

TAGMA TIMES

NEWSLETTER

(Technical Info. on Die, Moulds & Toolroom)

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March 2023



AEROSPACE AND DEFENCE:

FLYING HIGH

FACILITY VISIT:

Lucchini RS:
Forging ahead

TOOLTALK:

Anand Wankhede,
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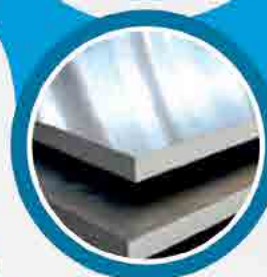
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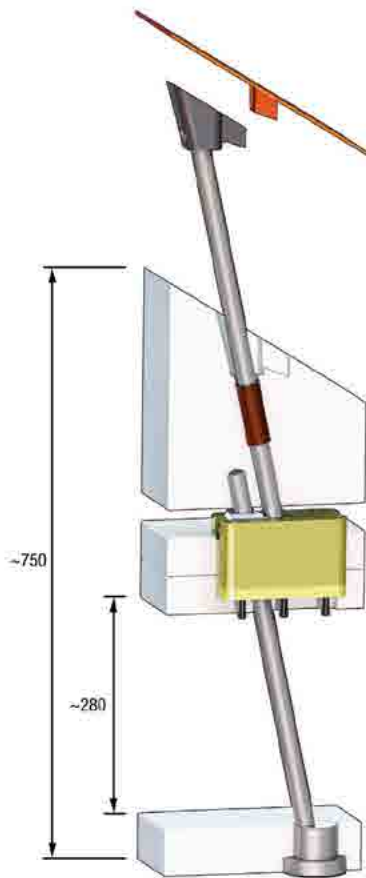
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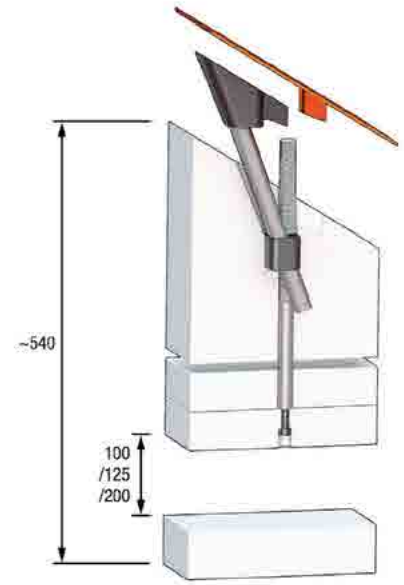
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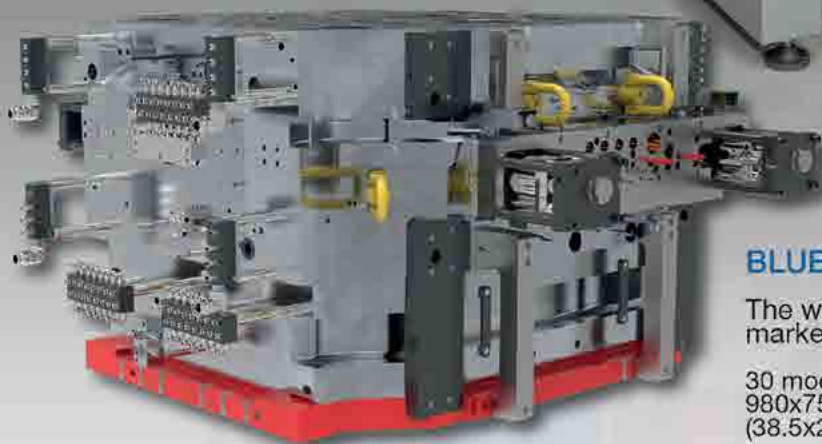
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The Indian aerospace and defence (A&D) industry has been witnessing unprecedented growth in recent years. It is projected to reach ~US\$ 70 billion by 2030, driven by the burgeoning demand for advanced infrastructure and government thrust. The government's initiatives like 'Make in India', 'Aatmanirbhar Bharat', and Defence Production and Export Promotion Policy are expected to fuel the growth further.

The Indian aerospace and defence (A&D) industry is highly dependent on tooling solutions for manufacturing critical components and systems. Toolmakers are responsible for designing, manufacturing, and maintaining various tools, jigs, fixtures, and dies used in the production process. They play a crucial role in ensuring the quality, precision, and efficiency of the manufacturing process. And, as the A&D industry continues to expand, it presents numerous opportunities for toolmakers to cater to the growing demand for tooling solutions.

However, to tap into this growing opportunity, toolmakers need to upskill themselves and upgrade their infrastructure. Toolmakers need to use the latest technologies and processes to cater to the high level of precision and quality that the aerospace and defence industry demands. Moreover, the industry is constantly evolving, which makes it mandatory for toolmakers to keep up with the latest trends & developments as well as focus on R&D to stay relevant. Following these pointers can help toolmakers play a crucial role in the industry's growth and contribute to the country's self-reliance goals.

The March issue of TAGMA Times highlights the opportunities in the domestic aerospace and defence industry. Read the 'In Focus' and 'Event Report' sections to know more. We also extended our scope of coverage and explored a steel manufacturing Group on international shores – the Lucchini RS factory based in Lovere, Italy. Read the 'Facility Visit' section to know all about how Lucchini RS, one of the world's largest tool steel maker, produces its high-end tool steel.

Happy Reading!





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ABB to invest INR 1,000 crore in India in next 5 years; new facility in Nashik



Image Courtesy: ABB

Electrification and automation company ABB India has announced its plans to invest INR 1,000 crore in the country in the next five years. The company, which recently inaugurated a new facility in Nashik, will be investing the money in adding capacity across the country,

its country head and managing director Sanjeev Sharma said.

According to him, ABB India is planning to invest INR 1,000 crore in the next five years for capacity expansion.

Its new factory spread across 78,000 sq. ft. will help double the Gas Insulated Switchgear (GIS) production capacity, a statement said.

The new facility will manufacture primary and secondary GIS. It will serve the power distribution, smart cities, data centres, transport (metro, railways), tunnels, ports, highways and other infrastructure developments, it said.

It deploys advanced robotics for manufacturing which connects people, processes, assets, and is capable of relaying real-time data for enhanced productivity. The company also launched an eco-efficient switchgear. ♦

Courtesy: PTI News

Government taking steps to make India \$5 trillion economy 'at an early date': Finance Ministry

The government recently informed the Rajya Sabha that it is taking steps to make India a USD 5 trillion economy earlier than the International Monetary Fund's forecast year of 2026-27. The IMF's World Economic Outlook earlier said the size of the Indian economy will increase from USD 3.2 trillion in 2021-22 to USD 3.5 trillion in 2022-23 and cross USD 5 trillion in 2026-27. "The government has been taking steps to make the country a USD 5 trillion economy at an early date," Minister of State for Finance Pankaj Chaudhary said in a written reply to the Upper House.

Observing that the outbreak of the COVID pandemic in 2020 and the Russia-Ukraine conflict in 2022 has impacted the world output, increased inflation in several countries and raised uncertainty in the world economy, he said, "lower uncertainty in the global economic outlook will help India become a USD 5 trillion-dollar economy earlier".

Some of the important measures taken by the government in the past to boost economic growth include the making of the National infrastructure pipeline of projects,



Pankaj Chaudhary, Minister of State for Finance

push to capital expenditure, implementation of the Production Linked Incentive (PLI) scheme, finalisation of the National Monetization Pipeline of public sector assets and formulation of National Logistics policy, he said.

The minister further said that capital expenditure will be speeded up by PM GatiShakti for integrated planning of infrastructure and synchronised project implementation across all concerned central ministries, departments and state

governments.

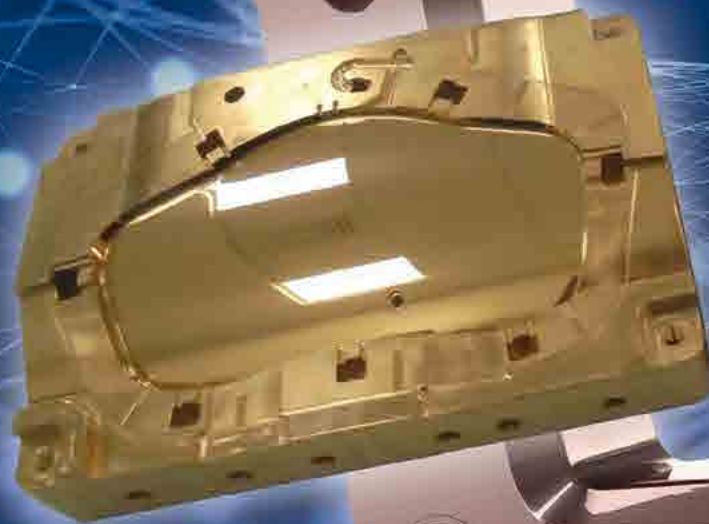
The Union Budget 2023-24, Chaudhary said, "further sustains the growth momentum with an increase in capital investment outlay for the third year in a row by 33 per cent to INR 10 lakh crore (3.3 per cent of GDP)".

The minister also said that the direct capital investment by the Centre is being complemented by the provision made for the creation of capital assets through grants-in-aid to states. ♦

Courtesy: PTI News

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ONE STEP AHEAD.

300-acre Apple-Foxconn plant in Karnataka to catalyse manufacturing, deep-tech ecosystem: MoS IT

The recent announcement of 300-acre Apple-Foxconn plant in Karnataka reflects the state's significant progress in electronics manufacturing, and will catalyse the entire electronics and deep-tech ecosystem, Union minister Rajeev Chandrasekhar has said.

Chandrasekhar noted that post-COVID, as electronics global value chains are being re-shaped, India is becoming increasingly relevant not just in terms of designing but also for manufacturing cutting-edge technology and next-generation products and devices.

The Minister of State for Electronics and IT was addressing the Deep Tech Summit organised by MeitY-NASSCOM Centre of Excellence (CoE) - IoT (Internet of Things) and AI (Artificial Intelligence), in Bengaluru, an official statement said.

Opportunities in the digital economy space have expanded rapidly and cover areas such as internet consumer tech, AI, data plus economy, electronics, automobiles and space. "Under PM Narendra Modi government, deep tech,



Rajeev Chandrasekhar, Union minister

electronics and semiconductor sectors and designing and manufacturing of next-gen products and devices are going to be significant focus areas for our digital economy, start-ups and young Indians," he added.

Chandrasekhar referred to the 300-acre plant being put up by one of the Apple Inc. suppliers, Foxconn, just outside Bengaluru and said it will open new opportunities for the youth and catalyse the electronics manufacturing and deep tech ecosystem in the state, the official release said.

The minister also highlighted the skilling initiatives of the government and the allocation of INR 8,000 crore towards it in the Union Budget, and pointed out that talent inputs

required to be an enabler for the expansion of the digital economy, have been put in place. "In Karnataka alone, 18-20 lakh youth will be skilled for both blue-collar as well as high-tech, industry-relevant and future-ready jobs over the next three years," the minister said. ♦

Courtesy: PTI News

Hyundai Motor lines up to buy General Motors' India plant

Hyundai Motor Co. said it has agreed to a potential acquisition of General Motors' plant in India, a move that could finally allow the U.S. automaker to exit a country where it stopped making cars in 2017.

A final deal is subject to meeting certain conditions including obtaining "regulatory approvals from relevant government authorities and all stakeholders related to the acquisition", Hyundai said in a statement.

GM stopped selling cars in India in 2017 after years of dwindling sales but its complete exit from the market has been marred by complications, including legal tussles with workers and the failure to find a buyer for the plant, which is in the western Indian state of Maharashtra.



In 2019, GM agreed to sell the plant to China's Great Wall Motor but talks collapsed last year after the companies failed to obtain regulatory approvals amid New Delhi's increased scrutiny of investments from Beijing.

GM and its factory workers - who allege illegal termination after the company decided to exit - have also been locked in legal battles since 2021. In the latest setback, in January, a union sued GM's India unit and its global CEO for failing to pay court-ordered compensation to sacked factory workers.

GM has previously said its employees have been legally separated and it remains confident of its legal position.

India has been a tough battleground for Western carmakers, especially U.S. companies, that have struggled to break the dominance of Japan's Suzuki Motor and South Korea's Hyundai

Motor, which together hold 60% market share. Like GM, Ford Motor, too, ceased operations in India.

This acquisition will give Hyundai a second plant in India allowing the carmaker to boost production capacity at a time when it plans to launch six electric vehicles in India by 2028. ♦

Courtesy: Reuters



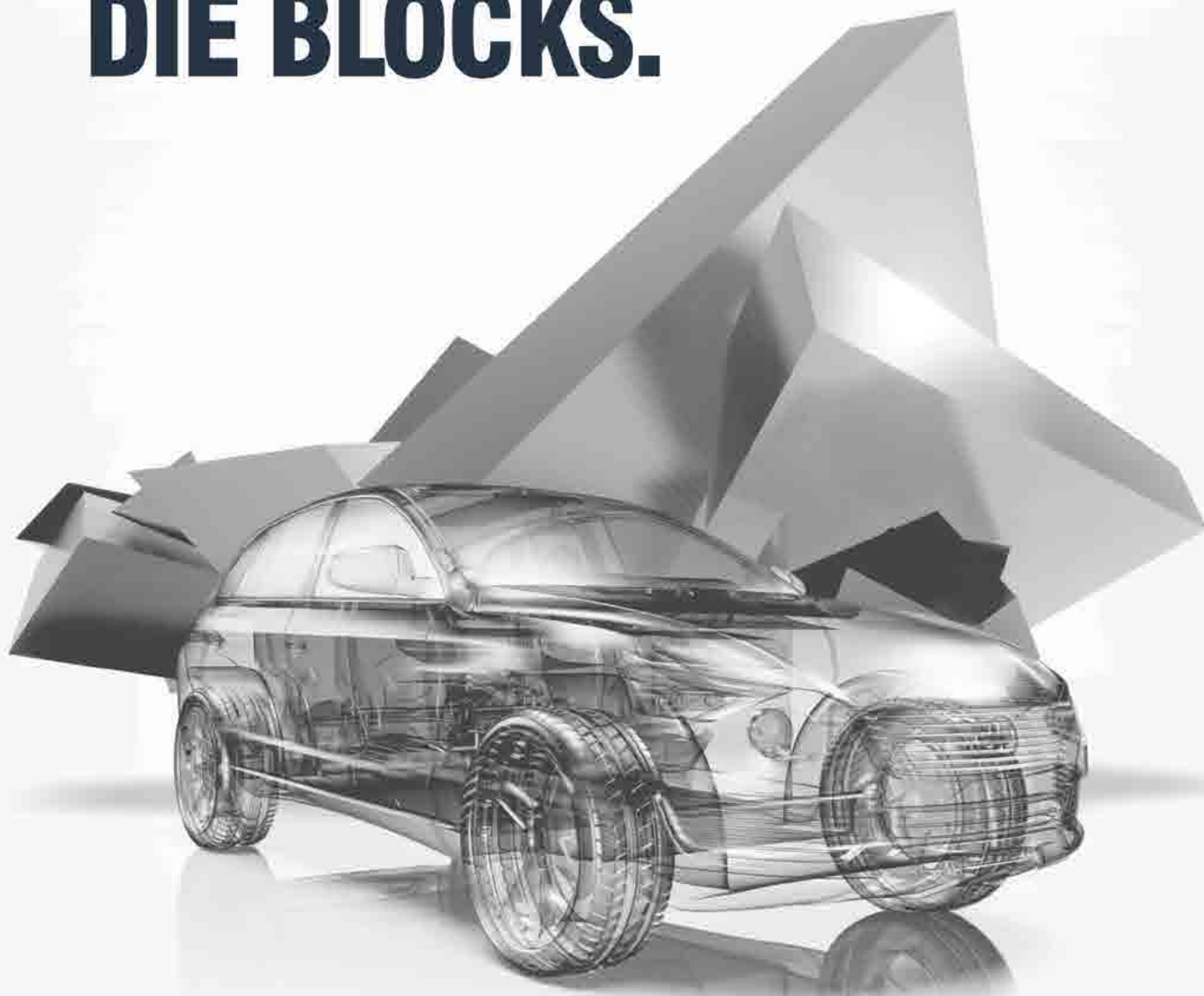
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Maruti Suzuki expects chip shortage to continue for few more quarters

Maruti Suzuki India expects semiconductor shortage to continue for the next few quarters, leading to a further increase in order backlog of certain models, according to a senior company official.

Due to the chip shortage, Maruti Suzuki India (MSI) has already witnessed a production loss of close to 46,000 units in October-December period and is expecting some impact on the production in the ongoing quarter as well. "The semiconductor shortage still continues. Last quarter, we lost 46,000 units due to this issue and this quarter also the problem continues for a few models," Maruti Suzuki India Senior Executive Officer (Marketing and Sales) Shashank Srivastava told PTI.

The company expects the shortage to continue for a

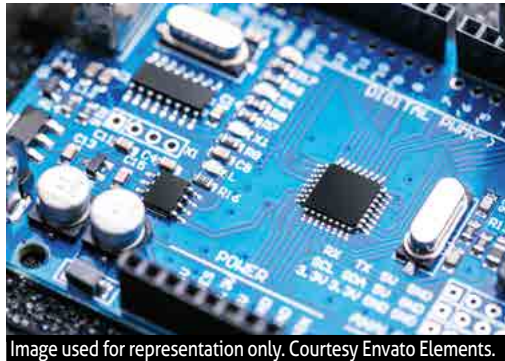


Image used for representation only. Courtesy Envato Elements.

few more quarters, he noted. "It is difficult to predict exact timelines when it will become normal because the visibility is not there," Srivastava said.

Commenting on the overall PV industry, he noted that the sports utility vehicle continues to lead with a share of 42.6% and hatchbacks accounting for 35%. "So far, the passenger vehicle industry this fiscal year has witnessed sales of 35.5 lakh units.

It seems the industry will end the year with 38.8 lakh units mark, the highest-ever number till date," he said.

Last fiscal, the number stood at 30.7 lakh units, so the sales are expected to go up by around 26% this financial year. He noted that the PV segment is expected to post a growth of 5-7% in the next fiscal year over 2022-23. ♦

Courtesy: PTI News

India's overall passenger vehicle dispatches cross 3.35 lakh units in February

Driven by strong demand, the overall passenger vehicle dispatches crossed 3.35 lakh units in February, as automakers, including Maruti Suzuki India, Hyundai, Tata Motors and Mahindra & Mahindra, reported robust sales during the month. The dispatches of more than 3.35 lakh units marked an 11 per cent over February 2022. It was also the highest ever overall wholesales in the month of February.



Image used for representation only. Courtesy Envato Elements

During a virtual interaction, Maruti Suzuki India Senior Executive Officer Marketing & Sales Shashank Srivastava said that in the April-February period this fiscal, the overall industry sales have risen to 35.5 lakh as compared with 27.47 lakh units in the corresponding period last financial year. "In this fiscal, we have already dispatched 15.08 lakh units, a growth of 23 per cent from 12.27 lakh units in the April-February period of last fiscal," he noted.

Hyundai Motor India saw its domestic wholesales increase 7 per cent year-on-year to 47,001 units in February. Tata Motors said its passenger vehicles sales in the domestic market last month rose to 43,140 units as against 40,181 units in the corresponding period last year. Mahindra & Mahindra

(M&M) said its passenger vehicle dispatches last month rose 10 per cent to 30,358 units, as compared with 27,663 units in February last year.

Kia India reported a 36 per cent year-on-year increase in domestic wholesales at 24,600 units in February. "With continued support from our esteemed customers, Kia has recorded another successful sales run in the month of February," Kia

India National Head Sales & Marketing Hardeep Singh Brar said. Achieving 35.8 per cent growth against the industry's growth of 10 per cent shows the love and confidence the Indian consumers have for the brand, he added.

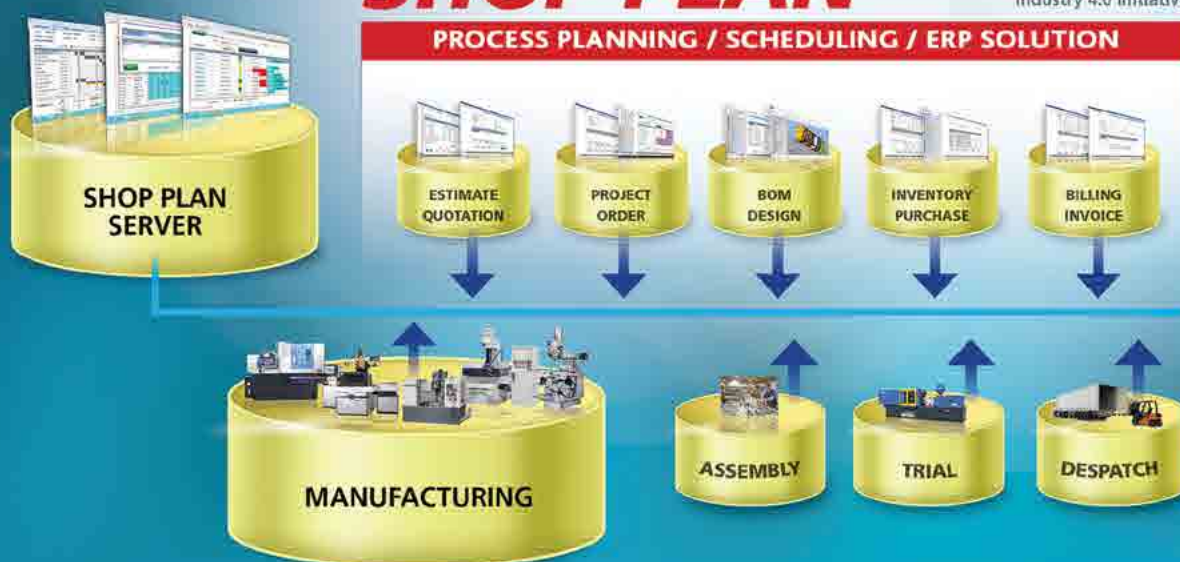
Toyota Kirloskar Motor said its domestic wholesales increased 75 per cent year-on-year to 15,338 units in February 2023. "Looking ahead, we expect to close this quarter on a high note, in comparison to last year. As a customer-centric company in constant pursuit to redefine customer experience, we are continually working to meet the market demand effectively," TKM Sales and Strategic Marketing Vice President Atul Sood said. ♦

Courtesy: PTI News

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HANNOVER MESSE – World's leading platform for hydrogen and fuel cells

At the upcoming Hannover Messe, running from 17 to 21 April, some 500 companies will be presenting their solutions for hydrogen production, transport, storage and consumption. The opportunities for all of these companies are vast because, by 2030, the EU Commission wants to install electrolyzers with a capacity of at least 40 gigawatts to produce 10 million tons of green hydrogen in a phased-in process.

The hydrogen economy is international, leading to a plethora of new, innovative companies worldwide. The technology has also triggered a boom in the southern Harz region of Germany. The exhibitor Maximator Hydrogen, a manufacturer of hydrogen filling stations, has been growing for years and is aiming for sales of 50 million euros – in its fifth business year. Construction is underway and production space is constantly being expanded. The company's order backlog now exceeds 100 million euros.

Numerous European small and medium-sized enterprises (SMEs) are profiting from the hydrogen economy and are constantly developing new solutions for hydrogen generation, infrastructure, transport, storage and refueling. Some 300 exhibitors will be showcasing their solutions at the Hydrogen + Fuel Cells EUROPE special display at HANNOVER MESSE alone, including well-known companies such as Bosch, Iberdrola, Schaeffler, Siemens, Linde and Emerson.

The hydrogen industry thinks internationally and will be showcased primarily in Hall 13, where decision-makers from all over the world will be discussing new technologies and applications for hydrogen and fuel cells in an area covering approximately 8,000 square meters of display space. Apart from Germany and Europe a lot of exhibitors are from China, Japan, South Korea, the United States and Canada.

Being an important partner for German and European future plans, Norway is also strongly represented at

the show. Equinor and German-based RWE recently signed an agreement to produce hydrogen in Norway and export it via pipeline to Germany, as well as converting gas-fired power plants to hydrogen and jointly developing offshore wind farms. Statkraft and Germany's HH2E presented their agreements with the Norway-based NEL company to purchase electrolyzers for hydrogen factories in several European countries. NEL is one of 14 Norwegian companies at the show. Among other things, the engineers will present their latest generation of electrolyzers.

Europe already produces and consumes around 80 million tons of hydrogen annually, with the trend pointing upward. The key challenge is to "greenify" the current and future consumption of hydrogen. By 2030, the EU Commission wants to replace gray hydrogen with green hydrogen, since gray hydrogen is based on fossil energy sources. Ambitions here are high. It will take many more electrolyzers to reach the target, with only seven more years to go.

According to the Fraunhofer Institute, the most efficient technology for producing hydrogen comes from Belgium, with its ZIRFON separators for alkaline electrolysis (AEL) being used by manufacturers of electrolyzers and owners of hydrogen production projects across the globe due to their durability and sustained high productivity, according to the developers.

But it's not just Europe that is betting on hydrogen. Many companies are also investing in China. Refire, for example, says it is already operating more than 4,000 fuel cell trucks. On the first day of the exhibition, Audrey Ma, Vice President at Refire, will discuss "Heavy Duty Trucks – is Hydrogen the future?" with representatives of European industry, including Jens Fleckenstein of Daimler Truck and Yves Dumoulin of the FORVIA Group. ♦



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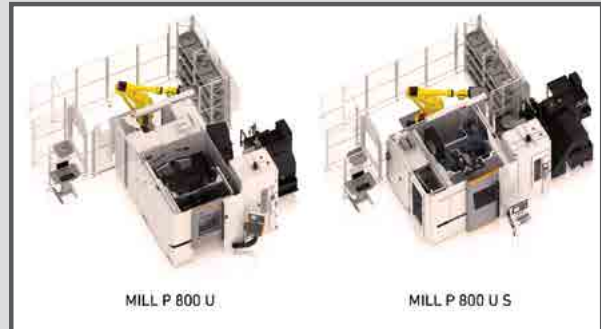
DISCOVER THE MEANING OF VALUE

GF Machining Solutions redesigns the high-performance Milling machine Mikron MILL P 800 U

GF Machining Solutions has decided to redesign the well-established Mikron MILL P 800 U and to create the new high-performance milling machine Mikron MILL P 800 U S with the same performance and reliability. The access to the machine has been considerably improved by making it more accessible from the back by shortening the space between the table and the robot. The better connectivity between the machine and the robot makes the MILL P 800 U S a state-of-the-art solution with a compact layout, even with multiple machines.

The MILL P 800 U S, which can be equipped with a Heidenhain TNC 640 or a Siemens Sinumerik control, delivers a high material removal rate thanks to its symmetrical gantry design that ensures stiffness and robustness, and to the 20,000 rpm Step-Tec Spindle of 36kW and 120Nm. The main water-cooled heat sources inside the MILL P 800 U S secure a long milling process and make the machine suitable for heavy roughing and finishing.

As part of GF Machining Solutions' DNA, the MILL P 800 U S is a high dynamic milling machine (with an acceleration of 1.7g). This is made possible by its standard specification (with a rapid axis traverse of 61m/min and an axis acceleration of 10m/s²) and the support on both table sides of direct (swiveling and rotary) torque motors. These ensure precision and accuracy, even during dynamic



milling, and guarantee an unattended, risk-free process 24/7 thanks to the smart machine module called Machine Spindle Protection (MSP). With the MSP, even if a crash occurs during the milling process, neither the spindle nor the machine are damaged and the milling process can restart immediately.

The combination of the performance and the compact automation layout in the MILL P 800 U S makes this new machine unique in the market. It can easily be connected to a robot and the scalability of the machine with automation is limitless because of the possibility to add a second, a third or even more machines of the same type into the robot cell. This allows to always keeping the best machine ergonomic and accessibility for the machine's set up or maintenance when needed. ♦

Easy to design thanks to the Meusburger colour codes

Meusburger offers standardised colour codes to simplify 3D CAD design for mould and die making customers. Each colour represents a clearly defined tolerance, and work can be done directly from the 3D model. Downloading is easy via the Meusburger website.

The creation of standardised colour codes for 3D CAD design was made possible by Meusburger's collaboration with the Association of German Tool and Mould Makers along with various cooperation partners. In the process, 70 variants of colour code tables were melded into one. Through the defined colours, tolerances can not only be clearly identified but also recognised in all common CAM systems. This allows you to go paperless and derivations from 2D drawings are no longer necessary.



Further advantages of the Meusburger colour codes

Customers especially benefit from the transferability of models for production at other locations worldwide or by different companies. There are also defined colours for different thread types. Another big advantage is time savings during calculation since the calculator automatically recognises

colours and tolerances and does not have to make any corrections. In addition, deep hole drilling lists are created automatically as features are read from the 3D model and correctly identified when imported into the deep hole drilling list. In most cases, the tolerances of the Meusburger colour codes are sufficient, as 4 to 5 colours are usually enough. ♦

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Avoid Accidental
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Control by
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e – CAMGUARD detects

- Any missing parts (all cavities filled)
- Parts not fully ejected.
- Improve movement of slide cores.
- Improper retraction of ejectors.
- Inserts placed correctly before injection.
- Abnormal flashes occurred (subjective)
- Short filling of parts (subjective)

Features & benefits

- Shoot and compute in real time
- Touch screen display – User friendly
- The system can be interlocked with any moulding machine.
- High pixel industrial camera-resolution up-to 1600 x 1200
- Near IR light source for better results
- Interlocked with Moulding machine stop Ejection and /or mould closure immediately upon detecting any malfunctioning of mould.



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Polishing
Consumables



Standard Mould
Parts



Descaling and
Flushing System



e-CAMGUARD- Mould/Die
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Hurco introduces practical job shop automation for high-mix manufacturing

Hurco has developed a streamlined automation package for high-mix manufacturing by partnering with ProCobots to make job shop automation practical, which means the automation packages are flexible, easy to program, and easy to move to other Hurco machines without the need for customers to call an integrator each time they need to make a change.

Hurco is able to provide seamless integration of automation to Hurco CNC machines due to the development of the Automation Manager control feature. This intuitive control feature includes a setup wizard, job and queue progress bars, a graphical interface between the collaborative robot (cobot) and the CNC machine to facilitate an easy setup process for each job, the ability to run multiple jobs sequentially, and the ability to load and save job sets.

"We know the struggles shops have experienced with traditional automation, especially when it's time for program changes or a machine transfer. That's why we formed a partnership with ProCobots to create a completely integrated job shop automation system that is portable, reliable, easy to set up, easy to program, and affordable. The Automation Job Manager software feature on the Hurco control was created specifically for job shops and



the machinists, who find ways to bring order to the chaos of high-mix manufacturing," said Maggie Smith, Marketing Manager for Hurco Companies, Inc.

According to Brian Knopp, President of ProCobots, "With compact footprints that don't require intrusive safety fencing the UR collaborative robots that we use work safely with machinists. With the Practical Job Shop Automation Packages Hurco has put together, machinists are able to focus on the high-value skills they contribute to each job and let the cobots do the monotonous, lower-skilled tasks, while also being empowered to own the automation process." ♦

HASCO's ejector portfolio is extended

HASCO's extensive ejector portfolio for the efficient demoulding of parts from injection moulding, compression moulding and diecasting tools has been further extended with a variety of ejector pins, ejector sleeves and flat ejector pins. With over 600 new additional versions, HASCO offers its customers maximum flexibility that allows individual selection of the most suitable product for every application.

The proven standard programme of hardened or nitrided ejectors with conical head or shouldered, with or without DLC coating, has repeatedly been supplemented in the last few years by a number of innovative products.

The ejector pins Z410/... with anti-twist head, for example, allow precision centering of individually contoured ejector or core pins in the mould. The flat ejector pins Z4656/... and Z4655/... with two or four corner radii



are preferably used in critical areas of injection moulding tools such as ribs or crosspieces. With the hardened and nitrided ejector sleeves Z458/..., complex articles can be demoulded safely and effectively. Especially for particularly long ejector strokes, the ejector sleeves Z4501/... have a longer guide bore of 100 mm in all the available sizes.

The innovative ejector pins Z401/... with ventilation allow

improved mould performance. Via the ventilation surfaces, the air in the cavity can easily escape. The new shouldered DLC-coated ejector pins Z4430/... of hardened HSS with optimum heat resistance are suitable, particularly at high mould temperatures and because of their dry running properties, for clean room applications.

With these extensive additions, HASCO is closing further gaps in its range and thus offers its customers unlimited possibilities in the field of demoulding. ♦



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Aerospace and Defence: Flying high

Setting its sight on a higher growth trajectory, the Indian aerospace and defence sector is all set to soar. The increasing demands from the civil aviation and defence sector have challenged manufacturers in this space to think out of the box and come up with innovative solutions to create components that are durable and reliable. By equipping themselves with the required skills, certifications and infrastructure, toolmakers in the country can play a prominent role in this growth story.

Kimberley D'Mello

The aerospace and defence sector has become a focus area for the 'Make in India' programme. As a result, the sector is likely to witness considerable steps towards encouraging the setting up of indigenous manufacturing infrastructure supported by a strong R&D ecosystem. In fact, driven by the increasing demand for advanced infrastructure, India's aerospace and defence market is estimated to reach around \$70 billion by 2030, state various research reports.

India's aerospace and defence

sector has developed over the years "and is today leading the growth of the manufacturing sector from the front by encouraging adoption of international quality standards and establishing technologically advanced manufacturing facilities. Several Indian companies have proven themselves capable of providing first-time correct quality comparable to global standards", revealed a recent report titled 'India's aerospace and defence sector can lead the way with Industry 4.0' published by Rolls-Royce.

The domestic deals

The Indian aerospace and defence market offers significant opportunities for domestic as well as international companies throughout the supply chain. The ordnance factories and defence public sector undertakings have not only been modernising and upgrading, but also expanding their product range with one goal in mind, namely, achieving self-sufficiency in defence production. The Indian aerospace industry is not far behind. Let's take a look at some such deals:



Image Courtesy: Airbus

► Tata-owned Air India to acquire 250 Airbus aircraft

In February 2023, the Tata Group-owned Air India announced its commitment to order 250 Airbus aircraft to boost its domestic and international operations. The commitment includes 140 A320neo and 70 A321neo single-aisle aircraft as well as 34 A350-1000 and six A350-900 wide-body jets that will mark a new era for the country. Deliveries are set to commence with the first A350-900 arriving by late-2023, informed a press release issued by Airbus.

► MoD inks two contracts with BEL worth INR 2,400 crore

In March 2023, the Ministry of Defence signed three contracts – two with Bharat Electronics Limited (BEL), Ghaziabad, and one with NewSpace India Limited (NSIL) – at a total cost of nearly INR 5,400 crore, to bolster the defence capabilities of the country. The first contract with BEL pertains to the procurement of Automated

Air Defence Control & Reporting System 'Project Akashteer' worth INR 1,982 crore for the Indian Army. The second contract with BEL relates to the acquisition of Sarang Electronic Support Measure (ESM) systems along with associated Engineering Support Package from BEL, Hyderabad, at an overall cost of INR 412 crore for the Indian Navy, revealed a press release issued by the Press Information Bureau.

► BrahMos Aerospace eyes \$200-million missile deal with Indonesia

According to a Reuters news report published in March 2023, BrahMos Aerospace expects to close a deal this year to sell Indonesia supersonic cruise missiles worth at least \$200 million. BrahMos, a joint venture between India and Russia, clinched its first foreign deal last year with a \$375-million sale of shore-based anti-ship missiles to the Philippines.

► Tata Boeing Aerospace delivers first fuselage for Indian Army AH-64 Apache

In January 2023, Tata Boeing Aerospace Limited (TBAL) delivered the first fuselage for six AH-64 Apache attack helicopters ordered by the Indian Army from its state-of-the-art facility in Hyderabad. TBAL's 14,000 sqm facility in addition to being a global sole source supplier for Apache fuselages, produces complex aero-structures for Boeing 737 and 777 models. More than 90% of the parts used in these aero-structures' assemblies are manufactured within India through over 100 Micro, Small and Medium Enterprises (MSME) suppliers, stated a press release issued by Boeing.

► MoD signs INR 667 crore contract for six Dornier-228 aircraft from HAL

According to the Press Information Bureau, the Ministry of Defence signed a contract for procurement of six Dornier-228 aircraft for the Indian Air Force from Hindustan Aeronautics Limited at a cost of INR 667 crore in March 2023. The six aircraft will be procured with an upgraded fuel-efficient engine coupled with a five-bladed composite propeller.



Image Courtesy: Press Information Bureau

In the international airspace

GE Aerospace to provide 1MW Turbogenerator for Sikorsky long-range Hybrid-Electric VTOL Demonstrator

Sikorsky, a Lockheed Martin company, is producing a Hybrid-Electric Demonstrator (HEX), a fully-autonomous hybrid-electric vertical-take-off-and-landing (eVTOL) prototype. With a maximum gross weight of more than 7,000-pounds, the uncrewed aircraft will serve as a flying test-bed to evaluate large aircraft design, novel propulsion systems and control architectures for sustained hover, and ranges greater than 500 nautical miles. For the HEX project, GE Aerospace will offer a CT7 turboshaft engine combined with a 1MW-class generator and associated power electronics, building on hybrid electric propulsion systems being developed by GE Aerospace for both NASA and the U.S. Army, informed a press release issued by GE Aerospace in March 2023.

Magellan Aerospace signs agreement with Collins Aerospace for complex castings

In a press release, Magellan Aerospace Corporation announced in March 2023 the signing of a significant long-term agreement extension with Collins Aerospace, a Raytheon Technologies business, to manufacture complex magnesium and aluminium castings for various military and commercial aerospace platforms. The castings will be produced by Magellan's facilities in Renfrew, Ontario and Glendale, Arizona. The extension of this LTA with Collins renews the framework for strategic alignment with Magellan; in addition to F-15, F-16, and F-18 castings for Collins' legacy programs, the agreement also encompasses the supply of castings to support F-35 Lightning II, KC-46, A320neo, 787 and 777X programs.



Image used for representation only. Courtesy Envato Elements.

Why make in India?

India plays a crucial role in the global supply chain for aerospace components and parts. The domestic deals in the aerospace and defence sector are proof. Besides, manufacturing in India offers several advantages, such as reasonable costs, technical/engineering expertise and skills to manufacture precision and high-quality components, among others. Indian tooling has proved what it does for components in the automobile sector. Its tremendous potential can be extended to components for the aerospace and defence sector as well.

In fact, many private companies have contributed to make India a preferred destination for aero structures, components, sub-assemblies and complex system assemblies. Original equipment manufacturers from across the globe have established joint ventures in India to manufacture aerospace-related parts and assemblies for commercial as well as defence aircraft.

Image Courtesy: Press Information Bureau



Tips for toolmakers

According to a report by Deloitte titled '2023 aerospace and defense industry outlook': "Supply chain disruptions and talent shortages may be the biggest risks or challenges for aerospace and defense industry (A&D) organizations in 2023. As demand for passenger travel is correlated to ticket prices, which, in turn, depend on jet fuel prices, a quick and sustained rise in jet fuel prices can impact traffic and increase market volatility. To address this challenge, aircraft manufacturers are investing in aircraft and engine design to make them more fuel-efficient, lower operating costs, and explore lower-and-zero-emission commercial aircraft for the future."

In the light of this situation, what do toolmakers need to keep in mind when manufacturing components for the industry? Let's take a look:

- ▀ **Complex components:** Components for the aerospace and defence sector have complex geometries because of their integrated functions.
- ▀ **Investments in capital and technology:** The sector requires huge capital investments and requires upgrading of technologies.
- ▀ **Certifications:** Getting certified is mandatory to ensure the required standards are met if one is looking to manufacture for aviation, space and defence organisations.
- ▀ **Quality check:** Safety and reliability are the two critical factors that come to mind when manufacturing components for the aerospace and defence sector. Stringent regulations have been put in place to verify if all the materials and processes meet these requirements. ♦

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Indigenous Opportunities @Aero India 2023

Prime Minister Narendra Modi inaugurated the 14th edition of Aero India 2023 at Air Force Station, Yelahanka, in Bengaluru, on February 13, 2023. Based on the theme ‘The Runway to a Billion Opportunities’, the five-day event witnessed the participation of more than 80 countries along with 800 defence companies, including around 100 foreign and 700 Indian companies. Aero India 2023 focused on displaying indigenous equipment/technologies and forging partnerships with foreign companies. A report...



Products launched

- **Vertical Launch Short Range Surface-to-Air Missile (Bharat Dynamics Limited):** VLSRSAM is a next-generation, ship-based, all-weather, air defence weapon, which can be used by the Navy as a quick reaction point defence against supersonic sea-skimming targets, like aircraft and UAVs. The missile has a smokeless propulsion system with all-weather capability. It has a highly agile configuration with state-of-the-art electronic counter-countermeasure features.
- **SAL Seeker ATGM for BMP II (Bharat Dynamics Limited):** This Semi-Active Laser Seeker-based Anti-Tank Guided Missile for BMP-II is a subsonic missile with a range of 4,000 metres and flight time of 25 seconds. The missile weighs 23 kgs with the launch tube and can be used in different kinds of terrains to incapacitate moving and stationary targets, such as tanks and infantry combat vehicles.
- **Jishnu (Bharat Dynamics Limited):** Jishnu, a drone-delivered missile, is a lightweight and miniaturised missile targeted for soft-skinned targets. It has a range of 1.5 km with a flight time of 9 seconds. The missile can be semi-automatic or completely autonomous based on the systems configurations.

- ▶ **Software defined NAVIC/GPS receiver module based on indigenously-developed processors** (*Astra Microwave Products Limited*).
- ▶ **Indigenously-built 'Counter Drone Radar' based on technology from DRDO** (*Astra Microwave Products Limited*).
- ▶ **9 mm sub-sonic ammunition** (*Munitions India Limited*).
- ▶ **BlueFire Touch on Ios** (*IdeaForge Technology Limited*): The *BlueFire Touch* Ground Control Station (GCS) software is built to plan and command both mapping and surveillance missions with the ability to pre-plan missions based on operational area and target locations via waypoint-based navigation.
- ▶ **HF SDR Radio** (*Bharat Electronics Limited*): It is an advanced software defined radio. The radio is a lightweight 20W transmit-capable radio. It provides a complete solution to the short-range communication requirements in the crowded HF band and long-range communications beyond line of sight.
- ▶ **Goniometer** (*Bharat Electronics Limited*): It is part of any integrated observation and fire control monitoring system for day time or night time use by the artillery.



Major announcement

Record 75% (approximately INR one lakh crore) of the defence capital procurement budget has been earmarked for the domestic industry in FY 2023-24, up from 68% in 2022-23. This was announced by Raksha Mantri Shri Rajnath Singh during the Bandhan ceremony of 14th Aero India in Bengaluru on February 15, 2023.

In FY 2023-24, the Ministry of Defence has been allocated a total budget of INR 5.94 lakh crore, which is 13.18% of the total budget (INR 45.03 lakh crore). The capital outlay pertaining to modernisation and infrastructure development has been increased to INR 1.63 lakh crore.

Organised on a total area of around **35,000 sqm**, at Air Force Station, Yelahanka, Bengaluru, Aero India 2023, the biggest-ever till date, witnessed the participation of around **98 countries**.



Partnerships forged

- ▶ MoU between Hindustan Aeronautics Limited and Safran Helicopter Engines, France, for work share for the formation of joint venture for the design, development, manufacture and life-time support of helicopter engines.
- ▶ MoU between Bharat Electronics Limited and Aeronautical Development Agency on IWBC and other LRUs for Advanced Medium Combat Aircraft (AMCA).
- ▶ Co-operation between BSS Material Limited and Pegasus Engineering, an ADUSEA Inc. Division (USA), for logistic drones for the Indian Army towards last-mile delivery for forward troops deployed along the border areas with capability of operation in wind/gust condition, rain/snow, etc.



- ▶ MoU between Gopalan Aerospace India Pvt. Ltd. and Ompol, Czech Republic, for manufacturing and assembling of first passenger aircraft (L 410 UVP-E20 version) by a private company in India.
- ▶ MoU on collaboration of Sagar Defence Engineering Private Limited (SDEPL) & Israel Aerospace Industries (IAI) for IDEX Challenge 'Autonomous Weaponized boat Swarm' for the Indian Navy.
- ▶ MoU between Bharat Dynamics Limited and Bultexpro Ltd., Bulgaria, for setting up the manufacturing facilities for 122mm GRAD BM ER and NONER rockets in India and fulfill the requirements (including ToT).
- ▶ MoU between GRSE and Rolls-Royce Solutions GmbH (MTU) for licence production with localisation of the MTU 16V4000M73L engine to support the indigenous content for the next-generation fast-attack craft vessel for the Indian Navy.
- ▶ BEML enters into a licence agreement for the Transfer of Technology (ToT) with R&DEE, DRDO for the development and supply of TRAWL assembly for T-72/T-90 tanks.
- ▶ ToT of Shakti EW System from DLRL DRDO to BEL Hyderabad Unit for all system units, bill of material, test procedures, integration & offering methodology.
- ▶ MoU between Hindustan Aeronautics Limited and Elta Systems Limited, Israel, for the cooperation on future business in Maritime Patrol Radar (MPR) for Indian platforms.

Text and Images Courtesy: Press Information Bureau

**The Defence Ministers of 32 countries,
Air Chiefs of 29 countries and 73 CEOs of global
and Indian OEMs attended the event.**

Karnataka startups, MSMEs make mark in Aero India with futuristic products

- ▶ Amid all the hustle and bustle of Aero India 2023, a small group of startups and MSMEs from Karnataka silently made its mark, attracting attention for their innovative range of products. In all, 24 organisations set up shop in the Karnataka Udyog Mitra stall at the 14th edition of India's own international air show.
- ▶ As startups and MSMEs go, these handful of entrepreneurs in the aerospace sector may not enjoy the recognition and brand recall of their global and corporate neighbours at Aero India 2023. However, these homespun companies are more than making up with the array of exciting products they have developed or are creating.

809 defence companies, including MSMEs and start-ups, showcased the advancement in niche technologies and the growth in aerospace and defence sector.

- ▶ Some of them like NopoNano Technologies in Bengaluru, are into producing single-walled carbon nanotubes with wide-ranging applications in aerospace. With applications ranging from coatings for aircraft, to batteries and semiconductors, these nanotubes attracted queries from visitors to Aero India.
- ▶ "We work on single-walled carbon nanotubes. This is an advanced material that will create the future of aircraft and spacecraft. This material we have created in Karnataka, in Bangalore, and this material is incredibly small. It's about one lakh times smaller than a hair strand and is manufactured to an atomic accuracy in the Electronic City," said Gadadhar Reddy, Founder, NopoNano Technologies, an aerospace startup in Bengaluru.
- ▶ For some of the Karnataka entrepreneurs at Aero India 2023, the sky is literally not the limit anymore. Apart from housing the headquarters of the nation's space programme, Bengaluru is home to several defence organisations and public sector units. Local MSMEs have leveraged on their technical and scientific expertise to become part of several exciting projects on land, at sea, in the air, and beyond - in space.
- ▶ For instance, Bengaluru-based Aidin Technologies Pvt. Ltd., a 15-year-old MSME, has distinguished itself by designing and developing cutting-edge products for ISRO, and BE, among others. Their success story includes the design and development of a space RF product subsystem for all the satellites and also the data link modem, which is used for aerial target vehicles or UAVs. But that's not all! "We are also part of the Indian human space flight programme. We have got the contract for executing the avionics interphase and the bio-based electronics package, which will be used to monitor the health parameters of the astronauts when they go up in space," said Harish, CMD of Aidin Technologies.
- ▶ So, what makes these relatively small enterprises tick in such a highly competitive sector? Essentially the thriving entrepreneurial landscape, the proximity to potential clients in the form of space, aerospace, and defence establishments, and finally, the support of the Karnataka state government, said the homegrown entrepreneurs at Aero India 2023. ♦

Courtesy: IANS



'I am optimistic about the future of Indian toolmakers in the electrical industry'

"I strongly encourage Indian toolmakers to gradually explore the electrical industry, which can create enormous business opportunities for them, as the demand for specialised tools and equipment continues to grow," says

Anand Wankhede, Sr. General Manager – Tooling, Schneider Electric India.



Nishant Kashyap

Q Tell us about Schneider Electric, specifically its tooling activities.

Schneider Electric is a French MNC that has presence worldwide and a revenue of 28 billion euros. Recently, the company acquired L&T's electrical and automation business in India, as part of its expansion plans.

The tooling requirement for Schneider Electric in India is significant, at least 50 to 60 times of what we were previously able to supply. Our tooling activities are managed through our Engineer Tooling Solution, which includes two tool development centers - one in Ahmednagar, near Pune, and the other in Baroda, Gujarat. I am responsible for the Baroda center, which has been operational for around eight years with three satellite design departments.

As a captive tool room, we have two primary responsibilities. One is to support new product development by designing, developing, and commissioning critical tools, and two is to duplicate tools as business demand increases. We only produce

critical tools, which require specific maintenance services that we also provide for the lifespan of the tool. Our tooling activities have developed skills in all aspects of tooling, including injection mould, compression mould, sheet metal dies, stage tools, progressive tooling, and tooling for ferrous and non-ferrous components, among others.

Q The Indian electrical industry has been growing rapidly since the past few years. What kind of growth do you foresee for Indian toolmakers in this industry?

The electrical industry in India has been experiencing rapid growth in recent years. This presents significant opportunities for Indian toolmakers. With the emergence of large companies like Schneider Electric and other major players expanding their presence in the Indian market, the potential for growth in the tooling sector is substantial. I strongly encourage Indian toolmakers to gradually explore the electrical industry, which can create enormous business opportunities for them, as

the demand for specialised tools and equipment continues to grow. Overall, I am optimistic about the future of Indian toolmakers in the electrical industry.

Q Building tools for every industry requires a different skill set. What is it like to design and build moulds for the electrical industry?

Designing and building moulds for the electrical industry would require a different skill set than for designing and building moulds for, say, the automotive industry. While the infrastructure and resources needed are similar, the key difference lies in the mindset towards the specific requirements of the customer.

To be successful in this field, toolmakers must be able to navigate external and internal challenges. External challenges are largely driven by customer needs, such as shrinking product sizes and shorter development lead times. These can be quite challenging, especially when it comes to engineering plastics, which are difficult to process.

Technically, the electrical industry relies heavily on EDM technology, with 80% of project valuation coming from spark EDM or wire EDM, and 20% from machining activities, like grinding and milling. This is in contrast to the automobile industry, where the major material removal process is based on milling operations.

Another significant difference in electrical tooling is the importance of fitment and cut bearings. The products are required to be small yet rigid, which requires precise matching and cutting of bearings. All of these challenges require specialised methods and techniques that are specific to the electrical industry.

Overall, designing and building moulds for the electrical industry requires a unique skill set and a deep understanding of customer needs. With the right mindset and expertise, however, toolmakers can take advantage of the growth opportunities presented by this rapidly expanding industry.

Q When building tools for the electrical industry, engineering plastics are mostly used. What grade of tool steel is needed for the electrical industry?

When building tools for the electric industry, it's essential to ensure they are extremely rigid, as they will be used for handling engineering plastics, which require aggressive parameters. For moulds, we typically use S13 steel, and for sheet metal dies, we use cold working steel. We import both types of tools. Our tools are designed to be extremely hard. For example, if it's a mould, it's heat-treated to achieve a hardness level of 50 to 54 HRC. Similarly, for sheet metal dies, we aim for a hardness level of 58 to 60 HRC through heat treatment. Heat treatment plays a crucial role in ensuring our tools meet the required specifications for their respective applications.

Q If I own a small tool room with all the necessary infrastructure to carry out tooling activities and currently serve the automotive industry, how should I equip myself (in terms of skills, know-how, etc.) if I am looking to venture into the electrical industry?

If your order book is already full and machines are occupied, you will not be able to add another project that requires a different skill set and know-how. Therefore, you should be ready to take up new challenges and acquire skills accordingly. Whatever helped you to be successful in the automobile industry is definitely needed, but a lot more things need to be taken into consideration when venturing into the electrical industry.

I would say there are three basic pillars of any good tool room - the people, the system, and the strategy. The challenge is how you can attract more people, who will develop good systems and align with the strategies. If these three pillars are addressed, there may not be any major hurdles. Therefore, to venture into the electrical industry, my suggestion would be: develop knowledge and expertise in designing and manufacturing tools for the electrical industry.

Q How does a toolmaker qualify to become a supplier for Schneider Electric?

Schneider Electric believes in having associates, as it is not advisable to do everything in-house. We have a simple strategy to go about it, which involves categorising our suppliers or associates into three categories: A, B, and C.

The C category consists of suppliers, who help us perform operations such as milling, EDM, wire EDM, etc. The B category comprises suppliers to whom we provide material, and we expect them to convert it into a product by using multiple operations, maybe a combination of milling, EDM, and

grinding. The A category is a group of suppliers to whom we provide our engineering inputs, and they help us obtain the finished part.

We have these three categories because, when we started sourcing, we realised that in India, there were few competent companies with the kind of know-how we need. So, we started working with people, who understood what we expected from them and onboarded them as our C category supplier. We worked with them and shared our know-how to build expertise at their place. Gradually, a few good C category suppliers migrated to B category, and very few B category suppliers, who were willing to invest and learn the next level of technology, moved to the A category.

Apart from this, like any corporate, we have our own selection criteria, technical forms, visits by purchase personnel, certifications, etc.

Q Schneider Electric's tool room is well known for carrying out various operations. What were the key challenges you faced and how did you overcome them?

I have spent more than 20 years in the industry and will split my answer into two parts – the first decade and the second decade.

In the first 10 years, I worked in an environment where my technicians, such as machine operators, had 25 years of experience running the same machine. We had fitters who were my father's age, and I had tool designers and engineers with a minimum of 15 to 20 years of experience. At least a dozen seniors were always available to guide me. That means those 10 years were ruled by experienced people.

In 2012, I moved from Mumbai to Baroda to set up a tool room. I tried to recruit experienced people from the market, but it was challenging to find them. So, what did we do? We started our own training activities and worked closely with diploma institutes. We trained students and

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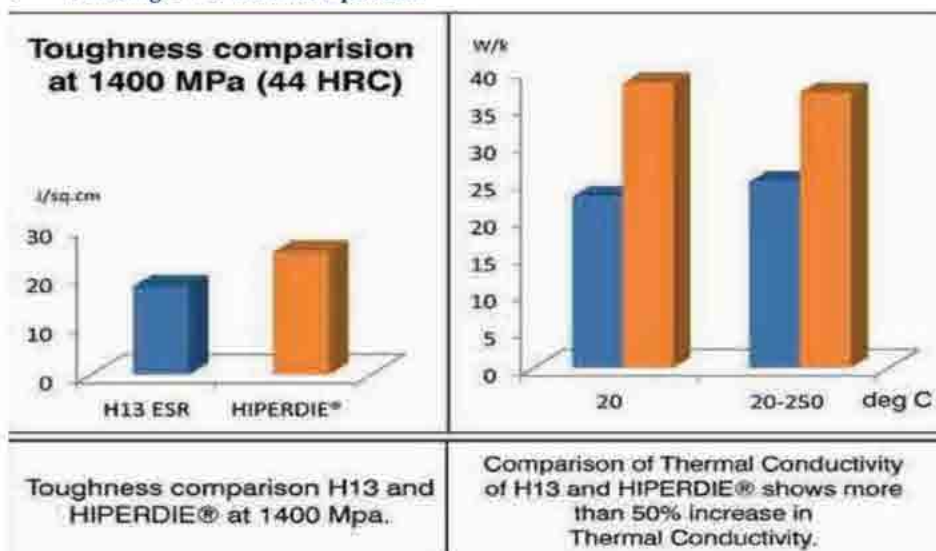
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Q If possible, could you share some management practices you applied to your system?

I would like to share an experience here. When I visited Japan in 2008 and stayed there for a month to learn about the tooling industry, I visited close to 25 tool rooms and interacted with the people associated with those tool rooms. One interesting thing I observed was that I found very old people making the tools, and I initially thought experience was the only solution to making good quality tools. But when I discussed with those individuals closely, I realised that it was not experience. In fact, those people were experts first and then gained experience. Even if you visit Japan today and visit any tool room, the owner will take you to a chamber where he will show you certificates and indicate how many experts, national experts he has in his shop. So, it is not just experience but expertise that we must aim for. This was the one message I took from that one month of my stay in Japan, and when I came back, I decided to start building experts. This was one strategy we adopted.

I have been fortunate to play an active role in the training and development activity in this organisation. Based on our knowledge, we made some modules that are a combination of Japanese techniques and our own learning and know-how of the Indian mindset and culture. These are some simple modules like templates that can be applied in every production environment. We made seven modules and have been applying them for eight years now. They are:

- 1 Focus on manufacturing excellence:** This mostly involves mindset work. We have instilled this passion for manufacturing excellence in all our manpower, and we aim for nothing less. Changing the mindset to aim for the best was the first task.
- 2 Set responsibility, accountability, and ownership in the team:** This way, we could develop leaders within the team who could take responsibility for certain tasks, and this was applied from the shop floor to the HOD.
- 3 Recognising defects:** Defects can happen to anyone in any project, but to minimise them, we categorised them into three categories: error, mistake, and violation, and started building solutions for some standard mistakes. This way, we could identify roadblocks and solve them without hampering the timeline.
- 4 Building experts:** In the tooling industry, it's difficult to find experts outside the organisation. We started identifying experts within the organisation, who could help us with training and skill development.
- 5 Deskilling operation:** It's very important in our industry to unlearn and relearn. We identified areas that could be standardised and areas that could be customised as per projects and started applying automation accordingly.
- 6 Culture building:** Our focus has been on cultivating a mindset of passion and excellence in our team members, particularly in their areas of expertise. To achieve this, we have been actively building a culture that fosters continuous learning and growth, while also providing ample opportunities for personal and professional development.
- 7 Building matrices:** In order to measure and identify areas of improvement for individuals, teams, and entire projects, we have developed matrices for performance evaluation. This has helped us to promote transparency and accountability, while also enabling each team member to gain a better understanding of their unique contributions to the project.

hired many of them, and helped our associates hire these trained students too. So, in the second decade of my experience, I observed that we did not get experienced people as we had earlier. So, we started skilling people to become experts.

Q You have the experience of working with several overseas and Indian toolmakers. What differences have you observed between the two?

I believe the biggest difference is that the Indian tooling industry lacks the necessary ecosystem. Unlike other countries, we do not have a centralised location where everyone in the tooling ecosystem can come together, which is crucial for the industry's overall development. With minor upgrades and changes, Indian tool rooms can match overseas tool rooms in terms of infrastructure and skills. Overall, a cluster approach is necessary for the growth of India's tooling industry.

Q What suggestions would you like to offer Indian toolmakers?

The Indian toolmaking industry has limitless opportunities. But I believe that toolmakers need to apply the following key suggestions to succeed:

- 1. Focus:** Identify your strengths and concentrate on them instead of chasing opportunities that may not align with your core competencies.
- 2. Embrace change:** Deskill and relearning will be crucial to keep up with the ever-evolving industry. Therefore, be open to learning new things and make space for new challenges.
- 3. Adopt a winning mindset:** Strive for excellence and aim to be the best in the business. Encourage this mindset among everyone in the organisation, from top-level management to machine operators.
- 4. Focus on people:** Invest in the training and development of your people to equip them with the skills necessary to tackle future challenges. ♦

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From a humble forge in 1856 to global leader in the production of high-quality steel products, the journey of Italy-based Lucchini RS has successfully forged through the challenges of time. This family-owned business has remained dedicated to its craft and committed to excellence. Nishant Kashyap visits the company's main plant at Lovere, Bergamo (Italy), and unravels the riveting reality of this four-generation-old thriving business.

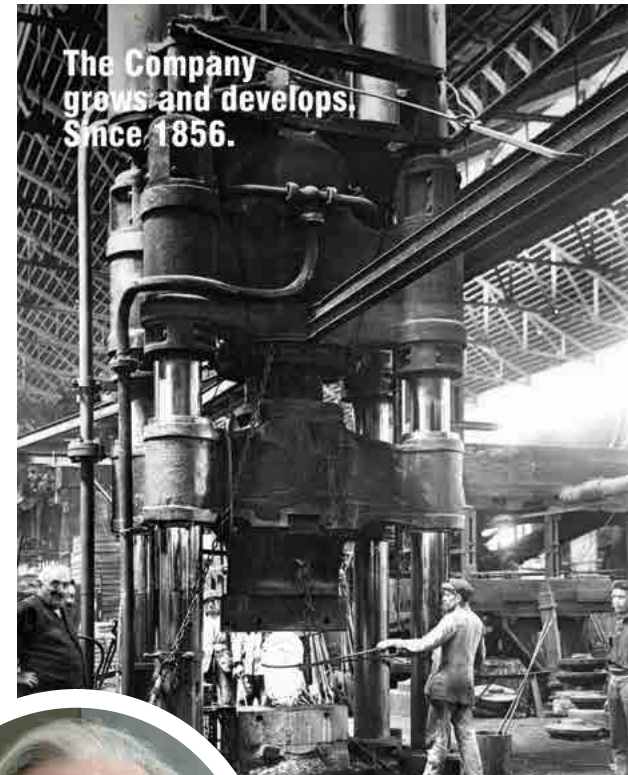
Lucchini RS: Forging ahead

Have you ever wondered what it would feel like to take a walk back in time and end up stepping into the future? While this may read like the exciting plot of a science fiction movie, in reality, it is the fascinating story of the Lucchini RS factory in Italy!

Headquartered in Brescia, the company's main plant is located at Lovere, Bergamo, on the west shore of the beautiful Lake Iseo, Italy. The plant covers an area of 237,000 sqm, including 147,000 sqm of factory buildings. As I stepped into the vast expanse of Lucchini RS's factory premises, I was mentally transported into the plant that began its operations in

1856 as a small forge, progressed through the 1900s and eventually evolved into a global leader in the production of high-quality steel products, where it currently stands.

Over the years, Lucchini RS has remained dedicated to its craft and committed to excellence – a fact that was clearly evident during my interaction with Mr. Giuseppe Lucchini, the company's Chairman. Mr. Giuseppe's passion for his work and his unwavering commitment to quality translates into every aspect of the factory's operations. Where does he find his inspiration? A look at the



Giuseppe Lucchini

"My grandfather's handcrafted activity was taken over by my father, Luigi, who built a small workshop. Using scrap from old rails and tyres, he

made the first production of small bars for reinforced concrete. It was the first step towards what will be a real industry. In the 1960s and 1970s, thanks to the post-war economic expansion, my father progressively developed the business, acquiring the first rolling mills and then the electric melting furnaces. In the following decades, the development became even stronger, building and sometimes acquiring even modern plants and more efficient steel mills. In 1990, in the frame of a state-owned steel mills reorganization plan, my family acquired a historic company founded in 1856, which is our main plant based out of Lovere, Bergamo on the banks of Lake Iseo," he continued.

In the early 2000s, the company started to expand and created subsidiaries in the UK, Sweden and Poland. "The year 2008 marked the beginning of a new

Lucchini family legacy holds the clue.

The Storied History

The history of the Lucchini Group exudes innovation, dedication, and excellence. Founded in 1856 as a small forge in Italy, the company began producing railway products in the early 1900s. Soon, it gained a reputation for quality and reliability. Over the years, the Lucchini Group expanded its operations, diversifying its portfolio to include tool steel products as well. Today, the company remains a global leader in the steel industry, and boasts of a history that spans over 150 years.

The company's rich legacy has been handed down through the generations. "Lucchini RS has been a family-run business. It has been handed down through four generations since the first decade of the last century. My grandfather Giuseppe Lucchini, who lived in Valle Sabbia, a beautiful and industrious valley in Brescia, started his own business in the field of metals. The streams flowing down from the mountains generated power to get the engines running as well as transported big steel hammers that were used to forge small tools utilised by farmers every day such as pickaxes, shovels and hoes," said Mr. Giuseppe.

phase for our industrial history because of a massive investment program to upgrade the Lovere site with advanced systems like a new rolling mill for railway wheels. The main purpose was to increase the quality and technical level in the railway market. As a matter of fact, the company name and logo changed to Lucchini RS. And 'RS' stands for Rolling Stock. On the other hand, along with the plant innovation program, the worldwide expansion went ahead, especially in 2010 with the development of new companies located in new and more important markets like India and China. Then, over the last decade, other strong investments have been made to strengthen the manufacturing process with advanced technologies, and new companies and joint ventures have been set up. This is how Lucchini RS has become an international steel manufacturing group with 13 companies and about 2000 employees across the globe," said Mr. Giuseppe.

The Tool Steel Division

Lucchini's tool steel division was established in 1984 as a small production unit within the Lovere plant. It focused mainly on the production of tool steel products. However, over the years, the division expanded its operations and improved its production capabilities

Talking about its product range, **Mr. Luigi Lucchini (Managing Director, Forging & Casting Division)**, who heads the company's casting and forging division, said, "Together with open die forging, the tool steel product line is the most important in our forging & casting division. Since 1984, we have been manufacturing forged tool steel for plastic injections, hot works and die casting. Our product range, where we have remelted forged tool steel as well, includes materials according to international standards and premium materials developed thanks to our metallurgists in the R&D department."



by investing heavily in advanced equipment and technologies.

"Tool steel is one of our 5 product lines in the forging & casting division. The company began manufacturing tool steel in 1984. At that time, the Lovere plant was still state-owned and in a bigger industrial group. The strategy was to complete the product range of the industrial group with the new product range of the Lovere plant," reminisced Mr. Giuseppe.

One of the keys to the division's success has been its commitment to quality and innovation. Lucchini RS has a dedicated research and development team, which is constantly exploring ways to improve its products and processes. This has allowed the division to stay at the forefront of the industry, continually developing new grades of tool steel that meet the evolving needs of its

customers.

Lucchini RS offers a wide range of tool steel products, including hot work and high-end plastic tool steel, plastic mould steel, and corrosion resistance (stainless & precipitation hardening) tool steel. Their tool steel products are used in a variety of applications, including automotive, aerospace, and machine tools.

"At the end of 2022, we launched a new brand strategy for our tool steel product lines. Other than the re-branding of certain steel grades, we introduced new steel grades for plastic injection with low equivalent carbon content. Our trusted Keylos 2738 MHH and Keylos 2002 became Keylos 35 EVO (where Evo means "Evoluzione", the Italian word for Evolution) and Keylos 40 EVO. We introduced new steel grades to complete the range: Keylos 30, Keylos 35 and Keylos 40. We are therefore completing our product range for low equivalent carbon steel grades, giving better performances than standard steel grades," said Mr. Luigi.

The Lovere Plant

The main factory of the Lucchini RS Group has been functional since 1856 and is equipped with the latest technologies to meet the growing demands of their customers. The Group's Lovere plant, one of the key manufacturing facilities located in Lovere, Italy, is equipped with state-of-the-art technologies and production processes, allowing the



company to manufacture a range of high-quality products. The factory has mainly five product lines in forging and casting division, ingots (up to 60 tons), castings (up to 160 tons), bars (diameter from 200 to 1300 mm), open die forging (up to 40 tons) and tool steel (up to 43 tons). In railway division, the other company division, is dedicated to the production of wheels, tyres, axles and wheelsets, plus a wide range of different solutions and services.

"We believe in investing in technologies. With our investment in the new forging press, which is planned to commence operations from Q1 2024, we will not just increase dimensional range and quality, but will also become more efficient and even save on natural gas consumption, which will reduce our CO2 emission rate," said Mr. Luigi.

On that eco-friendly note, he added, "Our production model is based on a circular economy aimed at reducing the consumption of resources, promoting the reuse of resources in the manufacturing cycles and fostering recyclability. 88% - that's the percentage of recycled raw materials we currently use. And, thanks to our energy plan, we have reached our goal to avoid total atmospheric emissions of approximately 3,828 CO2 equivalent tons in the last 3 years."

The Innovative Approach

Innovation and research are at the heart of the Lucchini Group's philosophy. The company has a long history of investing in R&D to drive continuous improvement and new product development across various divisions. Its team of highly trained scientists and engineers work on a wide range of projects



at the Group's dedicated research center. The research and innovation efforts at the tool steel division of the Lucchini RS Group are no exception. The division has a dedicated R&D team that is constantly exploring new ways to improve its products and processes. This has allowed Lucchini RS to develop new grades of tool steel that meet the evolving needs of its customers and to stay at the forefront.

And, quality plays an important role too! "Quality assurance is one of the pillars of our group. Considering we are a leading manufacturer of railway products, the reliability of our products for safety reasons is fundamental. In the forging and casting division, we have the same mindset, and our processes and products are strictly monitored and checked during the several production phases. Regarding continuous improvement, we have established the 'Lucchini Management System' (LMS). This system is the organized set of our values, objectives, and work standards. It helps us develop

organizational and technical abilities, connecting our strategic goals to our operational objectives. Basically, LMS is a bridge between our strategy and our daily activity," explained Mr. Luigi.

The Challenges

Innovation often arises in response to challenges or problems that need to be addressed. This is certainly true in the case of the Lucchini RS Group and its tool steel division. The group operates in a highly competitive industry and faces a range of challenges, including changing customer needs and preferences, and increasing competition from both established players and new entrants in the market.

For Lucchini RS, this means investing in new technologies and processes to improve the performance and quality of its tool steel products. The division's research and development team works closely with customers to understand their needs and to develop new grades of steel that meet those needs. This requires a deep understanding of the properties of different metals and alloys, as well as a keen understanding of the needs and preferences of customers in different industries. Lucchini RS has over 50 workers in the Metallurgical/R&D department, who collaborate with the technical and sales teams to collect



feedback from the customers and develop the new solutions requested for tomorrow.

"On one hand, the performances requested by our steel grades are increasing, and on the other, there is tremendous pressure on efficiency and price competitiveness. Our new Keylos range goes in the direction of both targets offering great performances at a competitive market price. The market is also requesting bigger blocks because of the increasing dimension of cars, and especially for the increasing dimension of the aluminium structural parts. This is one of the reasons why we invested in a new forging press last year; our dimensional range will increase with blocks weighing more than 40 tons," expressed Mr. Luigi.

The Indian Opportunity

The growing Indian manufacturing industry presents a significant opportunity for companies like the Lucchini RS Group. By establishing presence in the country and developing products and services that meet the needs of Indian customers, the company can tap into this growing market and drive long-term growth and success.

"In recent times, India has transitioned from being a total import market to a selective technology import market. By partnering with high-end technology companies, the government is promoting domestic production and export of

critical items. International coverage indicates that India is making remarkable progress in various sectors, such as IT, AI, defence, aerospace, automotive, agriculture, railways, medicine, and healthcare, among others. We are committed to the Indian market. This is especially true for us given our longstanding association with India through Multiple Special Steel Pvt. Ltd. They have been our authorised tool steel service centre in India for nearly two decades," said Mr. Giuseppe.

"As a businessman constantly seeking out new avenues and growth markets, we perceive significant opportunities in India right before us. India is an important player in the economy of coming decades," he added.

The Future Plan

The Lucchini management understands the importance of keeping abreast of the latest trends and technologies in their industry, staying competitive by introducing new and innovative products, and expanding their market reach. Their new investment in the 7.000 tons forging press is a testimony of the same. "We are planning further investments in heat treatments and in machining capability, especially in our owned distributor Lucchini FA.RO. More machining capability will enhance our service performance. We are continuously investing in our plants and equipment to enhance our quality and competitiveness, and

are evaluating the expansion of our authorised distributors around the globe to geographically cover all the markets," said Mr. Luigi.

With regard to the Indian market, through Multiple Special Steel, Lucchini RS has worked closely with Indian die and toolmakers along with some automotive OEMs. "We are thrilled to receive larger and larger-sized inquiries not only for car bumpers but also for truck bumpers in India. This indicates significant growth in the Indian tooling industry in terms of both capacity and capability. Another interesting trend we have noticed is the increased demand for aluminium 'structural' die-casting, which is a necessity as the automotive sector moves towards electric vehicles, where weight reduction is crucial," he added.

Lucchini RS believes it is well equipped to meet this demand for structural since they are "one of the few European mills that can be relied upon to manufacture and supply die-casting tool steel grades according to NADCA levels (e.g. Eskylos 2343 and 2344 EVO among the others), both ESR purified and extra-forged to obtain sizes as large as 700mm thickness, 1400mm width, and up to 2000mm in length", explained Mr. Luigi.

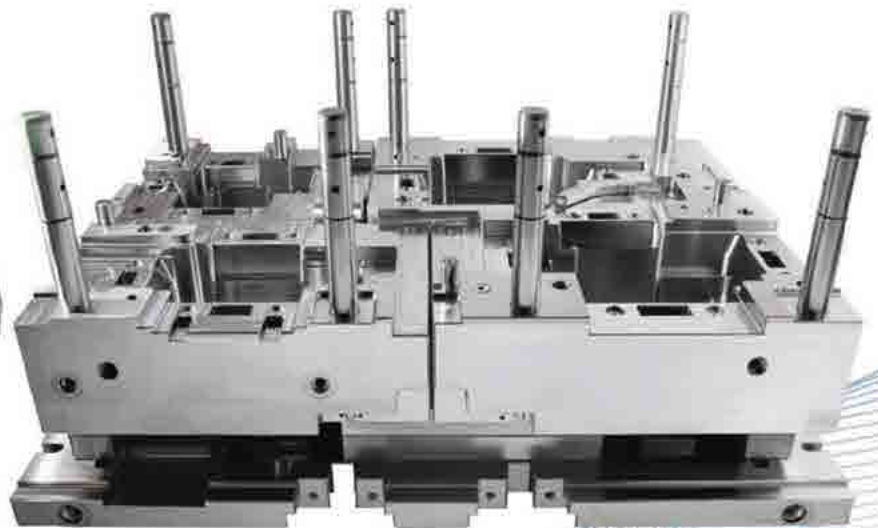
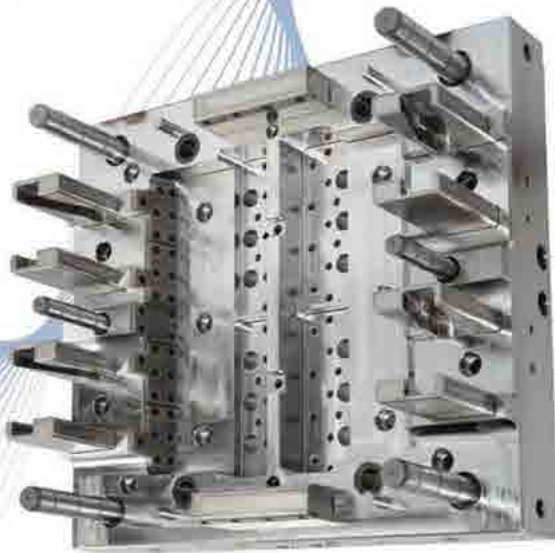
"As the present sentiment indicates, India has a huge market potential for internal consumption. Lucchini RS has plans to harness this tremendous growth potential. We will achieve this by supporting and serving the Indian industry with world-class quality products at affordable prices in time every time," affirmed Luigi.

Visiting Lucchini RS's state-of-the-art factory has been an interesting experience for me. What are my takeaways? Innovation and continuous improvement, customer-focussed approach, timely diversification and adaptability, the right strategic partnerships and collaborations, and commitment to sustainability can help a company achieve greater heights. ♦

Image Courtesy: Lucchini RS



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Hydraulic manifold for aerospace redesigned for Additive Manufacturing with Objectify Technologies



For the design and manufacture of hydraulic block manifolds, Additive Manufacturing (AM) is highly suited due to its ability to build internal features and passageways. Objectify Technologies has collaborated with a customer to redesign their current hydraulic block manifold with AM in mind.

The 3D Printing project sought to reduce the weight of a component while retaining its robustness. Due to the increased design freedom associated with AM, an opportunity was identified to improve flow paths. Objectify Technologies optimised the given design by reducing weight while considering loading constraints.

The aerospace industry is the research, development, and manufacture of flight vehicles and spacecraft. It produces aeroplanes, spaceships, and other aerial vehicles. The industry also designs, assembles, and tests such vehicles. Technical innovation is a trademark of this industry.

What is a hydraulic block manifold?

Hydraulic manifolds are used in the aerospace industry to regulate fluid flow. This helps us control the transfer of power between actuators, pumps, and other components in a hydraulic system.

Traditional manufacture of hydraulic block manifolds

Traditionally, hydraulic block manifolds have been manufactured from an aluminium alloy or stainless steel billet, which has been cut and machined to size and drilled to

create the flow pathways. Specialised tooling is often needed due to the complex drilling that is required. Passages require blanking plugs to properly direct flow through the system. The nature of the manufacturing process leads to the formation of abrupt angled junctions between flow paths, which causes flow separation and/or stagnation – a major contributor to efficiency loss.

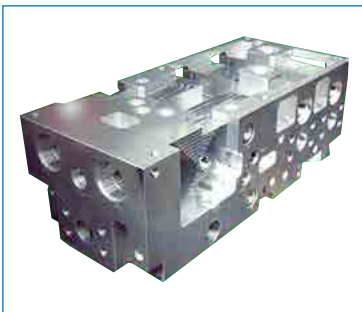
What material is used to print the hydraulic block manifold?

The material used to build is an age-hardening cast aluminium alloy that

Advantages of AM for the design and manufacture of hydraulic manifolds:

- ▶ Optimised flow paths increases efficiency of component functionality
- ▶ Need for fixturing is less
- ▶ Minimal requirement for removable support structures
- ▶ Significant weight reduction is achievable
- ▶ Block extraction passages are not required
- ▶ With full design freedom a manifold can be designed to pack into a significantly smaller volume

provides good hardness, strength and dynamic toughness. Aluminium alloy manifolds are generally less expensive to fabricate than stainless steel manifolds, and can be easily machined. However, because they are softer than stainless steel, aluminium can be worn away by loose particles in the flow. Stainless steel manifolds may cost more initially due to their higher material cost and machining complexity, but their higher hardness and density make them resistant to abrasion.



By eliminating unnecessary drill channels and substituting them with simpler designs, critical areas can be modified and internal channels redesigned for manufacturability by 3D printing in the considered orientation.

After analysis, the design was modified to improve its efficiency and strength. The new design was printed on a 3D printer and subjected to stress tests. The maximum stress observed on the component was 267 MPa. The original weight of the manifold was 21 kg; after optimization, we were able to reduce its weight by 6.1 kg — approximately 30% of its initial weight. The final

Direct benefits to customer:

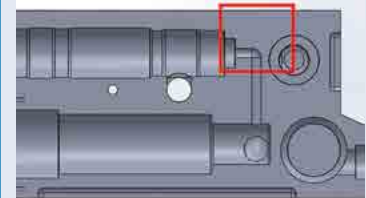
- ▶ Mass reduction of up to 30%
- ▶ Single piece construction, fewer opportunities for defects
- ▶ Rapid design and development iterations
- ▶ Compatibility with existing design
- ▶ Improved flow efficiency of up to 60%



weight after optimization was 14.9 kg.

Final changes were made to the design, and supports and stock material were added. The part was then fed into the 3D printer for printing. After printing was completed and the part had cooled down, it was taken out and post processing activities began. Build plate removal and manual powder removal took place next. Dimensions and quality checks came next, followed by an inspection for any defects in the print. Thus, we were successfully able to create the hydraulic manifold, which is more efficient, simpler in structure and lighter in weight using AM technology. ♦

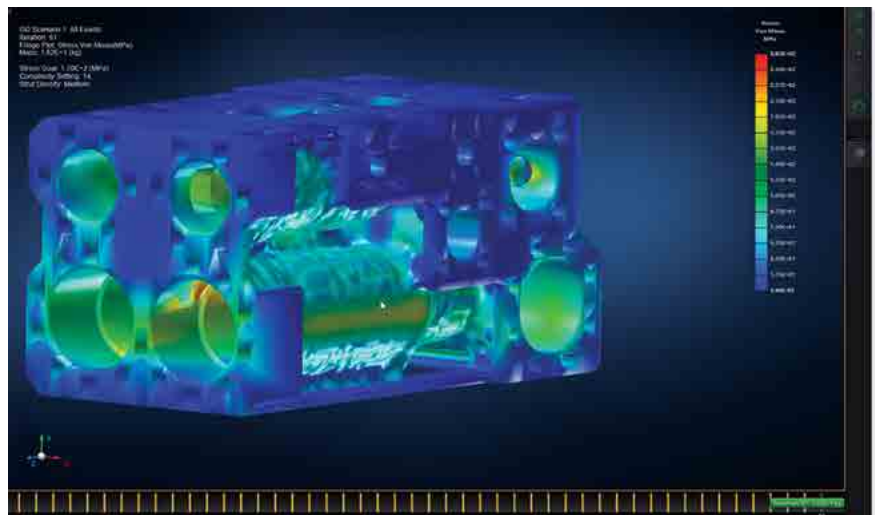
*Article and images courtesy
Objectify Technologies*



First design iteration

The previously provided part design is modified into a new one by design optimization by using simulation software.

- ▶ RHINOCEROS 3D was used for design modification
- ▶ MSC APEX was used for design optimization
- ▶ MATERIALISE MAGICS was used for data preparation
- ▶ SIMU FACT ADDITIVE was used for build simulation



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WORKNC automates mould maker's weekend production

Julien SA's finishing machining times slashed from 32 hours to 14

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

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

They mainly produce single order parts, or two to three small series moulds for foam parts. Based at the 10,000 square-metre head office in Le Creusot, France, Programming Manager Sergio Couto is responsible for preparing production and implementing the product manufacturing process. His department takes the lead on a range



of aspects such as technical issues, monitoring and quality control for tooling production.

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

The software is installed on seven computers on the company's

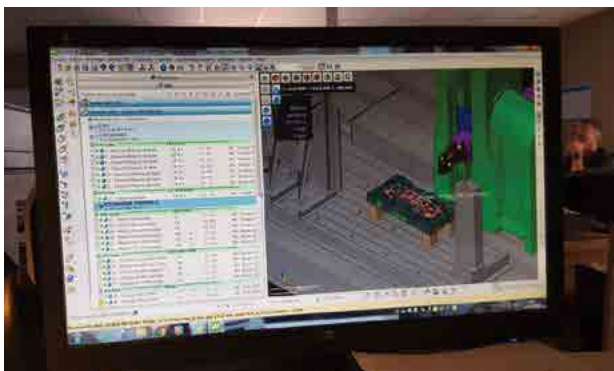
network, and drives three 5-axis machine tools: a Breton, Durango and Rambaudi; and four 3+2 machines: a Goglio, FPT, Anayak and Soraluces.

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

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

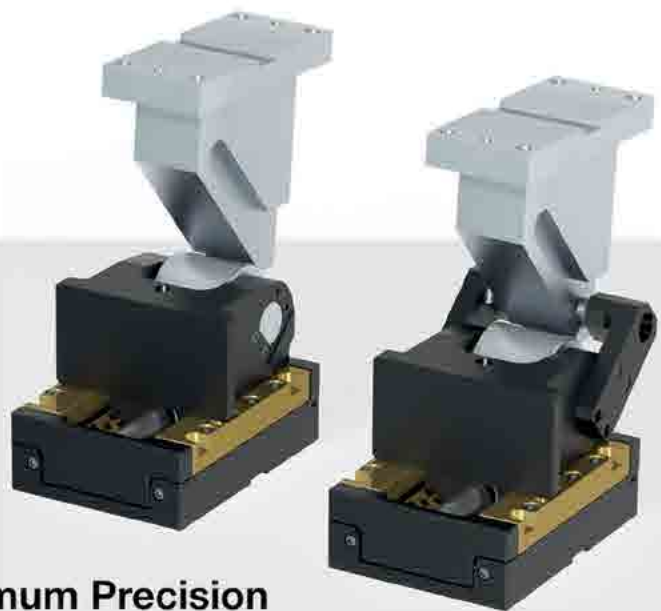
They then turn their attention to the number of parts they need to produce, and create the models in WORKNC, adding offset allowances, and any other details required for accurate machining.

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



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toolpaths to the specific machine being used.”

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

The final phase is in the workshop, where WORKNC’s simulation function validates the process before the machines start cutting metal. And, he says WORKNC’s powerful programming allows them to undertake lights-out machining. “It means the workshop operates 24/7. From midday on Friday and over the weekend, it is fully autonomous, with automatic tool changing and head rotation. We couldn’t do that without WORKNC.”

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

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

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

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

The company has also invested in a mobile measuring arm from Hexagon, to make precise measurements at different stages of the manufacturing operation. They use it to make immediate decisions to either modify or continue the

process when a doubt arises, which he says guarantees security, saving time. “This all helps with the precision we need to actually manufacture the part, ensuring it’s of high quality, and that it can be cleanly and accurately trimmed, which is particularly important for its final appearance, as many of the parts coming out of our moulds are visible to the end user in the vehicles.”

Concluding, he explains why they first invested in WORKNC in the 1994, and how it has developed since then: “In the 90s mould makers started receiving files from India and China, in which radii and planar surfaces didn’t conform to the original part, and it was no longer possible to program with CATIA. Even back then, WORKNC could rapidly generate a toolpath, irrespective of a part’s complexity, and imperfect surfaces.

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

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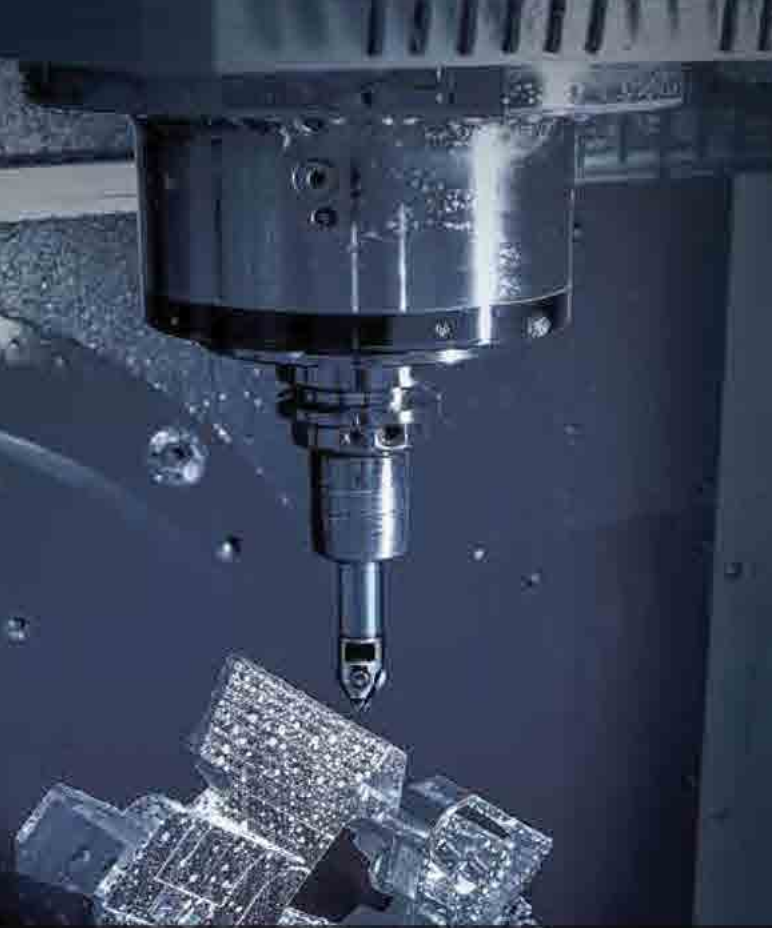
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Kyndryl and IIT Tirupati collaborate to advance AI-enabled 3D printing for manufacturing sector

Kyndryl, the world's largest IT infrastructure services provider, and the Indian Institute of Technology (IIT) Tirupati, one of the premier technology institutions in India, have recently announced a collaboration to advance research, share knowledge, promote innovation and drive breakthrough developments in AI-enabled 3D-printing technology. The collaboration will focus on quickly developing cost-effective 3D prototypes for complex products in manufacturing.

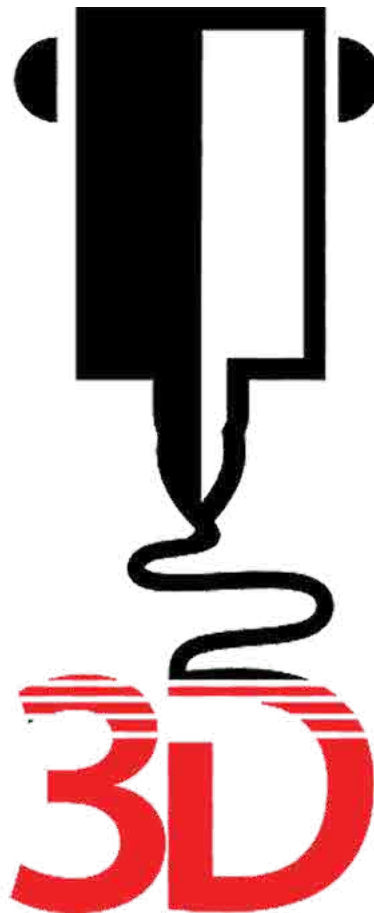
The evolution of 3D technology has become increasingly vital in the development and manufacturing of product prototypes that are then used to troubleshoot design issues before mass production. As digital transformation increases, the demand for skills and capabilities in smart manufacturing is increasing.

The collaboration will combine IIT Tirupati's domain knowledge in 3D printing with Kyndryl's global expertise in Artificial Intelligence (AI), enabling the co-creation of Machine Learning (ML) models that will allow for near real-time identification of potential defects during 3D printing. Gaining this knowledge in advance could help identify significant savings in cost, time and waste generation, as well as contribute to new product development by predicting performance in real-world manufacturing environments.

"This partnership will enable IIT Tirupati students and faculty to collaborate with Kyndryl's best-in-class professionals on the frontiers of implementing AI to solve industry challenges," said Prof. K.N. Satyanarayana, Director, IIT Tirupati. "The co-creation in the digital manufacturing segment with Kyndryl can quickly provide cost-effective solutions to the



IIT Tirupati's academicians joined by Kyndryl India leaders at the signing ceremony. (L-R) Dan Anamitra, Digital Engagement Analytics Leader - Kyndryl India, Sheela Siddappa, Data and AI Services Expert - Kyndryl India, Prof. K.N. Satyanarayana, Director - IIT Tirupati, Dr. Anil Kumar, Dean-SRC - IIT Tirupati, Dr D.V. Kiran, Dept of Mechanical Engineering - IIT Tirupati.



manufacturing industry and provide better exposure to our students."

"India's National Manufacturing Policy aims to raise the manufacturing sector's GDP share to 25% by 2025. To accomplish that goal, research advancements and skills development will play an important role in deploying AI in innovative ways to make smart manufacturing technology more accessible and efficient," said Lingraju Sawkar, President, Kyndryl India. "This collaboration will harness Kyndryl's Data and AI expertise to help IIT Tirupati create a meaningful learning experience for students and serve as a scalable model of how industry and academia can co-create to help industries."

The two organizations have already begun joint research and will be launching a series of thought leadership conclaves and innovation challenges to advance new ideas across industry and academia that aligns with the National Innovation and Start-up Policy-2019 (NISP-2019). ♦

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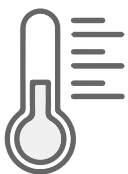


Phillips Machine Tools India Pvt. Ltd.

10 tips to get the most out of a grinding machine

With the complex machinery and multi-component structure; building and maintaining a grinding machine can be a real task. However, considering that it is a long-term investment with good returns, one can always plan and aim at getting the most out of the surface grinding machines. While the users

need to focus on daily care and timely maintenance, the surface grinding machine manufacturers need to incorporate certain machine-oriented techniques that can lead to the most efficient use of the equipment. In this article, we have discussed ten tips that should be implemented to make maximum use of a grinding machine in the most effective manner.



Maintain the temperatures

Make use of a chiller that will help in maintaining the correct oil temperature. It may be expensive but is crucial at the same time, making the investment worthwhile. The coolant and ambient temperature should be within one degree of each other and are supposed to stay stabilised.

1



Extra care of grinding wheels

Wheels play an essential role in the smooth functioning of any grinding machine. Hence, occasional dressing and conditioning of these grinding wheels are necessary to escalate its performance and enhance the surface finish.

2



Follow the manual rules

Whenever purchasing a new machine, one must thoroughly go through the manuals and documents to gain knowledge and prevent errors. Following the advice suggested, surface grinding machine manufacturers can go a long way in ensuring the best condition of their equipment in the long run.

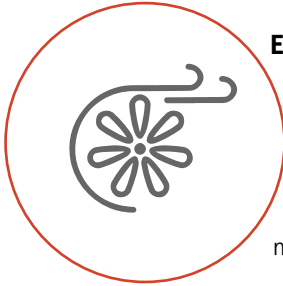
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Cleanliness is the key

It is highly recommended to keep the grinding machine system always tidy, structured, and clean. An organised system also prevents components from getting misplaced, helping you save time.

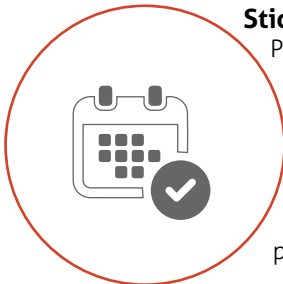
4



Effective cooling system

A coolant system should always be kept filtered and clean, as it is directly related to the efficient functioning of the grinding machine. Consider investing in a top-quality coolant system because good filtration guarantees sustainability of the system and more productivity.

5



Stick to the prescribed schedules

Plan a schedule for maintenance on a daily, weekly, and monthly basis, as instructed by the grinding machine manufacturer. Strictly take out time for cleaning and maintaining the components to prevent any technical issues from arising in the future. Breakdown maintenance can cause more damage, hence, preventive maintenance is suggested.

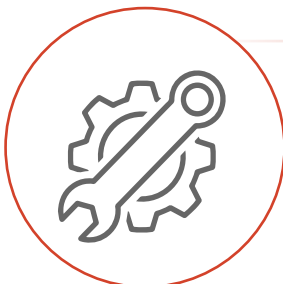
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Carefully handle fragile elements

Almost all elements of the machine, like collet adapters, grinding wheels, etc., are costly and fragile. Hence, special care needs to be taken while storing and handling them to sustain their condition and quality.

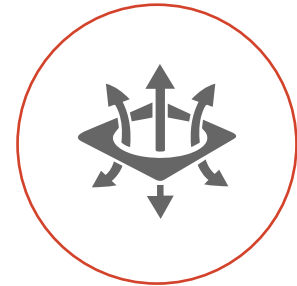
7



Maintain the condition of collets

Collet is one such component that needs to be replaced from time to time as they are consumable. One can't afford to continue using it with collected dirt or grinding marks.

8



Supply of air and electrical power

Consider the instructions given by the manufacturer in terms of the quality of air supply and electricity being provided to the machine. These may seem like trivial factors but play an important role in saving the machine from future breakdowns.

9



Quality of blanks

A lot about the machine's performance depends on the quality of the blanks and their insertion depth into the collets. Therefore, make sure to invest in high-quality blanks and check correct insertion in the collet.

10

By following the activities mentioned above, one can undoubtedly sustain their grinding machine equipment for the longest time while making the maximum revenue out of the investment. ♦

Article and image courtesy
Phillips Machine Tools India Pvt. Ltd.

AI-based Software



NCBrain has developed the new software to optimise machining of dies and moulds. After 20 years of experience in die and mould machining, NCBrain has developed the new AI based software called NCBrain AICAM. The AI-backed software only need some input data like CAD model and the tool holder and tools selection is done by the software itself automatically.

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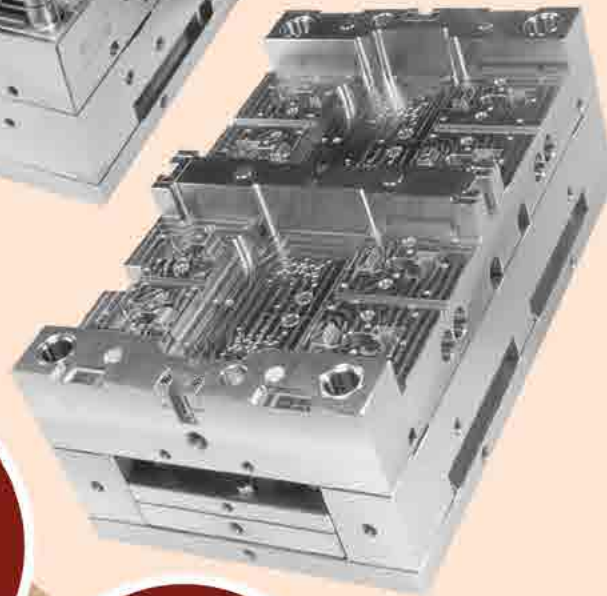
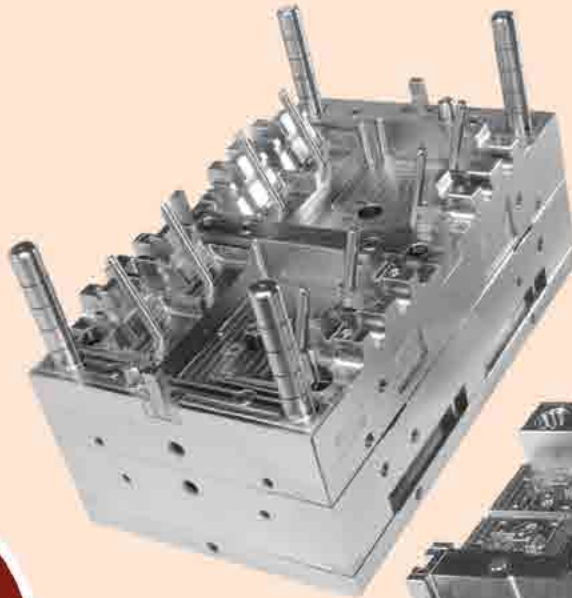
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Thermal Conductivity λ at 20°C	W / m -K	208	156
Electrical Conductivity	% I.A.C.S	48	30



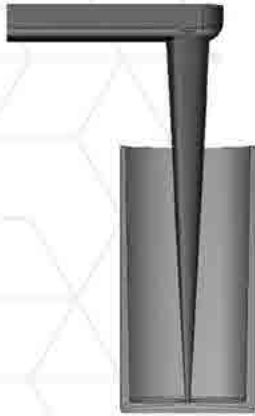
Address

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3PLATE MOLD
WITH COLD RUNNER

ELIMINATE
WASTAGE



REDUCED
CYCLE TIME

FASTER
COOLING

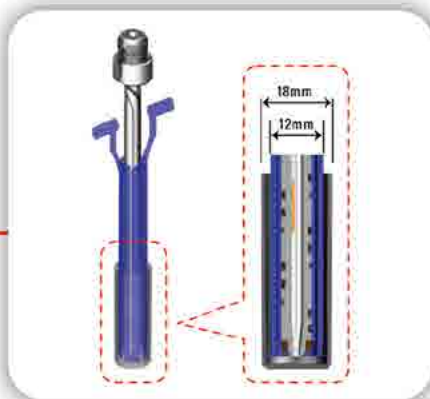


LIPSTICK CAP WITH
YUDO MICRO BORE NOZZLE

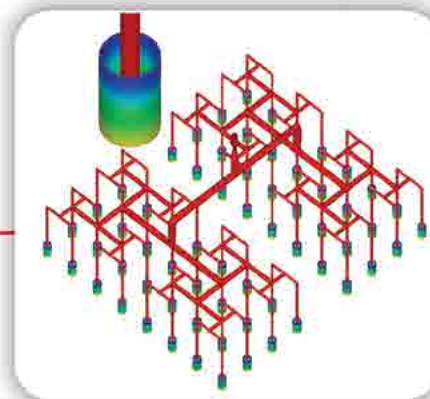
ACHIEVE MAXIMUM PRODUCTIVITY WITH YUDO ADVANTAGE IN

DEEP CORE SOLUTIONS

Deep core gate is a patented system with advanced nozzle design and ISO technology. It improves gate quality and reduces cycle time resulting in remarkable productivity gains



MICRO NOZZLE WITH COOLING



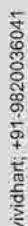
ANALYSE & VALIDATE CYCLE TIME



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On Time
Delivery



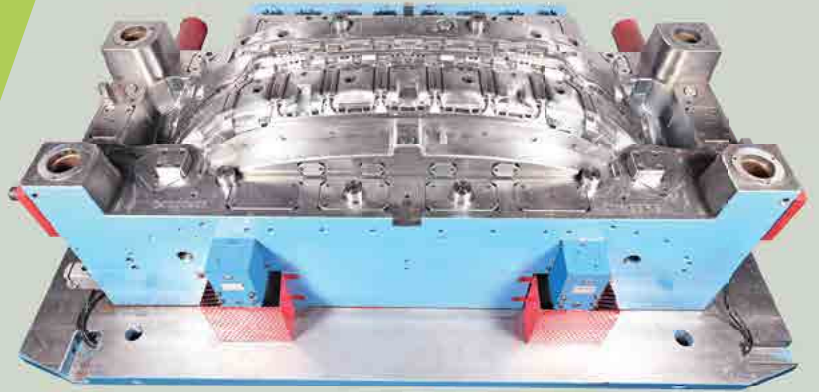
First Time
Right

%

Zero
Accidents



Sustainable
Procurement



UPPER GRILL
FRAME



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