19 and is expected to reach to INR 86,840 crore by 2021-22. India depends on imports up to an extent of 85% of total domestic demand of medical devices. The scheme aims to promote medical device parks in the country in partnership with the states. A maximum grant-in-aid of INR 100 crore per park will be provided to the states", informed a government press release issued last year.

Department of Pharmaceuticals had in 2019 received four proposals under this sub-scheme from (i) Andhra Pradesh Medtech Zone Ltd. (AMTZ), Andhra Pradesh, (ii) Telangana Medical Device Park, Telangana (iii) Kerala State Industrial Development Corporation (KSIDC), Kerala & (iv) HLL, Medipark Ltd (HML), Tamil Nadu. The Department of Pharmaceuticals gave 'in-principle" approval to all these proposals.

Opportunities galore

According to the IBEF report, "India has a 75-80% import dependency on medical devices, with exports at INR 14,802 crore (US\$2.1 billion) in 2019 and is expected to increase at a CAGR of 29.7% to reach INR 70,490 crore (US\$10 billion) in 2025. To increase export of medical devices in the country, the Indian Ministry of Health and Family Welfare (MOHFW) and Central Drugs Standard Control Organisation (CDSCO) implemented the following initiatives: re-examination and implementation of Schedule MIII (a draft guidance on good manufacturing practices and facility requirements), system for export labelling, clinical evaluation and adverse reporting clarification, state licensing authority to extend free sales certificate validity from 2 years to 5 years to allow exports, create a list of manufacturers with export licensing for easy access by regulatory authorities worldwide."

The opportunities for manufacturers already in the medical device manufacturing industry as well as those looking to venture into it are immense. "I believe that we need to look at every crisis as an opportunity and implement a strategy to make the most of it. COVID-19 has provided a lot of profitable opportunities to the medical industry," said Kirit Chheda, VP – Sales & Marketing, TTB Tooling.

"Earlier, equipment such as PPE kits, face shields, and masks, among others, were imported by a few traders and distributed at a higher margin. As the input costs were higher and we were unable to compete with Chinese products in this field, very few manufacturers were interested in setting up units. But now, when manufacturers realised that the demand for these equipment is going to exceed supply, many have ventured into this business. Just like the others, we also decided to diversify into this lesser-known field. We started manufacturing face shields on a war footing and are providing them to various organisations and COVID-19 warriors—namely, the police department, medical staff, and institutions. Besides, we also bagged the opportunity to manufacture ventilator moulds. This how we are able to stay in business and generate enough cash flow to at least pay salaries of our employees," added Chheda.

Checklist for toolmakers

The medical devices industry has changed over the past few years. As the industry advances into the future, there is a notable shift in the requirement for "smarter" technologies. If toolmakers are eager to explore this industry, they need to focus on efficient manufacturing processes and equipping themselves with state-of-the-art infrastructure. They also need to acquire the necessary certifications to do so and familiarize themselves with the updated regulations and compliances. The medical devices industry will witness newer trends in the years to come. Toolmakers, who are keen to manufacture medical devices, will need to acknowledge these changes and understand them if they want to reap the benefits.

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'The long-term potential for tooling stays optimistic provided we make the right move'



Q What are the major findings of the Indian Tooling Industry Report? Could you highlight a few?

When we started out, our first target was to find out the market size. This was a challenge, as we had to start from scratch. Our research endeavors helped us arrive at a size of close to INR 18,000 crore.

We then went on to understand the type of demand witnessed by the Indian tooling market. That is when we realized that India imports about 30% of tools. Eventually, we reached out "Leaving aside the pandemic, I think we have been growing significantly as a country. The automotive sector, which is the main buyer of tools, is also growing. Yes, there has been a slowdown in various sectors, but the long-term growth story stays intact. This will lead to additional tooling requirements in the country and subsequently, the growth of various sectors in the country," **Ashim Sharma**, Partner & Group Head **Business Performance Improvement Consulting (Auto, Engg. & Logistics),** Nomura Research Institute, tells Nishant Kashyap.

to end users to understand their perspectives and expectations from toolmakers.

Some of the major highlights of the report are:

- The market size of the Indian tool room industry is estimated to be ~INR 18,000 crore with ~70% of demand being met domestically and ~30% through imports.
- In terms of value, tooling imports into India are ~5x tooling exports from India; China and Korea account for almost 40% of the total tooling imports into India.
- Plastic moulds is the biggest segment accounting for 42% of the total demand, followed by sheet metal dies at 37%.
- ➤ Automotive is the largest end user accounting for 60% of the total demand, followed by consumer durables at 16%.
- Q As per the tooling report, ~70% of the demand is being met domestically and ~30% via imports. What can Indian toolmakers do to reduce the imports?

A major find of this report is that we need to continuously improve in terms of both, capacity and capability, to bridge the gap. To achieve this, tooling localization is key here. To be more specific, I would say, investments on high rpm machines, 5-axis CNCs, high-speed cutting tools, etc., will be needed. From the software point of view, high-end design, programming, and simulation software are needed.

Apart from this, skill development is also a key factor. Upscaling the workforce and utilizing the resources is critical, as doing so can help win the trust of end users. The industry can come together and seek the help of subject matter experts, experienced tooling professionals; international tooling professionals could be roped in too. These measures will prove to be helpful in the long run.

Finally, and importantly, there's a need to collaborate and explore synergies in capacity augmentation and capability optimization. Toolmakers can come together and explore each other's strengths to enhance their capacity. This will help bring down the country's 30% imports.

What are the major expectations from the user industry with respect to the procurement of tools? Also, what are the key evaluation factors they take into consideration before finalizing on a tool room for their project?

First and foremost, it is fundamental that the tooling supplier meets the expected levels of quality, cost, and delivery. However, before deciding on a commercial tool procurement, there are a host of overarching parameters, which include:

- Identical production output throughout the tool's life.
- Tool designing capabilities, ability to incorporate small changes in designs and a low response time to the carry out the change request.
- Availability of experienced tool designers is also evaluated.
- They also look at the tool room's financial capabilities. So, working capital availability is also a key enabler in meeting some of the above requirements.
- Does the tool room possess the required infrastructure, i.e. sufficient tooling equipment and machines?
- Q The industry is currently facing many challenges with respect to the availability

of adequate finance and skilled manpower, lack of industry-friendly policies and export incentives. According to the report, what are the major challenges present in the Indian tooling industry?

I believe that there are multiple challenges out there. The first and most critical one is the inverted duty structure. The imported duty structure on some of the critical machines and materials is very high. And this, in some cases, has a detrimental impact on cost competitiveness of Indian tool rooms with respect to imports.

The second is the lack of a tooling cluster and subcontracting ecosystem in India. With no common engineering facilities for processes like heat treatment, cold forming, laser machining, etc., toolmakers need to invest in them, which means a higher capital investment, or rely on a third party to complete the job, which increases the lead time.

The third is dependency on imports for critical raw material. Tool steel is still not available in India and tooling companies must rely on imports with heavy duty.

Another aspect, which is also very important, is the high cost of financing. Tooling activity is highly capital-intensive and tool rooms need working capital. Most tool rooms fall under the MSME category and are unable to meet the regulatory requirements to secure loans. Also, the high interest rates of 10% to 15% for lending loans only adds an extra cost pressure on tool rooms.

The report also highlights benchmarking with some major tooling hubs such as China, Korea and Taiwan. What are the major differences between these countries? Also, what policies and government support do tool rooms in these countries enjoy that Indian players don't?

The governments of China, Korea and Taiwan offer a lot of support to their respective tooling industry. Toolmakers in these countries get the much-needed tax exemptions, and infrastructure support. Their governments also help them with product & service promotion, availability of subsidized land, workforce training, and setting up of common facilities to carry out certain operations, among others.

Talking country-specific, in the case of China,

the government provides export incentives, and tax support for small and medium-scale tool rooms. Toolmakers are taxed lower than standard enterprises. So, they get a preferential tax rate that way. The Chinese government also established a research centre way back in 1966, which focuses on high-level scientific research and technology transfer in the die and mould industry.

Korea focuses on low interest financing for small manufacturing firms, which include many tool rooms. So, low-cost loans are made available for technology acquisition and promotion. The state governments in Korea have also created tool clusters to establish an integrated mould production system, which covers processes right from the R&D stage to order receiving, processing, and delivery stages. Also, there are many tooling clusters in Gwangju Province, which have helped speed up the production process.

Taiwan considers its tooling industry as a strategic one. Tool rooms are given preferential, low interest rate on loans, about 1.75% or 2.75%, to purchase new machines or equipment.

Another major differentiating factor that I see is the presence of tooling clusters and subcontracting bases in countries like Taiwan and Korea, which have added significant value to the production process.

Q Most major auto manufacturing countries have a strong domestic tooling industry. India, however, is an exception. What do you think are the reasons for the same? How can India overcome this?

Products and processes such as 2k and 3k moulds, reflector tools, lighting moulds, multicavity tools, and parting line tools, are not widely available in India. Besides, the unavailability of critical tools like engine casting tools, and high-frequency castings ball bearings leave most toolmakers with no option but to rely on imports.

Also, high aesthetic parts like bumper tools, IP dashboard, and facia parts, which require specific texturing and smooth finishing, are mostly imported from overseas tool rooms. Higher lead time from the tool planning process to tool deliveries is another factor for which end users evaluate the global tool rooms because that significantly affects their time to market for the new vehicle. Also, stringent qualities are required for critical big parts and high-tensile parts that are sometimes not met in India.

Then, there is a major skill gap in Indian tool rooms as far as tool design capability is concerned. Therefore, there is a lower ability to quickly respond to a design change request.

These are some of the factors that prompt automotive OEMs to import tools. Indian companies are getting better day-by-day in these requirements. However, they still have a long way to go.

Q Electric Vehicles (EVs) are said to be the biggest game changers in the global automotive industry. In your opinion, how will the emergence of EVs impact the demand for tools in the automotive industry?

EVs are going to cause a huge disruption in the automotive industry. Categorically speaking, as far as, say, a car body is concerned, not much needs to be changed. But when talking about engine-related components, and casting areas, those will be affected to a large extent.

However, there's a bright side to this. With the emergence of EVs, the requirements for enginerelated components will go down, but the requirements for a new set of things will emerge. For instance, toolmakers will be able to avail of die & casting opportunities in structural and EV components. Besides, new avenues will open up in HPDC and LPDC, and parts like battery trey housing and electric trey housing, inverter housing, among others. Toolmakers need to keep these points in mind and prepare for the EV evolution accordingly.

Q What opportunities are in store for Indian toolmakers? What will drive the demand for tools in India?

Firstly, we are a fast-growing economy. I mean, leaving aside the pandemic, I think we have been growing significantly as a country. The automotive sector, which is the main buyer of tools, is also growing. Yes, there has been a slowdown in various sectors, but the longterm growth story stays intact. This will lead to additional tooling requirements in the country and subsequently, the growth of various sectors in the country. The long-term potential for tooling stays optimistic provided we make the right move.

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Until now, there were only talks about how the supply chains could be made more efficient, and more responsive. But during this pandemic, we have seen how important it is to have an efficient supply chain. Companies are now looking for more localized content, which will eventually help domestic suppliers.

Since the tooling industry is considered "the mother industry", anything that needs to be manufactured will need some sort of tooling work. It's not restricted to the automotive sector; I think a host of other sectors will also demand a good number of tools.

Q Apart from automotive, what are the other emerging sectors in India?

There are many sectors, but to highlight a few I would say medical, defence & aerospace, white goods, home appliances, construction equipment, and agricultural equipment.

Q After conducting a study on the Indian and global tooling industries, what are your

suggestions to Indian toolmakers?

My first suggestion would be that human capital is the most important. So, action must be taken to ensure that we can retain the resources we have, especially the critical resources on whom we spend a lot of time training.

Second is that we are stronger together, which means that if we are able to form some sort of consortium or alliance together, whereby we complement each other's strength, we can significantly enhance our strength and capacity.

Third is to bridge the technology gap. Where there is a technology gap, look at how we can collaborate internationally. We can look at various global tooling hubs, who are leading in technology. So, joining hands with them, we can certainly gain access to futuristic technologies.

Fourth would be to look at how we can strengthen the whole value chain. For example, we have some clusters and SEZs in Taiwan that help in speeding up the whole process. \approx



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Case Study

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ranial implants need to meet the most stringent of criteria, with a large number of factors coming into play. This was the case with a patient in Argentina, who required a particularly large implant after a stroke-related surgery. The project called for a level of design for all relevant factors that was as close to perfect as one can imagine: from the highest degree of precision and compatibility to the integration of biological functions. The 3D-printing service provider,

Alphaform AG, relied on EOS technology for the realization of this successful cranial implant, which was developed by partner firm, Novax DMA.

Challenge

If a person requires an implant in the skull area, then external factors should serve to aid rather than hinder the healing process. This is particularly true of the implant itself. The most important factor here is that it should have the most perfect fit possible

Case Study

- a classic requirement of applications from the field of Additive Manufacturing. The layering production process, which utilizes a laser to harden the material - in this case titanium - piece by piece, offers the maximum degree of individualization in terms of both form and size. The doctors provided the medical technology experts from Novax DMA and Alphaform with further challenges to meet along the way. High on the list, due to the size of the hole in the bone structure, was the integration of biological functions and the lowest possible degree of heat dissipation in the cerebral tissue. Titanium actually conforms quite well with the human body. Nonetheless, the danger exists that, being a metal, it will lead to too much heat being generated inside the body in the event of high exposure to sunshine. Another factor is that a titanium structure would, of course, not be permeable for tissue fluid from the brain.

In the requirement specification, the doctors also stipulated special post-manufacturing processes for the implant. Only controlled post-processing, particularly in terms of cleaning, would facilitate the utilization of the part in the medical sector. This is of vital importance because particles can separate from the body with the slightest movement, leading to the possibility of infections or of rejection. In addition, absolute sterility is a central criteria of a successful acceptance of the implant by the body.

Solution

Only a porous structure would be capable of meeting the required characteristics. A latticestructured implant with integrated screw-in fixings all the way to the skull would facilitate both the passage of fluids through it and its fusion with the bone tissue of the skull itself. What's more? Such a design would have an insulation effect such that the heat dissipation into the cranial cavity would be minimized. The dimensions of the pores themselves are approximately 1mm in size, while the cell-links are approximately 0.2mm thick.



The additive manufactured implant made of a biocompatible titanium alloy was placed in the skull of a patient in Argentina who required it after stroke-related surgery (courtesy of Novax DMA).

Daniel Fiz, CEO of Novax DMA, remembers it well. "Time played an important role in this context. Patients should anyway be receiving their implants as quickly as possible. Once we had the information regarding the dimensions, we began immediately with the construction." For the 3D design of the implant, they employed the software from the company, Within. "It allowed us not only to define the basic form quickly, but also the porous structure itself," explains Kaveh Mahdavi, Business Development at Within Ltd. As soon as the CAD work was completed, Alphaform took on the manufacture of the implant. For the actual production they used an EOSINT M 280 from EOS. The construction time was just a matter of hours.

"We had already successfully completed many products with the EOS system," says Christoph Erhardt, Director of Additive Manufacturing at Alphaform AG. "However, we are proud of this implant, not only because of the precise realization of the form, but above all because we were able to optimize the cleaning processes." Porous structures, in particular, with their small interior hollow spaces, are extremely hard to clean. The process is relatively sensitive. Basically, Alphaform applied a multi-step process of abrasive and mechanical cleaning, rinsing, and ultrasound in order to arrive at the medically required level of purity. The development of this process alone took six months.

We have been manufacturing medical implants since 1995. Additive Manufacturing represents a new milestone for patients. It offers optimal biomedical characteristics together with the highest levels of compatibility, thereby having a lasting effect on the improvement of quality of life. For these reasons, we have applied the technology with success to other areas of the body. Alphaform has also manufactured jaw implants for us, as well as a hip joint and a spinal implant. For spinal implants, we are currently considering a combined series production using Additive Manufacturing."

Daniel Fiz, CEO at Novax DMA

Case Study

For us, Additive Manufacturing and EOS amount to the same thing. Both ourselves, and our customers are continually amazed by the application possibilities and the high-quality production that can be achieved using the EOS systems. That was once again the case here. We were able to help a person to live a normal life – on an ongoing basis – despite them having suffered a very serious injury."

Christoph Erhardt, Director Additive Manufacturing at Alphaform AG

Results

The perfectly tailored implant meets the individual requirements of the specific clinical picture. The porosity level reached 95, which means liquids could flow through with the least possible resistance. In addition, the bone tissue was able to penetrate the outer edges of the implant and grow together with it. At the same time, the material is stable enough to return the patient to the desired level of normality in everyday life. The structure, constructed in the form of a regular lattice, also provided the desired level of thermal conductivity – so the patient can also enjoy time in the sun.

Time played the most critical role in the process. If time to market is a key strength of Additive Manufacturing

in the industrial context, then it is even more significant in the medical sector. The implant was in the operating theatre in just three weeks. The largest block of time was taken up in the transportation, which took a week. Preparation of the data, and then construction, were completed within just two-and-a-half days. The remaining time was split among the various processes in the areas of logistics and coordination.

The two companies were also able to verify the purity levels through comprehensive measurements. Christoph Erhardt and his team carried out extensive tests, including particle and cytotoxicity testing. They also undertook a gas-chromatography analysis. "All of the analyses have confirmed that the implant produced through Additive Manufacturing fulfilled the necessary requirements to stabilize and protect the patient's skull. The one-and-a-half-hour surgery took place in May 2014, and went on smoothly. The patient left the hospital after two days and the wound was healed within three weeks. Since then, there have been no complications," confirmed the expert. The innovative technology from EOS has contributed significantly to ensuring that those, who have suffered sickness or injury, are able to live their lives without limits. 🚧







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Machining Mantra

Logic with a Twist!

Torque is the measure of force that makes an object rotate along its axis. The right torque applied can help you reduce risk, improve productivity, and protect you from losses.



orce causes an object to move along a straight line. Similarly, when we consider an object, which rotates along its own axis, there is a force that causes this rotation. Torque is the measure of this force, which makes the object rotate along its axis. It can be defined as the rotational equivalent of linear force. In simple words, it refers to the tendency of an object to turn or twist along its axis when force is applied. It is measured in pound-feet (lb-ft) in the US and Newton Meters (Nm) in the rest of the world.

What role does torque play?

In metal cutting applications, the spindle of machines

(VMC, HMC, multi-axis machines, SPMs or turning centres) rotates along its axis and creates a torque. When a metal is cut, the cutting edge produces an equal and opposite force to resist the torque. If the cutting edge or the machine spindle cannot take the designated torque (due to several parameters like depth of cut, high feed value, etc.), the outcome could be disastrous.

Another area where torque plays a major role is in fastening. Fastening means assembling two or more parts together with the help of threads. While this looks simple and uncomplicated, one must note that fasteners should not be over tightened or

Machining Mantra



under tightened. Let's take a look at this example to understand why. On August 20, 2011, the US military lost a surveillance drone in Afghanistan. Subsequent investigation revealed that the crash was due to a loose screw. Because of the under-tightened screw, an electric cable got disconnected from the onboard computer, the drone lost contact with the base and crashed. A loose screw cost the US military USD 73 million.

It is quite natural to conclude that it is better to over tighten the fastener rather than under tighten it. This belief is prevalent while tightening the inserts of cutting tools. The operator tends to think that tighter screws imply better safety. So, he uses the screwdriver, which comes along with tool, and over tightens the insert screws.

In such a scenario, if you are lucky, you will end up with only damaged screwheads and increased screw consumption. But if you are not lucky, the over tightened screws can shear off, thereby releasing the inserts from the cutter while rotating. This will cause costly damage to the workpiece, fixture, and machine. Moreover, flying inserts could injure the operator or



even bystanders. Injury could probably be prevented in modern machines, which are provided with bullet-proof doors, but spare a thought for the machine spindle!

Why do over-tightened fasteners shear off?

While tightening, the torque applied creates tension on fasteners. This tension will lead to the generation of tensile forces, which will force the fastener to stretch. If this tendency to stretch is higher than the capability of the fastener, it will shear off in the assembled condition. Young's Modulus of Elasticity defines this phenomenon as, "a solid material will undergo elastic deformation when a load is applied to it".



A fastener is not just something that simply holds parts together. Fasteners have a complex combination of mechanical properties and design features, which enable them to function properly and safely. The type of head and thread, dimensions, material, and tightening requirements are to be carefully identified when deciding on the type of fastener required for that assembly. Determining how much torque is needed depends on many factors, but, most importantly, on material properties of the fastener and purpose of fastening. Fastening is not simple and uncomplicated.

Keep in mind...

An under-tightened fastener will not be able to provide the required clamping force and an over tightened fastener will break. Correct tightening is crucial for the safety and performance of an assembled part. Therefore, applying the correct torque is of utmost importance. Torque tools ensure that the amount of torque applied is correct and safe. DR. TORQUE administers remedial solutions for right fastening with right torque tools. ~

Article courtesy: Stitch Overseas Pvt Ltd

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Techno Focus

3D future of medical equipment

3D printing has carved a niche for itself in several industries. But the advances in 3D printing in the medical domain are garnering attention because of its potential to enhance the treatment options for patients. **Objectify Technologies Pvt. Ltd.**, a New Delhi-based Additive Manufacturing/3D printing solutions provider, explains the benefits of going 3D and tells you why it's here to stay.



3D Printed Dental Implant

hree-dimensional (3D) printing or 'Additive Manufacturing' (AM) refers to the process of manufacturing objects from a digital file. A 3D-printed object is created using an 'additive' process during which the material is successively spread to form layers until the object is fully formed. Each coating can be viewed as a thinly sliced horizontal cross-section part of the last object.

3D printing is the opposite of the 'Subtractive Manufacturing', which is nothing but cutting or hollowing a piece of metal or any plastic, with the help of a suitable milling machine.

Techno Focus

It enables one to produce highly complex shapes using little material, as compared to traditional manufacturing methods.

Applicability

3D printing technology has been successfully implemented in various domains such as aviation, automotive, construction, etc., but its application in the medical domain has been phenomenal. Let's take an in-depth look at the wonders of 3D printing in the medical domain.

The flexibility and durability of the 3D printing process allow designers to make quick and crucial changes in a hassle-free way without the need for setting up any kind of additional equipment or tools. It also enables 3D manufacturers to create equipment matching the anatomy of a patient (who needs specific devices), or equipment with very complex internal structures, which are hard to design manually.

These capabilities have sparked a massive interest in 3D printing of medical devices and other products, including food, household items, and automotive parts as well. Some of the medical equipment and implants produced by 3D printing include orthopedic and cranial implants, surgical equipment, dental restorations such as crowns, and external prosthetics.

Due to its versatility, the 3D printing process has vast medical applications in the fields mentioned below:

- Medical devices regulated by FDA's Center for Devices and Radiological Health,
- Biologics regulated by FDA's Center for Biologics Evaluation and Research, and
- Drugs regulated by FDA's Center for Drug Evaluation and Research.

Medical equipment and implants' manufacturers should always refer to the FDA guidance documents and quality systems' regulations for more information on specific applications in the medical field.

Design

The 3D printing process is used to manufacture a variety of durable and versatile medical devices. Some of these include devices with complex geometry or tedious features and functions to match a patient's unique anatomy. Accuracy of these devices can ensure that the patient leads a comfortable life.

There are two ways to design 3D-printed equipment in the medical domain. In the first method, multiple identical copies of an equipment are printed from a standard, and popular design. In the second method, patient-matched or patient-specific equipment are created from a specific patient's imaging data that will meet the patient's particular requirements.

Commercially and quickly available 3D-printed medical devices generally include:

- Instrumentation (e.g., guides to assist with the proper surgical placement of any equipment),
- >> Implants (such as cranial plates or hip joints), and
- >> External prosthesis (e.g., hands).

Scientists are performing R&D on how to successfully use the 3D printing process to manufacture living human organs, such as a heart or liver. This research is currently in the primary stages of development.

Implementation

The 3D printing process can be implemented using any cutting-edge or top-notch technologies. Selecting the appropriate technique can depend on many factors, including how the final product will be used, in which domain it will be used, and how easily the 3D printer can be used.

Powder-bed fusion

The most common technique used for 3D printing medical equipment is called 'powder bed fusion'. Powder bed fusion is generally used because it works with a variety of manufacturing materials used in medical equipment, such as titanium and nylon.

The powder bed fusion process builds a 3D product from excellent metal or plastic powder. First, this powder is poured onto a platform and leveled carefully. A laser or electron beam is then



3D Printed Ankle Bone Implant

Techno Focus

moved across the powder layer and starts melting the material it touches. The melted plastic is then fused to the layer below it and to the powder around it to create a solid substance. Once a layer is completed, the platform is moved down, and one more layer of carefully leveled powder is placed on top of it.

The FDA owns several 3D printers that help us better recognize the capabilities of 3D printing of medical equipment and the public health benefit of this technique. For example, the FDA has printers that use different printing techniques, including powder bed fusion, to evaluate what parts of the 3D printing processes and workflows are critical to ensure the quality of the finished medical equipment.

The challenge

Now, let us see a case study that shows how Objectify Technologies from Delhi created a DMLS Titanium Calcaneus Implant for a patient who was suffering from bone cancer.

Doctors from Maulana Azad Medical College in New Delhi urgently required a heel bone implant for a patient, failing which the patient would have to face amputation. The condition was needed to be met soon, and the patient's relatives and the patient himself wanted to avoid amputation at any cost. The timeline was crunched to one week.

The solution

Objectify Technologies made it happen within the timeframe in the following way:

With the help of the CAD file of the ankle obtained through a CT scan of the patient, Objectify Technologies started working on the customized 3D model of the bone implant. Metal additive manufacturing was used to meet the requirement successfully.

Using Polymer-based 3D printing technology (SLS – Selective Laser Sintering), the Objectify Technologies' team created an effective mockup implant for testing. It was tested successfully, and then, the end implant was manufactured and handed over to doctors to help them save the patient's foot.

3D future

3D printing is here to stay. The benefits it can offer the medical domain are numerous. Thanks to this continuously evolving technology, the medical domain can provide the much-needed relief to patients from critical illnesses. Firms, such as Objectify Technologies, are marking their footprints in this field to become pioneers and guide others to revolutionize this technology. ~

Indian Tool Room Industry Analysis January 2020

TAGMA and Nomura Research Institute Consulting & Solutions conducted a Market Study on Indian Tool Room Industry covering all user segments and understand current market and its evolution over the next 5 years

- Global Tooling Industry Snapshot
- Indian Tool Room Survey Approach and Methodology
- Survey Results Major Highlights
- Total Tooling Demand in India and Share of Different Sources
- Demand and Supply Split by Tool Type and End Users
- Sectoral Insights
- Tooling Market Trends Demand Side
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- Taiwanese Tooling Industry
- Government Initiatives for Tooling Industry
- Future Expectations on Tooling Demand
- Key Imperatives for Ecosystem Stakeholders





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Tech Know-how

Disinfection robot:

Value created by linking up to building data

The disinfection robot BALTO — named after a sled dog who carried urgently needed vaccines to a highly inaccessible region of Alaska a hundred years ago — is capable of disinfecting doorknobs and similar objects. It does this autonomously, reacting to human beings in the surrounding area at the same time. An interface with the Building Information Modeling process makes this possible.



A disinfection robot demonstrator in use at NOI Techpark in Bozen.

ever before has hygiene attracted so much attention — it is, after all, one of the weapons society is deploying in its effort to survive the coronavirus pandemic. BALTO, the disinfection robot of the Fraunhofer Italia Innovation Engineering Center in Bozen and the Fraunhofer Institute for Industrial Engineering IAO in Stuttgart, developed as part of the Fraunhofer in-house program to combat coronavirus, is addressing this very issue: As one of many modules, its job is to help contain the pandemic and do its very best to avoid others in the future. "BALTO is capable of autonomously disinfecting doorknobs and other areas that a large number of people touch

on a very regular basis. This is a way of reducing the risk for visitors, as well as the risk for those people who have the job of disinfecting," says Dr.-Ing. Michael Riedl, Deputy Director of the Fraunhofer Italia Innovation Engineering Center. However, this robot's distinctive feature is not its ability to disinfect per se — other disinfection robots can of course do this as well — but rather its direct link with the Building Information Modeling (BIM) process. The BIM models store not only the building geometries, but also all fundamental component attributes such as function or materials. The technology can detect and precisely localize even doorknobs, for example.

Tech Know-how

Precise, reliable, and highly automated disinfection

To do its job, the robot needs the relevant building data. It does not make any sense for the robot to create its own building map: This would require not only the BIM data to be regularly updated, but the robot's data too. The system would be more expensive, trickier to operate and more error-prone. "We have therefore created, on the basis of the open Robot Operating System (ROS), an interface via which the robot can talk directly to the BIM," explains Riedl. This tells BALTO not only where doors, for example, are located in the building, but also which of these doors are frequently used and from which material the doorknobs are made. It can then adapt its disinfection program accordingly. If construction work is blocking access to a particular corridor, BALTO will know this from the BIM and can use the information in its navigation planning. The interface to the BIM is also important for the human-robot interaction. BALTO is designed to sidestep if it encounters one or more people. If this is not possible, the robot stops. But there might be a problem if it stopped in an emergency exit, of all places, and caused an obstruction. Because, however, even the emergency exit pathway is logged in the BIM data, such situations can be avoided via the interface. This interface to the BIM is not unilateral, the traffic is two-way. This allows the robot to coordinate its disinfectant tasks with other BALTO colleagues and report the shared jobs back to the system once completed.

BALTO plans its route by itself

BALTO also scores points when it comes to planning the disinfection routines: "We don't have to feed the robot with coordinates, we can tell it to disinfect an entire class of objects," says Günter Wenzel, Head of Department at Fraunhofer IAO. Instead of having to state the locations of each doorknob to be disinfected, we can give a general instruction like: Disinfect all frequently used doorknobs at X minute intervals. An additional interface, to the digital twin of a building for instance, would open the door for scenarios such as: According to the room planning file, a meeting will be held in this room at the following time. Please do not disinfect in this room during this time. BALTO uses data like this to plan its disinfection routine by itself — starting with the question of which routes are the best ones to choose through to the optimum disinfectant for the materials to be treated.

At NOI Techpark in Bozen, home to both companies and research institutes alike and hence, a place where people constantly come and go, already has three BALTO demonstrators in use. For the time



BALTO planning its disinfection tasks by itself.

being, still permanently monitored by the research team. Another system is in use in the Future Work Lab of Fraunhofer IAO — a combination of production environment and exhibition space — and in the Center for Virtual Engineering ZVE.

Numerous other conceivable applications

BALTO is by no means limited to disinfection. The robot is able to combine disinfection with cleaning routines and will, over the longer term, be able to handle even monitoring and maintenance activities. Meaning: Users will be able to cover a range of tasks using robot systems linked to BIM. The researchers are now collaborating with companies from the disinfection sector to examine which steps need to be accomplished before the industrialization stage is reached. \approx

Article courtesy: Fraunhofer-Gesellschaft

Manufacturing industry loses two pioneers

'Life well lived' is the thought that comes to mind when one remembers the significant contributions of Mr. S.R. Pophale, Founder, Electronica Group, and Mr. Ramesh Suri, Co-Founder, Subros Ltd. They were brave, followed their instincts, and made their dreams come true. Their lifetime was defined by inspiring many entrepreneurs and teaching by example. TAGMA Times pays tribute to these two great visionaries.



Mr. S. R. Pophale, Founder, Electronica Group

In life, we may come across great people, who can see endless possibilities. But encountering those who dare to execute their vision is rare. Mr. S. R. Pophale, the Founder of Electronica Group, who paved the way for EDM technology and machine finance in India, was one such individual.

Mr. Pophale's contribution to the machine tools and tungsten carbide industries has been invaluable. He was a pioneer in developing a range of indigenously manufactured Electric Discharge Machines (EDM) and CNC Wire Cut EDM Machines marketed under the brand, Electronica. These products were import substitutes.

By supplying thousands of EDM machines, metal cutting and metal forming machines

through Electronica HiTech, Mr. Pophale's contributions to the die & mould, tool room and Indian engineering industries has been nothing short of significant.

Mr. Pophale was known for his tremendous passion for life, innovative ground-breaking ideas, profound wisdom, and infectious optimism. He inspired thousands of people. He was indeed a unique blend of philanthropy, spirituality, and philosophy. He has set an example for many entrepreneurs and proved that one can succeed without compromising on one's ethics and values. His work and life were driven by the joy of working, going beyond the blind pursuit of money. He will be remembered fondly by everyone, whose life he has inspired. \approx



Mr. Ramesh Suri, Co-Founder, Subros Ltd.

Mr. Ramesh Suri, chief mentor, guide, and co-founder of Subros Ltd., India's largest manufacturer of automotive airconditioning and thermal products, passed away recently. He was 82 years.

As one of the few doyens of the Indian automotive component industry, Mr. Suri witnessed the evolution of the Indian vehicle manufacturing industry over the last five decades.

He co-founded Subros Ltd. with his brother, late Mr. Lalit Suri, in 1985, as a joint venture company with Denso Corporation, Japan, and Suzuki Motor Corporation, Japan. He not only created India's largest automotive air conditioning manufacturing company, but also owned one of the largest Maruti Suzuki dealerships in the country.

In over 50 years of serving the automotive industry, his contribution remains invaluable. He served the industry as the Chairman of the Automotive Component Manufacturers Association (ACMA) and Vice Chairman, CII, Uttar Pradesh State Council. He has been a guide and mentor for the industry at large. \approx



New Members

MSME Tool Rooms joins TAGMA Membership

We are glad to welcome, 22 MSME Tool Rooms, set up by Ministry of MSME, Govt. of India as member of TAGMA India. TAGMA India provides various benefits to its members that includes TAGMA TIMES monthly Newsletter; Bi-annual DMI Directory for all members; special rates for TAGMA members participating in Exhibition, conference and Seminar organised by TAGMA; participation thru TAGMA in various overseas exhibition; networking platform for interaction with industry; exclusive NTTF-TAGMA Library Section; among others.

Commenting on the development, Mr DM Sheregar, President, TAGMA India said, "We welcome the MSME Tool Rooms and look forward to closely working with them. We would like to leverage each-others platform and capabilities for betterment of the industry."

List of the Tool Rooms are:

CENTRAL TOOL ROOM & TRAINING CENTRE - Bhubaneswar

Address: B-36, Chandaka Industrial Area, PO-KIIT (SO), Bhubaneswar - 751024, Odisha.

Contact Person: Mr. Lingam Rajasekhar - General Manager / Sri Ambuj Ballav Nayak - Divisional Head (M&C) Contact Number: 0674-3011701 Email Id: cttc@cttc.gov.in Website: www.cttc.gov.in Activities: The MSME / Technology **Development Centre Specializes in:** 1- High End tool Mfg such as Press Tool, Plastic Tool, Moulds, Die Casting Die, Jig & Fixtures. 2- High end precision manufacturing of components for the Automobile sector, Engineering and Aerospace industries. 3- Additive manufacturing /Rapid Prototyping solutions for automotive sector, engineering and Aerospace sector. 4- Common facility for testing in the field of electrical/electronics, Mechnical system including vacuum heat treatent. 5-Consultancy services to the MSME sector for quality and productivity improvement

CENTRAL INSTITUTE OF HAND TOOLS - Jalandhar

Address: G.T. Road, Road, Bye-Pass, Opp Bhagat Singh Colony, Jalandhar - 144008, Punjab

Contact Person: Mr. Sarabjit Singh -Principal Director/ Mr. Amit Kumar - Dy Director (Prod)

Contact Number: 0181-2290196/ 2290226

Email Id: cihtjld@gmail.com;info@ciht.in Website: www.ciht.in Activities: 1-Design of Tools for the industries and Prototype development. 2-Common facility services for forging, dies tools, jigs & Fixtures, gauges etc. 3-Trained Personnel for the industry to adopt improved technology in product design, production technologies, testing & quality control techniques, Packing & Product Development. 4-Consultancy Services leading to setting up of turnkey projects. 5-Assistance to the small and medium scale industries in the design and development, manufacture of dies, Heat treatment of tooling for Hand tool.

CENTRAL TOOL ROOM & TRAINING CENTRE - Kolkata

Address: Government of India Society, Ministry of MSME, Bon Hooghly Industrial Area, kolkata- 700108, West Bengal

Contact Person: Shri Debdutta Guha - General Manager / Mr. A.K.Samanta -Sr. Manager

Contact Number: 033-25780001 **Email Id:** cttc-msme@gov.in **Website:** www.msmetoolroomkolkata.com **Activities:** We design & Manufacture all types of Production tools. We also do critical component manufacturing.

The Government of India, particularly with the objective of helping SMEs has established Tool Rooms in various part of the country. These Tool Rooms provide invaluable service to the Indian industry by way of precision tooling and providing skilled manpower in the area of the tool and die making. The setting up of these Tool Rooms led to the dawn of a new era in the field of tooling and co-related activities in India. Today these Tool Rooms are highly proficient in mould and die making technology and promote precision and guality in development and manufacture of sophisticated moulds, dies and tools. Each Tool Room has achieved apex position in its respective region. Not only are the Tool Rooms equipped with the best technology, they are also abreast with the latest advancements in the field and periodically add new technology like CAD/ CAM, CNC machining for Tooling, Vacuum Heat Treatment, Rapid Prototyping, etc.

CENTRAL TOOL ROOM - Ludhiana

Address: House No 3250, CTR Housing complex, Urban estate, Phase - II, Dugri, Ludhiana - 141010, Punjab Contact Person: Mr. A P Sharma -General Manager / Mr. Sharn Pal Singh - Manager Production

Contact Number: 0161-2670057 **Email Id:** info@ctrludhiana.org **Website:** www.ctrludhiana.org **Activities:** Education and training to candiates in Tool & Die technology, Mechatronics, CAD / CAM / CAE, Development & manufacturing of press tools, injection mould , Pressure diecasting dies, jigs & Fixtures machine components. Testing of materials & Heat treatment & rapid prototyping.

ELECTRONICS SERVICE AND TRAINING CENTRE

Address: Kaniya, Ramnagar, Nainital - 244715, Uttrakhand Contact Person: Mr. Sanjeev Kumar Chetti Contact Number: 05947-251201 Email Id: pd-estc@estcindia.com Website: www.estcindia.com Activities: Training and technical services mostly related to Mechanical area. Also Printed circuit Board, others

INSTITUTE OF DESIGN OF ELECTRICAL MEASURING INSTRUMENTS (IDEMI)

Address: Swatantrayveer Tatye Tope Marg,Near Eastern Express Highway, Sion

New Members

PO, Chunabhatti (East),

Mumbai - 400 022, Maharashtra **Contact Person:** Mr. Pradeep Gujarathi-Principal Director (I/C)/ Mr. Hrishikesh Deshpande - Assistant Director Tool Room

Contact Number: 022-24050 301/2/3/4 **Email Id:** pd@idemi.org; toolroom@idemi.org **Website:** www.idemi.org, www.msmetdemumbai.org **Activities:** Design, Reverse Engineering & Manufacturing of Press tool, Moulds & Pressures die casting die, Manufacturing of Precision Aerospace components. Calibration & Testing as per ISO/IEC 17025:2017. Skill development training on die design, Manufacturing and Maintenance.

INDO GERMAN TOOL ROOM-Aurangabad

Address: P-31, MIDC, Chikalthana Indl. Area, Aurangabad - 431 006, Maharashtra Contact Person: Mr. H. D Kapse -Managing Director Contact Number: 0240-2482593 / 2470541 Email Id: gm@igtr-aur.org Website: www.igtr-aur.org

Activities: "Design & manufacturing of Press Tools, Mould, Die Casting Dies, Jigs & Fixtures, Gauges etc. & machining of critical / highly precision components, providing job work services in the areas of 3D Scanning, Reverse Engineering, Simulation, Product Development, Additive manufacturing of parts in Plastic & Metal and Imparting training in Tool & Die Technology, CAD/ CAM/CAE etc."

INDO DANISH TOOL ROOM -Jamshedpur

Address: M-4 (PART), Phase - VI, TATA Kandra Main Road, Gamhria, Jamshedpur- 832108, Jharkhand Contact Person: Shri Anand Dayal -Managing Director / Shri P Swain -Sr. Manager (Prod) Contact Number: 0657-2201261/ 1262 Email Id: reach@idtr.gov.in Website: www.idtr.gov.in Activities: Design, Development and manufacturing of Press Tool, Mould, Die Casting Die, Jigs & Fixtures, Precision Machining, Diploma in Tool & Die making, PROD ENGG, ITT, NSQF etc

INDO GERMAN TOOL ROOM -Ahmedabad

Address: Plot No 5003, Phase IV, GIDC Vatva, Mehmedabad Road, Ahmedabad - 382445, Gujarat Contact Person: Mr. Indrakumar Hariramani / Mr. Vishal Kumar - Sr. Manager (TRG) Contact Number: 079-25840966 Email Id: gm@igtrahd.com Website: www.igtrabd.com Activities: Tool & Die Making, 3D Printing, Precision Moulds, Consultancy, Education & Training

MSME TECHNOLOGY CENTRE - Baddi

Address: Hadbadt No.214, village Bhatolikalan,PO & Tehsil Baddi, district solan, Baddi - 173205 Himachal Pradesh Contact Person: Mr. Amit Kumar Singh - Senior Manager / Mr. Gaurav Chittal -Senior Engineer

Email Id: tcbaddi@dcmsme.gov.in **Activities:** Training, Production, New Product Development, Prototype making, Product Designing, Tool & Die Design & Manufacturing, Consultancy (Technical Support)

MSME TECHNOLOGY CENTRE -Bhiwadi

Address: Plot No SP3-871(A), 872, RIICO Industrial Estate, Pathredi, Dist - Alwar, Rajasthan, Bhiwadi - 301019, Rajasthan Contact Person: Mr.Sumit Jain - Dy General Manager/ Mr. Rakesh Pati -Sr. Manager

Contact Number: 0149-3242100 **Email Id:** dgm-tcbhiwadi@dcmsme.gov.in **Website:** www.msmetcbhiwadi.org **Activities:** Design & Manufacturing of Precision Dies & Tools, Moulds, Jigs & Fixture, Gauges etc. Precision Machining and Heat Treatment, Long/Medium/Short Term Courses in Tool & Die Technology

MSMETECHNOLOGY CENTRE - Bhopal

Address: Plot No 259/2, 261, 267/2/1, Industrial Area, Special Education Zone, Acharpura, Bhopal - 462038, Madhya Pradesh

Contact Person: Mr. Ranjan Choudhary -Deputy General Manager Contact Number: 9561114806 Email Id: dgmtcbhopal@gmail.com Website: www.msmetcbhopal.org Activities: Training & Skill development, Manufacturing of Press Tool, Die casting die molds, Jig & Fixtures components as per requirements, Providing Consultancy for Product development and quality improvement

MSME TECHNOLOGY CENTRE - Durg

Address: Plot -2D, Sector B, Bori Industrial Growth Centre at Rasmada, Dist- Durg - 491001, Chhattisgarh Contact Person: Mr. R. K. Tandekar -Deputy General Manager/ Mr. Jajati Keshari Mohanty - Sr. Manager Training Contact Number: 0788-2617200 Email Id: msmetcdurg@gmail.com Website: www.msmetcdurg.org Activities: 1-Design & Manufacturing of Toolings, (Die, Moulds, Jigs & Fixtures) and Machining pof Precision components of Engg Automotive & Defence sector. 2-Skill Development training. 3- Technical & Business consultancy/ Advisor

MSME TECHNOLOGY CENTRE -Greater Noida

Address: Plot No 3, Eco Tech -VIII, Greater Noida Industrial Development Area, Dist - Gautam Budha Nagar, Greater Noida -201306, Uttar Pradesh Contact Person: Mr. Surendra Kumar Porwal - DGM

Contact Number: 8511193477 **Email Id:** s.k.porwal@gov.in **Activities:** Training, Testing & Calibration, Production related to ESDM Sector

MSME TOOL ROOM, CENTRAL INSTITUTE OF TOOL DESIGN

Address: A1 - A8, Apie, Narsapur X Roads, Balanagar, Hyderabad - 500 037, Telangana

Contact Person: Mr. Prabhu H S -Principal Director/ Mr. R K Pavithra Kumar - Director & Sec. I/C Contact Number: 040-23774536 Email Id: pd@citdindia.org Website: www.citdindia.org Activities: Our main activities are short and long term courses on CAD/CAM, Tool Design, VLSI/ Embedded Systems with state of art tool room to execute and design all Press Tools, Dies, Jigs & Fixtures and Metrology Services

MSME TECHNOLOGY CENTRE -Puducherry

Address: 21-Pillaichavady Revenue Gaon, Oulgaret Taluk at RS. No. 170/2 pt, situated inside IT park at Pillaichavady, Kalapet, Puducherry - 605014, Tamil Nadu Contact Person: Mr. Amit Nain - DGM **Contact Number:** 0413-2971085 **Email Id:** dgm-msmetc.py@dcmsme.gov.in **Website:** www.msmetcpudcherry.org **Activities:** Manufacturing, Testing and calibration of electrical products, Production of Die and moulds for MSMEs, Product Prototyping for MSME and OEMS

MSME TECHNOLOGY CENTRE -Sitarganj

Address: Plot No 12, Sector 3, Phase 2, IIE, Sidcul Sitarganj, U. S. Nagar, Sitarganj - 262405, Uttarakhand Contact Person: Mr. Sanjeev Kumar

Chetti Contact Number: 9559786600 Email Id: pdtcsitarganj@gmail.com Website: www.msmetcsitarganj.com Activities: Training and technical services mostly related to Mechanical area.

MSME TECHNOLOGY CENTRE (Indo German Tool Room, Indore)

Address: 291/B-302A, Sector E, Industrial Area, Sanwer Road, Indore -452015, Madhya Pradesh Contact Person: Mr. R Panneerselvam-General Manager Contact Number: 0731-4210703 Email Id: patogm@igtr-indore.com Website: www.igtr-indore.com **Activities:** Design and manufacturing of precision press tools, Injection & blow mould, jig & Fixtures.

MSME TECHNOLOGY CENTRE-Rohtak

Address: Plot No 10 & 11 , Sector 30B, IMT, Rohtak, Haryana - 124021 Contact Person: Mr. Ashwani Kant -DGM / Mr. Naresh Kumr Jain - Senior Manager Training Email Id: dgm-tcrohtak@dcmsme.gov.in Website: www.msmetcrohtak.org Activities: Training of candidates in Tool & Die technology, Mechatronics, CAD/ CAM/CAE. Development of Tool, Die jigs & Fixtures. Consultancy to MSME

MSME TECHNOLOGY CENTRE -Visakhapatnam

Address: Plot No 6, Industrial Corridor-Pudi, Near APSEZ, Achutapuram visakhapatnam, Visakhapatnam -531011 Andhra Pradesh

Contact Person: Mr. Prasada Reddy Gujju - Deputy General Manager/ Dr. T Vijay Krishnakanth - Sr. Manager **Contact Number:** 9552759848 / 08924-282601

Email Id: dgm.tcpudi@gmail.com **Website:** www.msmetcvizag.org **Activities:** Marketing & Consultancy services, Training, Production

MSME - TECHNOLOGY CENTRE -

New Members

Kanpur Address: Atherton Mill, Fazulganj Industrial Area, Kanpur - 208012,

Uttar Pradesh **Contact Person:** Shri Anand Dayal -Managing Director / Shri P Swain - Sr. Manager (Prod) **Contact Number:** 8709478033 **Email Id:** reach@idtr.gov.in **Website:** www.idtr.gov.in **Activities:** Design, Development and Manufacturing of Press Tool, Moulds, Jig & Fixtures, Die casting Die, Precision Machining, Diploma Training, ITI, NSQF & other etc

TOOL ROOM & TRAINING CENTRE, Guwahati

Address: Amingaon Industrial Area, North Guwahati Road, Amingaon, Guwahati - 781031, Assam

Contact Person: Shri Kajal Kumar Saha - Project Manager / Shri Arindam Saha -Deputy Manager

Contact Number: 0361 2670907 Email Id: tcguwahati@dcmsme.gov.in Website: www.trtcguwahati.org Activities: Training, Manufacturing of Tools, Dies, Moulds, Jigs, Fixtures, Precession Components and Consultancy

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Contact Details:

S.No. 173-B, Hissa. No.12,14,15, Village – Chandrapada, Naigaon–East, Taluka: Vasai, District – Palghar Vasai - 401207. Maharashtra **Contact Person:** Mr. Abhijeet Raut - Director /

Mr. Amit Mandve - Sr. Manager - Business Dev. Tel: +91-9136993791 / 92 / 93 / 94 / +91-9820555471 / +91-9702293111 Email: abhijeet@abhijeetplastics.co.in / amit.mandve@abhijeetplastics.co.in

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Contact Details:

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Bal Vinayak Compound, Gamdevi Road, B/H TATA Power House, Govind Nagar, Bhandup West, Mumbai - 400078 Maharashtra Contact Person: Mr.Kamlesh Vadgama- Proprietor Tel: 02225960339 Email: ky@encotools.in Website: www.encotools.in

Activities: Channel Partners / Distributor of Mitsubishi Tools, Emuge-Franken Tools, KTA- CNC tool Holding Systems, Quaker Houghtoncutting oil, cleaners, rust preventives, Micro-Flat Datums - Inspection Equipments, Special tailor made solid carbide and index able tools

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E-Wing Shed No 1, 128/3, Sanghvi Compound, Pune - 411019 Maharashtra Contact Person: MR.R Balaji - Director / Mr.Hemadri Tenneti- Sales Director Tel: 9850813906 Email: hotmoldeng@gmail.com Website: www.hotmold.co.kr Product: HotMOLD Engineering co has been established in 1999 as a professional Hot Runner design manufacturing company, based on 25 years of Mold & Hot Runner manufacturing technology. In 2010 establishment in India

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