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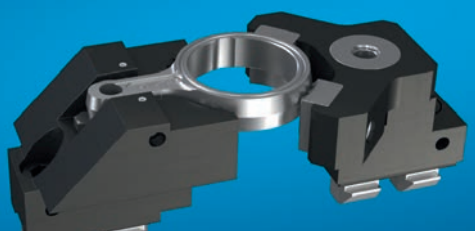
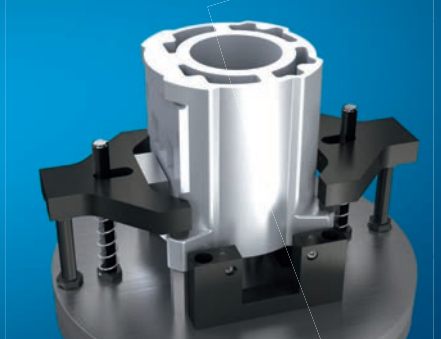


Turning mechanism
Low-deformation clamping. Purely axial clamping with relative positioning.



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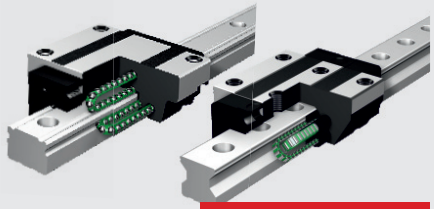

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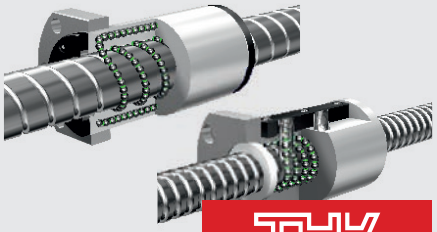

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HAAS

L Krishnan
President, Indian Machine Tool Manufacturers' Association (IMTMA) and
Managing Director, TaeguTec India Pvt Ltd

Pushing Forward for Sustainable Growth

Greetings!

Riding on the wave of optimism generated from the positive growth recorded in FY15, the manufacturing industry is fast tracking towards development. The quarter point reduction in repo rate to 7.25 per cent by the Reserve Bank of India in June, this year, has sent the right signals to the world and has made India's intention to put its economy on sound footing even stronger. This will open up room for more investments.

Going forward, our industry needs to renew their focus and efforts at building machine tools that can design, produce and operate in a sustainable manner, if it wants to translate opportunities into success. Capital productivity and labor productivity will no doubt be the key aspects to sustain and attract investments in the sector. Additionally, the industry needs to focus on technological improvements while maintaining energy consumption and resource efficiency to sustain and attract investments.

Elsewhere as well, sustainable manufacturing is a critical parameter for decision making factors such as productivity, cost and flexibility. Sustainable manufacturing will allow companies to make their presence felt in global markets and tap into growth opportunities in emerging sectors. Much will depend on the investments into research and development (R&D).

To guide and facilitate this journey, the Indian Machine Tool Manufacturers' Association (IMTMA) has worked with the government in shaping various policy schemes for the benefit of the industry. IMTMA interventions resulted in the Department of Heavy Industry announcing the Scheme for Enhancement of Competitiveness in the Indian capital goods sector. This is a great opportunity for technology development and acquisition. I would urge machine tool units to take advantage of the scheme by putting up proposals for technology development and acquisition. The Association has also developed a site called 'IMTMA – Institute Innovation Collaboration' to bring together industries and institutes willing to work on R&D projects.

The machine tool expos at New Delhi and Ahmedabad will enable one to engage with users in specific regions. Both the expos have received an overwhelming response not only from India but also from overseas. The National Productivity Summit is scheduled to be held in November, this year, and at this summit, one will be witnessing some path breaking concepts and initiatives undertaken by various manufacturing industries in order to enhance their productivity towards sustainable manufacturing.

I would like to conclude by calling upon the industry to whole heartedly support IMTMA's initiatives and join hands in its journey towards excellence.

Wishing you a pleasant reading.

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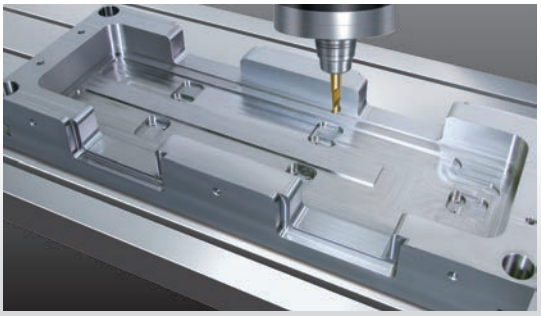

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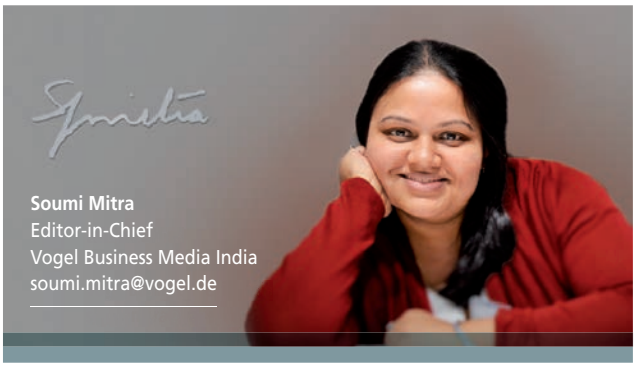

Soumi Mitra
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Progress: The Journey not the End Goal

Recently, we were spectators to a nationwide gung ho after the UN declared June 21 as Yoga Day. For the first time, the entire country witnessed the Prime Minister leading a gathering of around 37,000 people at the iconic vista in Rajpath, New Delhi. Orienting the importance of yoga, Modi emphasised that the practice is not just about exercise, it is a way to discover the sense of oneness with oneself, the world and nature; consequently, a means to enhance effective team work and maintain an ecological balance.

"The greatest threat to our planet is the belief that someone else will save it."

~Robert Swan, OBE, FRGS

An analogy could be drawn between yoga and sustainability. As yoga, in its most basic form, is a practice—a journey to taking stock of one's progress and making adjustments and corrections to find the right position, similarly, sustainability is a rigorous practice—an organization's long journey towards what is achievable with measured movements. It is about being thoughtful and discerning in our move towards progress by taking stock of where we are, and recognizing the small and big adjustments we need to make for a better life.

The objective behind sustainable building is to preserve our environment and avoid depletion of the earth's natural resources. Focussing on renewable energy, sustainable materials, water conservation, site development and indoor environmental quality green buildings not only helps cut down on emissions released into the ozone but also helps to significantly reduce energy, water and HVAC costs. Hence, companies these days work to create sustainability programs of substance that have a meaningful and lasting impact on communities and environment, lending several economic and societal benefits.

In this context, we happily present you this 'green' issue because the green movement is here to stay and the benefits of sustainability will continue to grow!

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▶ **FACILITY VISIT:** The shopfloor at SKF's Pune facility. 43

▶ **ADDITIVE MANUFACTURING:** The hybrid machine allows milling and additive manufacturing in one fixture. 48

▶ **COMPONENTS:** Husky's Ultra Helix provides the possibility to direct gate parts with gate vestige, it is so clean that it is often unmeasurable, with a level of gate quality that lasts for millions of cycles.. 52

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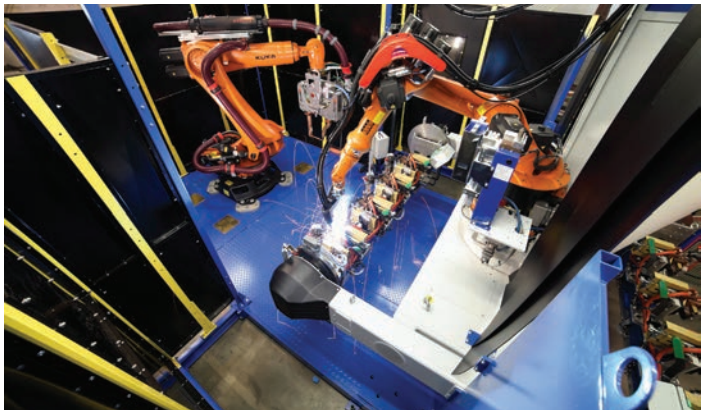

▶ **WELDING:** The streamlined design of the wrist ensures that the robot enjoys minimal disruptive contours and maximum freedom of motion. 56

▶ **MACHINING:** The largest JUNKER platform built to date will soon be put to use for the grinding of crankshafts. 58

▶ **EVENT REPORT:** Managing Director, Reed Triune Exhibitions Pvt Ltd, Cyril Pereira (extreme left);Minister of State for Woman & Child Welfare, Food & Civil Supply, State of Maharashtra, Vidya Jayprakash Thakur (third from right) and CEO, Reed Exhibitions India, Michael Mandl (second from right) along with other dignitaries at AMTEX 2015. 66

▶ **EVENT REPORT:** (LtoR): Minister of Industries, Government of Tamil Nadu, Thiru P Thangamani; Managing Director, Lucas TVS Ltd,TK Balaji and President, Powder Metallurgy Association of India (PMAI), N Gopinath inaugurating the event along with other dignitaries. 72

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How Engaged is Your Customer?

"Intent and actual behavior can be very different. Loyalty is an emotional state, whereas engagement is actual behavior."

CEO,
Micromatic Machine Tools Pvt Ltd,
TK Ramesh

In these days of continuous change, globally linked economies, volatility and uncertainty are the only constants. Customers are closing their purses and opening them only to a favored few. In such conditions, companies need to re-strategize themselves on sound customer performance metrics. There are a plethora of measures such as loyalty index, net promoter score, customer loyalty, customer engagement, advocacy, etc., which could lead or mislead the strategy if not carried out properly.

In the capital equipment space, where there are long-term relationships between machine tool companies and their customers, it is important to realistically understand and correctly interpret customer perspective measures.

Machine tool customers are a demanding group. They have huge expectations and, often, little patience for companies that do not meet them. Even if a company somehow meets their expectations, it does not necessarily mean they will remain satisfied loyal customers. Sometimes customers move because they are curious about a new competitor. Sometimes customers move just because they can.

Loyalty is not an accurate measure

Customer loyalty in machine tool buying is difficult to measure. Loyalty is typically gauged indirectly via surveys that capture an intention to recommend or to repurchase. But stated intent and actual behavior can be different. Consequently, loyalty as a business metric is often misleading and in turn, makes loyalty problematic for justifying increased resources and credibility among customer sales and service executives.

Customer engagement, on the other hand, is an effective leading indicator of loyalty and profitability. Customer engagement is the extent of a customer's willingness to invest his or her discretionary time with a company for mutual benefit. It is easier to measure, easier to influence, and more strongly correlated with revenue and profits than loyalty measures.

There are two key components of customer engagement – advocacy and involvement. Engagement is measured by activities that build positive connections between a company and its customers, which results in greater involvement that positively impacts revenue. Successful machine tool companies engage with customers in their growth efforts, especially in product innovation, and overall business strategy.

Behavioral analysis

Effective engagement activities create emotional attachments that draw customers closer to protect companies from their competitors; encourage repurchasing and promote evangelism. Engagement will become a key metric of business performance in the future.

The key characteristics of customer engagement will be intuitive where machine tool customers provide referrals, participate in product and strategy advisory boards, speak at conferences on behalf of the company, and advocate company products. They are clearly more likely to repurchase and increase the company's share, with reduced price sensitivity.

Engagement is a more accurate measure of customer perception and is a leading indicator of loyalty. Loyalty is an emotional state, whereas engagement is actual behavior. Contrastingly, engagement is based on observable behavior.

Planning the future together

Engaged customers trust your brand, advocate for you, and buy a greater breadth and depth of your machines. They recognize that their strategies and your strategies are aligned.

This is the age of engagement, customers are demanding to be heard and involved. Successful companies will continue to grow further as they engage customers in customer acquisition, retention, operations, innovation, and even strategy. MMI

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

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India Needs 'Sustainable Manufacturing' to Remain Globally Competitive

India's machine tool industry is taking ardent steps to improve productivity and sustainability. By developing good design capabilities, the industry is able to build machines in mid-level applications and special purpose machines.

With Indian companies beginning to make their presence felt overseas, it is time for the machine tool industry to step up and take adequate measures to enhance its research and development (R&D) capabilities, innovations and become energy efficient.

Source: IMTMA

These measures could be either technical, i.e., applied to the machines themselves or organizational, i.e., applied in the overall production process.

Enhancing sustainability

Machine tools play a critical role in enhancing manufacturing excellence. Indian machines are price competitive in their range and also hold an edge in flexibility to change, and availability of after sales service network. Despite these advantages, the industry is confronted with the challenge to bridge technology gaps. Enhancing research and development efforts is an important step to attain manufacturing excellence. Additionally, the industry needs to place larger emphasis on developing new products, modern safety concepts and processes to aid manufacturing through machine tools that can operate and produce in a sustainable fashion. It should aim at 'sustainable manufacturing'.

Reduction in energy consumption with respect to machine shops; capacity enhancement through manufacturing system redesign; weld shop productivity improvement through elimination of process, parts, quality and equipment downtime; alternative cooling techniques and reducing emissions, are routes to sustainable manufacturing.

Global leaders such as Germany, Japan and China that are strong in manufacturing, build brands owing to their research and development (R&D) and innovations that are increasingly linked to eco-design. India needs to emulate this; it needs to bring forth energy-efficient machines into the market by focusing on technological independence and manufacturing excellence. This could be achieved when the

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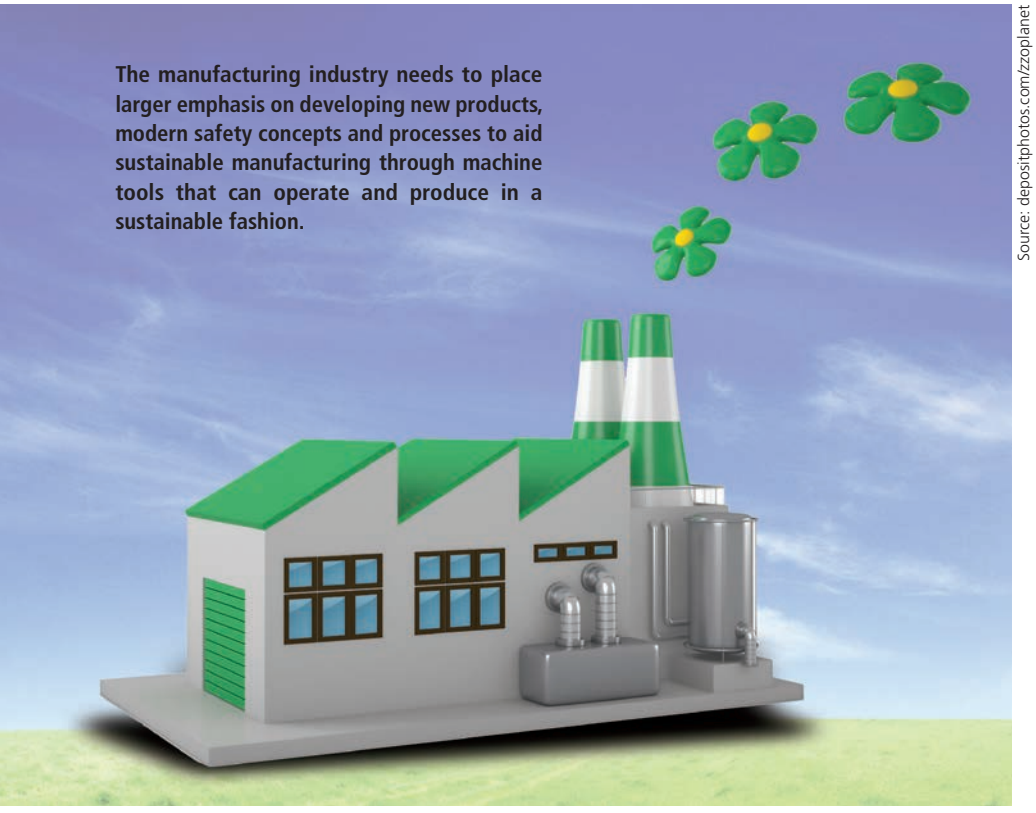

The manufacturing industry needs to place larger emphasis on developing new products, modern safety concepts and processes to aid sustainable manufacturing through machine tools that can operate and produce in a sustainable fashion.

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manufacturing world shuns 'utmost profits from the least funds' and adopts 'utmost profits from the least resources'.

"With the global focus shifting to India's 'Make in India' initiative, a surge in demand for goods is expected in the future. Manufacturing decisions should not be arrived at without considering long-term sustainability," says President, Indian Machine Tool Manufacturers' Association (IMTMA), L Krishnan. Director-General, IMTMA, V Anbu adds, "Increasing the market share in niche sectors such as automobiles, consumer goods, aerospace, and pharmaceuticals is possible only when India's machine tool industry focuses on technological improvements while keeping in mind energy consumption and resource efficiency."

IMTMA is concentrating on some exclusive programs for enhancing industry capabilities in the manufacturing sector. The Association has also played a catalytic role in shaping the two policy schemes announced by the Department of Heavy Industry, Ministry of Heavy Industries & Public Enterprises, Government of India for enhancement of competitiveness in the Indian capital goods sector.

The first one, Technology Development through the Centre of Excellence is an opportunity to develop new technologies. The Indian Institute of Technology, Madras has been identified as the nodal agency for the Centre of Excellence in Machine Tools & Production Technology under the scheme. For approved projects, the scheme provides up to 80 per cent of the development cost with the industry contributing the remaining. The second one, Technology Acquisition Fund Program provides up to 25 per cent of the technology cost to be acquired.

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IMTMA introduces specialization modules that are structured to be more subject-specific and provide comprehensive design knowledge to working professionals. **'Design of Fixture'** module will cover fixture design fundamentals, jigs and fixture, study of component drawing for accuracy, cycle time, clamping and manufacturing, and fixture design for auto components. **'Design of Hydraulics'** module will focus on hydraulics, fluids, filtration, actuators and accumulators. Selection of hydraulic components, hydraulics in machine tools and machineries, hydraulic circuits using elements, assembly testing and maintenance, hydraulic accessories, and design of hydraulic system for machineries will also be covered. **'Mechatronics'** module will cover modern CNC machines, electronic system for mechanical engineers, Mechatronics elements, assembly techniques, drives, and machine tool testing. **'Design of Spindle'** module will cover CNC machine tool spindles, design fundamentals, design objectives, design considerations, and bearings and selection. It will also cover design concept, 3D part and assembly modeling, and bearing life along with stiffness calculations.

IMTMA - Institute Innovation Collaboration IIIC

The Association has also developed a site 'IMTMA – Institute Innovation Collaboration' to bring together industries and institutes willing to work on R&D projects. The site will have a database of industries with R&D areas which they are interested in; a database of institutes with R&D capabilities; and a search facility for locating a suitable partner.

The road ahead

The Indian machine tool industry needs to stay abreast of global changes in the manufacturing space if it wants to remain competitive. Investments in emerging industries such as aerospace and pharmaceuticals must be driven by their feasibility, criticality and sustainability. The domestic sector needs to be revived through the creation of an eco-system for exports backed by solid policy reforms, investments and infrastructure. This year, the machine tool expos at Delhi and Ahmedabad will be held in the months of August and September, respectively. These expos enable one to engage with users in specific regions and ultimately uplift India's indigenous market. MMI

MACHINE BUILDING SKILLS CENTRE

Machine tool industry is facing a serious manpower resource crunch and the need for training in machine tool assembly is essential. IMTMA is imparting hands-on training in machine building skills for fitters. The training will include four modules beginning with developing basic fitting skills, scraping skills, mounting or alignment of LM guides and ball screws, sub assemblies such as headstock, slides, tailstock, workholding, turret, hydraulic/pneumatic/ lubrication systems, guarding, etc. Final assembly, verification of technical specifications, functional aspects, geometrical accuracies, positioning and repeatability, and trials/prove out will also be covered in this course.

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CII Outlines a 4 Point Action Plan to Reduce Trade Deficit with China

Mumbai – The Confederation of Indian Industry (CII) has outlined a 4-point action agenda to reduce the growing trade deficit with China. "Both governments recognize that strong efforts must be made to redress alarming trade imbalance," said Director General, CII, Chandrajit Banerjee. The CII publication Report on 'Accelerating Indo-China Economic Engagement' notes that bilateral trade between India and China has grown rapidly in the past decade. Bilateral trade crossed $65 billion in 2013 and $72 billion in 2014–15. Latest figures released by the Department of Commerce, India, reveal that trade deficit has expanded to $48 billion in 2014–15.

Source: CII

Director General, CII, Chandrajit Banerjee

The report recommends a 4 point action plan. This includes:

- Leverage India's importance as a market for Chinese products as well as an investment destination for Chinese companies
- Push for market access in key sectors of China—Pharma, IT, tourism, media and entertainment, auto components, etc.
- Prioritize Chinese FDI in 18 identified industry sectors and establish a sovereign deal to attract investment in Indian infrastructure.
- Set up an institutional committee of the Government and industry led by the PM's Office or Department of Commerce to direct and monitor the achievement of goals.

Haas Automation to Showcase New Machines

Zaventem, Belgium – Haas Automation will take centre stage at the forthcoming EMO 2015 exhibition, the largest event of its kind in Europe. Taking place in Milan, Italy on October 5–10, the US-based company will use EMO to exhibit a number of high-performance, competitively priced CNC machine tools, as well as the Haas F1 car, which is on schedule to make its debut at the FIA Formula 1 World Championship, in 2016. Haas machines differentiate themselves from competition in many ways, not least the high quality, affordable components with which they are built. Among the new machines on display will be the Haas UMC-750SS, a super-speed version of the company's popular universal five-axis machining centre. The UMC-750SS is a five-axis, 40-taper model equipped with a 15,000 rpm inline direct-drive spindle, a high speed 40+1 tool side-mount tool changer, and Haas Automation's powerful, high speed machining software.

Source: Haas Automation Inc

The UMC-750SS is a five-axis, 40-taper model that offers travels of 762 x 508 x 508 mm, 30.5 m/min rapids and an integrated high speed, dual-axis trunnion table.

It offers travels of 762 x 508 x 508 mm, 30.5 m/min rapids and an integrated high speed, dual-axis trunnion table. Also, at EMO will be the newly developed Haas DM-1 high-speed 40-taper drill/mill centre. The inline direct-drive spindle turns to 15,000 rpm, and allows high-speed rigid tapping.

Daimler Orders Two Laser Blanking Lines from Schuler

Kuppenheim, Germany – Daimler AG has ordered two Laser Blanking Lines from Schuler for its Mercedes-Benz facility in Kuppenheim, near Baden-Baden, Germany. The two lines cut blanks out of a moving sheet metal coil that are then formed into car body parts in further steps. As fiber lasers are used for the cutting process, no dies are required—in contrast to conventional blanking lines. The flexible blanking method means there is no need for procurement and handling of blanking dies. Product changes can be made almost without any set-up time—simply by loading the corresponding cutting program. Additionally, the material can be saved by optimizing nesting: more shaped blanks can be cut from the same surface area, this significantly reduces coil waste. "An important argument was also the fact that both lines can do without a basement and elaborate press foundations," explains Managing Director, Schuler, Stephan Mergner. The two Laser Blanking Lines are due to be installed in November 2015 and the production launch has been scheduled for 2016.

Source: Schuler

As the Schuler line uses fiber lasers, no dies are required – in contrast to conventional blanking lines.

Hindustan Powerprojects Achieves COD of Unit-I of its Anuppur Thermal Power Plant

New Delhi – India's leading integrated power player, Hindustan Powerprojects has achieved COD of unit–I (600 MW) of the first phase of its flagship 2520 MW Anuppur thermal power project in Madhya Pradesh. The company had signed power purchase agreements with the Government of Madhya Pradesh and Uttar Pradesh for 35 per cent and 361 MW respectively.

Moreover, the coal for the project is secured through a fuel supply agreement with South Eastern Coalfields. The total capacity of the flagship thermal plant is 2,520 MW and is to be developed in two phases of 1,200 MW (2 x 600 MW) and 1,320 MW (2 x 660 MW). The first phase of the project has been commissioned at a total project cost of ₹8,000 crore. Commenting on this, Chairman, Hindustan Powerprojects, Ratul Puri said, "The country needs to ramp up its energy generating capacity quickly to be able to meet the developmental agenda. We are committed to the vision of the government and are focusing on adding capacity while not losing focus on the environment or social impact of the project.

This project will play a key role in addressing power sufficiency in Madhya Pradesh and Uttar Pradesh."

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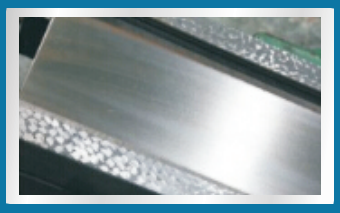
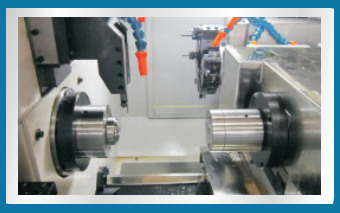
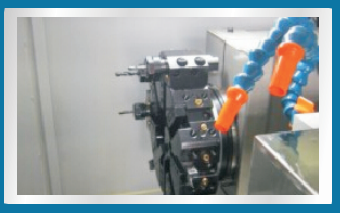

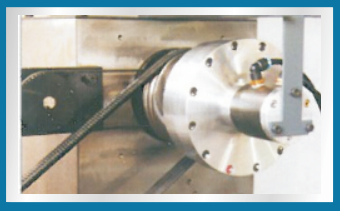


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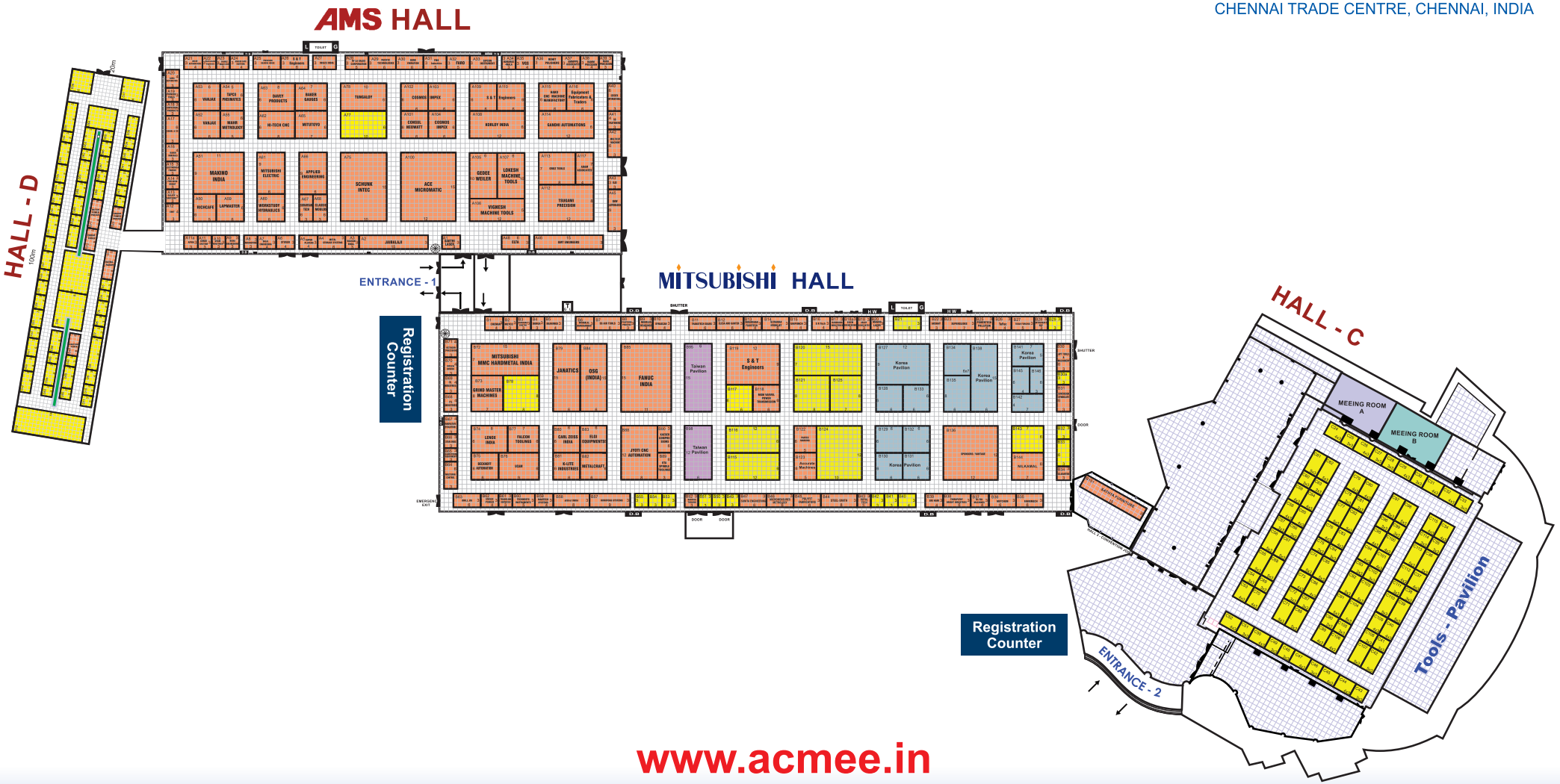

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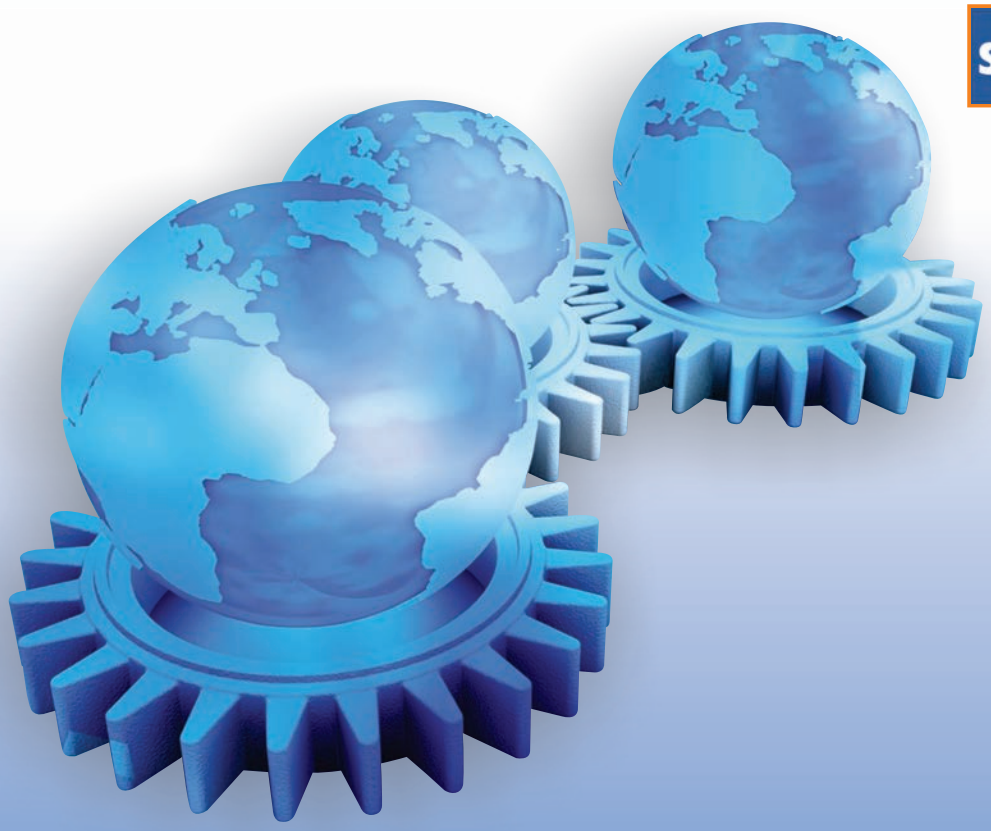

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Solutions for Milling and Turning Machines

Mitsubishi CNC offers a range of advanced technologies for the manufacturing fraternity in India. These solutions offer high accuracy and hence enable better productivity. Providing prompt responses, solid technologies and user-friendly support, the company continuously improves its after-sales service quality for users across the country. Here is a look at the some products and solutions that the company offers in India.

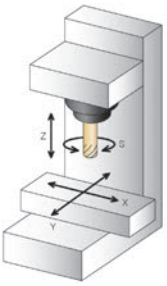
Source: Mitsubishi CNC

Array of solutions from Mitsubishi CNC.

SOLUTIONS FOR MILLING MACHINE

Compact Milling

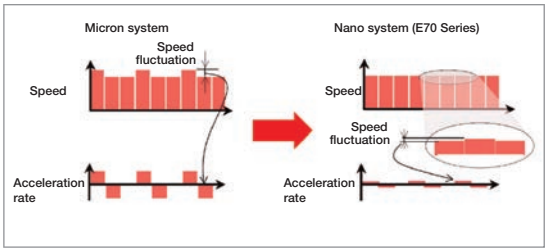
- Simple & easy CNC E70
- Small sized amplifiers
- Compact and high power SJ-DJ Series



High Cost Effectiveness

- Very smooth cutting surface achieved with one-nanometer position interpolation.*
- Up to 20 sequence programs can be registered with the built-in PLC function.
- A wide array of development support tools such as NC Designer is available.
- Ultra-compact drive units with built-in power supplies contribute to reducing control panel size.

*Least command increment is 0.1μm



MITSUBISHI CNC Machine Operation Panel

- The display and keyboard are the same color, providing consistency in design.
- The key layout can be customized according to machine specifications.
- The sequence program samples have been prepared for the basic key layout.
- Wiring has been reduced by connecting the panel with the NC via a remote I/O link.

*Refer to the product brochure for details.

Example when combined

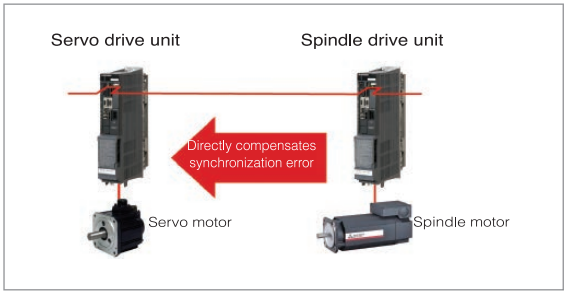
High Speed Drill Tap

- Standard CNC M70V type B
- High-speed tapping function OMR-DD
- Low inertia & high-speed spindle motor

OMR-DD Control

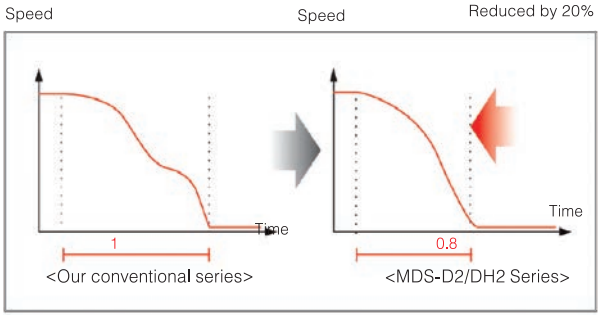
Optimum Machine Response Direct Drive

A high-speed error-compensation function is used for controlling the spindle and servo, enabling accurate tapping.



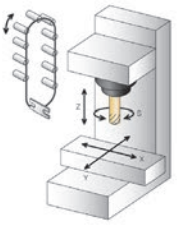
Reduced Orientation Time

Declaration is performed with the maximum torque to minimize the spindle orientation time.



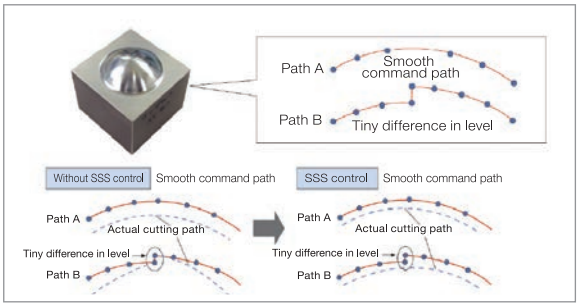
High Precision Vertical Milling

- High accuracy control with M70V Type A/M700V
- SSS control for high precision control
- Light weight spindle motor SJ-D



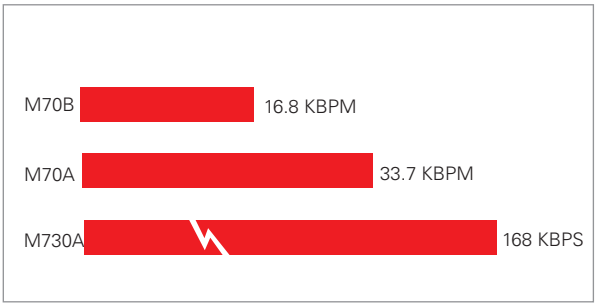
SSS Control-Super Smooth Surface (Optional)

By judging shapes in large from commanded paths, unnecessary deceleration is reduced even when fine step exists; thereby; realizing smooth and deviation free die-mold machining. Machining time can be shorter by 5 to 30% relative to our convention system, especially more effective at a higher feed rate.



High-speed Machining Mode

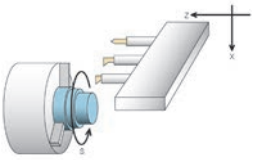
By reading ahead some blocks in a program that contains successive fine travel distances, the program can be rapidly executed at up to 33.7k blocks/minute.



SOLUTIONS FOR TURNING MACHINE

Compact Turning

- Simple & easy CNC E70
- Small-sized amplifiers
- Analog output for VFD connection



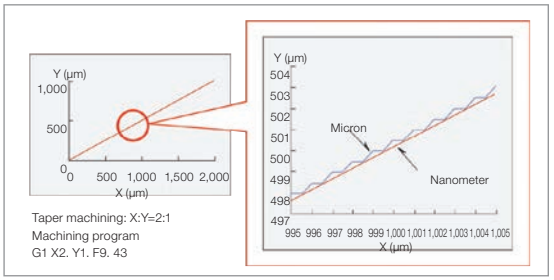
Simple Operability

- Screen design equivalent to M700V/M70V Series, offering simple operability.
- Switching between lathe and milling systems is accomplished simply by changing a parameter.
- Multiple display languages available for global use, which can be selected by parameter setting.
- A pop-up window shows your desired information without closing the original window.

Complete Nano Control

NANO Control

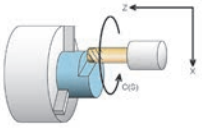
Even with one-micron- unit commands in the machining program, interpolation, is in nanometer units. As the calculation accuracy of a block intersection is improved, lines on the surface is finer.



Taper machining: X:Y=2:1
Machining program
G1 X2. Y1. F9. 43

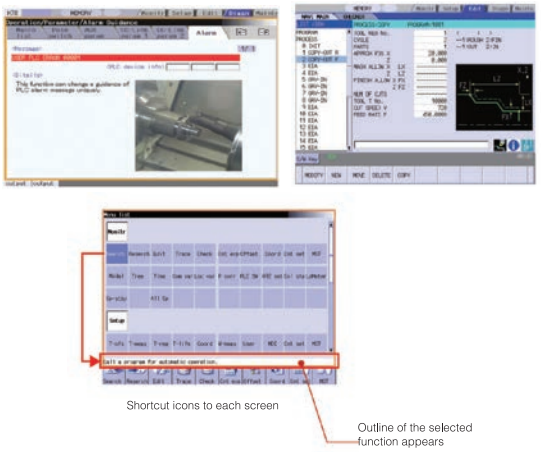
Standard Turning

- Standard CNC M70V type B
- All in 1 regenerative drive MDS-DM2-SPV
- Compact & high-power SJ-DJ series



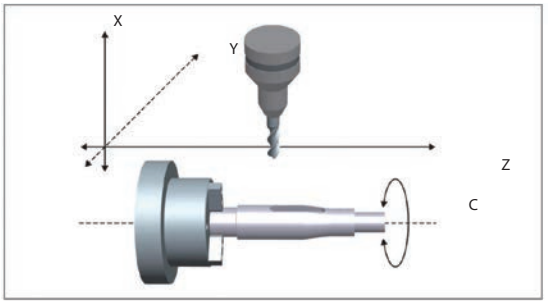
Simple Operators Screen

Simple operator screen that helps the operator to run the machine easily



Polar Coordinate Interpolation

- This function converts the commands programmed for the orthogonal coordinate axis into linear axis movements (tool movements) and rotary axis movements (workpiece rotation) to control the contours.
- It is useful for tasks such as cutting linear cutouts on the outside diameter of the workpiece and grinding camshafts.



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Building India's **Green Footprint!**

With 60 million sq ft secured by green factories, India has earned the respect of being one of the few countries in the world to take the green mandate ahead with vigor. Read on for interesting case studies that convince one to go green.

Four core aspects of a green factory: Energy efficiency, water efficiency, indoor environmental quality and cost savings.

Source: snehal pillai

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Green Footprint

"The plant is lit with 100 per cent LED lighting that consumes about 1/3rd the energy of regular lighting. The side sheets of the facility are made up of polycarbonate that allows uniform dispersion of light."

Chief Executive Officer, Mahindra Reva Electric Vehicles Pvt Ltd, Arvind Mathew

"Low flow water taps along with a rain water harvesting lake has been developed in the facility to conserve water. This has led to savings by 30–33 per cent per equivalent of product."

Plant Head–Dharwad Works, Tata Motors Ltd, K Mohan Kumar

Today, the priorities of the world are changing. 'Sustainability' has become the new buzz word among individuals and business organizations across the globe. As an environmentalist has rightly stated that even as the world is faced with the growing threat of climate change, it already has the means to build a more sustainable world and avert widespread disruptions and destruction if there is a will to act. To this we say, yes, we do have the means to build a sustainable world but the question is, "Are we ready to make a conscious effort and transform the existing scenario into a green and sustainable one?"

All of us are aware that we live in a world where industrialization is taking place at a rapid pace, especially in a country like India, which aims to become a manufacturing hub by 2020. Hence, initiatives should be undertaken to pursue industrialization and economic growth in a sustainable manner and this can be made possible through the construction of 'green' factories. Senior Engineer, Conserve Consultants Pvt Ltd, Hadrian Vivek NC who has executed numerous green projects across the country shares four vital parameters that help one to understand the basic criteria of a green factory or plant:

- ***Energy Efficiency:*** The factory should establish optimum levels of energy efficiency by following international standard design procedures; it should reduce carbon emissions through the usage of efficient equipment and has to harness more energy from renewable sources.
- ***Water Efficiency:*** The plant should capture or harvest rainwater and also reduce water usage within the factory. It has to reduce the use of water for landscaping through efficient irrigation design and treatments and lastly, it reuses the waste water for onsite activities.
- ***Indoor Environmental Quality (IEQ):*** Ensuring optimum fresh air ventilation levels as per international standards, providing enhanced occupant comfort through thermal comfort design strategies and harnessing natural daylight thereby increasing productivity levels and better occupant health levels.
- ***Cost Savings:*** In a green factory, the life cycle cost of the building reduces over time, provides lower operational costs and offers better Return on Investment (ROI) or payback due to energy conservation measures.

With this understanding of green factories, it will surprise one to know that in India, the Indian Green Building Council (IGBC) has registered a green footprint of 60,916,961 sq ft of factories alone! Supporting the green movement in India, Chairman, IGBC, Prem C Jain at a recently held CII event said, "India has crossed the three billion sq ft mark of registered green building footprint (out of this, 60 million sq ft is dominated by green factories). This is a remarkable milestone that has put the country in the second position in the world green building footprint." These mighty figures make us proud of the fact that we have some green factory examples in our very own country.

Live case studies — Going green and how!

Tata Motors automobile manufacturing unit

Location: Dharwad, Karnataka
Total area: 17,424,000 sq ft

It is good to see that automotive giants have gone green and established strong examples for their counterparts to follow. One such example is Tata Motors' automobile manufacturing unit in Dharwad, which has received a Platinum rating from IGBC (The Council offers ratings based on total points scored by the project, Gold being the least, followed by Silver and Platinum

Tata Motors automobile manufacturing unit

Source: Tata Motors Ltd

Ahlam Rais
Senior Sub Editor
Vogel Business Media India
ahlam.rais@vogel.de

leading the table). Plant Head–Dharwad Works, Tata Motors Ltd, K Mohan Kumar says, "We have imbibed the concept of 'environment' as an integral part of our standard operating system, and this is evident as green materials such as fly ash bricks have been used for all masonry works in the development of this facility."

Energy efficiency: Some of the components in which the facility remains energy efficient include light emitting diodes lamps, energy efficient motors, energy efficient non-CFC equipment, etc. Combined, all these measures lead to energy savings of about 25–27 per cent.

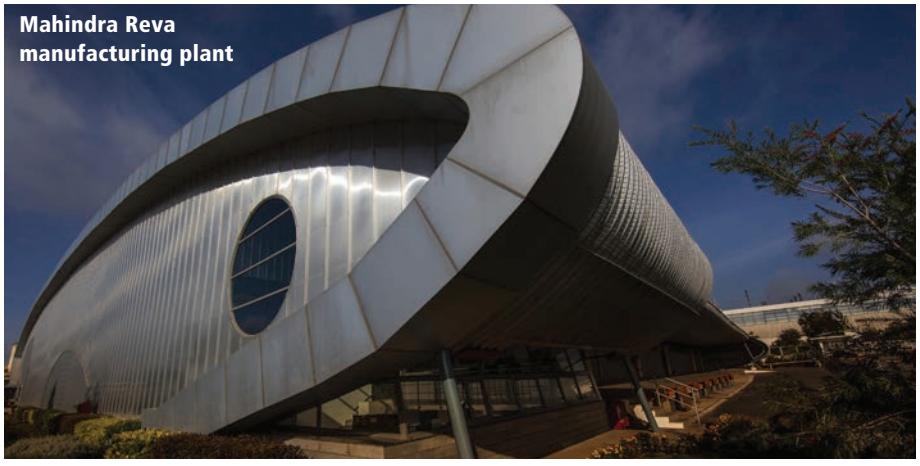
Water efficiency and IEQ: The automobile manufacturing unit reduces, reuses and recycles maximum resources. "Low flow water taps along with a rain water harvesting lake has been developed in the facility to conserve water. The treated water is then used for various processes in the facility. This has led to savings by 30–33 per cent per equivalent of product," adds Kumar. In addition to this, waste management and air quality is continuously measured and monitored.

Cost savings: The total cost of the Dharwad plant is about ₹936 crore and the payback period is between three to four years.

Mahindra Reva manufacturing plant

Location: Bommasandra industrial area, Bengaluru
Total area: 182,952 sq ft

Mahindra Reva has created a new paradigm in sustainable mobility solutions and has carried this belief to its manufacturing plant as well. Set up in August 2012, the design of the Platinum rated project by IGBC is a reflection of the company's commitment to the environment and its determination to use clean technology.


Mahindra Reva manufacturing plant

Source: Mahindra Reva Electric Vehicles Pvt Ltd

SKF Ahmedabad factory

Source: SKF India Ltd

Energy efficiency: The plant is designed to maximize the use of natural light. Chief Executive Officer, Mahindra Reva Electric Vehicles Pvt Ltd, Arvind Mathew says, "When required, the plant is lit with 100 per cent LED lighting that consumes about 1/3rd the energy of regular lighting. The side sheets of the facility are made up of polycarbonate that allows uniform dispersion of light. In addition to this, 35 per cent of the power supplied to the plant is sourced from our solar park, which is close to 72 kW." This helps the company to save up to 53,000 kg of CO_2 emissions per year and 22,000 liters of diesel per year. Also, the use of LED lights across the unit ensures reduction of energy consumption by 40 per cent.

Water efficiency: On-site rain water harvesting along with the assistance of a drip irrigation system for landscape has helped the company to attain 100 per cent water treatment, and reuse of grey water. The plant also has the capacity to store 48,000 litres of rain water and apart from this; the facility is able to achieve 30 per cent savings in potable water through the usage of low flow rate faucets.

IEQ: Natural ventilation, cooling and lighting were top priorities for the facility. "Regular plants have 12 air changes per hour, but this plant has 15 air changes per hour for circulating fresh air. This is achieved using GRAVENTS – Gravity Ventilation without using energy," mentions Mathew. The roof of the plant is coated with SRI (Solar Reflective Index) paint and special insulation, to keep the interiors cool.

Cost savings: The company does not wish to specify the cost and the payback time for the project.

SKF Ahmedabad factory

Location: Ahmedabad, Gujarat
Total area: 1,447,745.95 sq ft

SKF's factory is the first bearing factory in India to be certified as a Leadership in Energy and Environmental Design (LEED) Gold standard project. LEED is a green building rating system that is nationally and internationally accepted as a benchmark for the design, construction and operation of high performance green buildings. The project has been modeled using the e-QUEST energy analysis software, which uses the DOE 2.1 building energy simulation engine to evaluate optimized energy performance of the facility.

Energy efficiency: The factory has incorporated efficient interior lighting solutions along with efficient HVAC systems and chilled beams for the office areas in order to optimize its energy consumption. Director-Business Excellence, Quality and Sustainability, SKF India, Shrikant Savangikar says, "The facility also makes use of displacement ventilation and high COP chillers, etc., in the production halls. Apart from this, diverse strategies such as demand controlled ventilation and

exhaust air energy recovery have also been implemented to reduce fresh air loads. Through all these measures, the facility has achieved an energy cost reduction of 26.82 per cent."

Water efficiency: The factory comprises a waste water treatment facility that helps in treatment and utilization of process waste water to the tune of 100 per cent.

The water consumption has been reduced through the use of efficient plumbing fixtures such as dual flush fixtures, urinal sensors, pressmatic pillar cork, low flow fixtures, water closets, etc., which has led to reduction in water by 42.46 per cent.

IEQ: The plant has an automated thermal comfort system which enables one to monitor and control room temperatures, humidity and CO^2 levels. Savangikar says, "The facility is fully compliant with ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) standard 62.1-2004 for fresh air requirements."

Cost savings: The total cost of the project including plant and machinery is more than ₹280 crore and the payback period is expected to be around 3.2 years.

Grundfos India's factory

Location: Chennai
Total area: 125,280 sq ft

The initial brief given to the architect to construct this IGBC Gold certified factory was to develop an energy efficient design that not only satisfies the functional and aesthetics aspects but also addresses all the energy and water efficiency aspects. Head, Production, Grundfos India Pvt Ltd, Elavarasu Veerapathiran opines, "The facility's walls have been made of aerated concrete blocks. Its PEB roof has been provided with wool insulation and has also been provided with transparent sheets on regular intervals to bring in daylight into the occupied space. The roof-sky light ratio is maintained at 10.7 per cent."

Energy efficiency: The facility implemented an energy efficient building envelope that comprised the usage of aerated auto calved concrete walls, high performance glass, insulated and a reflective roof. Energy efficient lighting designs were also incorporated in the facility with a window to wall ratio maintained at 10.6 per cent. "In order to further reduce power consumption, high efficient VRV systems with the best coefficient of performance have been developed in the HVAC design. The project has achieved 32.68 per cent of energy savings when compared to the base case as mentioned in ASHRAE 90.1-2004," mentions Veerapathiran.

Water efficiency: Water efficient plumbing fixtures were installed to achieve 49.7 per cent of water savings when compared to the IGBC green factories baseline standard. Water efficient irrigation systems were installed to minimize irrigation water wastage and 100 per cent of the generated waste water is treated and used for irrigation purposes. Lastly, about 97 per cent of the total rain water runoff is being collected and stored for reuse.

IEQ: In order to support enhanced IAQ (Indoor Air Quality) and long-term well-being of all occupants, adequate fresh air has been planned in line with international ASHRAE standards. "The entire building complies with the minimum requirements of ASHRAE Standard 62.1-2007 and all the refrigerants used in the project are free from CFC/HCFC," opines Veerapathiran. The building is mechanically ventilated and the outdoor air ventilation rates provided by each air handling unit serving occupiable spaces exceed the minimum required by ASHRAE 62.1-2007 by at least 30 per cent under all normal operating conditions.

Cost savings: The investment in this project is ₹100 mn and the payback period was around four to five years.

ACG's capsule manufacturing plant

Location: Pithampur, Madhya Pradesh
Total area: 1,149,518.25 sq ft

ACG's capsule manufacturing plant in Pithampur is the first in the Indian pharmaceutical industry to be awarded a Gold rating by LEED–India. Chief Marketing Officer, ACG Worldwide, Quateel Ahmad says, "In the initial stages, it looked extremely difficult at the outset that we could achieve this LEED Gold accreditation for a process driven manufacturing facility. However, a different mindset, an extra effort from the architect and the team went a long way in achieving this certification."

Energy efficiency: The lighting power density in the plant is as per ASHRAE standards. Various components such as outdoor LED lighting for exterior lighting and an electromizer to control lighting voltage

ACG's capsule manufacturing plant

Source: ACG Worldwide

Grundfos India's factory

Source: Grundfos India Pvt Ltd

"The facility is fully compliant with ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) standard 62.1-2004 for fresh air requirements."

Director-Business Excellence, Quality and Sustainability, SKF India, Shrikant Savangikar

"The entire building complies with the minimum requirements of ASHRAE Standard 62.1-2007 and all the refrigerants used in the project are free from CFC/HCFC."

Head, Production, Grundfos India Pvt Ltd, Elavarasu Veerapathiran

"Waste water from the plant and sanitary facilities are 100 per cent treated and used for gardening. Due to this, the facility witnessed about 48.4 per cent reduction in water consumption."

Chief Marketing Officer, ACG Worldwide, Quateel Ahmad

have been implemented in this project. "Along with this, highly-efficient HVAC systems such as high COP chillers, energy efficient motors with an EFF1 type, and plug fans help in the continuous monitoring of the capsule plant's heating and cooling performance," adds Ahmad. Furthermore, paints with a high SRI have been applied on the facility's roof to avoid harsh sunrays from entering the facility. Together, all these measures have led to 20.88 per cent reduction in energy consumption as compared to the ASHRAE base case.

Water efficiency and IEQ: In order to conserve water, the facility has made use of water efficient fixtures and developed a natural pond in the premises to store storm water. "Waste water from the plant and sanitary facilities are 100 per cent treated and used for gardening. Owing to this, the facility witnessed about 48.4 per cent reduction in water consumption," mentions Ahmad. In terms of IEQ, HVAC systems were designed to meets the requirements of ASHRAE standards.

Cost savings: The company does not wish to share the cost, whereas the payback period is projected to be around three to four years.

Parker Hannifin India Ltd's factory

Location: Chennai
Total area: 402,807.06 sq ft

Parker Hannifin India Ltd is a leader in introducing new products and technologies in hydraulics, pneumatics, electromechanical, etc in the manufacturing space. And hence, it was not suprising when the company desired to create a green factory and set an example wherein, eco-friendly measures would be implemented within the factory premises. Business Unit Manager, Automation Group, Parker Hannifin India Pvt Ltd, KN Balaji mentions, "Various green materials such as AAC block with fly ash content, cement with fly ash and gypsum content, RMC with fly ash content, rapidly renewable materials such as bamboo for making furniture and paints with low or no VOC content were made use of in setting up this green factory." The facility has received a Gold certification by IGBC.

Energy efficiency: A sun path analysis was carried out while designing the facility to ensure maximum sunlight into the premises. In its interiors, energy star rated equipment have been positioned and the walls and roof of the factory have been insulated. This resulted in energy savings of about 15.2 per cent.

Water efficiency and IEQ: Water efficient fixtures in the facility along with dual flush systems have been included in the toilets to reduce the usage of water. "Along with this, drip irrigation systems are utilized to water the lavish green landscape outside the facility and in order to conserve water; two large rainwater harvesting ponds have been created

HIGHLIGHTS

Green Prints!

▶ **Green ratings is a must**
By adopting green ratings, the factory or plant can holistically address various aspects of environmental management and in the process achieve excellence in resource conservation, bottom-line improvement and green corporate image.

▶ **Green geographical spread**
In terms of geographic spread, IGBC has stated that the West (33 million sq ft) leads the maximum foot print in green factories followed by the North (13 million), South (12.5 million) and East (1.46 million).

Parker Hannifin India Ltd's factory

Source: Parker Hannifin India Pvt Ltd

"Various green materials such as AAC block with fly ash content, cement with fly ash and gypsum content, RMC with fly ash content, etc were made use of in setting up this green factory."

Business Unit Manager, Automation Group, Parker Hannifin India Pvt Ltd, KN Balaji

"It is estimated that the country's building stock is all set to grow 100 billion sq ft by 2030 and here lies great opportunity for India to construct all the upcoming projects as green factories."

Principal Counsellor, CII- Indian Green Building Council (IGBC), M Anand

"We foresee that the number of green factories will increase in the coming years owing to the fact that owners have become aware of the impacts a factory can cause to the environment."

Senior Engineer, Conserve Consultants Pvt Ltd, Hadrian Vivek NC

in the premises. Together, all these factors have resulted in 73 per cent of water savings," adds Balaji. In addition to this, variable chiller systems along with high COP VRF systems ensure good air quality in the facility.

Cost savings: The additional cost incurred for implementing a green factory was only 5 per cent extra over the $10 mn investment for the total project.

Green factories make good business sense

Through the case studies mentioned here, it is evident that green factories or plants lead to significant savings in terms of energy, water, IEQ and cost. Principal Counsellor, CII – Indian Green Building Council (IGBC), M Anand opines, "Though incremental cost of a green factory would be about 3–5 per cent higher over that of a conventional building, the additional costs get paid back in less than three years through substantial reduction in operational costs."

Creating future green impressions

With 60 million sq ft of green footprint occupied by factories and still counting, we say, YES, we are ready to make a conscious effort and transform the existing scenario into a green and sustainable one. Anand opines, "It is estimated that the country's building stock is all set to grow 100 bn sq ft by 2030 and here lies great opportunity for India to construct all the upcoming projects as green factories by design and set new global standards in design, construction and operation." Agreeing to this statement, Vivek NC adds, "We foresee that the number of green factories will increase in the coming years owing to the fact that owners have become consciously aware of the impacts a factory can cause to the environment. This notion has increased the necessity to establish green factories which are sustainable for a longer period of time." The numerous advantages of a green factory make it a win-win situation for both the environment as well as for the organization and with so much happening in the green space, we are certain that the future of green factories definitely looks bright and promising.

Guess it's the right time to look at the world lens, pose with our green factories and say 'green!' MMI

SPOTLIGHT

What's Trending!

Last month, the Confederation of Indian Industry (CII) stated that the number of firms opting for the Green Company (GreenCo) rating is likely to reach the 1000 mark by 2017. This rating will help the companies to save about ₹2,000 crore, apart from gaining other tangible and intangible benefits. CII had launched the GreenCo rating system for companies, the first of its kind in the world in 2011. This is a comprehensive rating covering all aspects of the environment including energy, water, GHG emissions, waste, etc. At present, India has 48 GreenCo rated companies and over 140 companies are working on this rating. Speaking at the GreenCo Summit 2015 in Mumbai, Chairman, CII-Godrej Green Business Centre, Jamshyd Godrej said, "Based on the earlier experiences, CII will appropriately fine-tune the existing GreenCo rating and will adopt a cluster approach in rating Green SMEs in the country." Adding to this, Chairman, Gujarat Pollution Control Board, Dr KU Mistry said, "A large number of manufacturing units in Gujarat follow the zero-discharge norms and reprocess hazardous waste materials. The pollution control board is enabling green Gujarat." This unique GreenCo rating will make India a global leader in the environmental front and will greatly improve the competitiveness of the companies.

Source: Dürr Ecoclean

Visit us at Stall E107 / Hall 10, MACHINE TOOL EXPO at New Delhi from August 20–23, 2015.

High-Quality Cleaning System Built in India – Universal 81W

Are your facing cleaning challenges after manufacturing? Do you have trouble with drying and corrosion? Dürr Ecoclean offers a broad range of efficient cleaning solutions to meet your individual needs.

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The Universal 81W cleaning system is a low-cost, highly efficient system, which owing to its modular design, can be used for a very wide range of applications in industrial parts cleaning. Depending on the features installed, the machine is suitable not only for removing oil and emulsion from mass-produced parts but also for fine cleaning of assembly parts.

Always close to you – cleaning trials in Pune

In order to find the right solution for your cleaning task and parts, the company offer cleaning trials on a range of Dürr Ecoclean systems with different media (aqueous, hydrocarbon, polar solvents and chlorinated hydrocarbons) at its local Test Center in Pune.

Advantages

- Ready to plug and perform
- Modular, compact and flexible design
- Low energy and water consumption
- Low cost per unit for cleaning
- Maintenance-friendly technology
- Several similar installations in India
- Local service support across India

Source: Dürr Ecoclean India

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TAIWAN

MACHINE TOOLS SHAPING THE WORLD

Taiwan Machine Tools Remain Active in the Automotive Industry

For more than three decades, the Taiwanese machinery suppliers have worked zealously to lay the groundwork for a comprehensive supply chain in Southeast and South Asian regions, allowing them to serve the manufacturing sites in Thailand, Indonesia, Vietnam, Malaysia, and India more efficiently.

The industrial links between Taiwan and these regions are solid, providing many manufacturers with comprehensive machining solutions and services.

As the world's automobile manufacturing centers shift to ASEAN and India, carmakers from these nations should take advantage of the opportunity to build modern production lines with Taiwanese technology. This would allow them to keep up with the latest manufacturing trends while keeping costs on a manageable level.

Most Taiwanese machine tools are designed for global carmakers to use in producing car components. Because of the favorable price to performance ratios of cutting and forming machines from Taiwan, the global automotive industry considers domestic machine tool suppliers among the most reliable.

Mold Machining

Mold surface finishing is the focus of mold processing for large-sized, high-speed machining centers. This type of machine tool should be adaptable to manufacturing processes.

For instance, users should expect machine tools to be able to cope with challenges such as rough machining (high chip removal machining), deep hole drilling of mold cooling passages, or other instances that need to be carried out on specifically designed machines.

High-speed machining centers designed for mold processing come with high rigidity and accuracy. These feature excellent damping ratio as well, making them more adaptable to frequent speed changes during processing.

The prerequisites for high-speed processing include a high-speed spindle up to 15,000 rpm, with dual contact tool shank in HSK types. The spindle should maintain a good dynamic balance, rigidity, thermal stability, power, and torque.

The cutting feed rate should be able to reach up to 10m/ min or above, with excellent control for contouring. The rapid feed rate should exceed 50m/ min, so that the idle duration can be shortened. High acceleration nature is important as well.

Machines that travel under 1m should be of 1G while machines that travel over 2m should be more than 0.5G.

Taiwanese machine tool manufacturers developed machines for high speed machining with linear motor driving in 2006. These machines were used to process automotive metal stamping parts for COC Tooling & Stamping, a Sino-Japanese mold company.

The machines were used for high-speed mold processing. The feed rate for fine machining was soon increased from 4m/min to 10m/min, which impresses most people in the sector.

In 2005, Taiwanese machine tool suppliers worked with Bosch to install Bosch Rexroth linear motor products on a high-speed 5-axis gantry machining center– the G3050.

With these advancements, the time needed for mold process procedures was reduced by 50%. Not only was the time cut in half, but the processing quality and contour accuracy were also improved as well. Perfected quality and contour accuracy save the need for further manned polishing and die spotting in future process.

As for demands for molds, checking gauges, and quick modeling in the automotive industry, Taiwanese machine tool suppliers offer two solutions: GM type and G type machines.

The GM type adopts a box-in-box design, the driving center of a gravity gantry structure, which delivers optimal structural rigidity and stable accuracy while eliminating any environmental impact. G3020/G2540 types adopt an integrated U type body structure, with compact structural rigidity and the smallest cover area, benefiting factory owners by reducing demands on space.

These two types of machines feature fixed type table design and tri-axial overlap gantry type structures; thus machine performances are not subject to the changes of mold-piece weight. Moreover, these types are driven by linear motors, with axial feed-rate reaching up to 60m/ min. With a high-torque, two-axis head and high-speed electro-spindle, these two types of machines can achieve high chip removal rates and high speed finishing.

For instance, the G3020 Linear Motor five-axis High Speed Machining Center is equipped with an HSK63A-24000rpm electro-spindle, which enables the G3020 machine to process five machining models, delivering the most compact solutions.

Five Machining Models

1. Mass Chip Removal: No. 45 steel material, tool diameter 50mm, cutting width 35mm, cutting depth 0.8mm, feed rate 12m/ min, chip removal rate (CRR) reaches up to 366 cc/ min.
2. Deep-Hole Gun drill: No. 45 steel material, tool diameter 30mm, spindle speed 1,273 rpm, axial feed-rate 127mm/ min.
3. Mold Surface Finishing: Tool 25mm, cutting pitch 0.5mm, spindle speed 12,000 rpm, feed rate 11m/ min.
4. Multi-Penciling: Tool 2mm, spindle speed 18,000 rpm, cutting feed rate 1,760 mm/ min
5. Mold Surface Mirror Finishing: Tool diameter 0.8mm, spindle speed 22,000 rpm, feed rate 800 mm/ min.

One of the most famous automotive stamping part manufacturers, who supports TATA MOTORS, MARUTI SUZUKI INDIA LIMITED, ASIA MOTORWORKS LTD, and many other leading manufacturers in the automotive industry, has adopted the GM five-axis, high-speed machining centers in its production line.

The machine uses a linear motor mechanism to drive its 3 axes as well asa box-in-box gantry structure with process ranges that reach 3m x 5m x 1m. Taking into account tool abrasion during processing, the estimated actual processing feed rate is 12-15m/ min.

Together with an ATC system, tool length and diameter laser monitoring and calibration, and automatic on-cell workpiece measuring and compensation mechanisms, factory production can run 24 hours per day on a three-shift rotation.

Regarding rapid prototyping, since it is a prerequisite that the machine tool size has to cover the size of the targeted cars, large-sized Taiwanese machine tools are well sought-after in the market. Common materials include polystyrene, clay soil, resins, andan aluminum/zinc alloy.
The G4070 machine made by Taiwanese suppliers uses rapid prototyping and the processing range and efficiency are both very good.

Taiwanese machine tool suppliers are skilled at manufacturing large machines for mold processing and prototyping. In the area of ordinary machining, a number of Taiwanese suppliers offer machine centers and lathes that can process different kinds of automotive components, such as steering shafts, transmission units, cylinder blocks, brake discs, brake drums, steering knuckles, and other critical

components. These cutting machines made in Taiwan are widely used at Tier 1 and Tier 2 levels.

Forming Processing

The development of forming machines in Taiwan has a long history. Taiwanese forming machine manufacturers strive to excel in the free market, attaining the best skills that are much favored by global users.

In Thailand, the component supply chains of TOYOTA, HONDA, ISUZU, MITSUBISHI, FORD, NISSAN, and SUZUKI, with their high-precision demands, use Taiwanese forming machines. ASEAN car makers adopt Taiwanese forming machines, such as small C frame mechanical presses that can process light and thin steel forming and progressive die parts.

Such machine type can also perform punching, bending, and blanking. Recently, with the growth of the ASEAN industry, the company started to sell middle and large-sized forming machines for local users to process large-sized sheet metals for vehicles, such as the award-winning Straight Side Mechanical Press (SAG) and Straight Side Eccentric Gear Mechanical Press (SE2).

The demand for these two high-end machines from the ASEAN regionhas grown. The machines are used to process car bodies, chassis frames, stab bar bracket assy, stopper, hanger assy lh, hanger assy rh, seat frame, drum brake, brake shoes, brake linings, lower arms, stamping fan shields.

ASEAN manufacturers notice that Taiwanese forming machine products are catching up with their Japanese counterparts.The former has the advantage of a more favorable price to performance ratio though. This advantage is achieved as Taiwanese companies are able to group their suppliers together to form an integrated production line.

This production line can make precise adjustments in manufacturing, from component manufacturing, frame welding and casting to machine assembly, which are supervised by their respective headquarters. Because of this, all of their products are much more flexible in terms of price and lead time.

Now as ASEAN factories struggle with a shortage of professional workers, Taiwanese suppliers are prepared to support their ASEAN customers with automatic production line programming, integrating an in-time surveillance system that can best supervise operation conditions such as machine temperature, pressing load, lubrication pressure, brake system, and other crucial links in the forming procedures.

Taiwanese forming machine suppliers are able to assist ASEAN users with forming demands to make the best of their purchased equipment and thereby maximize production.

Besides this, in ordinary sheet metal forming, forming the clamp items to clamp oil and water tubes is also the selling point of many outstanding Taiwanese forming machine manufacturers.

The YSM-36T automatic forming machine is widely distributed throughout India and Indonesia. The wire diameter of its processing capacity is 0.6-3.2mm, and the maximal width of the strip is 30mm. The thickness of the strip reaches up to 0.3-1.5mm; and the hardness of the strip is 80 (CARBON). This type of machine is used in the supply chains of TOYOTA and HONDA in India and Indonesia to process clamp items and the Anti Rattle Brake Clamp, due to its economical price to performance ratio.

As well, the advanced type YSM CNC-39T, their three-axis servo-forming machine, can process even more clamp items and, due to its three-axis CNC structure, is flexible to mold change. Due to the CNC advancement, when the mold design is changed, the YSM CNC-39T can adapt to the change with ease and still keep up with the manufacturing step. This type of CNC forming machine excels at keeping production lines agile.

Though these cutting and forming machine manufacturers do not represent the whole Taiwanese machine tool industry, they represent a common spirit that all Taiwanese suppliers share: keep moving forward.

For the last five decades, the industrial development in Taiwan has showcased Taiwanese people's unbeatable courage and strong faith toward a better future. Machine tool suppliers in the 21st century offer, not only machinery, but also turnkey solutions for their users. In Taiwan, you can find what you need and what you want for your production lines. Taiwanese suppliers want to know your needs and will eagerly offer you optimal solutions for your production lines.

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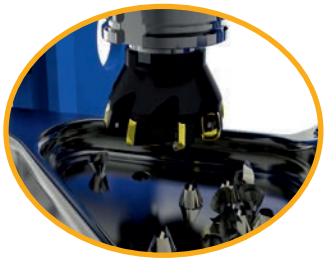

Key Take Aways

- Live case study presentations on best productivity improvement projects
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Hi-Tech Visions

Spread over 100 acre, SKF's Pune facility focuses on implementing new technologies to manufacture a wide range of bearings for automotive and industrial applications. Read on for interesting facts about the facility and prospects for the automotive industry.

The government's call for 'Make in India' has sent out positive cues to the global manufacturing community. This augurs well for the domestic manufacturing sector and will aid economic activities in the country. The industrial sector, being closely associated with the manufacturing and infrastructure sectors is of strategic importance to the economy. Director – Automotive OE, SKF India, Harsha Kadam says, "The 'Make in India' initiative will boost confidence of global investors and act as a catalyst for overall growth of the industry. This year, the automotive sector has shown signs of recovery. The Indian automotive sector has significant potential for growth, considering that per capita penetration is still at around nine cars per one thousand people, which is among the lowest in the world." Higher purchasing power and disposable income of the middle class augurs well for the two-wheeler and passenger car segments. However, high interest regime can dampen the demand. "In the commercial vehicles segment, heavy commercial vehicle demand relies on the growth in the core sectors such as mining, steel and cement and infrastructure which are subdued and require favorable policy reforms. The light commercial vehicle segment has seen a positive growth on the back of higher logistical activities particularly from the E-commerce sector," adds Kadam. In the backdrop of this industrial scenario, the need for bearings in these sectors will also increase and SKF is one company that has established a strong benchmark in this segment.

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Hi-Tech Visions

The shopfloor at SKF's Pune facility.

Source: SKF

Tracing the company's background

SKF's roots in India can be traced back to 1923, when a trading arm of SKF Group was set up in Kolkata. Today, SKF is present in India by way of three different entities—SKF India Ltd (the listed entity), Lincoln Helios India Ltd (in 2010, SKF acquired Lincoln Group, which is represented in India), and SKF Technologies Pvt Ltd, which is a SKF Group subsidiary. In December 2011, the company inaugurated a state-of-the-art Global Technical Centre India in Bengaluru, reinforcing its group strategy to bring technology development closer to customers, locally. Kadam says, "Over the years, we have invested for long-term growth and have evolved from two manufacturing plants in the 90s to six manufacturing plants and a Global Technical Centre in India." In addition to this, the company has developed a supplier network of over 300 distributors across the country and serves the fast-growing Indian market with high-quality products and solutions. "Our manufacturing footprint is spread evenly covering the entire country to serve the small and large size bearings, seals, housings, lubrication systems for virtually all automotive and industrial applications that require rotational or linear motion," he adds.

The company is surely forging ahead with a profit before tax of ₹779 million for the first quarter that ended in March 2015, thus registering a growth of 3.8 per cent over the corresponding quarter of the previous year. Also, the company has recorded net sales of ₹5,790 million in the first quarter ended March 2015, registering a growth of 1.5 per cent over the corresponding quarter of the previous year.

In focus: the Pune facility

SKF's Pune facility has been in existence since 1960s and is spread approximately over 100 acre. The plant manufactures a wide range of bearings for automotive and industrial applications such as deep groove ball bearing, tapered roller bearing, hub bearing units, seize resistant ball bearing and McPherson strut bearing units.

High quality products

SKF has been the pioneer in developing a manufacturing technology for high volume bearing production with a proven track record of repeatedly delivering high quality products with consistency. One of the critical factors for this is having one SKF standard of quality across all its factories. To ensure that the same is standardized across all the location, a culture of Business Excellence is strongly driven in all the factories. The Group also focuses on developing and implementing new technologies to increase reliability and flexibility, reduce costs and improve environmental performance. This is evident through activities carried out at its Pune facility where the performance of the products has been improved by an advanced selection of steel and heat treatment combination. And to maintain this high standard, considerable investments have also been made in heat treatment equipment. Kadam mentions, "Intelligent machining, integrating sensors and measuring equipment have been incorporated into machines for more consistent and reliable manufacturing processes. Components such as advanced intelligent technologies for vision systems and measuring equipment enable tighter control of manufacturing processes." This is not all! To improve its sustainability quotient, the facility implements new processes and carries out energy-efficient measures to reduce the use of process media. It also carries out optimum utilization of materials for all the manufacturing processes, resulting in reduced waste, manufacturing variations and allowances.

An automated line showcasing bearings that the company manufactures.

Source: SKF

Green scale

The manufacturing and working area is roughly 40 per cent out of the total space occupied by the facility and the remaining area is green. Since 2010, the SKF Group has implemented the policy to build all new facilities as per LEED principles. "We have implemented several environment friendly practices in the existing facility in Pune, such as water recycling, waste recycling, energy management services, which significantly impact our CO_2 emissions and energy consumption. We continue to explore and find new ways to conserve energy and implement best practices that help to reduce our CO_2 emissions," says Kadam.

Asset management services

SKF has combined its manufacturing experience and knowledge of rotating machine reliability to form a uniquely comprehensive range of strategic and tactical asset management services for its facility that covers: Consultancy in manufacturing and process industries, and industry-leading expertise in application engineering and condition monitoring. "Building on the knowledge accumulated over the past decades, SKF has developed advanced services and technologies to maintain, monitor, repair and optimize assets throughout their operating life. We focus on providing the optimum replacement parts at the right time and help our customers to optimize their asset efficiency," opines Kadam. SKF remanufacturing services can restore bearings, housings and spindles to full working specifications, avoiding costly replacement.

"Our manufacturing footprint is spread evenly covering the entire country to serve virtually all applications of the automotive and industry that require rotational or linear motion."

Director – Automotive OE, SKF India, Harsha Kadam

Skill development

As the manufacturing ecosystem is developing and evolving in India, bridging the skill gap has become pivotal for growth. Today, in India, there are automotive, engineering, and ancillary companies that demand for industry ready labor. And the latest trend suggests that these companies are upgrading themselves by looking at automation and installing computerized systems. These computerized systems control a lot of elements and functioning of machines, which effectively means that the technician needs to have computer literacy. Keeping this in mind and in order to enhance technical trainings for employees, SKF has developed its very own skill and knowledge development centres 'KUSHAL' at its Pune factory.

The way ahead

SKF has made considerable investments in India in the recent past and continues to invest in existing facilities for brownfield expansion as required. "Our expansion initiatives will continue. We are investing in manufacturing channels for the automotive market again in the years to come," says Kadam. Despite the constraints and challenging environment, the company continues to focus on sustainable profitable growth through the use of advanced technology. "Our performance is a result of our focused customer centric approach amidst the volatility in the current economic environment and re-emphasizes our strong business model," concludes Kadam. MMI

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Trends in the Sheet Metal Industry

Many of the technologies used globally might not have been adopted by the Indian industry for various reasons, which, finally, influence the commercial viability. It is however clear that the Indian industry is fast catching up with global trends in manufacturing. Read on to know more about the emerging trends in the global sheet metal industry.

Of late, most of the developments in the sheet metal industry have aimed towards precision and speed. Achieving precision in sheet metal part dimensions is a difficult task on account of inconsistent springback. Increased productivity calls for enhanced speed; consequently, a higher level of automation and better control over the manufacturing parameters, and thereby, consistency in part quality. Use of modern technologies for this purpose is usually only viable for high-volume production. Additionally, reworking the product in a high-volume production scenario is not feasible, as a small percentage of rejects amount to a huge volume of manual rework, which will also lead to inconsistent quality. Hence, consistency in the quality of manufacture at all stages becomes crucial and calls for the mechanization of operations.

It is inherently difficult to control dimensional variation as a difference of few minutes of springback (variation in the bend angle) often translates into a dimensional change in millimeters. The dimensional tolerances on formed sheet metal components therefore cannot be achieved to micron levels as is the case with machined parts.

Most of the developmental effort has been devoted to 'taming the springback'. This includes steps towards more consistent material properties and more consistent sheet metal thickness, so that springback can at least be partly compensated by an appropriate design of the tool profile. This way, the dimensional variations arising from inconsistent springback can be considerably reduced, and the functional quality of the part significantly enhanced. But this becomes a challenge when using thin sheets.

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Initial efforts

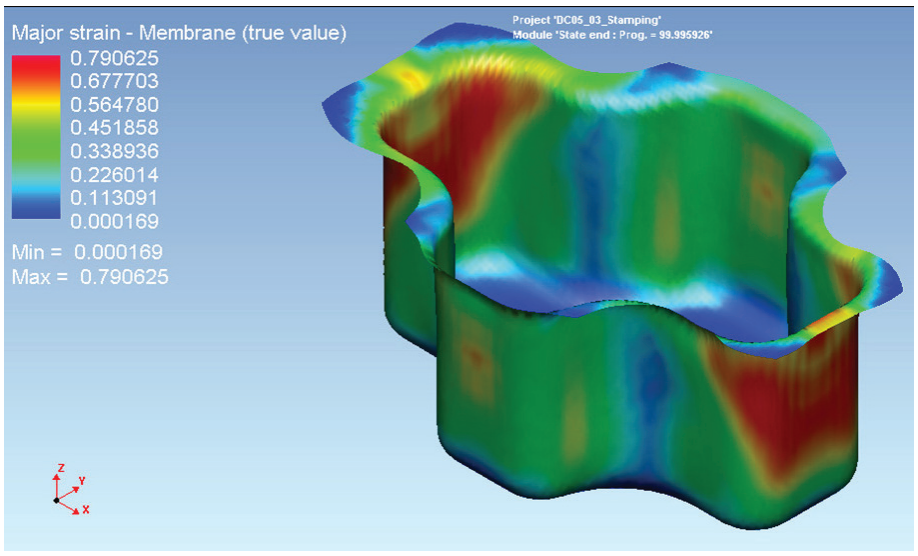
Earlier, weight reduction was attempted by using thinner gauge sheets of high strength. This led to very high springback on account of the high yield strength needed for high dent resistance and reduced thickness needed to decrease material input and hence weight. In addition, forming forces increased, and so did the tool wear. And the use of high strength steel would turn out to be an expensive proposition. Additionally, the design of the part had to change to suit the relatively limited formability of a thin, high-strength steel sheet.

Another type of steel, namely, the bake hardening steel was developed to have low yield strength (and hence low springback) during forming and high strength (and hence high dent resistance) when in use. This type of steel is designed to acquire a certain amount of strength during the paint baking process performed after the sheet metal part has been formed and painted. However, this solution allows for a limited degree of light weighting to be carried out on the part. Material input cannot be significantly reduced as the soft, thin sheet can potentially crack during press working, owing to the fact that formability is strongly influenced by sheet thickness.

Hot forming

Among the modern technologies, hot forming is a widely accepted technique to overcome springback, especially when the part is expected to have high in-service strength and low weight. This is achieved by a special chemical composition of steel wherein the addition of manganese (usually up to 1.25 per cent) and a small quantity of boron to steel enhances the hardenability of the material. Such a steel sheet is not formable at room temperature and must be heated to its hot working temperature and then deformed to the required shape. By the time the deformation is completed, the formed part has a large area of contact with the tool, which results in rapid cooling of the part. The typical cooling rate in such steels is about 25°C per second, which is achievable by industrial hot forming tools.

Source: Prof PP Date



A benchmark sheet metal component.

This imparts the hardness, on account of formation of a mixture of bainitic and martensitic phases (hard constituent phases) in the formed part. As the part was deformed at high temperatures, there is practically no springback. Additionally, the hardness on cooling of the part is very high; imparting the desired in-service dent resistance.

However, since rapid cooling occurs from a fairly high temperature, thermal stresses would be set up in the part during cooling. Temperature gradients are inevitably developed. But then thermal distortions as a result of these gradients can be suppressed by getting the part to cool under tool pressure. This, in turn, induces residual stresses, which may be relieved by subsequent heat treatment.

The advantage of hot forming is that one can, by design, obtain different hardnesses in different regions of a given part. Unintended variations in hardness and toughness are introduced without any effort, but then a deliberate functional variation in mechanical behavior may be obtained by controlling the heating temperatures and the cooling rates in different regions of the part. For instance, a 'B-pillar' is a popular part made by hot forming. This is a structural member of a car body, which supports hinges of rear doors of a car. Part of the B-pillar needs to have considerable toughness (and hence a relatively lower strength/hardness) to absorb the energy of side impact and ensure passenger safety in the event of a collision. The remaining portion of the B-pillar can be hardened to full strength so that a thinner sheet can have the requisite strength to serve as a structural member in a car body. Such a procedure of obtaining different strengths through designed heat treatments is called 'tailored heat treatment'.

Tailor welded blanks

The objective of developing different strength/toughness characteristics in a B-pillar may be achieved by welding together two sheets having different mechanical behavior. The one meant to take impact would have to absorb the energy of the colliding vehicle, calling for higher toughness. Different alloys in steel have been developed for this purpose. In some of the modern alloys, the impact of the collision drives metallurgical changes in the material, in addition to the energy absorbed by permanent deformation of the sheet metal part. The other sheet would have to be thin and hard. On welding these along a common edge, one obtains the 'tailor welded blank', which could be deformed to the desired shape, ensuring the right kind of sheet to form the right features of a given part. A similar concept is used for 'tailor welded tubes' used to make different parts from thin tubes. This procedure involves welding of tube/sheet by application of heat, and this may often lead to slight degradation in properties in the vicinity of the weld, particularly when the strength in the original sheet is achieved a by high degree of alloying or due to hardening of the sheet during deformation.

In comparison, a tailored heat treated part is a monolithic part devoid of any joints. Also, the gradient of mechanical properties is not as sharp as that of a tailor welded sheet.

Hydroforming

Raw materials like thin tubes may be shaped by blowing them like a balloon, into a cavity having the intended shape. Being a 'steel balloon', the pressures required to 'balloon' the steel tubes are far too high, beyond the capacity of human lungs and compressible media like air (or any gas for that matter) if used to inflate these. Hence 'incompressible' pressurized hydraulic media need to be used. Such a pressurized medium could be water or oil. This process, called 'hydroforming', could be adopted for sheets as well. Here, one can start with a much lower thickness compared to conventional forming processes as the variation in thickness introduced by this process is a minimum. Moreover, very complex changes in cross sections, especially in case of parts made from tubes, are easily feasible, eliminating the need for fitment of multiple parts thereby speeding up the production. A low springback is also an added advantage.

Alternate technologies (using an alternate metallic form of raw material, other than sheet metal) can also constitute viable options and must be explored. For instance, in sheet metal parts requiring multiple stages of draw, maintaining a uniform thickness is tough. Issues due to springback get further complicated. Moreover, one part is made over several stages. Instead, one could think of alternate processing methods to make many parts (of uniform wall thickness, and no springback) in a single step as opposed to one part over several steps.

In other words, there is no end to development of technology alternatives to enhance quality and rate of production of sheet metal parts! **MMI**

LASERTEC 65 3D — Optimum Productivity

With the LASERTEC 65 3D, DMG MORI offers a unique hybrid machine and incorporates generative laser deposition welding into a fully-fledged 5-axis milling machine.

The market for additive processes has grown rapidly in the past. However, up till now, these have been restricted to the production of prototypes and small parts, which otherwise could not have been manufactured using any other conventional method. With the combination of the two processes, metal deposition and chip removal, on one machine, additive technology supplements and enhances traditional machining methods.

Source: DMG MORI

For generative manufacturing, the LASERTEC 65 3D is equipped with a 2 kW diode laser for laser deposition welding, while the fully fledged 5-axis milling machine from DECKEL MAHO in robust monoBLOCK design also enables highly accurate milling operations to be carried out. "Thanks to the fully automatic changeover between milling and laser operation, the LASERTEC 65 3D is suitable for complete machining of complex components with undercuts as well as for repair work. It is also ideal for the application of partial or complete coatings for mould making and mechanical engineering or even medical engineering," explains Sales Director, SAUER LASERTEC, Friedemann Lell in Pfronten, Germany.

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LASERTEC 65 3D

Producing large parts generatively

In contrast to laser melting in a powder bed, laser deposition welding enables large

The hybrid machine allows milling and additive manufacturing in one fixture.

Source: DMG MORI

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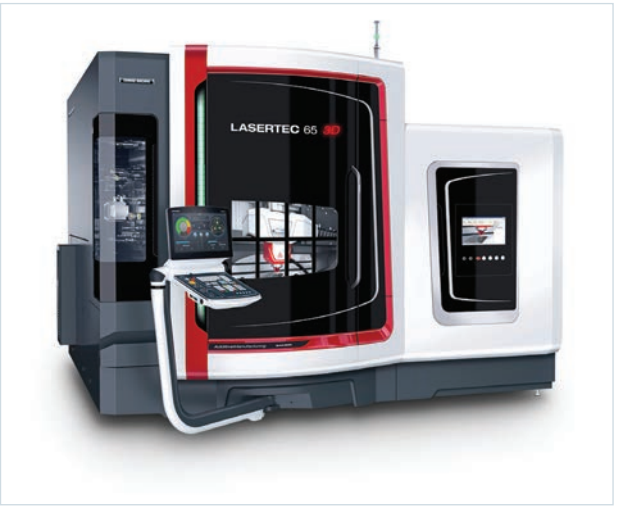
Source: DMG MORI

Large workpieces with high stock removal volumes can be economically machined.



Source: DMG MORI

The Lasertec 65 is a 5-axis milling machine with the flexible integration of a laser head.

parts to be manufactured using a metal powder nozzle. With a deposition rate of up to 3.5 kg/h, this process is up to approximately 10 times faster than the laser generation of parts in a powder bed. The combination with milling opens the door to completely new applications. The component can be built up in several steps, whereby milling can be interspersed with deposition welding in order to allow areas, which the cutter would no longer be able to reach when the component was finished due to the component geometry, to be machined to final accuracy.

The hybrid machine combines the advantages of milling, such as high precision and surface quality, with the flexibility and high deposition rate of laser welding. "In the case of some components, where today 95 per cent of the material is removed by milling, with additive processes, the material is only built up where it is needed. As a result, material loss is reduced to 5 per cent. This leads to significant raw material and cost savings," explains Lell.

The laser, complete with powder deposition head, is fitted into the HSK toolholder of the milling spindle. It can be automatically parked in a secure docking station while milling operations are being carried out on the machine.

The machine is controlled by means of a 19" ERGOline panel featuring the Operate 4.5 on a SIEMENS 840D solution line. The controller for the laser process is mounted in a separate electrical cabinet, which makes it easier to integrate this system into other DMG MORI machines.

Production of 3D contours

By means of a laser diode, the metal powder is deposited in layers onto a base material, and fuses with it without pores or cracks. In doing so, the metal powder forms a high-strength welded bond with the surface. A coaxial inert gas prevents oxidation during the build-up process. After cooling, a layer of metal which can be mechanically machined is produced.

As laser deposition welding has long been established as a stand-alone technology, it becomes ideal for incorporating into DMG MORI's high-quality CNC machines. "The combination of chip-removal and additive processes will become more important in the future, as it opens up many new options and advantages for the user", adds Lell.

One of the strengths of this process is the option to successively build up layers of different materials in lines of 1.6 mm and 3 mm; this becomes possible depending on the nozzle geometry. Complex 3D contours can also be generated in layers without supports.

The individual layers can then be accurately machined before the areas become inaccessible to a cutter or other tools due to the component geometry. The combination of the two processes is a sensible choice for repair work and the production of mould tools. However, it also offers many interesting options for lightweight components, prototypes or production of small batches—particularly in the large manufacturing sector where other additive manufacturing processes cannot be used due to limited space.

Economical solution

Large machines, such as those used for machining bulky components in the energy or aerospace industries, tend to be expensive. If roughing, deposition and finishing are reduced to a single machine, it will prove to be a financially advantageous solution to the customer. Furthermore, in the energy and oil industry, components often have to be coated with corrosion-resistant alloys to protect against wear. Deposition welding provides protection for products such as tubes, fittings, flanges and special products that are used in aggressive environments. With a hybrid machine, machining of the base material, coating and finishing can be carried out on one machine. This results in cost savings and a reduction in throughput times. MMI

HIGHLIGHTS

LASERTEC 65 3D

- Unique combination of laser metal deposition and milling provides optimum surface finish and component precision
- Laser deposition welding with powder nozzle: approximately 10x faster than powder bed processes
- Ability to produce complete components
- Many 3D geometries, including undercuts, can be realised without supporting structures
- Repair of turbine components and in tool or mould making
- Application of wearing surfaces
- Complete machining with fully automatic changeover between milling and laser operation
- Large work area for workpieces up to Ø 500 mm, 360 mm in height and maximum 1,000 kg in weight
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Hot Runners Build on Solid Origins

Commercial hot runner systems have been available for over 40 years, and though the first design was patented in the US, as long ago as 1940, the basic technique has not altered too much from the original.

Most hot runner systems continue to provide a conduit for a melt delivery system by extending the machine nozzle into the mould through the mould cavities whilst keeping the flow of the material hot. Canadian pioneer Mold-Masters (acquired by Milacron for an estimated $975 mn in 2013) offered its first hot runner systems in 1965, in what it claims was the first embedded heater surrounding the melt channel to achieve the uniformity of temperature required to maximize part quality. But it was not until the oil crisis in the 1970s that economic conditions conspired to push technical innovation and adoption further as the rising price of raw materials forced mould and die makers to find new ways of reducing their own costs.

Source: ETMM Online

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HOT RUNNERS

Source: Husky

Husky's Ultra Helix provides the possibility to direct gate parts with gate vestige, it is so clean that it is often unmeasurable, with a level of gate quality that lasts for millions of cycles.

Necessity forces innovation

Hot runners helped to trim production expenses by minimizing the amount of waste generated when cutting off the sprue—the solidified residue left in the passage, which feeds the liquid material into the mould and needs to be removed from the finished part. The larger the mould, the bigger the sprue due to the distance between the injection cylinder nozzle and the moult cavity.

"One benefit is material savings as you do not have to melt unnecessary material, cool it again and then regrind it," explains President, Mold Hotrunner Solutions (MHS), Harald Schmidt citing a second advantage of savings in energy costs associated with the sprue recycling—again a particular problem in the 1970s as electricity prices fluctuated during the oil crisis. Schmidt estimates that potential power savings for hot runners could reach as high as 25 per cent as compared to savings for cold runners, for example.

"Not only do you have to plasticize the material that goes into a cold runner, but you have to extract that heat again through a cooling system. Once up to temperature and running 24/7, a hot runner usually comes in at a maximum power consumption of 20–40 per cent, whereas with a cold runner mould you waste energy with every cycle," he says.

Craig Reynolds is the director of business development for hot runners and controllers at Canada-based injection moulding system specialist Husky, which currently manufactures a range of hot runner systems, controllers and nozzles under the Altanium, Ultra, Unify and Pronto brands. He agrees that hot runners reduce wasted resin, lower the required fill pressure and improve part quality, which contributes to a net reduction on the volume of scrap, whilst cutting electricity bills.

Mold-Master released its V-Series hot runners in the 1970s with similar systems introduced by Incoe and other manufacturers. What followed was a series of upgrades designed to deliver precise temperature control through more accurate nozzles with the 1980s seeing new approaches to valve gating in particular.

New materials and better reliability

Reynolds says things advanced 'pretty dramatically' for hot runners in the 1980s as new materials with better wear characteristics and/or thermal transfer properties emerged, improving reliability and hot runner lifecycles—implying that systems started to last longer between refurbishments.

"Next generation heaters have less variation in the manufacturing process and longer operating life," he says. "Filling balance improvements have enabled further cycle time reductions, which improve the payback of investing in a hot runner."

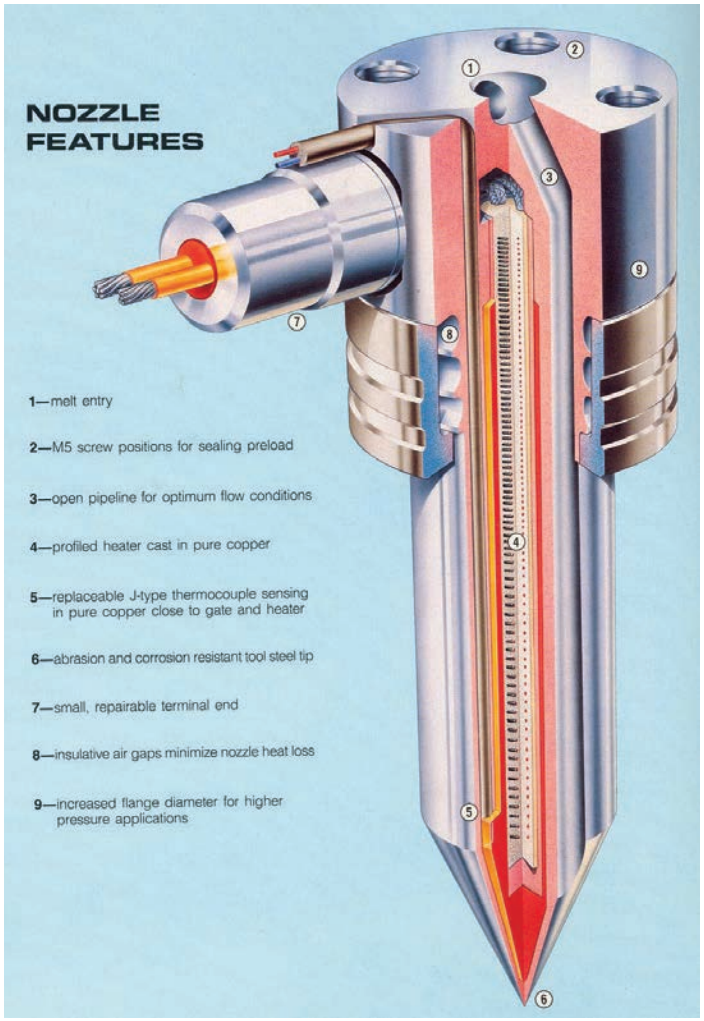
"In the 1980s and 1990s you had thousands of new materials coming onto the market and conquering new market segments such as packaging, medical and so on and hot runner systems had to complement this," adds Schmidt. "Reliability has increased especially with valve gate systems which allow a wider processing window in a fully automated environment whilst process control is much more efficient."

The introduction of front gating techniques helped to simplify mould design by eliminating parting lines but perhaps more significantly hastened greater automation of the process to improve productivity whilst offering greater flexibility in the size of the components which could be produced. Further innovation in side gating followed alongside new types of moulds – from stack moulds to family and cube moulds – which cannot be produced without using hot runner technology to deliver the required melt in many cases.

Männer first patented its cylindrical valve closure in 1981, for example, a component still used in hot runner systems today for the manufacture of tubular plastic parts, such as hyperdermic syringes, in the medical and pharmaceutical industries. Männer's Edgeline hot runner was recently upgraded with a shut–off nozzle for lateral injection which allows for more accurate moulding by using COC or COP plastics. This also helps to reduce waste and improve process reliability.

Current customer usage patterns

Recent innovation has been centred on greater automation and temperature control through valve gate nozzles, which help to control how quickly the melt in the gate area cools in order to increase precision and improve quality of the component



Source: Milacron

1980: Fused metal composite delivers even greater temperature control and uniformity.

whilst cutting material wastage further by eliminating drooling or stringing for example. Hot runners are now used in almost every market segment, from automotive to consumer electronics, packaging and medical—typically employed by any firm making injection moulds or injection moulding parts.

Nevertheless, Reynolds believes that this type of system is still being used by less than half of the moulds being manufactured worldwide. This lack of penetration may stem partly from the belief amongst some moulders that hot runners cannot mould some heat-sensitive resins for very small part weights, despite Husky and others seeing hundreds of examples where companies are using hot runners for Polycarbonate parts smaller than 0.1 g.

"I think this perception is really a holdover from the early days of hot runners but with today's hot runners, it is definitely possible," says Reynolds. "A hot runner is only as good as the temperature controller it's connected to and this is sometimes where moulders can be misled. Control is just as important as the nozzle and heater design."

Return on investment

Despite the obvious benefits, the cost and complexity of buying, setting up and maintaining hot runner systems as compared to cold runners continues to deter companies from making the investment. Others point to potential for thermal degradation of the material and difficulties in carrying out color changes as the remaining disadvantages. Some applications are heat sensitive, whilst there is a perception at least that hot runners are not well suited to moulds, which use very small shot sizes. Some parts, or families of parts, are also best kept attached to the runner until they reach another downstream operation, whilst low scale production makes it difficult to justify the relatively high cost of capital equipment purchases.

"Hot runners may make the mould slightly more expensive to manufacture and run, but they allow savings by reducing plastic waste (especially with continuously increasing prices for all types of resins and additives) and the cycle time because there is no need to wait until the conventional runners freeze," says strategic manager of marketing for Europe, Milacron, Michael Schiele. "I suppose one could argue that if the mould has a short production run of less than 100,000 parts over its life, it can be more difficult to justify the cost of the hot runner, but in general, the benefits can be applicable to almost every application," says Reynolds.

Future of hot runners

If the hot runner technology is to continue its development, vendors have to put a greater emphasis on reducing overheads through tighter integration with the mould and the machine, argues Reynolds, making sure that different pieces of equipment 'can talk to each other and optimize themselves'. Other suppliers also point to a growing use of IT for simulation and optimization purposes.

"I think the first task is to practically simulate the process, then based on that simulation and analysis you are designing the hot runner to optimize the parts," says Schmidt. "It is not so much about building hot runners faster and in higher quantities but building them to make better parts and that cannot go on without the IT and software side of things."

March 2015 saw Milacron introduce its Smart-Mold, for example, a platform based on an integrated PC that connects with sensors in the hot runner itself to feedback data from strain gauges, thermocouples and accelerometers.

"There is an ongoing trend for more complexity—step, servo motors and a growing number of sensors integrated within a hot runner equipment (the data) which needs to be understood and managed, alongside increasing automation and monitoring for preventative maintenance," says Schiele. **MMI**

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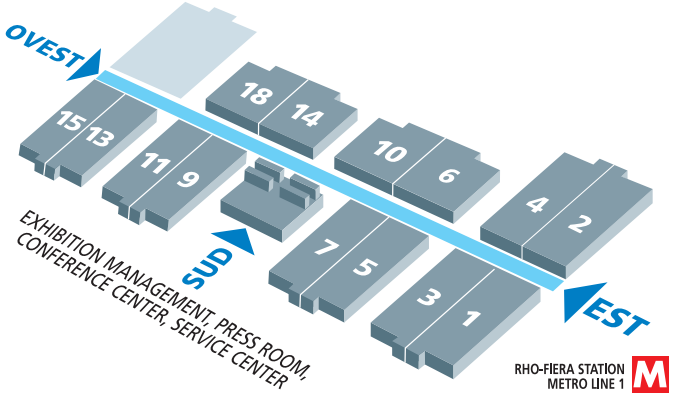

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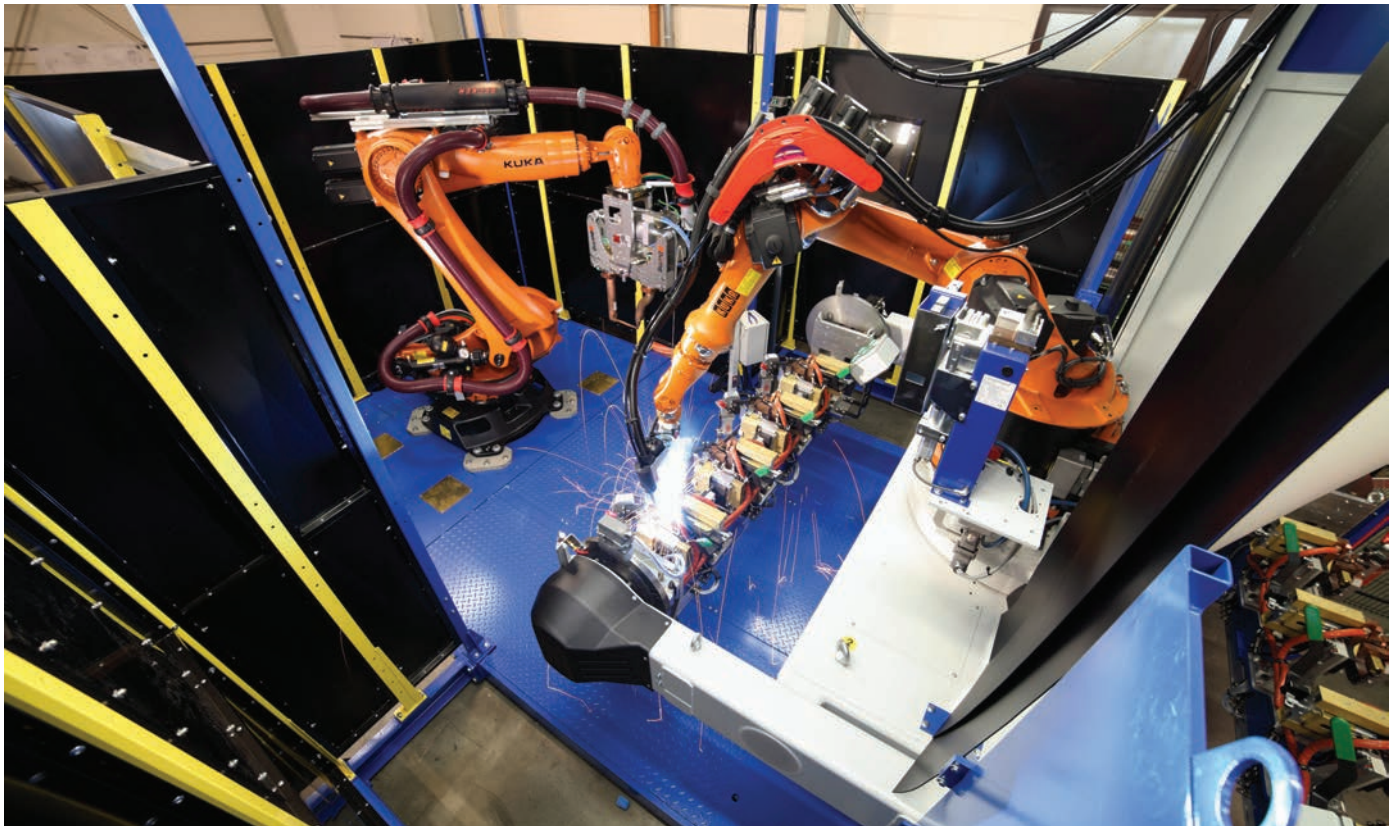
Source: KUKA Roboter GmbH



Perfect combination—the universal cell is centered on an H table with a KUKA robot of type KR 6-2 mounted in the middle to ensure different welding processes in a single cell with minimized space requirements.

Maximum Results in Minimum Spaces

ENKO Staudinger combines a wide range of welding processes in a compact universal cell with KUKA robots for its customer KAUTH GmbH und Co KG. The solution is one that can be further customized depending on use and applications. Learn how this solution brings about productivity and efficiency in a manufacturing setup.

ENKO Staudinger GmbH specializes in the development, design and manufacture of tools, fixtures, special machines and machine tools. With more than 40 years of experience and know-how, around 70 employees manufacture both conventional, manual fixtures and individual, complex systems for customers in the automotive industry, aerospace industry, chemical industry and general industry.

For Denkingen-based KAUTH GmbH und Co KG, a company that specializes in high-quality metal processing, ENKO Staudinger has developed a compact universal welding cell, combining a range of different welding processes in a single cell with minimum space requirements. "The requirement of the customer, Kauth, was the construction of a welding cell that was suitable for both spot welding and arc welding, taking all accessibility requirements into consideration," explains Bernd Menhart from ENKO Staudinger. The Augsburg-based manufacturer built the cell around two KUKA robots that perform the welding tasks.

Laura Schwarzbach
KUKA Roboter GmbH
LauraSchwarzbach@kuka-roboter.de

Perfect combination of robotic welding processes

The universal cell is centered on an H table with a KUKA robot of type KR 6-2 mounted in the middle. Use of a rotating table means that there is always one welding fixture in the productive process, while the second fixture that is loaded by the operator will have no effect on the cycle time. The cell can be used variably: either with a single robot as a very compact robotic welding cell or in combination with other robots. In the latter

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Maximum Results

case, various robotic welding processes can be combined. In the cell for KAUTH, two KUKA robots are used.

First of all, an operator loads a workpiece into the welding fixture and starts the system. The table rotates the clamped fixture through 180 degrees beneath the robot into its welding area. The KUKA KR 6-2, equipped with a Fronius CMT torch for arc welding, moves into the fixture and welds the workpieces. A second robot, of type KR 210 R2700 extra, equipped with an X 100 servo-pneumatic robotic gun from Düring Schweißtechnik, then moves into the fixture again and joins the workpieces by means of spot welding. On completion of the welding process, the H table rotates and a second, newly-loaded fixture enters the workspace of the robot. The rotation of the table moves the first fixture back into the workspace of the operator. The clamps open pneumatically and the operator can remove the welded parts. The loading/unloading by the operator has no effect on the cycle time.

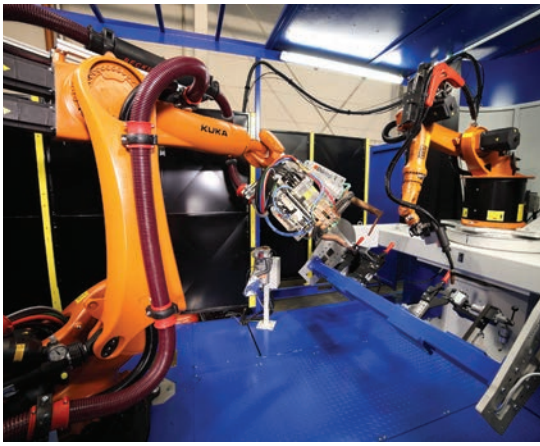
Improved accessibility and optimal welding results

The positioning of the robot on the H table improves accessibility of the robot during the welding process in the working area of the fixture. With its low payload capacity of six kilos and a reach of 1600 mm, the KUKA robot of type KR 6-2 mounted on the table is ideally suited to standard arc welding tasks. The streamlined design of the wrist ensures that the robot enjoys minimal disruptive contours and maximum freedom of motion. The welding expert is thus able to reach all welding positions on the workpiece effortlessly. The KR 210 R2700 extra performs spot welding tasks with high precision and at high speed. As is the case for all robots in the KR QUANTEC series, it is characterized by reduced space requirements and a wide variety of potential applications. With a payload capacity of 210 kg and a reach of 29,26 mm, it is predestined for the spot welding process in the universal cell. Additionally, the six-axis robot could also perform handling or machining tasks with ease. Both robots ensure perfect and measurable welding results in the ENKO Staudinger cell.

Ideal for prototype production

"This cell provides the customer with a wide range of options for the universal implementation of various welding processes, or even combination with other robotic tasks," summarizes Menhart. This flexibility makes the solution of particular interest for small series and prototype production, as the cell can be adapted very quickly and easily to new workpieces. Moreover, further options can be added to the cell. In the future, ENKO Staudinger intends to exploit the versatile combinations of different joining processes with other robotic tasks in a modular system still further. **MMI**

Source: KUKA Roboter GmbH



The streamlined design of the wrist ensures that the robot enjoys minimal disruptive contours and maximum freedom of motion.

Source: JUNKER

The largest JUNKER platform built to date will soon be put to use for the grinding of crankshafts.

Making the Grinding of Large Crankshafts Possible!

JUNKER builds a new platform for cylindrical and non-cylindrical grinding of workpieces with a swing diameter of 470 mm and a part length capacity of up to 4,800 mm, initially applied for grinding of large crankshafts. The company takes inspiration from its customers' queries to bring about solutions that are developed for the grinding of new applications. Read on for one such example.

Junker, the grinding machine specialist, used to repeatedly get asked the question, "Do you also have a machine for grinding large crankshafts, as your CBN technology is so economical?" The grinding machine specialist researched the request and discovered that to a point, primarily antiquated machines are installed worldwide for large crankshaft grinding. To another point, downsizing can be observed in generator and marine engine design; several smaller engines are of course easier to handle than one large one. As a result, the need for modern production methods and new machines is on the rise. To satisfy this need, the company decided to develop a larger platform with many technical refinements.

This platform will first be used in the JUCRANK series for grinding large crankshafts. As these weigh up to 1,000 kg, it is a challenge just to set the parts up for the process. To adjust the table assemblies, the company has developed a slide with an integrated length measuring system. As a result, the setup technician first brings the work heads into position, then the steadies.

Source: JUNKER

Newly developed steady with CNC control

First, to enable the processing of such unstable workpieces, the company had to develop its own steady. The currently available systems are simply too bulky and not rigid enough for high-speed grinding. The new patent-pending steadies are CNC-controlled

and only have one axis each. This considerably increases their stability and stiffness. Up to a maximum of 11 steadies can be controlled individually and applied to a section at any time—even during the process. This key feature allows for higher sequence flexibility of the grinding process. To make this possible, the company applied its proven control concept to a larger, high-performance control system. After all, in its simplest execution, the JUCRANK 8 already offers 24 CNC axes.

Source: JUNKER

The newly developed JUCRANK 8 from JUNKER is up to ten meters (32.8 feet) long and grinds forged large crankshafts in just one set-up.

Integrated measuring

Large crankshafts are mainly produced in small batches, and in some cases as single pieces. Furthermore, the forging and hardening costs are so high that scrapping a part is disastrous. JUNKER has added an integrated measuring system to overcome these challenges.

First the two grinding wheels, each mounted on a wheelhead with its own X- and Z-axis, pre-grind the main and pin bearings. The diameters are measured during the process. Then it becomes apparent that the grinding machine is also a measuring machine, as it measures the entire workpiece after pre-grinding—from the taper of each element, the bearing widths to the lift heights.

Based on the measuring data, the JUCRANK 8 finishes the grinding process while using the WK axis. During grinding, it swivels the grinding spindle, compensating for tapers in the process. With this technology, the grinding machine can provide each main and pin bearing with its own profile shape, i.e., if necessary with specific crowning. With this functionality, the machine then also grinds the two shaft ends if required (these often feature a taper and not a flange or post end).

As a result, the forged crankshaft is completely ground and ready for installation after only one set-up. Another possibility of applying the new JUCRANK technology is for the re-grinding of used crankshafts. The crankshafts are ground based on the measurements taken by the machine in record time.

Prospective applications outside of crankshafts

The first two machines were ordered for grinding of large crankshafts; however, there is also plenty of potential for other applications, for example, printing rollers, electric motor shafts and many more. Therefore, the company built the first JUCRANK 8 for its technology center to develop the grinding of new applications together with its customers. MMI

Through a Different Lens!

When one visits a show like HANNOVER MESSE, the norm is to witness innovation, demonstrations, industry stalwarts and even political leaders; however, one of the sights that caught my eye was the presence of a group of inquisitive students from India, particularly Maharashtra. Read on to know more about why the professor leading this group thinks it is necessary to have global exposure even as students.

This year's edition of HANNOVER MESSE holds dear to India's heart. India was the partner country for the event and showcased itself rather well promoting itself to welcome not only business and investments but also a culture that wants to learn in order to grow. As a visitor, having walked through the numerous halls and attended various seminars, a group of students caught my eye. On speaking to their Professor, (PhD pursuing in NITK Surathkal, Masters in Mechatronics FH Aachen Germany), Dean R&D, Head – Study Abroad Cell, NK Orchid College of Engineering and Technology, Solapur, Shriniwas Metan, it was amazing to learn that this particular group of students were all from Maharashtra—handpicked from the Solapur University, Maharashtra, India.

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Different Lens!

The start of the program

Speaking to Prof Metan, what became apparent was the importance he put on foreign exposure especially for students from Tier II cities such as Solapur. "In my experience, coming from a small town in India, I was unaware of many technological trends, and hence I wanted to bridge this technology gap for the benefit of the students of my town," averred Prof Metan. This goal manifested in the form of this opportunity, wherein the professor was in charge of leading a group of students to witness the 'Make in India' event at HANNOVER MESSE. "It was a golden opportunity to sow the same seeds in the young minds that will shape the future of India. I saw it as a learning experience for the students where they can witness this mega event and get extensive exposure to the advancements in the field of engineering," continued Prof Metan.

Source: Prof Shriniwas Metan

Prof Metan and his students on their visit to Hannover, Germany.

Ethereal experience

According to Prof Metan, the opportunity to visit Germany was an eye-opening one as it is a global leader in several industrial and technological sectors. In addition to visiting HANNOVER MESSE, the student group had the opportunity to visit the Leibniz University of Hanover and one of the facilities of Volkswagen Company. "Stepping in to the arena of the Volkswagen Company has provided us with moments

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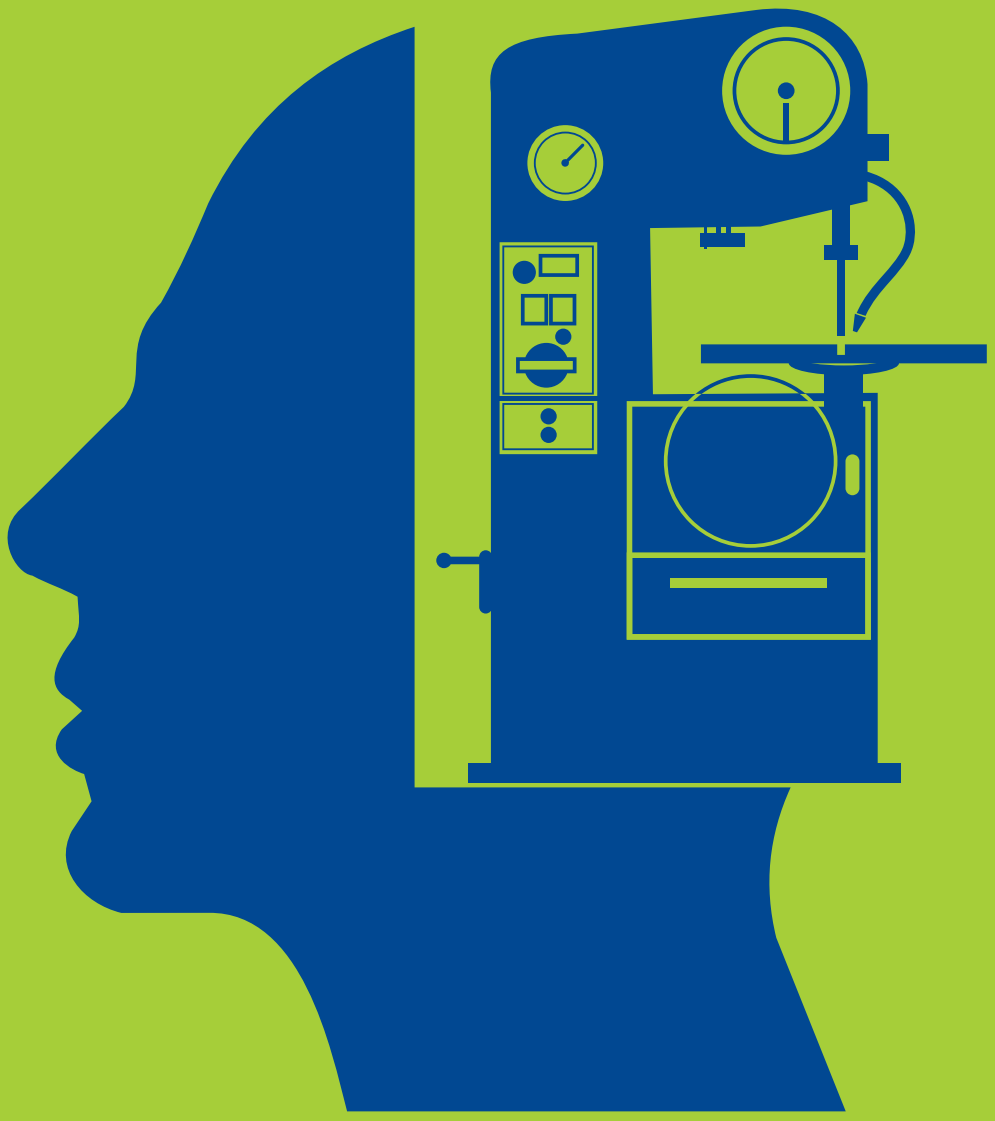

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that will be cherished for a life time. The students were mesmerized during their visit as they witnessed the whole production process of the Polo car and Gulf car. The manufacturing process had 6000 robots in use—minimizing the manual efforts, remarkable efficiency, automation, cleanliness in the surroundings and ultimately the painting section," informed Prof Metan.

In his opinion, the professor feels that this opportunity of witnessing the 'Make in India' campaign at HANNOVER MESSE that has surely helped the students in setting up milestones in their careers: "The event has proved to be one of the stepping stones that have opened up new ventures in the field of engineering to the world. The interactions of the students with the top notches of the industry got them acquainted with skills such as leadership, managing work effectively, team work, working in multicultural environment and work efficiency in global scenario."

Necessary exposure

Prof Metan asserts that students who belong to the small towns are miles away from the happenings in the field of technology. This is the reason why even if they have a creative mind and talent, it goes waste. Students should not only grasp basics of traditional engineering knowledge also they should imbibe skills through real experiences. "I feel there is a need that these students are made well acquainted with the present scenario, which will eventually help them in coping with the emerging trends in globalization and help them chalk their career plans effectively. When students from a tier two cities like Solapur get to experience events such as HANNOVER MESSE, they come across professional skills like time management, innovation, work ethics, etc., which they may not find in their curriculum," he stressed.

Set the ball rolling

Another benefit to this visit for the students was to get them acquainted with opportunities for pursuing a Masters degree in the best global universities. "The students now have a glimpse of where they can pursue their MS and get experience, which they can utilize in their home land by contributing towards employment enhancement through their experience and networking," mentioned Prof Metan.

Speaking on how these types of visits will also help global counterparts recognize the Indian talent pool, Prof Metan declared, "We have the best of our talent in varied fields working throughout the globe. However, there is a potential that can be well channelized through students that come from small towns or from rural areas. They are hardworking and consistent; all they really require is the right kind of channelizing of their talent, which will help them sustain the global market."

The emphasis here lies in providing the youth with the right opportunities for learning and skill development. MMI

TESTIMONIALS

"My visit to Hannover has changed my vision towards life, people and my career. After networking with industry stalwarts from different fields of technology and witnessing robots interacting with people, I feel motivated and inspired to think of innovative ideas. Overall, it was a life-changing, enhancing experience rather than a life changing experience for me.

Kanak Kawadi, Second Year — Computer Science Department, NK Orchid College of Engineering & Technology, Solapur

"My team and I also visited various companies such as Microsoft corp., Accenture, TCS, Bosch, InQu Informatics, to gain insights into the latest industrial happenings. Apart from the event, I visited the Volkswagen facility where I gained immense knowledge about automation. Truly, it was an extraordinary feeling to visit this industrial trade fair. .

Gayatri Pandit, Second Year — Computer Science Department, NK Orchid College of Engineering & Technology, Solapur

"Our trip to HANNOVER MESSE gave us the opportunity to mingle with people from different countries. We also visited one of the leading companies in automobile industry, Volkswagen. Going through the various machines used in automation has created an interest and has inspired me to learn and contribute to the creation of such machines.

Anjum Mujawar, Second Year — Electrical Department, NK Orchid College of Engineering & Technology, Solapur

"I visited various IT companies such as Microsoft, Bosch, TATA Consultancy Services, Inqu Informatics, Accenture, Siemens. The brilliant technology displayed there, motivated me to master my skills in my field. I also had the pleasure of meeting leading industry players. This experience has inspired me to pursue my masters and contribute to this industry.

Divya Rajput, Second Year — Computer Science Department, NK Orchid College of Engineering & Technology, Solapur

"This experience gave a new dimension to my goals in life. This experience has helped me to identify new vistas in technology and helped grow my confidence as I got to interact with eminent personalities from the industry. Also, it was an unforgettable moment when we interacted with our Prime Minister and Chief Minister.

Aniket Kalshetti, First Year — Civil Engineering Department, NK Orchid College of Engineering & Technology, Solapur

"The skills that I witnessed during our visit, and which I will imply in my career are discipline, time management, politeness, team skills, focus on practical knowledge and its application. Exploring different domains in engineering like animation and automation added a valuable contribution in my academics, that I would not had have acquire through mere theoretical knowledge.

Raghvendra Metan, First Year — Mechanical Engineering Department, NK Orchid College of Engineering & Technology, Solapur

Prof Metan explaining a the component to his students at the Volkswagen booth.

Source: Prof Shriniwas Metan

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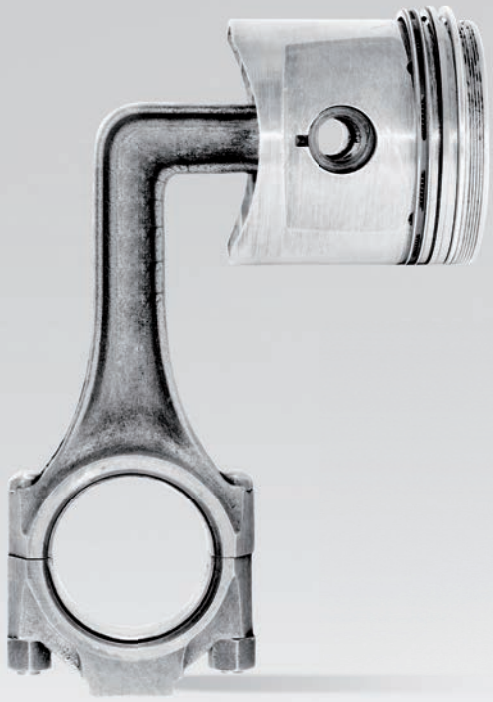
MEASUREMENT PRECISION



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EVENT CALENDAR

Event Name	Contact	Date & Venue
Machine Tool Expo 2015 – Delhi	Mahesh T: +9886680466 E: mahesh@imtma.in www.mtx.co.in	August 20–23, 2015 Pragati Maidan, New Delhi, India
Cambodia International Machinery Industrial Fair	Phnom Penh T: +855 (023) 5553219 E: service@chanchao.com.tw www.camboexpo.com	August 21–24, 2015 Diamond Island Convention and Exhibition Centre, Cambodia
LASER World of PHOTONICS INDIA	T: +91(022) 42554700 E:info@mmi-india.in www.world-of-photonics-india.com	September 9–11, 2015 Pragati Maidan, New Delhi
Euromold	DEMAT GmbH T: +49 (0) 069274003 – 0 E: info@demat.com	September 22–25, 2015 Düsseldorf, Germany
Machine Tool Expo 2015 – Ahmedabad	Mahesh T: +9886680466 E: mahesh@imtma.in www.mtx.co.in	September 24–27, 2015 Mahatma Mandir, Gandhinagar, India
EMO Milano 2015	T: +39 (02) 26255860 E: info@emo-milan.com www.emo-milano.com	October 5–10, 2015 Milan, Italy
Blechexpo	T: +49 (0) 70259206-0 E: info@schall-messen.de www.blechexpo-messe.de	November 3–6, 2015 Stuttgart, Germany
IESS 2015	Avishek Ghosh T: +91 (33) 22890651 E: aghosh@eepcindia.net www.iesshow.in	November 24–26, 2015 Bombay Exhibition Centre, Mumbai, India
sps ipc drives	T: +49 (0) 71161946-0 www.mesago.de/en/SPS	November 24–26, 2015 Nuremberg, Germany
IMTEX Forming 2016	Balasubramanian Pillai E: bala@imtma.in www.imtex.in	January 21–26, 2015 BIEC, Bengaluru, India
Die & Mould India International Exhibition	Bhaskar Kanchan T: +91(22) 28526876 E: diemould@tagmaindia.org www.diemouldindia.org	April 06–09, 2016 BIEC, Bengaluru, India

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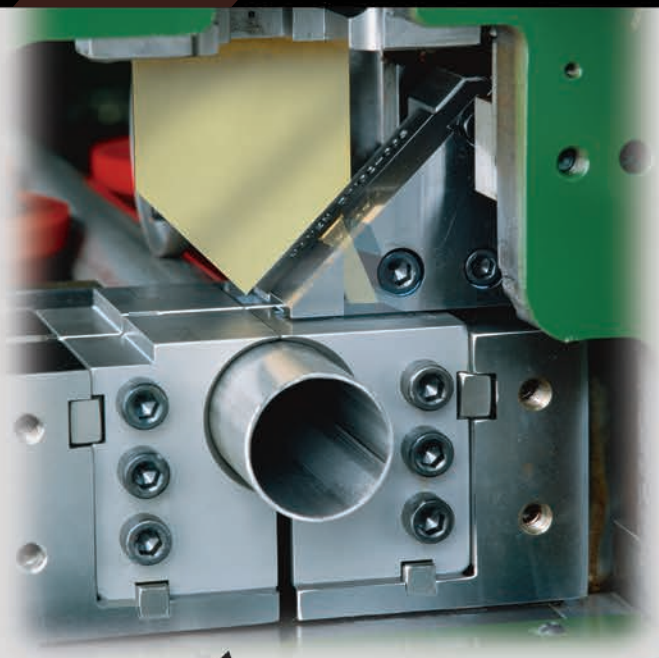

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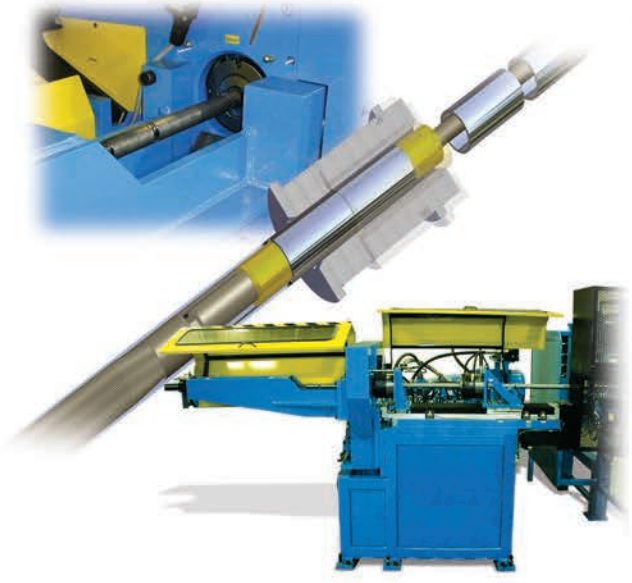

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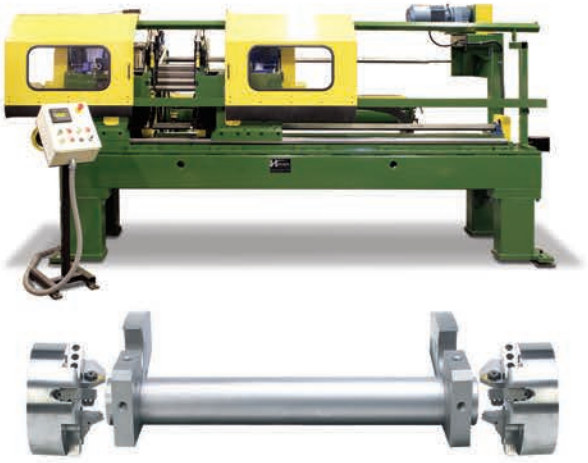

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AMTEX 2015 Goes Regional

This edition of AMTEX was organized for the first time in the Western Region. At the event, numerous exhibitors and visitors participated wholeheartedly, thus making it a big success. Here is a report on the show.

Asian Machine Tool Exhibition (AMTEX) was held from May 29 – June 1, 2015 on the grounds of the Bombay Exhibition Centre in Mumbai.

Inauguration

After a ribbon cutting and lamp lighting ceremony, AMTEX 2015 was declared open for visitors. The event was inaugurated by Minister of State for Woman & Child Welfare, Food & Civil Supply, State of Maharashtra, Vidya Jayprakash Thakur; CEO, Reed Exhibitions India, Michael Mandl and Managing Director, Reed Triune Exhibitions Pvt Ltd, Cyril Pereira.

The show witnessed an impressive display of technologies, Chief Guest, Thakur said, "Shows like AMTEX facilitate in showcasing the precision, quality, speed and accuracy of machine tools manufactured specially by Indian machine tool builders. The show provides a platform for manufacturers to meet their target audience. And also enables visitors to select, bargain and buy the right machine to suit their requirements. In other words, it is a perfect meeting platform that creates a win-win situation for all."

Swati Deshpande
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Vogel Business Media India
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Focus on western India

The western region of India is a vital venue for business. Speaking about the same, Mandl said, "At the planning stage, after talking to exhibitors, we realized that there is a need to host a machine tool show in Mumbai. Hence, from now on, we plan to host every alternate edition of the show in Mumbai." Seconding the same, Pereira added, "Being the financial capital of the country and its close proximity to key production and consumption centers of Western India, Mumbai is a perfect location to host this show."

Participation

This edition of AMTEX saw a perfect mix of Indian as well as international participation, as the show housed Chinese and Taiwanese Pavilions. On one hand, visitors were able to browse through various high-end machines from China and Taiwan and on the other hand, they were also updated on the latest innovations from the Indian MSME sector.

"As this exhibition was supported by the National Small Industries Corporation (NSIC), MSME units have been offered subsidies to participate. As a result, these units have received an opportunity to rub shoulders with big players from the industry," said Managing Director, Reed Triune Exhibitions Pvt Ltd, Cyril Pereira. AMTEX 2015 proved to be a successful show as it drew visitors in good numbers. The next edition of the show is scheduled to take place in New Delhi from July 8-16, 2016. MMI

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AMTEX 2015

Source: Reed Triune Exhibitions Pvt Ltd

Managing Director, Reed Triune Exhibitions Pvt Ltd, Cyril Pereira (extreme left); Minister of State for Woman & Child Welfare, Food & Civil Supply, State of Maharashtra, Vidya Jayprakash Thakur (third from right) and CEO, Reed Exhibitions India, Michael Mandl (second from right) along with other dignitaries at AMTEX 2015.

Source: Reed Triune Exhibitions Pvt Ltd

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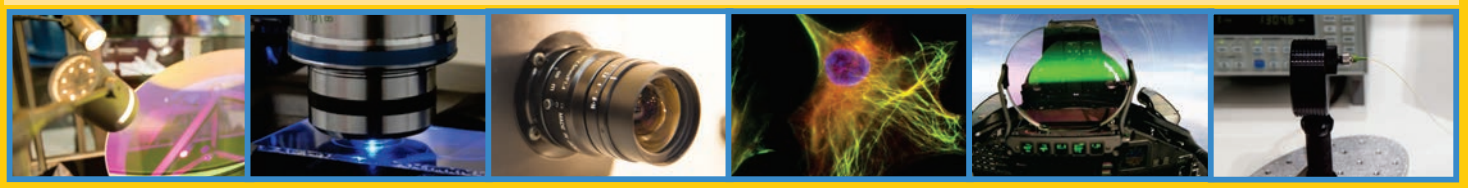
LASER World of PHOTONICS INDIA's exhibitors are manufacturers and service providers in the field of laser and optics, components and applications.



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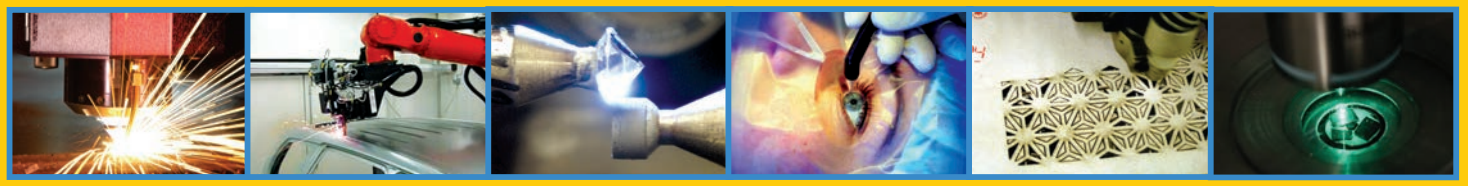

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Made in Taiwan!

On my visit to Taiwan, I observed many impressive technologies and products manufactured by the small yet dynamic island country. Read on to find out the latest market scenario in this region.

Dominated by small and medium sized companies, Taiwan knows how to make its presence felt in the competitive global manufacturing space and it's through technology! This is the impression that I had on visiting the region for a week long industrial tour organized by the Taiwan External Trade Development Council (TAITRA). During my visit I was accompanied to various factories in the industrial city of Taichung in Taiwan, where I witnessed many interesting technologies, production aspects and also tracked the latest happenings in the region's manufacturing industry.

Strong manufacturing sector

Machine tools form the largest segment of the local machinery industry in terms of dollar value, and other industry equipment such as lathes, EDMs, cast iron, tool magazine and other products have allied with noted vendors to facilitate supply to the global market. Taiwan's machine tool production amounted to $3.55 billion in 2013, trailing behind that of Japan, Germany, China, South Korea, United States and Italy; thus, making it the world's seventh largest machine tool production market!

Ahlam Rais
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Vogel Business Media India
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The region has a passion for producing diverse high-quality products, this was evident through the various companies that I visited in the region such as TBI Motion, a specialist in linear and motion products; Fair Friend Group that manufactures a wide range of products such as CNC machine tools, power tools & equipment, forklifts, pneumatic equipment, etc.; AutoCam specializing in the production of CNC rotary tables, high speeded indexing unit and machine tools charger unit; Yinsh Precision Industrial Co, a leader in manufacturing locknuts, inner thread, outer thread and precision machine track scraper; Johnford that produces vertical machining centers, double column multi-axis, 5-face machining centers, etc.; TJR Precision Technology Co specializing in the production of CNC rotary tables; Accuway, a manufacturer of CNC lathe, vertical CNC lathe, 5-axis vertical machining center, Kingston series engine lathe, etc., and Excetek specializing in the production of wire-cutting EDM.

The country has grown rapidly in a number of high-tech segments including IC, IT, communications and optoelectronics. To meet the needs of the high-tech industry, high-speed cutting has become the most highly needed feature of future machine tools. Overall, the growth of Taiwan's machine tool industry lies more in the high-tech industry than in the traditional manufacturing sector, allowing producers to explore products with higher margins.

Source: TAITRA

Vogel Business Media India (fourth from right) was present at the TAITRA held industrial tour.

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Made in Taiwan!

Potential growth industries

The region has five core potential sectors through which it intends to gain more business; all of them are listed below:

Bicycles: Taiwan is currently the world's major producer of premium bicycles. Bicycle producers have sought to expand output capacity by acquiring additional machine tools, making the bicycle industry one of the main sale targets for machine tool producers.

Aviation: Ongoing technological improvements have steered Taiwanese industries more towards the capital and technology-intensive end of the spectrum. The machine tools used by the aviation industry are mostly planer type milling machines and 5-axis machine centers with CNCs.

Green energy: Green energy has prospered ever since Mainland China committed resources to wind power projects, and the EU and the USA went ahead with solar power projects. This has given rise to the needs of key components such as gear boxes and bearings for wind power generators, and vacuum chambers for solar power. Both of which are capable of driving machine tool sales, particularly with regards to high speed milling machines, planer type milling machines and 5-axis machine centers with CNCs.

Medical instruments: The Taiwanese Government is committed to developing higher value-adding industries, particularly with medical instruments, as Taiwan's high-tech background provides a solid entry into electronic instruments and orthopedic materials. Owing to the higher quality requirements and complexities involved in producing medical instruments, most producers use 5-axis machine centers and multi-task machines centers in their production.

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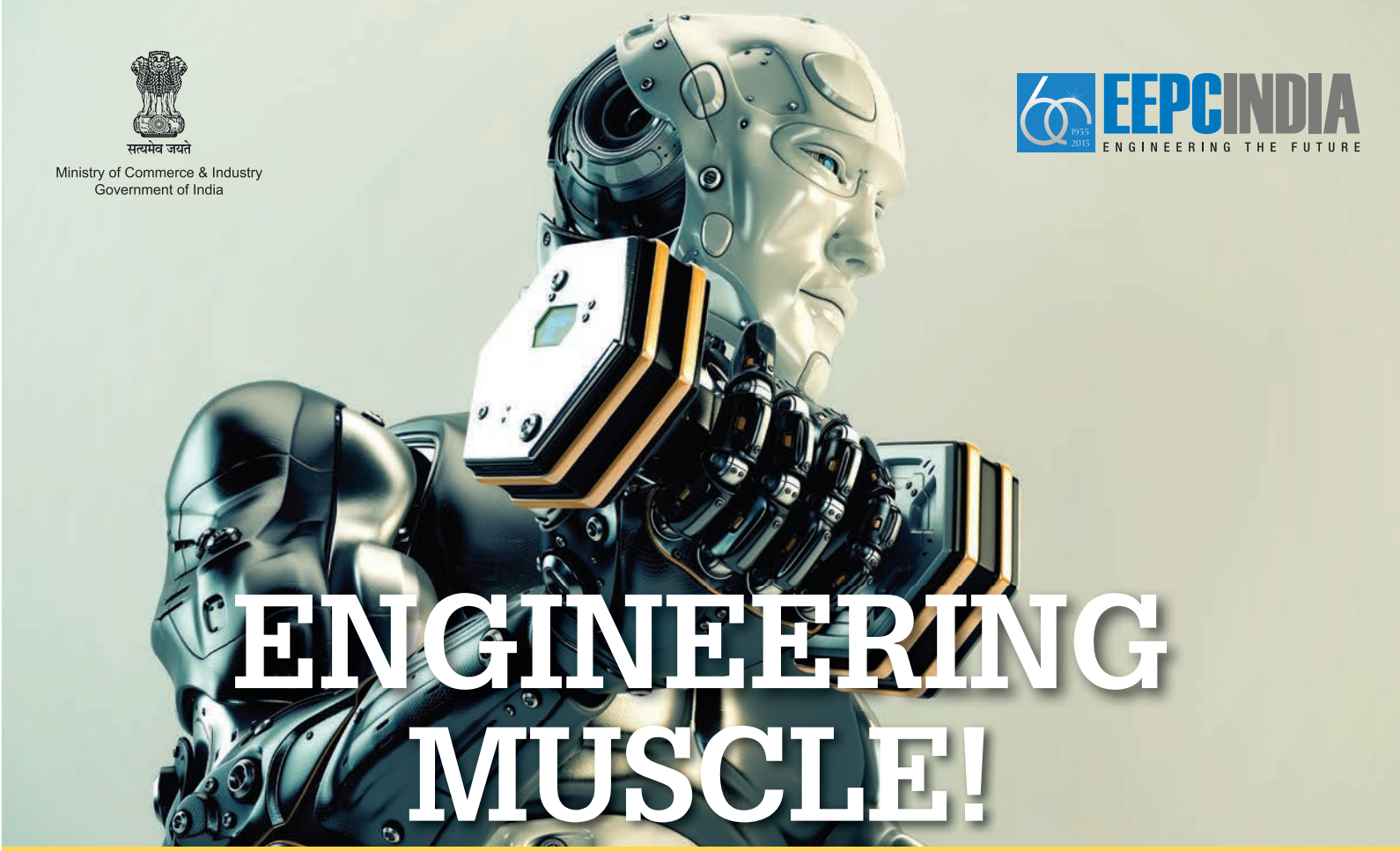

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India Engineering Sourcing Show – The biggest meeting place of global buyers to source engineering products from India

Precision molds: Faced with low-cost competition from Mainland China. Taiwan's molding industry has been shifting focus from large-size molding to higher value, refined and precision molding. Some of the technologies that the molding industry is focused on include high-precision mold surface processing; hydraulic tubing molding; deep drawing and high-speed transmission stamping; thin shell and precision injection molding; and continuous panel press forging techniques.

Government support

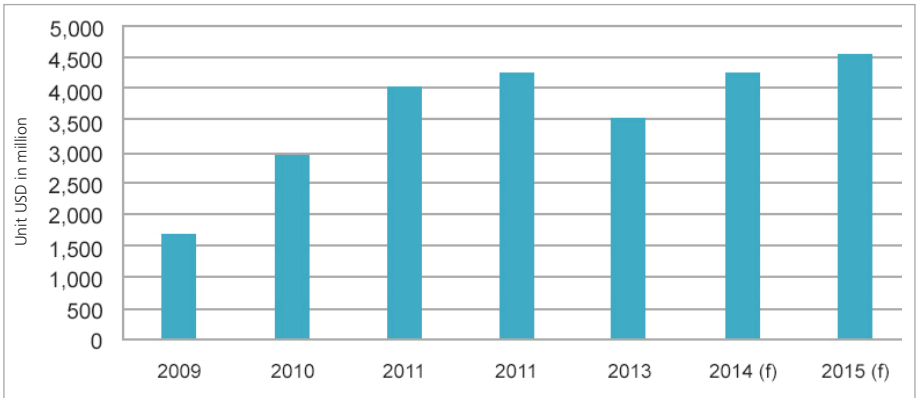
No industry can prosper without the support of its government and it is here that the Taiwan's Government new trillion-dollar initiative will make sure that the machine tool industry in the region is poised for growth. The government has identified precision mechanics as one of the core technologies to be developed in its six-year plan, and pushed for the creation of the Central Taiwan Science Park, which focuses on precision mechanic and aviation technology development. This will lead to new technologies and equipment required for industry upgrades and support further growth in the 3C and optoelectronics industries. Its medium-and long-term goals are aimed at supporting biotechnology and nanotechnology development. Taiwan's precision mechanics industry has accumulated robust competitiveness in terms of production and R&D, thanks to the government's relentless support.

Business-export scenario

Taiwan's major machine tool business comes from exports. The country's exports are expected to increase to $4.5 billion by the end of 2015, and if this happens Taiwan will be the world's third largest machine tool exporter. Metal cutters account for more than 80 per cent of Taiwan's machine tool exports. In particular, machine centers and lathes are the two main product lines. Shipments of machine centers and lathes are especially tied to growing demand in Europe and America. Among which, NC lathes have achieved the highest export growth averaging 63.5 per year from 2010 to 2012. Machine centers come in second in terms of export growth, averaging 41.6 per cent per year.

Taiwan's machine tool exports in 2015 are still expected to be dominated by machine centers and lathes, with the former estimated to reach $1.5 billion and the latter $1.3 billion by the end of 2015. Furthermore, metal casting tools are expected to reach $4 billion, while drill presses and tapping machines may exceed $500 million, raising Taiwan's stature as the world's major supplier of multi-axis drill presses and tapping machines by 2015 end.

Machine centers have long established their position as the market mainstream and nearly 80 per cent of such machine tools are exported to 138 countries that meet high technological standards. In addition to this, the country has also developed significant strengths in the production of machine tool components including castings, cutters, ball screws, linear guides, etc. This affirms Taiwan's capability as a major machine tool supplier in the global market.



Value of Taiwan's Machine Tool Exports, 2009-2015

Source: Customs Administration, Ministry of Finance, Taiwan; (2014/1) Industrial Technology Research Institute, IEK (2013/05)

Increasing its global footprint

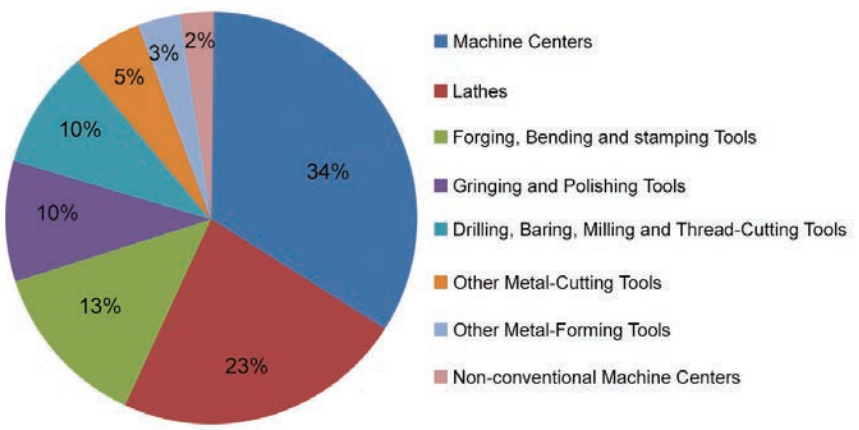
Taiwan supplies different machine tools to different countries. As for Mainland China and emerging countries in Southeast Asia such as India; Central and South America; Taiwan's exports mostly consist of machine centers and metal forming tools. Especially for a market like India, Taiwanese companies face the challenge of it being a price-competitive market and hence, the Taiwan industry still has a long way to strongly penetrate into this market. Exports to more advanced nations in Western Europe, Scandinavia, and North America; lathes comprise a significantly high percentage whereas metal forming tools are considerably lower. Quality lathes are indicative of Taiwanese producer's technical capabilities, and the fact that Taiwan-made lathes are favored by advanced nations it demonstrates their reliability as well.

Strong competition

Success does not come easy and this is evident as the small island country faces tough competition from its Italian and Korean counterparts, especially in the mid-end market segment. In order to stay ahead of this competition and gain greater market share, Taiwanese producers have been responding swiftly to the changing demands of their customers. The country's machine tool industry supply chain from R&D design to component manufacturing, assembly, testing and marketing, forms a complete system and is one of its core strengths.

In conclusion…

With so much happening in this country, it was a pleasure to visit the factories and interact with industry leaders to gain an overall perspective on the region's machine tool market. And with quality being an important factor for Taiwanese machine tools, may be the next time you come across a machine tool in any region of the world, it will state that it's MADE IN TAIWAN! MMI



Distribution of Taiwan's Machine Tool Exports, by Categories

Source: Industrial Technology Research Institute, IEK (2013/05)

Visit

Organizer

Indian Machine Tool Manufacturers' Association

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Detroit of India Makes AES 2015 Successful

Chennai, being one of the most important automotive hubs in India, became a perfect platform for hosting the Automotive Engineering Show (AES). The ninth edition of the event was a grand success. Here is a report on the same.

Automotive Engineering Show (AES) organized by Messe Frankfurt was officially opened on July 7, 2015, at Chennai Trade Centre, Chennai. In recent years, this city is popularly known as the 'Detroit of India' as has become one of the largest export hubs for automobiles and components in India. Therefore, the city was the ideal venue for the exhibitors across the globe to display their automotive related products and solutions.

Inauguration

The show was inaugurated by Minister of Industries, Government of Tamil Nadu, Thiru P Thangamani. Along with him, the occasion was also graced by eminent personalities in the industry including Managing Director, Lucas TVS Ltd, TK Balaji; Project Head, GARC, a unit of National Automotive Testing and R&D Infrastructure Project (NATRiP), MV Ramachandran; President, Powder Metallurgy Association of India (PMAI), N Gopinath; CEO, BFW, Ravi Raghavan; General Manager, Business Development and Corporate Planning Department, The Automotive Research Association of India (ARAI), Vijay A Pankhawala.

Addressing the guests, Thangamani said, "I am happy to inaugurate this important industry exhibition. In recent years, Tamil Nadu has become a front runner among the Indian states in terms of industrial development. Chennai has not only emerged as a leading automobile manufacturer but is also at the forefront of automobile exports."

Agreeing to the same sentiment, Executive Director & Board Member of Messe Frankfurt Asia Holding Ltd, Raj Manek said, "Chennai, being one of the country's largest automotive and auto components manufacturing hub, it gives us immense pleasure to organize the ninth edition of the Automotive Engineering Show. This credible industry platform focuses on indigenous manufacturing, which fits well with the current 'Make in India' initiative undertaken by the government which aims to enhance India's manufacturing competitiveness in the automotive sector. Also, industry professionals can witness the latest automotive manufacturing innovations from over 100 exhibitors as well as learn about the current cost and operational challenges facing the industry over the next three days."

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On display

Spread across Halls 2 and 3 of the Chennai Trade Centre, the fair provided a platform for over 100 leading technology companies for showcasing their range of automotive automation and engineering solutions. AES was an apt opportunity for auto professionals to browse through a broad range of product demonstrations. Various leading companies from India and abroad including Siemens, Omron, Mitsubishi Electric, FARO, Mahr, SICK India, Olympus, Panasonic, Bharat Fritz Werner, etc., exhibited at the event.

The gamut of demonstrations included various solutions required by the automotive industry such as marching centers, material handling systems, software, automation equipment, lubricants, testing, etc.

Faro demonstrated its Faro Edge ScanArm HD at the event. This is an affordable measurement device that enables users to significantly reduce on-site measurement times, seamlessly scan across diverse surface materials and sustainably enhance their products and processes.

On the other hand, BFW displayed its four

Source: Messe Frankfurt

(LtoR): Minister of Industries, Government of Tamil Nadu, Thiru P Thangamani; Managing Director, Lucas TVS Ltd,TK Balaji and President, Powder Metallurgy Association of India (PMAI), N Gopinath inaugurating the event along with other dignitaries.

"Chennai has not only emerged as a leading automobile manufacturer but is also at the forefront of automobile exports."

Minister of Industries, Government of Tamil Nadu, Thiru P Thangamani

"This credible industry platform focuses on indigenous manufacturing, which fits well with the current government initiative – 'Make in India."

Executive Director and Board Member of Messe Frankfurt Asia Holding Ltd, Raj Manek

"We received a positive response from the MSME, tier 1 & tier 2 component suppliers. The cost-effective Accutron product has generated a lot of business interest."

CEO, BFW, Ravi Raghavan

cutting edge machines that would interest auto professionals. Accutron TSP 350V, a twin spindle vertical machining center; Dhruva HE, a high speed vertical machining center; BMV35+, a Nano Versatile Machining Center and Vortex BTC 1540, a compact general purpose horizontal turning center. Apart from these big companies, small and medium scale companies also showcased their solutions according to the requirements of the automotive industry.

Seminar

Along with the display, AES was also a great learning platform. Messe Frankfurt had organized a seminar themed 'Smart Automotive Factories' to enable auto professionals to exchange insights on traceability solution, Manufacturing Execution System (MES) software, connected cars and Internet of Things (IoT). Professionals also shared developments on performance enhancement of industrial robots by making use of calibration data and the lean manufacturing competitiveness scheme.

On a concluding note…

With this, AES 2015 created a perfect platform for participants to exchange and learn about new solutions available in the market. The next edition of the AES is scheduled to take place from March 21–23, 2017, at Pragati Maidan, New Delhi. MMI

Maiden Delhi Machine Tool Expo: Focus on Regional Manufacturing

IMTMA is all set to give its members and exhibitors a new regional platform in the form of the Machine Tool Expo 2015 – Delhi. At this event, domestic players can connect with new potential customers in the Northern region of the country and understand their requirements accordingly. Read on to know more about the opportunities involved in the machine sector.

The Indian Machine Tool Manufacturers' Association's (IMTMA) first ever Machine Tool Expo 2015 – Delhi is scheduled to take place at Pragati Maidan, New Delhi, from August 20–23, 2015. With a prime focus on manufacturing solutions for the regional industries, the expo will be a one-stop destination to witness the latest technologies and solutions for SMEs to upgrade and improve their productivity and quality requirements.

The machine tool expo is a business-to-business exhibition that will encourage manufacturing industries and SMEs to reach for higher quality, productivity and achieve competitiveness by adopting modern machines and technology.

Compiled by:
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Expectations

Expressing his expectations from the inaugural show, President, IMTMA & Managing Director, TaeguTec India Pvt Ltd, L Krishnan said, "Exhibitions hold the key to penetrate into regional markets, exchange ideas, and share new technologies for enhancing productivity."

Elaborating on the forthcoming show, Vice President, IMTMA & Managing Director, Jyoti CNC Automation Ltd, Parakram G Jadeja added, "Exhibitions are one of the most vital tools to enhance the brand visibility as well as business. We foresee a huge number of visitors from North India to witness this state-of-the-art event crafted by IMTMA. Hopefully this event will complement the post monsoon demand for machine tools across the industrial spectrum and prove to be a catalyst to our 'Make in India' mission."

Response

The Delhi Machine Tool Expo covers an area of around 10,000 m^2 in four halls (Hall No 8, 9, 10 and 11) and though it is just the first edition, the show has received a satisfactory response from exhibitors. The show is expected to witness participation from five countries along with group participations from China, Taiwan and the United States. Speaking on the same, Director General, IMTMA, V Anbu noted, "Companies across several regions and verticals have already booked space for showcasing their products at the event. With more than 150 exhibitors not only from India but also from overseas, the show will have the presence of some of the prominent global machine tool manufacturers which is an added advantage for the visitors to see the best manufacturing technologies in the industry."

IMTMA is looking forward to many visitors for the show and expects it to translate into trade enquiries and business. Additionally, the Delhi Machine Tool Expo 2015 will have trade delegations from various sectors. It will be one of the best places to judge the requirements of the regional market in sectors such as automobiles, auto components, defense, railways, telecom and many others. MMI

Source: IMTMA

Aerial view of one of the exhibitions held by IMTMA.

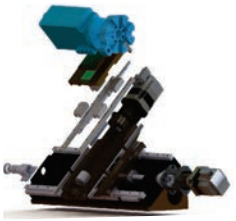
Train Your Engineers @

DESIGN INSTITUTE
Machine Tool Design Powered by Technovation

IMTMA has taken a positive initiative in providing state of the art facilities and industrial expertise to establish a high-end Design Institute for the cause of moulding fresh engineers into specialized machine tool designers. The IMTMA Design Institute aims to extend the training programmes to the machine tool and other companies for the benefit of training their fresh hires and nominated individuals into productive and highly efficient machine tool designers.

Machine Tool Design

IMTMA Design Institute training programmes are structured very systematically to provide the participants an in-depth knowledge in the subject of machine tool design and an orientation of the entire Machine Tool Industry. This is complimented by hands-on group projects that emphasize the development of practical design skills of the candidates. The well researched curriculum is endorsed and taught by subject matter experts from the industry making it the only course of its kind in India. An interactive learning process is adopted to enable participants to build practical skills on a solid theoretical knowledge base.



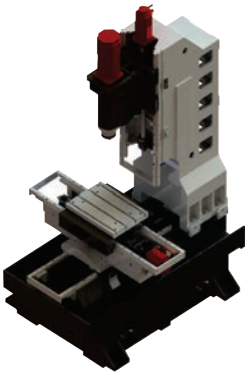
IMTMA Certified Machine Tool Design Programmes

Comprehensive Modules

Machine tool Design - Mechanical
[8 Weeks] Schedule : 03 August to 29 September 2015

Machine Tool Design - Electrical
[4 Weeks] Schedule : October | March

Machine Tool Design - aCADemia
[20 Days] Schedule : July



Specialization Modules

Design of Fixture
[6 Days] Schedule : June | February

Design of Hydraulics
[6 Days] Schedule : 27 June to 01 August 2015

Design of Spindle
[6 Days] Schedule : 20 July to 25 July 2015

Mechatronics
[6 Days] Schedule : May

Facilities at IMTMA Design Institute
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- Independent CAD Work Stations
- AUTOCAD, INVENTOR, SOLIDWORKS, CREO, ANSYS
- Expert Industry Professionals as Faculty
- Curriculum blended with latest design trends

Course Modules
- Machine design fundamentals
- Design of machine elements
- Introduction to CNC machine tools
- Engineering materials and heat treatment
- CAD Tools training
- Design of Manufacturing Drawing
- 3D part & assembly modelling
- Drafting of machining drawings
- Complete machine design exercise of CNC Machine
- Design of hydraulic and pneumatics for machine tools
- Machine tool testing and calibration
- Industrial design

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For More details contact : Rahul Vylen, ; Tel : +91-80-6624 6835 ; cell : 9663884656; email : rahul@imtma.in

www.imtmatraining.in

Circlip-grooving Insert

Seco has designed its new X4 polycrystalline cubic boron nitride (PCBN) insert to bring high stability and long tool life to circlip grooving operations that involve heavy interrupted cuts in hardened steels. The X4 PCBN insert features a strong solid-carbide body structure, four cutting edges and a highly stable clamp design that results in reliable and cost-effective production of parts. In addition to its circlip grooving capabilities in unstable conditions, the insert also performs accurate 6TPI threading operations.

▸ **Seco Tools India (P) Ltd**
T: +91 (02137) 667300, E: seco.india@secotools.com
www.secotools.com/in

Laser Cutting Machine

LVD has newly launched Electra, a high-speed fiber laser cutting system. Featuring storage for up to 10 nozzles, it brings greater autonomy, reduces piercing time and increases the overall throughput on the machine. With the nozzle changer, the laser cutting machine will select the right nozzle for every job. Therefore, it eliminates operator intervention and reduces downtime by quickly performing nozzle changes including cleaning the nozzle and checking the nozzle alignment.

▸ **LVD Company n.v.**
T: +32 (56) 430511, E: marketing@lvd.be
www.lvdgroup.com

Measuring Software

FARO Technologies, Inc has released FARO CAM2 Measure 10.5, its latest software for FaroArm, FARO Laser ScanArm and FARO Laser Tracker. CAM2 Measure 10.5 leads the market with its capability to connect multiple 3D measurement devices, within the same coordinate system, and simultaneously scan into a single seat of software on one computer. This capability allows users to seamlessly scan large objects with higher speed and precise accuracy in order to complete 3D scanning jobs faster. Significant advancements to Geometric Dimensioning and Tolerancing (GD&T) functionality provide users with streamlined analysis and visual reporting.

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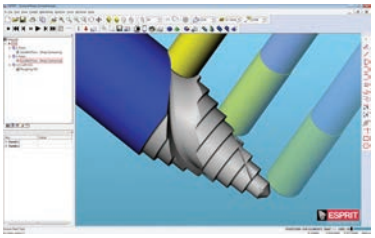
CAM Software



DP Technology Corp has released its Innovative CAM Solution ESPRIT 2015. The new version promises to increase productivity and automation. The release also provides many new and improved features specifically in the areas of intelligent machining, strategic machining, CAD-CAM data exchange and Cloud-Enabled CAM. ESPRIT delivers full-spectrum programming for 2–5 axis milling, 2–22 axis turning, 2–5 axis wire EDM, multitasking mill-turn machining and B-axis machine tools, and high-speed 3- and 5-axis machining.

▸ **DP Technology Corp**
T: +1 (805) 3886000, E: katherine.liu@dptechnology.com
www.dptechnology.com

TopDrill Chipbreakers

TaeguTec has launched two new chip breakers that achieve longer tool life and improve the machinability of the TopDrill line. The DK type chip breakers are made for cast iron drilling while the DA type is suitable for aluminum drilling. The new geometry DK type utilizes the TT6080 grade and improves wear resistance when machining cast iron. The DA chip breaker is designed with a polished top face surface as well as a sharp edge to minimize cutting resistance and built-up edges while drilling into aluminum workpieces, which helps to avoid chipping and fracturing of the cutting edge normally caused by vibration.

▸ **TaeguTec India P Ltd**
T: +91 (080) 27839111, E: sales@taegutec-india.com
www.taegutec-india.com

Vices

ARNOLD SC High Precision vices are specially designed to work on machining centers with small tables as well as with 5-axis controlled centers. Their compact design with exterior guides avoid deformation and the clamping force is distributed throughout the width. Moreover, they have a threaded right-left spindle, which can be operated with a standard key. Also, the interchangeable jaws can reach a height of 125 mm. This means that they can overcome the biggest obstacle for this type of work that is, avoiding collisions with the machine turrets or the rotation of the table.

▸ **Fresmak ARNOLD Precision Engineering Pvt Ltd**
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www.fresmak.com

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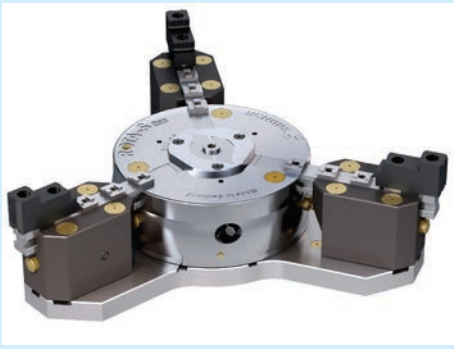
Schunk, a leading provider of clamping technology and gripping systems, has numerous innovative products in its portfolio. Here are some of its offerings:

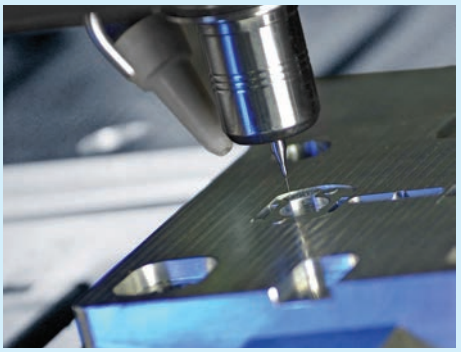


Manual Lathe Chucks

SCHUNK ROTA-S flex, manual multi-purpose lathe chuck from SCHUNK is particularly suitable for customers, who want to machine a broad workpiece range on the mill/turn machine. The lightweight chuck combines SCHUNK lathe chucks of the ROTA-S plus series with extended guideways, and turn them into useable large chucks. Compared with conventional lathe chucks for large clamping diameters, the deadweight with the ROTA-S flex is reduced by up to 60 per cent. Considerably heavier workpieces can be machined at an identical table load. Due to the low height, plenty of space remains for workpiece and tool.

Stationary Workholding

SCHUNK KONTEC KSC 125 delivers high precision and process reliability. A pre-clamped and scope-free center bearing (ball bearing) and a particularly adjusted slide ensure a re-peat accuracy of +/- 0.01 mm, and allow precise machining of the first and second side of the clamping system. An integrated chip flow and a specially protected spindle ensure maximum process reliability. The centric vise is also suitable for automated machine loading: it can be used in every pallet storage system as an affordable solution.



Toolholders

The polygonal toolholders of the TRIBOS-Mini and TRIBOS RM series are available with the interfaces HSK-E 25, HSK-E 32, and HSK-F 32 starting from clamping diameter 0.5 mm, on option also ultra-fine balanced at a balancing grade of G 0.3 at 60,000 rpm. Therefore, demanding requirements in terms of dimensional accuracy and surface quality in the micro-mold making can be met. These are especially useful in industries such as optical, medical, jewelry, etc. Compared to conventional balanced toolholders for micro machining, their tool life is longer. Since expensive cutting edges are used for micro machining, an excellent balance grade pays off after a very short period of time.

Gripping System

The analog SCHUNK MMS-A magnetic switch is the first teachable encoder, which can be integrated directly into the C-slot of gripping modules free of interfering contours. It serves to accurately detect the size of the gripped parts, which can be output as an analog voltage value as 0-5 V DC or 0-10 V DC, as selected, during the current handling process. Now the extremely compact MMS-A, with a 4 mm diameter, is sufficient where previously several magnetic switches were required. The required electronics are already fully integrated. The output signal is sent over a displacement measuring range up to 30 mm with a resolution of up to 0.1 mm.

Chuck Jaws

SCHUNK, the competence leader for clamping technology and gripping systems designed the PRONTO quick jaw change system particularly for conventional lathe chucks with screw connected chuck jaws. It lowers set-up time of a complete jaw set to 30 seconds, which is about 95 per cent faster than conventional solutions. SCHUNK PRONTO combines fine-serrated supporting jaws (1/16" x 90° or 1.5 mm x 60°) with special quick-change inserts, and extends the clamping diameter up to 45 mm in seconds. This is eight times more than with conventional lathe chucks.

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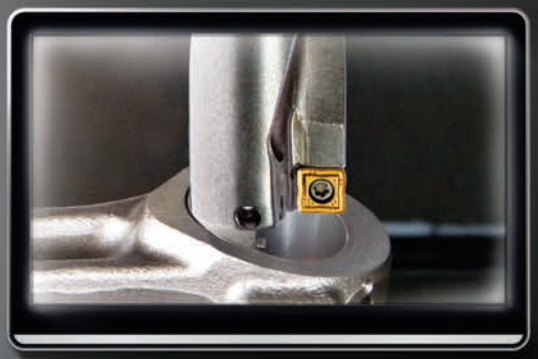

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