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The official magazine of Indian Machine Tool Manufacturers' Association

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EMO SPECIAL

Preview 2015

EVENT REPORT

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MOTION CONTROL

Energy Efficiency – A Decisive Factor

ARVIND BALAJI

President, ACMA and Joint Managing Director, Lucas-TVS Ltd

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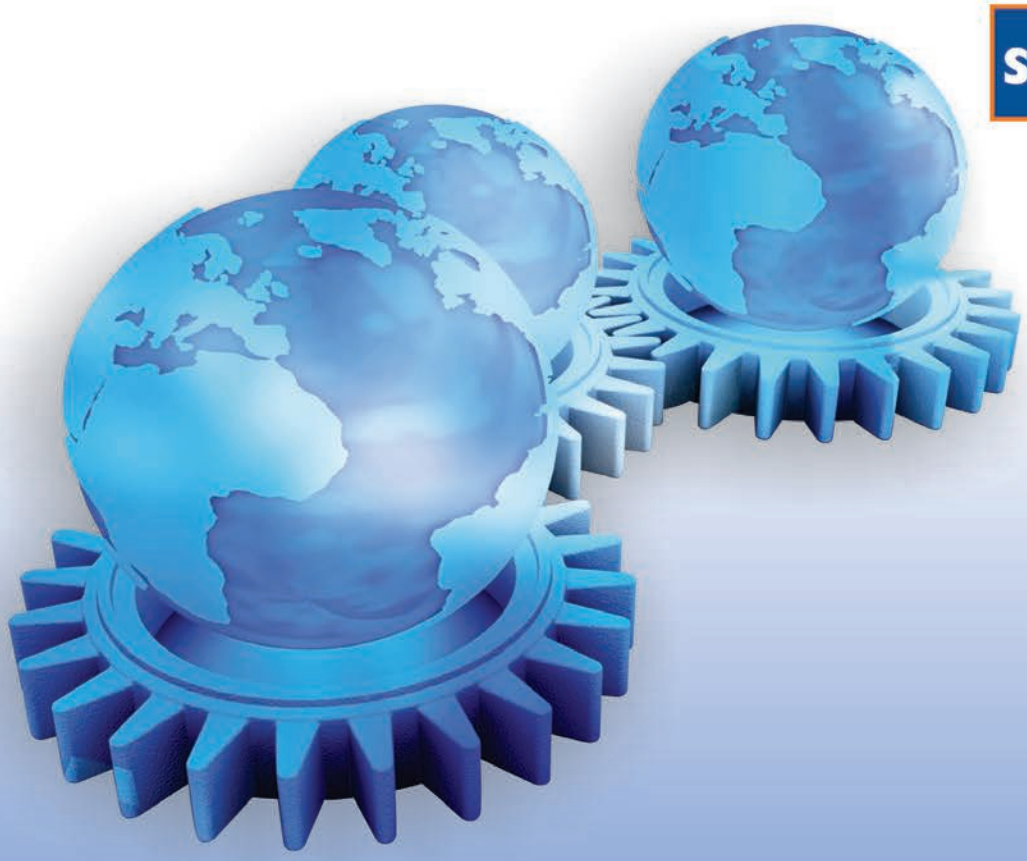

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L Krishnan
President, Indian Machine Tool Manufacturers' Association (IMTMA) and
Managing Director, TaeguTec India Pvt Ltd

Building Upon a Successful 'Regional Expo'

Greetings!

World economies are constantly navigating through newer uncertainties such as the threat of Greece going bankrupt and now turbulence following devaluation of the Chinese Yuan. Closer to home, data from the recent past indicates that India's economy has started to gather steam for its next movement. Industrial production picked up pace in the month of June with the trade deficit narrowing down in the following month of July.

Both manufacturing and services PMIs (purchasing managers' index) showed an upward trend in July with the latter returning to expanding mode. Moving forward India needs to implement the promising Goods and Services Tax (GST) reform to scale up its manufacturing activities and continue reforms to improve its ranking on the ease of doing business.

However, we do realize that for an emerging economy like ours implementing many of the ambitious reform agenda will have its own challenges and might take some time before the vision is translated into a higher demand for goods and services. We are optimistic that the momentum picked up during this season will see us journeying on the right direction for achieving more.

Autumn has turned out to be a great season for regional manufacturing as Indian Machine Tool Manufacturers' Association organized the first edition of the Delhi Machine Tool Expo at Pragati Maidan, New Delhi in the month of August. The response to this event was tremendous. We were able to open up the manufacturing industry to the requirements of the entire northern region. The event attracted the best from all sectors and this was evident from the number of delegates that were present at the expo. These included major original equipment manufacturers, public sector units, industry associations and government bodies.

The first edition of the Delhi Machine Tool Expo witnessed a total footfall of 13,500. The exhibition witnessed 220 exhibitors displaying over 200 machines from 9 countries along with group participations from three countries. The show had the presence of more than 40 industry delegations representing various industry sectors.

The Delhi Machine Tool Expo has also proved to be an eye opener for the small and medium enterprises (SMEs) to seek technologies and solutions required to upgrade and improve productivity and quality requirements. We are quite hopeful that the SMEs will be able to implement the necessary steps to bridge quality gaps, sustain performance, enhance skill sets for better productivity, and expand their business in the global supply chain though the exposure gained at the event.

In this edition of MMI, you will be updated on how cost–effective automation will enable SMEs to play a pivotal role in the global supply chain. You will also be informed on the recent and upcoming initiatives of IMTMA that will prove beneficial for connecting the industry with its customers. I am sure that the contents herein will be valuable for the readers.

I would like to conclude by calling upon the industry to whole heartedly support our upcoming Ahmedabad Machine Tool Expo at Gandhinagar in the month of September and make it a grand success.

Wishing you a pleasant reading.

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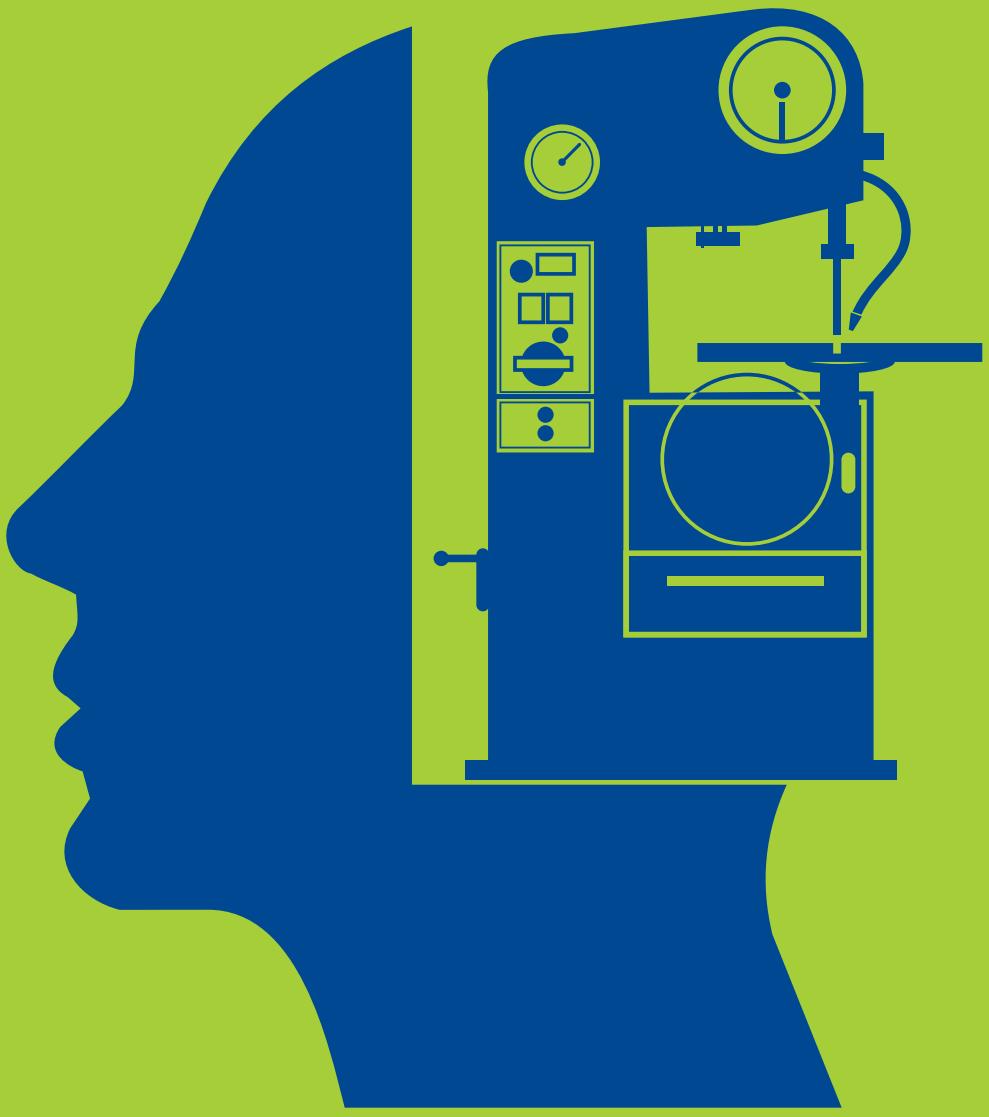

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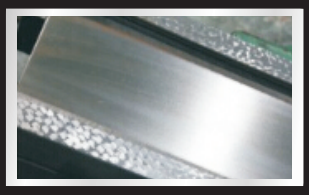
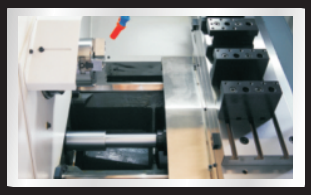

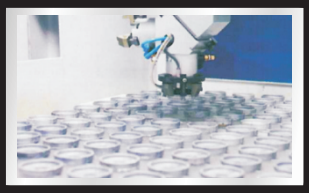

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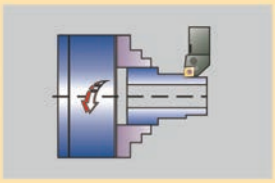
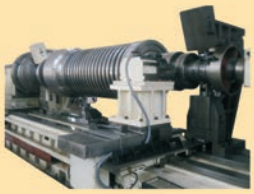


SC-8K
GANTRY LOADER

SC-14
BIG BORE LATHE



SC-25
CNC HEAVY DUTY LATHE

CNC Internal Grinding

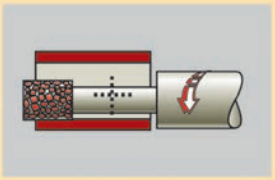
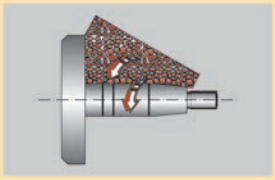


FIG-200 SPL CNC
BIG BORE GRINDER

FIGT-300 CNC
FOUR STATION TURRET

FIGE-150 CNC
ID / OD GRINDER

CNC Cylindrical Grinding

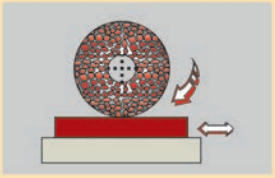


AWH-1500 CNC
LONG SHAFT GRINDER

AWH-2000 CNC
HEAVY DUTY GRINDER

SWH-400 CNC
AUTO LOADING

Surface Grinding



SG-106 CNC
CREEP FEED GRINDER

SGR-60
ROTARY GRINDER

SG-63
HYDRAULIC / PLC

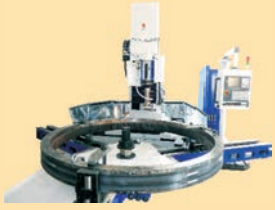
Automats

A15/25

TD36
AUTOLOADING

A42/60

Vertical Turning Lathe



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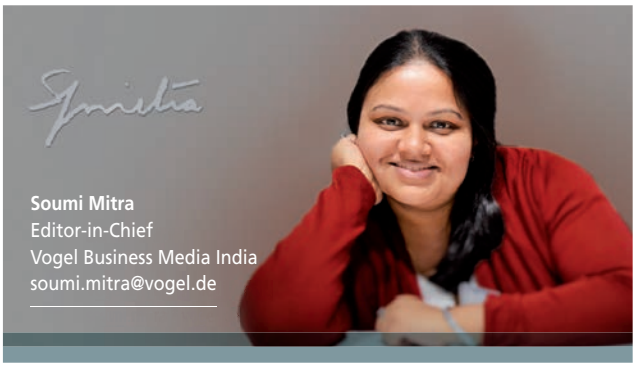

Soumi Mitra
Editor-in-Chief
Vogel Business Media India
soumi.mitra@vogel.de

Action Gets Results!

Recently, a friend of mine, on their return from Moscow, gifted me with an exquisite set of Russian nesting dolls. These dolls, also called 'matryoshka', adorn my writing desk with their vibrant hues and enliven my work space. Well-known as national souvenirs of Russia, these dolls are made with the utmost precision. Extreme accuracy is called for to ensure that the exact amount of wood is removed from the doll's top and bottom halves so that they fit perfectly together. Hence, it is always a marvel to see these dolls of decreasing sizes placed one inside another showcasing the perfect example of recursion and practice.

"Live out your imagination, not your history!."

~Stephen R Covey

Similarly, in the manufacturing sector where the machine tool performance plays a critical role in production efficiency and product quality, it is imperative to deliver machines that combine high speed and precision to stay competitive in a global market.

With the advent of more advance technologies the demands are equally high for machines and components that are more reliable and energy efficient. The entire profitability quotient revolves around delivering low-maintenance products with a low environmental impact and even lower operating costs.

This being a given, we bring to you this issue packed with the latest trends and happenings in the industry along with the glimpse of one of the most awaited events of the year—the EMO Milano 2015 fair.

Wishing you a world of discoveries and a happy read ahead!

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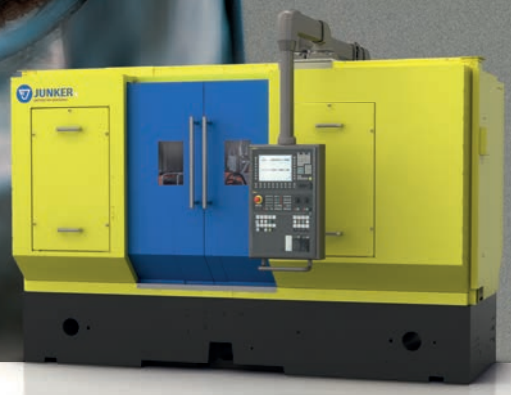

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▶ **BIG INTERVIEW:** Arvind Balaji, President, ACMA and Joint Managing Director, Lucas-TVS Ltd. **42**

▶ **FACILITY VISIT:** The facility is encompassed with all the tools necessary to build world-class equipment. **44**

▶ **VERTICAL MACHINING:** Bertol's first Haas machine, a VF–1 vertical machining centre, arrived in 2005. Since then, the company has added a VF–2 vertical machining centre and four Haas turning centres, including two ST–10 models. **62**

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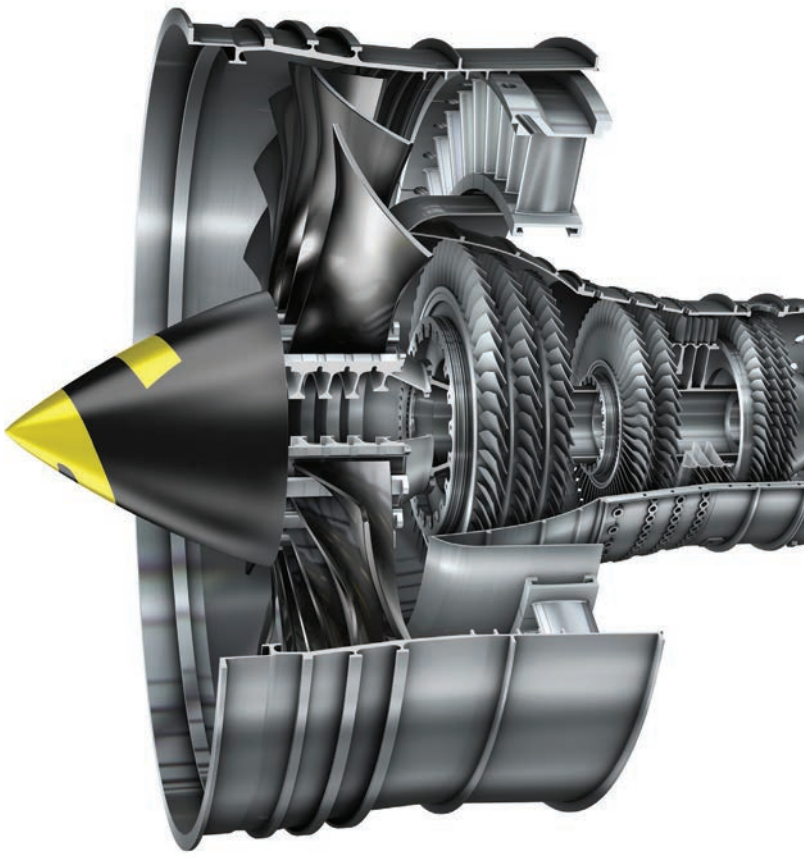
▶ **EQUIPMENT MACHINING:** In DMG's hybrid machine, the laser ensures the deposition of the material. **64**

▶ **EVENT REPORT:** Ribbon cutting ceremony by the delegates at the Delhi Machine Tool Expo 2015. **70**



▶ **AEROSPACE MACHINING:** Aerospace engine showing fan disc (1), shaft (2), blisk (3), fan casing (4), spool (5), turbine disc (6) and combustion casing (7). **56**

DIGITAL VERSION

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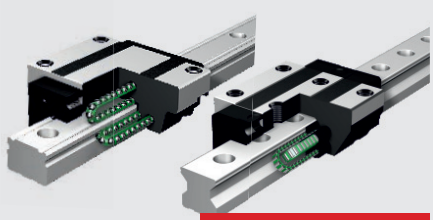
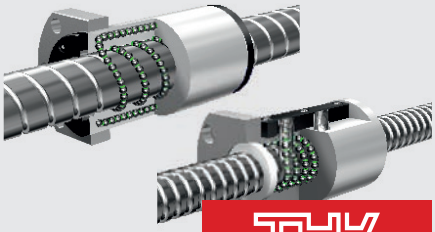
LINEAR MOTION TECHNOLOGIES

Linear Motion Guides



THK The Mark of Linear Motion

Precision Ball Screws



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Precision Cross Roller Ring

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Clamps for Linear Guides

ZIMMER TECHNISCHE WERKSTÄTTEN

Cross Roller Guides

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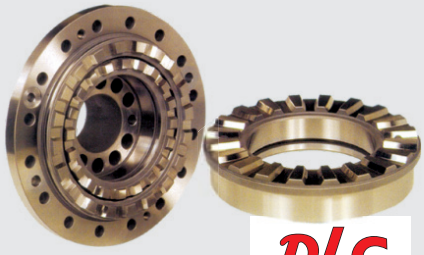
Curvic Coupling



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Will Your Company Pass the Test of Good Strategy?

"An effective strategy sets the direction of the organization and aligns its department to achieve results."

CEO,
Micromatic Machine Tools Pvt Ltd,
TK Ramesh

In today's competitive business arena, no business can afford to do less than its best. Competition is intense; companies rarely get a second chance. You may be seemingly doing everything right, but is your business still stagnating? Your direction is clear, but your pace is lagging! In order to manage performance, companies must have a clear picture of their strategy and it must understand how and where that strategy is succeeding or failing. We must be aware of trends that might provide insight into the changes required. There are simple and direct ways that could measure and test the strategies employed for its effectiveness.

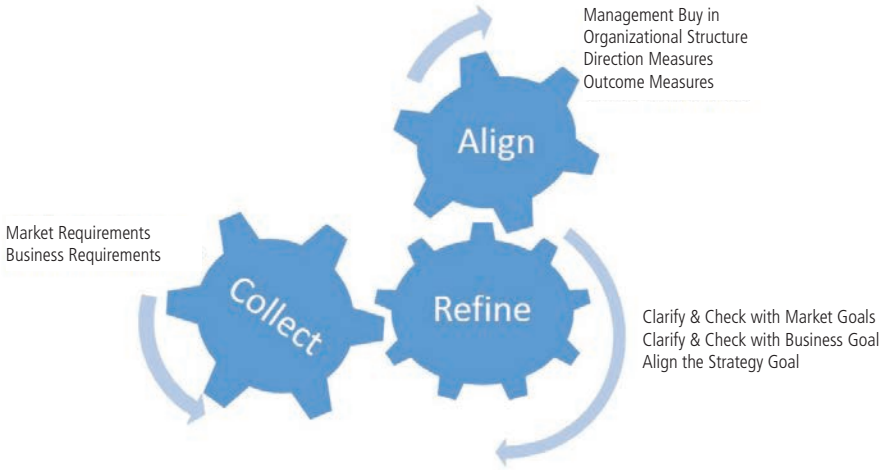
Discern and move

We must have correct and current information to answer the most basic questions and there by derive answers to the more complex business questions such as:

- What were our results, when compared to the last year, to our projections or to our competitors?
- What did we accomplish and how long did it take?
- What impact does our organizational structure have on our sales results?
- What impact does our organizational structure have on our customer satisfaction?

Every organization is under increasing pressure to translate strategy into dependable performance. Even with a strategy that effectively sets the direction of the organization and aligns its department to achieve results, organizations must grapple with the prospect of daily market and competitive changes that can negatively impact results.

If the management team cannot quickly and accurately change to reflect the current market conditions, the seemingly good strategy can erode revenue, so every member must have access to information that will quickly and easily tell them if the tasks they are performing are in support of business success and provide alerts to correct and re-evaluate tasks and direction suitably.



Ask the right questions

Without current, accurate information, tailored to suit the task and goal, the organization will suffer. The questions that need to be answered for putting our strategy to work are:

- How do we take tactical action to align the operation with our goals?
- How do we monitor conditions and take early corrective action?
- How can we accelerate planning and decision cycles?

Good strategy forcefully translates ideas into action, is integrative across the organization, reconciles the past with the future and provides clear actionable options. MMI

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

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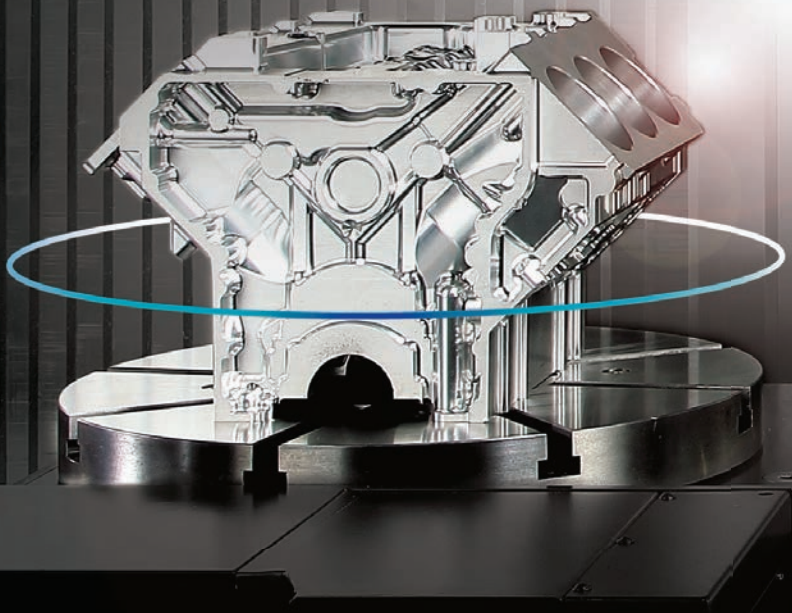

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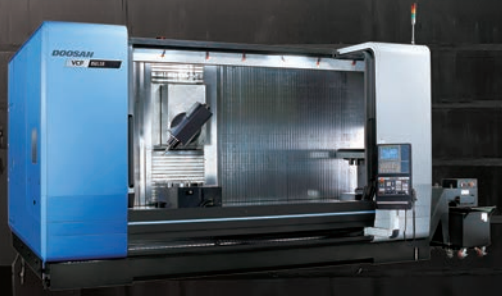

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Adopting Cost–effective Automation: A Key to Sustain Manufacturing Capabilities for SMEs

SMEs are often confronted with the task of bringing out high quality and high precision products. Automation is one solution that can enable them to play a lead role in the global supply chain.

Off–shore competition, identifying and retaining trained manpower, high cost of labor, controlling production costs and sticking to government regulations are key challenges facing the manufacturing industry. Small and medium enterprises (SMEs) are often confronted with this in their day–to–day quest of bringing out high-quality and high-precision products. Automation is one solution that could elucidate some of the basic challenges confronting SMEs and enable them to play a lead role in the global supply chain.

Source: IMTMA

Automation although promising in many aspects is scarcely implemented by SMEs in India as they think it to be an expensive affair. To overcome this, we need to develop cost–effective automation, which can address consistency of output, robustness of processes or product, increased predictability of quality, and increased throughput and productivity. Cost effective automation when developed in India will help SMEs to bring out larger volumes at significantly lower costs wherein it would benefit the original equipment manufacturers.

SMEs contribute to about 80–90 per cent of the total manufacturing units in India and comprise about 40 per cent of the current market size of the Indian machine tool industry. Industry reports have stated that nearly 80 per cent of the SMEs are not IT and automation enabled. The operations are largely manual, using low–end solutions that are difficult to maintain. In this scenario, it is all the more crucial for SMEs to adopt

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Automation

Robots used for welding in an automotive production line.

Source: IMTEX 2015

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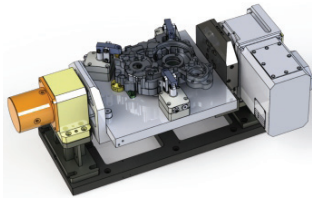
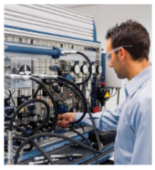
Design of Fixture – Specialization @ Bangalore 05 - 10 October 2015

This course is structured with the introduction to Fixture Design basics to final design. Design of fixture is key to effective utilization of machine tools. Basics of fixture design if not implemented correctly results in poor productivity & quality problems. Set-up time and cycle time reduction, increased accuracy on components, deskilling the job setting operation are the obvious advantages of a good fixture. Competence in right fixture differentiates excellent organizations. A complete process of fixture design will be carried out from concept to finish design.



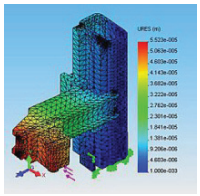
Pre-design activities like design input, conceptualization, process planning, accuracy consideration, cycle time estimation, POKAYOKE, 3D modeling of parts and assembly, using popular design CAD tools and preparing the final manufacturing drawings. Design for Accuracy, Manufacturing and Assembly will be addressed during the course. It will be highly interactive and hands on training session and covers entire 360° view on fixture design aspects.

Training on Hydraulic System Design for Machineries @ Pune 26 to 31 October 2015



This course is structured with introduction to basics of Hydraulics system to complete design. Design of Hydraulics is key to effective utilization of any Mechanical Application. Hydraulics design if not implemented correctly results in poor performance & quality problems during running. Conceptualization w.r.t the actual requirement in terms of force, speed and safety is very essential during design. Selection of hydraulic elements, sizing of elements, calculations for optimization, design of entire system is very vital in any mechanical industry. Assembly of hydraulic elements, hydraulic plumbing, machine interface and trouble shooting is key requirement. The entire course is designed to address all the above and convert engineer as hydraulic engineer. During the course a complete hydraulic system design will be carried out from concept to final design with hands on.

Design validation through FEA using ANSYS @ Bangalore 02 Nov to 07 Nov 2015



Practical methods to implement FEA as a part of the Design Validation Process needs emphasis with a proven approach addressing real-world situations. FEA has become commonplace in terms of adoption and efficacy. It is important that, in order to stay competitive and profitable, Indian manufacturing industries focus on innovation and technological upgradation by incorporating best-in-class process as applied to Design Validation. This is not only essential to protect profitability but also to ensure survival.

This training also includes hands on training on FEA tool – ANSYS – both APDL and Workbench.

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Source: depositphotos.com/Baloncici

Production line with one automatic robotic arm.

automation. How do we do this?

Measures for adopting automation

Creating awareness is one step. Japan, for instance, realized that a combination of human skills and appropriate automation could be cost–effective, easy to maintain and this lead to a competitive scenario. Indian SMEs need to be made aware of the payback results (return on investment), simplicity in operation, design, flexibility and maintenance. If cost–effective automation is simple then as products change it can be modified, taken apart and reused. Such cost–effective automation is designed and manufactured on the shop floor, and the user is actively involved in all the stages right from design till the tryout stage.

Access to funds in order to upgrade technology is another step. Investing in a simple robotic operation could be considered as a financial burden on SMEs. Therefore, many of them continue to operate without any long–term plans. The union budget of 2015 has some initiatives to boost the manufacturing sector. The decision to set up the 'Mudra Bank', a refinance agency to be launched with a corpus of ₹20,000 crore and a credit guarantee fund of ₹3,000 crore with direct lending to micro, small and medium enterprises will address the funding issues to an extent. However, the benefits from these to trickle down to the SMEs may take some time. Once the management decides to adopt automation, it needs to impart the requisite technical and functional training to reap the full benefits of automation. The delegates need to be made aware of the objectives. This will also inculcate a sense of ownership in them. SMEs need to invest in products from companies that have training facilities and are willing to share their experience and industry knowledge.

In conclusion

It is imperative to note that any automation system must be selected based on its appropriateness. For example, a fully automated system is an appropriate solution in a high-volume bearing plant, and cannot be designed and implemented by shop-floor personnel, nor can it provide the return on investments in one year. However, an automated part unloader with manual loading can be a cost–effective solution, and more appropriate for batch production at a Tier–II automotive component manufacturer. Appropriate automation must be cost competitive based on the scale of production. While cost–effective automation catches one's attention, it is not a solution for all automation requirements. It is more meaningful to use appropriate automation, which includes cost–effective automation. As India embraces automation, it will bring forth high precision products that will enable its SMEs to establish their footprint on the global map. MMI

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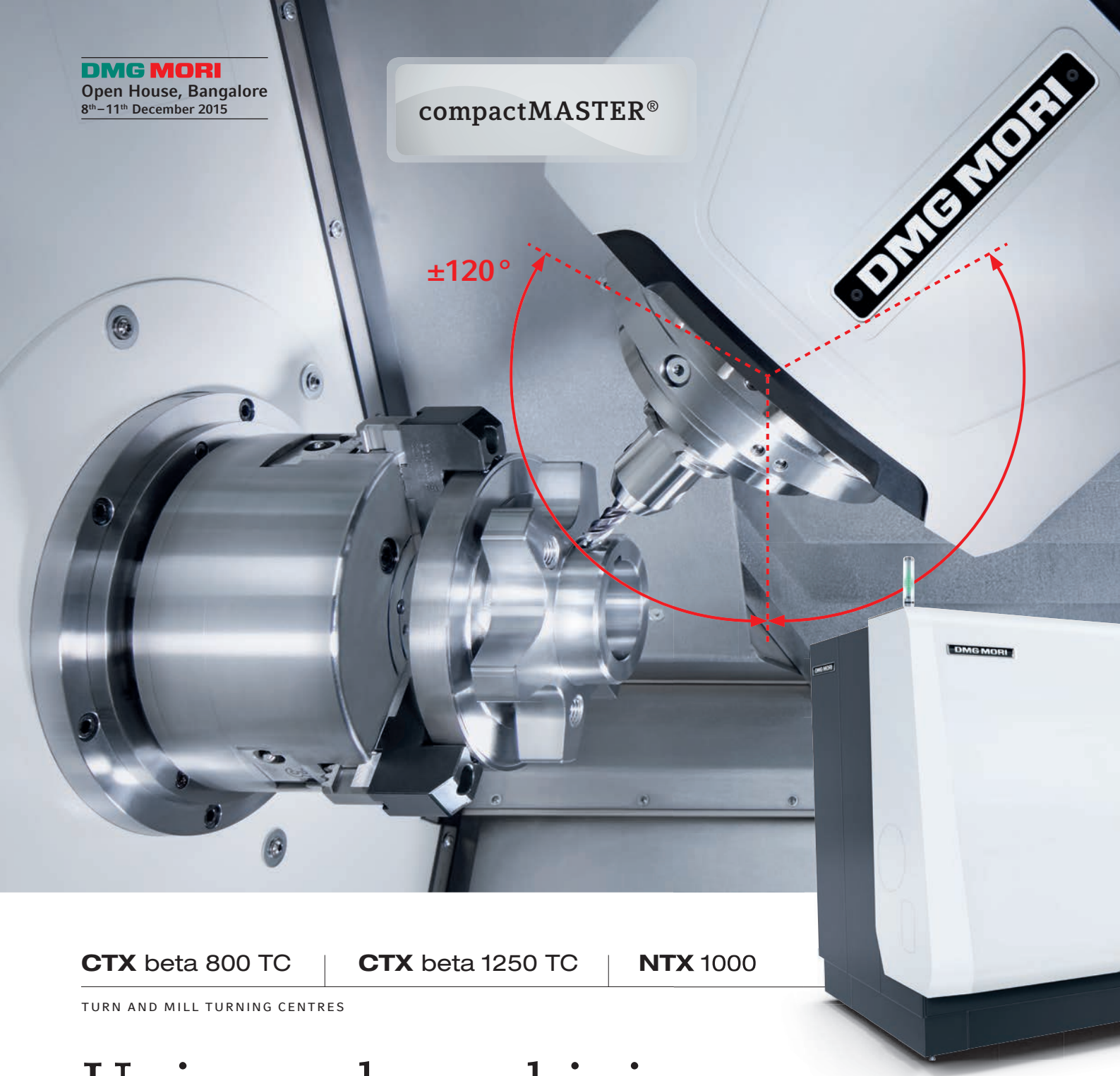

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Dimensions: ø 230 × 250 mm
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Machining time: 7 mins 30 sec

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Taiwan Machine Tool Exports to India surges over 11%

New Delhi – Trade between India and Taiwan is increasing rapidly with Taiwan's machine tools exports to India growing by 11.6 per cent in the first two quarters of 2015 (January to June). This comes in the wake of the overall Taiwan–India bilateral trade touching $2.108 billion in the first five months of 2015. Taiwanese exports to India contributed $1.28 billion while imports from India touched $828 million. "There is a clear cut synergy between the needs of the Indian manufacturing sector and the special characteristics of the Taiwanese machine tool industry. The strengths of Taiwanese machine tools products include excellent quality, reasonable prices, integration and constant innovation, and continuous value addition. In the future, we truly expect Taiwanese products to help speed up India's manufacturing energy and make a significant contribution to the Make in India initiative," said Director, Taipei Economic & Cultural Center in India, Economic Division, Lee Guann-Jyh at a press conference at Pragati Maidan on August 20, 2015.

Source: Taitra

Director, Taipei Economic & Cultural Center in India, Economic Division, Lee Guann-Jyh addressing the press conference.

CII Business Excellence Road Show

Mumbai – CII (Confederation of Indian Industry) conducted the CII Business Excellence Road Show on August 4, 2015 in Mumbai to evangelize Business Excellence and explain how companies can benefit from the pursuit of excellence. At the event, manufacturing and service sector leaders from highly successful organizations shared their journey on business transformation. The list of speakers included Principal Counsellor & Head, Business Excellence, CII Institute of Quality, CV Subrahmanyam; Co-Chairman, CII Institute of Quality & Managing Director, Tata Chemicals Ltd, R Mukundan; CEO & Mananging Director, Rallis India Ltd, V Shankar; Executive Vice President & Business Head, Godrej Locking Solutions and Systems, Shyam Motwani; CQH, Rallis India Ltd, Pravas Mohapatra and Head of Delivery Excellence, Tata Consultancy Services Ltd, K Subramanian. All the presentations explained the important factors that one has to consider in order to reach business excellence. These included sustainability of business, implemen-ting a strategy in the right manner, experimenting with innovative ideas, etc.

Source: CII

Co–Chairman, CII Institute of Quality & Managing Director, Tata Chemicals Ltd, R Mukundan delivering his speech at the event.

Indian Enterprises Must Undertake 'Frugal Engineering'

New Delhi – Indian enterprises have the ability to undertake frugal engineering and must excel, innovate and design to drive its economic growth by 9–10 per cent for the next three decades to create employment driven growth, said Secretary, Department of Industrial Policy and Promotion, Ministry of Commerce & Industry, Government of India, Amitabh Kant. He was speaking at the 7th VLFM Learning Convention (Visionary Leaders for Manufacturing) program held under the auspices of Champions of Societal Manufacturing organized by CII. Calling the apex technology and management institutes in the country to document their innovations by patenting them, Kant said that 22 per cent of the patents filed from India are done by Indian companies while 78 per cent were done by multinational companies operating from India. Sharing instances of innovation by global conglomerates operating in India, Kant said, "Renault has designed a car for the global market from Chennai and General Motors is now trying to do the same in Talegaon. What the world is realizing is that India has the ability to do frugal engineering."

Source: CII

The 7th VLFM program witnessed the presence of industry champions.

Make in India Mittelstand! (MIIM) Initiative Launched

Berlin, Germany – Make in India is a major new program by the Government of India that is designed to facilitate investment, foster innovation, enhance skill development, protect intellec-tual property and build best-in-class manufacturing infra-structure. During India's participation as the Partner Country at the Hannover Messe 2015, the Make in India program was presented to the German industry.

Following the significant interest shown by German companies, especially the Mittelstand, the Indian Embassy in Berlin with the support of the relevant Ministries of the Government of India is now implementing a strategic, first of its kind Market Entry Support Program: "Make in India Mittelstand!"(MIIM). MIIM is designed to assist German Mittelstand companies in entering the Indian market.

In order to offer smooth market entry for investors, the MIIM program offers a wide range of business support services under a single platform. Services include strategy consulting, M&A advice, operational market entry support, tax & legal support, financial services, project financing, location services, technology collaboration, facilitation of approvals from central & state agencies and access to government agencies.

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Asia Manufacturing Awards 2015

Singapore – At the recent Asia Manufacturing Awards 2015, Siemens PLM Software won two of the top awards. Receiving awards for the Best CAD/CAM Systems Provider and the Best PLM Systems Provider, Siemens PLM Software continued their winning form, marking the third consecutive year of being recognized at the coveted awards. The ceremony, organized by Contineo Media, gathered top players from manufacturing industries, recognising technological solutions that are transforming the industry in Asia. The winners were chosen by an international panel of experts including seasoned judges from various industries that are contributing to the growth and development of manufacturing. Siemens PLM's CAD/CAM solutions have enabled numerous companies, with a strong presence in Asia, in providing well designed, highly customizable products made in a condensed lifecycle showcasing improved efficiency in the manufacturing process. Siemens PLM Software provides solutions to customers helping them overcome limitations, respond to emerging industry challenges and compete on a global scale. As Asia witnesses the high adoption rates of digitalization, manufacturers are realizing innovation through product lifecycle management tools.

EEPC's Diamond Jubilee

Source: EEPC India

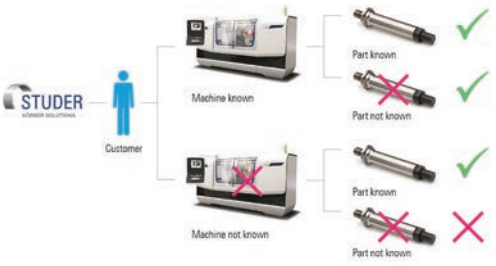
Chairman, EEPC India, Anupam Shah presenting a memento to the President of India, Pranab Mukherjee.

New Delhi – The Diamond Jubilee Celebrations of EEPC India was inaugurated by President of India, Pranab Mukherjee. At the event he said that India remains among the bright spots in an otherwise gloomy global economy but the country needs to build on its strength by investing in infrastructure and human capital to maintain high growth for the next several years. This level of growth should be sustained with by investing in infrastructure. He also lauded initiatives like 'Make in India' which will help the country the manufacturing hub of the global firms. EEPC also held diverse road shows that focused on different subjects such as business warehousing in Europe and export opportunities for engineering products, export awareness and opportunities, export awareness program under the Niryat Bandhu scheme of Ministry of Commerce & industry, Government of India, etc. These shows served as a platform to network and present interactive sessions so that industry players can stay updated on the latest happenings in the market.

Bluecompetence – The Green Label

Switzerland – Energy efficiency is an important issue in machine construction. STUDER, as well as all the other companies in the United Grinding Group, have qualified for the 'Bluecompetence' label. Sustainability is the focus and the label aims towards establishing energy efficient products, technologies and processes that save on resources. The label may only be used by companies that have acknowledged the conditions of use in writing and have committed themselves to the implementation of energy and resource efficient solutions. Having been given the rights to use this label, United Grinding Group and therefore Studer too are pioneers in the industry. Optimized use of resources begins with consideration and analysis of the machining process chain. The best energy is always the energy which is not used, or can be avoided. It is therefore important that the best finishing strategy and the most efficient production technology is ascertained for each workpiece.

Source: United Grinding Group

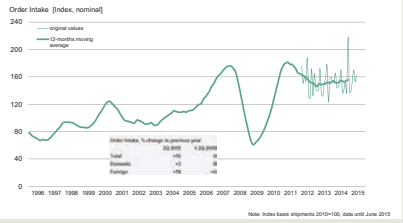


EE4C is a system which enables the customer to obtain the exact energy value for the production of his workpiece.

German Machine Tool Industry Posts Balanced Half-Year

Frankfurt am Main, Germany – Orders received by the German machine tool industry in the second quarter of 2015 were 10 per cent up on the previous year's figure. Domestic orders were 3 per cent higher, foreign demand grew by 14 per cent. There was 6 per cent growth in orders from the euro zone, and a 16 per cent increase from non-euro countries. Compared to the previous year, incoming orders stagnated in the first half of 2015. Domestic orders fell by 8 per cent, whereas foreign demand rose by 6 per cent. "After a decline in the first quarter of 2015, orders recovered again in the second quarter. This means that the German machine tool industry has presented a balanced half-year balance sheet," said Executive Director, VDW (German Machine Tool Builders' Association), Dr Wilfried Schäfer commenting on the result. This is mainly due to the significant increase in demand from abroad. Domestic business continues at a satisfactory level despite percentage cuts triggered mainly by the base effect of strong figures in the equivalent period last year.

Source: VDW



German Machine Tool Industry: Balanced half-year thanks to foreign orders.

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Source: Vogel Business Media India

Mitsubishi's busy booth at Delhi Machine Tool Expo 2015

World-class Technology on Display

Maiden Delhi Machine Tool Expo pulled huge crowd from SMEs and MSMEs from Delhi and surrounding region. It allowed visitors to browse through latest products and technologies while it gave a chance to exhibitors to meet their existing and potential customers in the region. With the same mission, Mitsubishi Electric also displayed its technology. Here is a report on the same.

Delhi Machine Tool Expo 2015 (DMTX), a regional show that took place at Pragati Maidan during August 20–23, 2015, gave Mitsubishi Electric a platform to reach out to SMEs and MSMEs in the region. The company showcased best-in-class technology including lately launched M800 Series. The M800, a next generation CNC controller from Mitsubishi Electric, features a touch-screen display and user-friendly interface. One of the key advantages of this product is its simplicity. It allows users to check the machine's operating status at a glance on the home screen itself. Thanks to such ease of operations, the controller has grabbed the attention of visitors'. Apart from M800, the company also displayed M80 series.

Additionally, at the expo there were numerous machines displayed by the other participants having Mitsubishi Electric's controller.

Development of convention-breaking CNCs

Leading the way in today's industrial globalization, the innovative products of Mitsubishi Electric continue to exceed the expectations of users around the world. The outstanding performance of our CNC lineup consistently wins praise from users for their high levels of productivity, intuitive usability and superior functionality. However, to develop the new M800/M80 Series, we went back to the drawing board and completely reexamined our cutting-edge control technologies. The result is a breakthrough in the control of high-speed, high-precision machining.

User performance requirements demand a commitment to development

The story of the new M800/M80 Series began with conventional development to produce incremental evolutionary improvements. But our goal was a

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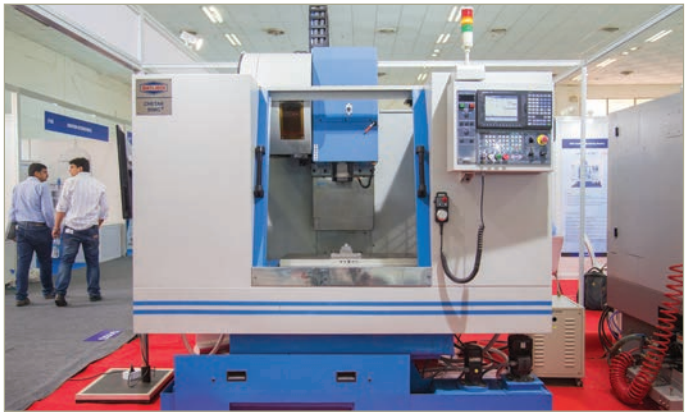
World-class Technology

Source: Mitsubishi Electric



Batliboi's Chetak 55 machine with Mitsubishi's controller

Mitsubishi's controller has been installed in COSMOS' CVM 1060

LMW's JV 55 machine incorporates Mitsubishi's solution

VML 50, a machine from Lokesh as well has Mitsubishi's controller

Mazak displays its Integrex J2000 with Mitsubishi's controller

Multi Axis CNC Machine with Mitsubishi's Controller

S&T's MANFORD VL850 machine with Mitsubishi's controller

TAL's TVM 855 machine with Mitsubishi's controller

Picture Source: Mitsubishi Electric

19-type touchscreen provides easy operability (for M800W Series only)

Source: Mitsubishi Electric

Advanced display and keyboard designs.

Source: Mitsubishi Electric

revolutionary leap in CNC performance. Our project team determined that the only way to significantly boost processing performance and totally satisfy user demands would be the creation of a CPU optimized for CNC control. This insight inspired Mitsubishi Electric's first-ever attempt to develop a CNC-dedicated CPU and opened a new chapter in CNC development.

In-depth analysis and simulations achieve one volition

Pursuit of CNC-dedicated CPU began with design validation on an unprecedented scale as well as high-precision simulations to verify processing performance. Achieving a leap in processing performance demanded the integration of innovative technologies beyond optimizing processor manufacturing processes. Overcoming numerous hurdles and maximizing the potential of the processor, we succeeded in producing a CNC-dedicated CPU that achieves unprecedented high-speed processing performance.

Experience the revolutionary high-speed processing of the new CNC-dedicated CPU

Incorporating the CNC-dedicated CPU in the new series not only results in phenomenal processing speed, but also reduces the number of required parts, leading to fewer possibilities of failure and increasing product quality. Equipped with Mitsubishi Electric's first-ever CNC-dedicated CPU, the long-awaited M800/M80 Series is the fruit of an original development process and the sum of our latest technologies. With the utmost confidence, we are proud to introduce the M800/M80 Series and invite customers to experience performance of the future today.

19-type vertical display unit provides two-split multiple windows for various applications

A 19-type vertical display is included in the M800W Series. The display provides two-split multiple windows that can be customized by arranging the software keyboard, document viewer or other application.

The slim personal computer unit enables greater flexibility in operation panel design

M800W Series personal computer unit boasts 50mm thick (excluding protrusions). This provides a higher degree of flexibility in operation panel design.

Display redesigned for enhanced visibility of keyboard

The display and keyboard have been redesigned. Measuring only 9.5mm thick (excluding protrusions), the possibilities of machine tool design have been expanded. In addition, their gray-scale colors can be easily harmonized with machines in different colors. The surfaces of display and keyboard are flush, providing beauty and usability as well as increased operability. 10.4-type and larger displays have touchscreen made of beautiful, long-life glass, which allows you easy day-to-day maintenance. Vertical mount and horizontal mount keyboards are included in the product line.

Smartphone-like intuitive touch operation

The display features a capacitive touchscreen that is commonly used in smartphones and tablets, allowing for intuitive and easy operation.

With a simple flick of the finger, for instance, you can monitor the desired part of program, or view and select a menu key on the next page without the need for tedious key operation.

In 3D graphic check, you can view a 3D model at any desired size, in any desired position. MMI

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- Solid Support for Day-to-Day Comfort
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MITSUBISHI CNC
THE CUTTING EDGE OF MACHINING CONTROL

Source: Stratasys India

3DFX

3D printed multi–material engine.

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3D FX

With the Indian 3 dimensional printer market expected to reach up to $79 million by 2021, we take a look at the potential of 3D printing technology in the national market. In addition to this, we also provide an in–depth analysis of this innovative technology by citing live examples from across the globe. Read on to find out some impressive facts about this distinct technology.

Currently, additive manufacturing or 3D printing is in vogue across diverse sectors such as automobile, medicine and aerospace. This process in which a product is printed into a solid object by building up numerous layers of material has existed in the market since the past 25 years, but it is only recently that the Indian market has been actively using this innovative technology. The credit behind the rise of this technology in the country goes to the emergence of domestic players and the popular 'Make in India' campaign. A global leader in 3D printing, General Manager, Stratasys India, Rajiv Bajaj explains the potential of this technology in the Indian scenario, "According to a recent report by Mckinsey and Company, India's manufacturing sector could touch $1 trillion by 2025, and there is potential for the sector to account for 25–30 per cent of the country's GDP. Together with the growing focus on 'Make in India', a lot of Indian manufacturers and SMEs are placing emphasis on smart manufacturing locally, and are in need of a technology that is both cost and time effective to create innovative products and maximize business opportunities. Such initiatives provide us with an opportunity to partner with local manufacturers and educate them on the benefits of 3D printing." Against this backdrop, it is not surprising that market researcher 6W Research has forecasted the 3D printer market in India to reach up to $79 million by 2021.

This estimated figure can increase if the country obtains support from the government. Director – Technology & Operations, Imaginarium India, Guruprasad Rao part of India's largest 3D printing setup opines, "Unlike in the developed economies, India is yet to get a national policy for 3D printing in order to build a sound ecosystem. The government along with industry should come together as it is an innovation enabler to provide focus and benefit." With India's aim of becoming a manufacturing hub by 2020, now is the time to learn and adopt the potential of this technology on a national scale.

Now trending

With the market demand for 3D printing steadily growing, many industry players have termed 3D printing as the next big phenomenon in the manufacturing space. This technology is being used to create concept models, functional prototypes, as well as production tools (including custom production tools and on-demand production parts) across different industries such as automobile, medicine and aerospace. The advantages of this innovative technology are endless. For instance, in today's competitive market, time is of essence as companies look for ways

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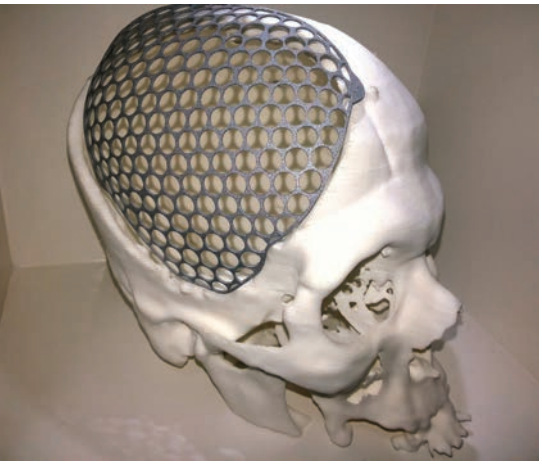


Source: Imaginarium India

Ti Cranial Implant with the help of 3D printing.

"Wastage of material is less in 3D printing; however, this technology is feasible for batch production and not mass production."

President Marketing,
Jyoti CNC Automation Ltd,
Vikas Taneja

"India being a cost-sensitive market, LASERTEC 65 3D will definitely be a big leap in India."

CEO Asia III,
DMG Mori Asia,
Dr Jens Hardenacke

to reduce cost and minimize resources while increasing production efficiency. Bajaj opines, "3D printing addresses to these concerns as it provides solutions to quickly and effectively build parts and models for concept communication, design validation and high-mix, low-volume production in different sectors." Adding to this, President Marketing, Jyoti CNC Automation Ltd, Vikas Taneja mentions, "Wastage of material is also less in 3D printing technology; however, this technology is feasible for batch production and not mass production." This technology can create wonders, and this can be witnessed through the following examples.

Live action!

Numerous organizations across the globe are implementing this technology in their respective fields and the results are stunning! In the automotive industry, Ford Motor Company is printing 200,000 parts each year on 14 different industrial 3D printers at its Michigan facility, USA. The company's 500,000th 3D printed auto part was a prototype engine cover for the all-new Ford Mustang. Apart from creating prototypes in plastic, it is also looking at printing final production parts in metal as part of its future plans. According to the company's website, with traditional methods, an engineer would create a computer model of an intake manifold—the most complicated engine part—and wait about four months for one prototype at a cost of $500,000. With 3D printing, Ford can print the same part in four days, including multiple iterations and with no tooling limits at a cost of $3,000. Bajaj mentions, "3D printing speeds up the research and development process of new type of autos drastically while reducing the prototyping cost and keeping high confidentiality with parts being 3D printed in-house. In addition, customized automotive parts and components start to emerge as 3D printing offers a quick way to produce durable parts that can be used directly."

3D printing has won hearts in the medical industry too. Once such example is from Netherlands where doctors successfully implanted a 3D printed skull in a woman. Coming closer to home, a hospital in Bengaluru also created a 3D printed skull that helped a lady gain her life back. This technology enables one to create customized parts for the body, and as only a single piece is created, the cost for any other process apart from 3D printing would be very high. Bajaj adds, "3D

Source: Stratasys India

3D printed BMW fixtures.

Source: Precihole Sports Pvt Ltd

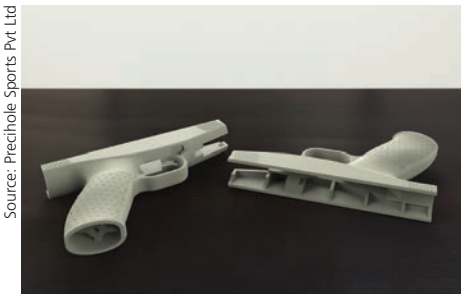
CNC machined pistols have to be created in two halves and then joined together to complete the part.

"Unlike in the developed economies, India is yet to get a national policy for 3D printing in order to build a sound ecosystem."

Director–Technology & Operations,
Imaginarium India,
Guruprasad Rao

printing's scalability and geometric capabilities go a long way in specialized patient care and advanced experimental work. From highly accurate surgical guides, true-to-life medical device prototypes, to strong tooling, custom fixtures, research aids and medical device components, 3D printing offers numerous benefits." Today, constant research is being carried out with diverse other body parts too.

For aerospace, 3D printing helps lower fuel consumption and minimizes aircraft downtime as light-weight parts can be printed on-demand. Bajaj says, "This technology can be used for ground support system as well as tooling, to better fix parts onto aircrafts, flying machines or maintenance tools." For instance, Airbus—the leading aircraft manufacturer has produced more than 1,000 flight parts for its A350 XWB aircraft. The 3D printed parts were used in place of traditionally manufactured parts to increase supply chain flexibility, enabling Airbus to meet its delivery commitment on time. Rao adds, "This technology is particularly useful to make customized products where traditional manufacturing models are not feasible. Hence, it is the most appropriate technology for applica-tions pertaining to aerospace, medical and healthcare industries where one requires parts in small numbers, as small as one! Printing expensive spares on–demand would be anytime preferable verses large inventory by traditional manufacturing. Also, in the emerging competitive market, changes will be inevitable; the 3D printing process is most versatile and is least impacted by quick design changes, which is a definite advantage on traditional processes."



Source: Precihole Sports Pvt Ltd

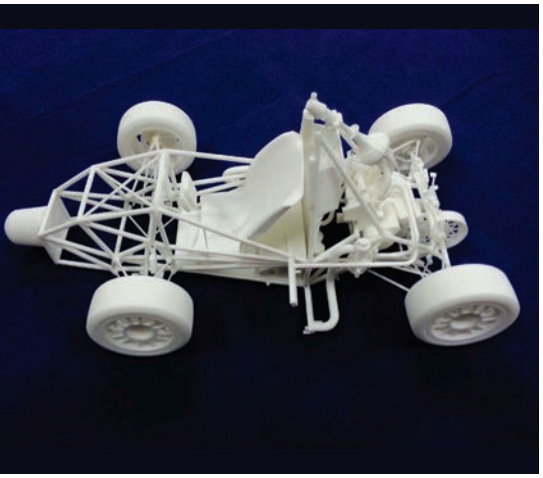
One can print the same pistol at one go with the help of 3D printing.

3D printing and CNC machining

With several advantages of 3D printing over CNC machining, many believe that the former will replace the conventional method of machining. However, Bajaj clears the speculation by saying, "3D printing does not and will not replace CNC machining due to the different fabrication nature and purposes the two fabrication methods serve. Instead, 3D printing provides an alternative and works hand-in-hand with CNC in the machinery and manufacturing world to help companies maximize their investments through best–suited solutions."

One such case in which 3D printing was used as the best–suited solution over CNC machining is the rotary wing and fixed wing repair specialist Advanced Composite Structures (ACS) performing low-volume component manufacturing using composite parts. This work requires layup tools, mandrels, cores and drill guides. When these are produced through CNC machining, ACS invests several months and many thousands of dollars. And when changes occur, costs rise and delays mount. ACS adopted 3D printing and used it for nearly all of its composite tooling needs. On an average, 3D printed layup tools cost only $400 and are ready for use in 24 hours—cutting 79 per cent of tooling costs and 96 per cent production time from traditional methods—and leaving room for any design remake or last-minute changes.

However, in smaller industries, the scenario is a bit different. Manager–Development, Precihole Sports Pvt Ltd, Azhar Qazi who makes use of additive manufacturing processes such as SLA (Stereolithography) and SLS (Selective Laser Sintering) for



Source: Imaginarium India

Prototype of a formula race car.

making prototypes of air rifles, air pistols and their accessories says, "While producing smaller parts at the prototype stage, 3D printing proves to be economical as compared to CNC machining. As in machining, one has to arrange for special cutters that are small in size in order to machine the small parts. In addition to this, one also has to arrange for fixtures and the part has to be machined in multiple set ups." This entire process is time consuming and not feasible. However, if we speak about prototyping larger parts, one can create it quickly but it will be costly as the cost in 3D printing is based on its volume. Qazi continues, "To give you a better understanding, a hollow 3D printed rifle will cost around Rs 23,000 whereas a solid CNC machined rifle will cost only Rs 7,000! In this case, CNC machining will be a better option to choose as it will take a longer time to create the product but will be a cheaper option for industries like us."

3D printing has allowed printing of difficult parts that are not possible through CNC machining. Qazi adds, "If one has to create a part through CNC machining that has features on the outside as well as develop curves on the inside, it will not be possible to create it as a whole. It has to be created in two halves and then joined together to complete the part. In this process, a lot of time is lost. Apart from that, one will also require a fixture. However, if one does it in 3D printing, one can print the entire product at one go with all the requirements."

"3D printing does not and will not replace CNC machining due to the different fabrication nature and purposes the two fabrication methods serve."

General Manager,
Stratasys India, Rajiv Bajaj

Apart from these factors, Taneja opines, "It is also important to note that since CNC machining removes material, it does not affect the material properties (in most cases), which is an important factor if one intends to create a prototype and run structural tests on it such as tensile, compressive, bending and thermal. However, 3D printing cannot be used for physical testing. Another key benefit of CNC machining is its precision that provides tight tolerances. This is important if the product has mating parts, shafts, and bearings, as 3D printing offers poor surface

Source: Stratasys India

Prototype of a disk brake using 3D printing technology.

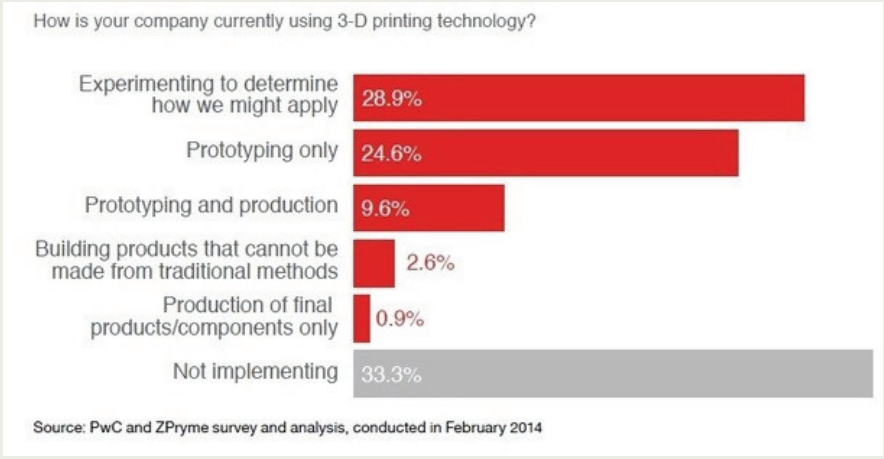
GLOBAL WATCH

Tracking the Market

Two-thirds of Top 100 Manufacturing Companies Already Use 3D Printing: PWC Survey

In 2014, PricewaterhouseCooper (PWC) conducted a survey of over 100 leading manufacturing companies on how their company is using 3D printing technology. The results were startling! It was observed that about two–thirds of these top firms already utilized 3D printing, in various applications such as prototyping and experimentation while a few companies used it for both prototyping as well as production.

In addition to this, it was noticed that a small percentage of companies used 3D printing to build products which they were unable to construct by using traditional methods (2.6%), while the other companies used it for printing final products or parts (0.9%). While these figures were small then, we are positive that by this year end, this figure will increase.



"While producing smaller parts at the prototype stage in smaller industries, 3D printing proves to be economical as compared to CNC machining."

Manager–Development, Precihole Sports Pvt Ltd, Azhar Qazi

finish and bad tolerances." Hence, depending on the best–suited solution for the company's product, CNC machining or 3D printing is utilized.

The way ahead...

If both CNC machining and 3D printing technologies are combined in a single machine, the machine tool industry can achieve even greater success. Agreeing to this, Rao mentions, "Hybrid systems are being developed and tested at a few research institutes across the world." One such hybrid machine has already been created by DMG Mori – LASERTEC 65 3D. This is a unique mechanism that combines both the processes of metal deposition and chip removal on a single machine. This technology caters to a wide range of industries including prototyping, large work pieces, integral parts, lightweight components, complex parts with undercuts, etc. CEO Asia III, DMG Mori Asia, Dr Jens Hardenacke explains, "The process uses the metal deposition by powder nozzle, which allows the complete machining of nearly all materials without process–chamber and is about10–times faster than the generation in the powder bed. Large work pieces can now be machined in an economical way. In addition to this, complete machining with fully automated change between milling and laser operation eliminates the need to have different machines for laser deposition and milling. LASERTEC 65 3D comes with a full 5-axis milling machine in a stable monoBLOCK-design. It is an all-in-one process."

On inquiring about the potential of this technology in the Indian market, Hardenacke adds, "India being a cost-sensitive market, this technology will definitely be a big leap in India. LASERTEC 65 3D is a hybrid machine that 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, 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." 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 be a financially advantageous solution for the customer.

With the launch of ground–breaking hybrid machines, we are eager to see how 3D printing will further evolve in the future. Guess we will just have to wait and watch! MMI

IMPRESSIVE

3D Magic in Paper!

Established in 2004, Ireland based Mcor Technologies Ltd is an innovative manufacturer of the world's most affordable, full-color and eco-friendly 3D printers. They are the only 3D printers to create complex, durable and stable physical 3D models from standard sheets of copy paper. Mcor 3D printed models can be tapped, threaded, hinged, made water resistant and flexible. They can even be disposed of in the recycling bin for cradle-to-grave sustainability. The only ones to include the global-standard ICC (International Color Consortium) color map, Mcor 3D printers produce the industry's most accurate and realistic color.

Rising 3D printer material costs are straining budgets and limiting use of the technology at commercial and educational organizations. Mcor's material costs are 10–20 per cent of other technologies' costs, and therefore, the total cost of ownership over five years can save hundreds of thousands of dollars. This low cost enables wider accessibility of the technology and therefore, greater innovation!

More than **Just a Ride!**

The manufacturing industry as a whole is very positive. The automotive and auto ancillary industries too have recently shown record breaking growth. Associations such as the Automotive Component Manufacturers Association (ACMA) are undertaking initiatives to support the current scenario and encourage further growth through expanding avenues. President, ACMA and Joint Managing Director, Lucas-TVS Ltd, Arvind Balaji shares his views on the future of this industry and how this segment is putting India on the map.

The automotive and auto ancillary industries are the primary drivers of the Indian machine tool industry. What is the growth of the machine tool industry in India?

Arvind Balaji: The automotive industry in India accounts for 60 per cent of the machine tools consumed in the country. The domestic machine tool manufacturers provide significant capital cost advantages over imported tools. Over the years, the Indian machine tool industry has improved in technology and is well positioned for medium accuracy requirements; however, to be globally competitive, areas such as reliability, solution engineering, new/improved technology & products and delivery commitment/CRM need to be focused upon.

According to the recent ACMA–IMTMA joint study conducted by Roland Berger Strategy Consultants, it is observed that the machine tool industry in India is facing strong competition from foreign players who have advantages in terms of technology, workmanship, quality, robustness, delivery commitment, etc. However, Indian machine tool players have an edge over the overseas counterparts in terms of cost, flexibility, availability of spares, service network presence, etc. The domestic machine tool manufacturers also provide cost advantage over imported tools. Furthermore, some large domestic machine tool players are developing new products and adopting new technologies in their offerings.

In the next five years, the entire Indian automotive industry across vehicle and component segments is expected to witness robust growth that will propel the machine tool consumption in India from $1.3 billion in FY14 to $3 billion by FY20 growing at a CAGR of 14 per cent per annum.

"In the next five years, the entire Indian automotive industry across vehicle and component segments is expected to witness robust growth that will propel the machine tool consumption in India from $1.3 billion in FY14 to $3 billion by FY20."

President, ACMA and Joint Managing Director, Lucas-TVS Ltd, Arvind Balaji

Source: ACMA

What are the initiatives that ACMA is undertaking in order to help continue the auto component industry growth and development, which clocked its highest growth of 11 per cent in four years?

Balaji: A key focus area for ACMA is export development. The component industry has

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More than Just a Ride!

PERSONAL

"There is a need for the industry to develop its own IP and build scale through significant export growth and domestic consolidation."

Arvind Balaji

done reasonably well with exports scaling $11.2 billion in FY15 growing at a CAGR of 29 per cent over the last six years. ACMA has played a critical role in supporting its members in export development and in discovering new market opportunities; currently it exports to more than 160 countries, which has been growing at 15 per cent per annum. ACMA's recognition as an export promotion council has been in promoting Indian exports by organizing participation of the Indian component industry in several leading global trade fairs and focused buyer-seller meets.

According to you, how will the auto ancillary expand in the coming years?

Balaji: The auto component industry in India is largely dominated by SMEs; in fact, 70 per cent of ACMA members consist of SMEs. ACMA has taken several initiatives to ensure that auto components stay competitive, some of these are illustrated below:

ACMA signed an MoU with SIDBI to support its MSME members to avail credit at reduced rate of interests. To ensure timely technological advancements within the SMEs, the ACMA Centre for Technology (ACT), a technical wing of ACMA, has helped upgrade process technology within the membership in over 500 plants across the country, making them world-class. Today, ACT runs several cluster programs such as the Foundation, Basic, Advanced, Engineering Cluster programs and the New Product Development Cluster. ACT also runs a special cluster program for SMEs like ACT MSME Lean Cluster and ACT MSME Advance Cluster. Each cluster program has a distinct road map where the best practices are imparted right from the shop-floor to the top management.

Furthermore, to help upgrade the capabilities of the SMEs in Tier 2 and Tier 3 cities, ACMA has launched the ACMA–UNIDO cluster program with support from the Department of Heavy Industry, Government of India. Over a hundred small and medium auto component manufacturers have taken advantage of this program, and we intend to scale up this program rapidly so that many more can benefit.

Do you see the online platform for buying of goods from the auto component industry contributing to the growth of this sector?

Balaji: Certainly it is a wind of change. The online retail market for the automotive aftermarket parts industry and accessories continues to emerge as a tremendous growth opportunity for the Indian aftermarket industry. However, the concept of e-tailing is new and in nascent stages; therefore, it is early to comment on its performance.

ACMA, together with SIAM has also developed the AutoDx, a platform that allows diverse ERP systems of the suppliers and the OEMs to talk to each other. Already around 10 OEMs and 100 suppliers are successfully working on this platform. This will be help streamline the manufacturing value chain in the country.

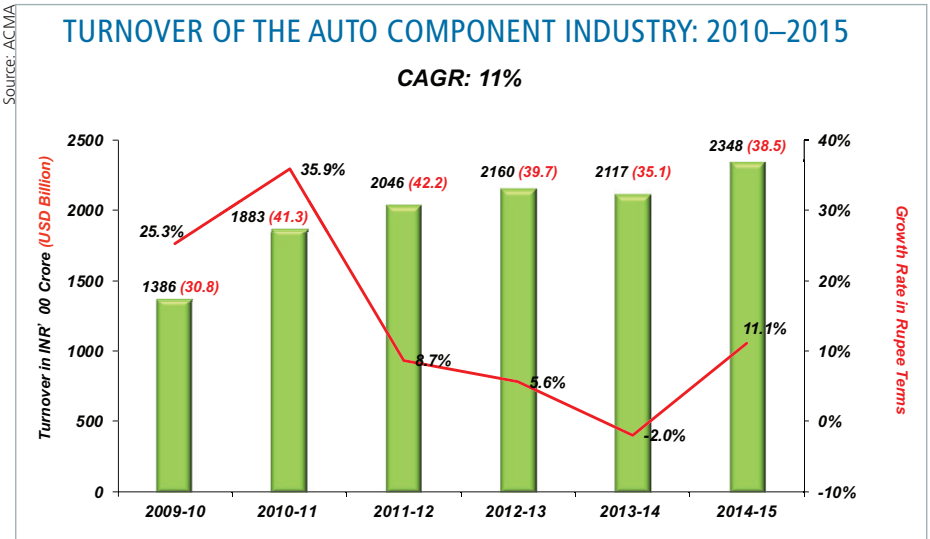
According to you, how will the auto ancillary expand in the coming years?

Balaji: In the coming decade, driven by needs of safety, fuel efficiency, sustainability and end customer needs, the Indian automotive industry will undergo a significant transformation. The New Motor Vehicles Act and legislations such as Vehicle Recall will also impact the industry dynamics.

The component industry, over the years has adapted well to the changes in the policy and regulatory environment and the needs of our customers. I would also like to point out the need for the industry to develop its own IP and build scale through significant export growth and domestic consolidation. The industry needs to graduate from being a build to print to one that is art to part and support from the government would be critical.

I am confident that by 2026, the component industry will meet the targets defined in the Automotive Mission Plan 2026—turnover of $200 billion, with exports and domestic market each reaching $100 billion in size. This calls for an additional capital investment to the tune of $80 billion, which demands the industry to focus on better returns on capital. MMI

Source: ACMA



The industry registered a growth of 11 per cent in 2014–15 over the previous year and a CAGR of 11 per cent over the last six years.

The interview was conducted by:
Nedra Pereira, Deputy Editor,
Vogel Business Media India
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A Penchant for Excellence

UCAM Pvt Ltd specializes in manufacturing precision CNC rotary tables, index tables and pallet changing solutions for machine tool applications. The company's journey has been one that can be described as arduous with consistent growth. Here's a look at the company's journey so far.

UCAM Pvt Ltd began its journey in 1986. It started as a small jobshop in the BEL Industrial Estate, Bengaluru. Initially, this business did not do too well and hence, Managing Director, UCAM Pvt Ltd, Indradev Babu decided to develop and manufacture CNC rotary tables and allied products. Babu advises, "The years from 1993 to 2000 were a great struggle for survival, but post 2000, the UCAM brand has increasingly gained recognition and the company has grown steadily since then."

In 2005, UCAM opened its second unit at Peenya, Bengaluru. This unit, till this year, housed all the departments of UCAM from the admin, sales and testing to tutorials, R&D and manufacturing of products. However, as time passed, the company realized that the Peenya facility being a small plot was becoming insufficient to meet its growing demands.

Nedra Pereira
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Building more

The company, which is known for its workholding equipment, needed more space to design and manufacture large and precise indexing tables. Additionally, owing to the limited capacity at the existing Peenya facility, the company faced production constrains that affected its time delivery. The decision to move to a bigger facility ensued following the success of its large size CNC Rotary Table, the first of its kind to be manufactured in India, measuring 2500 mm x 3000 mm. Babu mentions, "Rotary indexing tables are high-tech and precise equipment. Its development and manufacture call for high investments in appropriate infrastructure. Our rotary tables range from 150 millimeters to larger ones measuring up to four meters. The large rotary tables call for a hanger with large spaces and high tonnage crane capacities. Hence, the decision to move to a facility that provided the required infrastructure was made."

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Excellence

Keeping all these requirements in mind UCAM developed a master plan wherein the entire property forms a cluster of manufacturing units for various processes, thus keeping the material flow well organized. To conserve land, the factory has two levels to enable enough space for greenery and landscaping. Additionally, UCAM wanted a space that could cater to all the requirements of R&D and manufacturing. Babu shared his initial plans for the new facility, "We wanted our new facility to be state–of–the–art not only in terms of infrastructure but also with talent. For instance, our design department would need to be equipped with the best software tools for both design and analysis and manned with the right combination of engineering talent."

A great deal thought has gone in to the planning of this new facility, which has resulted in employing eco-friendly equipment such as LED lamps, sunlight illumination windows and solar panels to conserve energy and cost.

Furthermore, numerous parts that the company manufactures requires various forms of precision machining, i.e., turning, milling, hobbing and grinding,

The facility is encompassed with all the tools necessary to build world-class equipment.

Source: UCAM

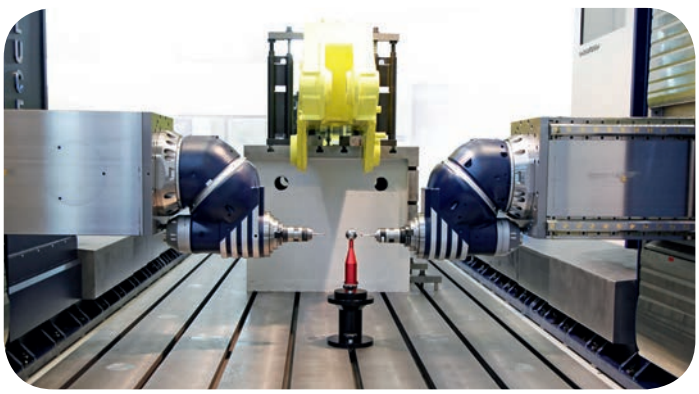
SORALUCE

Robust structure, high precision

in best ever productive performance and efficiency

Floor Type Milling Machine

for simultaneous machining from two opposite columns



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and appropriate material treatments, 100 per cent part inspection and stage wise quality checks. The Dobaspet facility is encompassed with all the tools necessary to build world-class equipment. The site also includes a temperature controlled hanger for machining and critical assembling needs, a separate R&D unit, an administration block, an amphitheatre and a roof-top cafeteria.

Babu advises, "As the business grows, building blocks will be added to cater to units such as a motor manufacturing facility, bearing manufacturing facility, machine tool manufacturing facility and so on."

The new facility has a capacity to produce 4,000 rotary tables in a year and possesses surplus space that can be expanded in the future. Furthermore, its precision machining facility is equipped with high-precision CMMs to meet the rugged quality control demands, and a battery backup with UPS facility for uninterrupted manufacturing.

Diversifying avenues

UCAM in its quest to develop and acquire technology for building rotary tables began to develop and manufacture precision rotary table bearings as well as torque motors. And as a result, it has entered the aero space and high technology machine tools domain under its new business verticals – Nimble Electric and Nimble Machines respectively.

Speaking about the success of the company, Babu expresses, "All the business verticals are doing really well. Nimble Machines has launched the NOAH range of CNC gear hobbers with advanced features. And Nimble Electric manufactures various types of torque motors catering to the machine tools sector as well as the aerospace and defense sectors. Hydrostatics bearings are another area that UCAM has made immense progress in as the bearings are used in the rotary tables as well as linear slides. Additionally, we, recently, have also developed composite machine bases (granite epoxy) for in-house usage, which may be sold to machine tool builders in the future."

Export ventures

The company exports its goods to international markets. Babu mentions, "We have been able to successfully design and deliver various advanced 5 axis solutions to machine tool builders in Europe. In fact, for a few of the machine manufacturers in Europe, we are the sole suppliers of technologically advanced products such as the tilting head, table in table, cantilever table, etc."

The Dopaspet facility will also help UCAM facilitate their existing export business. Babu informs that when it comes to making first impressions seeing is believing, he explains, "When international customers visit the new facility, they will witness that UCAM has the required infrastructure that matches global standards for the production of precision rotary indexing tables. This will contribute in building our brand."

Branding

The facility is not all that has changed for the company, UCAM, this year, has redesigned its logo with the aim of bringing to the forefront the quantum jump it has made in terms of quality improvement, technology development, an enhanced manufacturing facility, and the introduction of new products that meet the ever-changing needs of the customer. "We wanted to make our customers aware of 'UCAM 2.0'. To bring about this, we made a bold change in the brand—new brand encompasses the old logo along with mnemonic of a turn table, i.e., representative of the UCAM range of rotary tables, and the tagline 'Engineering Excellence. Exactly'. The tagline communicates the message of technological expertise, superior quality and precision manufacturing," elaborates Babu.

"UCAM has been quite successful in offering innovative and technologically advanced solutions. Being passionate about innovation and technology, we are always hungry for new challenges."

Managing Director, UCAM Pvt Ltd, Indradev Babu

Keeping in line with its motto—'Stay focused to meet customer needs even before he expects it', the company works very closely with its OEM and distribution partners both domestic and internationally to deliver the best solutions to its customers. "We listen to our customers requirements carefully and work towards implementing and meeting their expectations. Risks are involved in developing such products, but we do it because we expect to learn something new from it. And it also helps our business to grow," claims Babu.

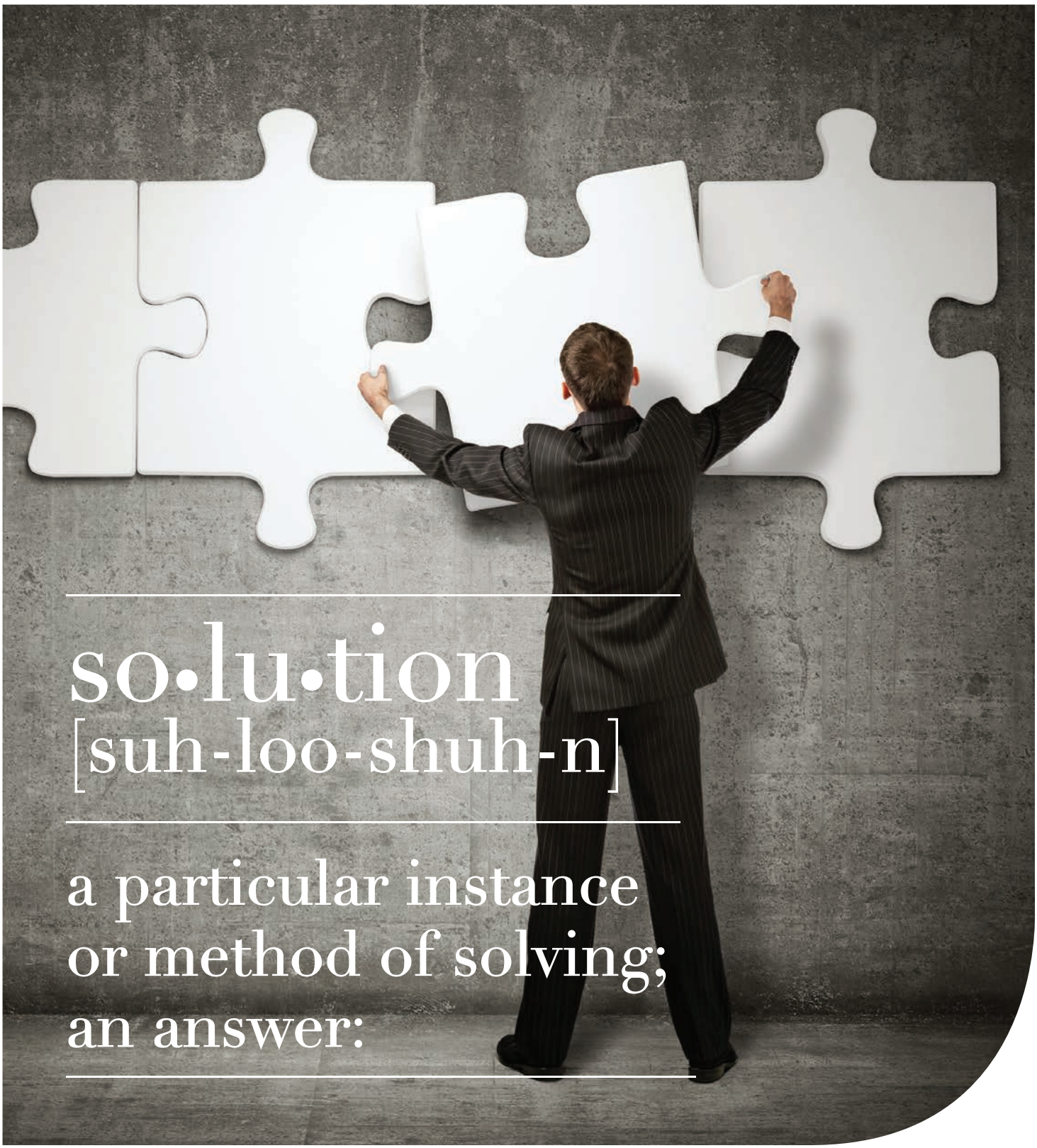
Future forward

UCAM takes its customers' feedback and opinion very seriously, and hence, has been quite successful in offering innovative and technologically advanced solutions. "When you are serious about the requirements of the customer, you will come out with solutions that automatically turn out to be innovative. Innovation is not limited to our products and services," he infers.

The company in its aim to continually grow has also restructured its administrative system. Using backward integration in all the processes within the company, it aims to increase its competiveness and wants to achieve the status of being among the top 5 rotary table manufacturers globally in the next seven years. Seeing advancements, the company is constantly making an endeavor to build products that are innovative and cost effective. The industry will surely see more of the UCAM brand in the future! MMI

UCAM's new facility at Dobaspet, Karnataka.

Source: UCAM



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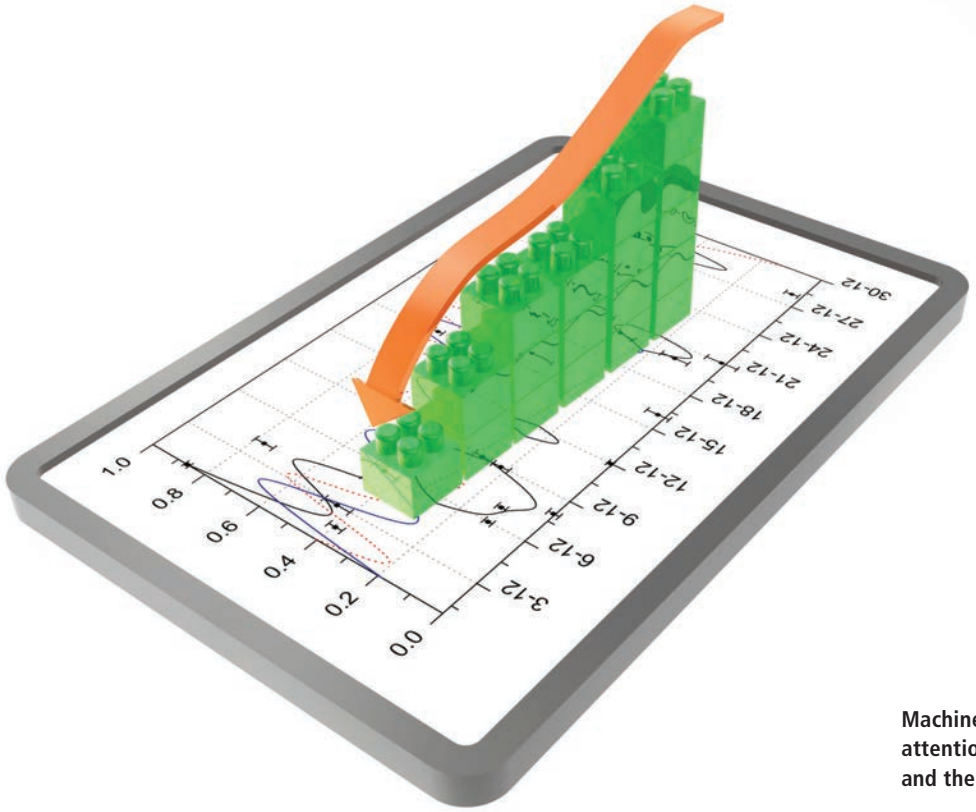

Machine tool companies are playing close attention to efficient energy expenditure and the role it has on production.

Energy Efficiency – A Decisive Factor

Due to rapidly growing international competition, constantly increasing energy costs and climate change, energy efficiency is becoming increasingly important not only for domestic usage but also for industrial production. In all industrialized countries as well as emerging markets, 'energy efficiency' is a subject that receives increased awareness leading to a close focus on the industry which plays a major role in energy utilization. This is particularly the case for machine tools where energy efficiency is becoming a decisive factor in production.

The rising energy prices influence the production costs as well as productivity. Driven by climatic changes, companies value a 'green image' and undertake measures to protect the environment. In many countries, the energy demands increase faster than the installed capacity can cope with. This leads to temporary production shut downs.

Rajan Goyal
Chief Manager
Motion Control Systems
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Due to rapidly growing international competition, constantly increasing energy costs and climate change, energy efficiency is becoming increasingly important not only for domestic usage but also for industrial production. In all industrialized countries as well as emerging markets, 'energy efficiency' is a subject that receives increased awareness leading to a close focus on the industry which plays a major role in energy utilization. This is particularly the case for machine tools where energy efficiency is becoming a decisive factor in production.

Which factors needs to be taken into account while purchasing and working with a machine tool in terms of its energy efficiency? In principle, the energy efficiency of a machine tool can be compared to that of a vehicle. In both cases, the energy consumption is determined by the quality of the technology, i.e., the machine or the vehicle, as well as by the behavior of the operator or driver. Highly efficient drive technology with an

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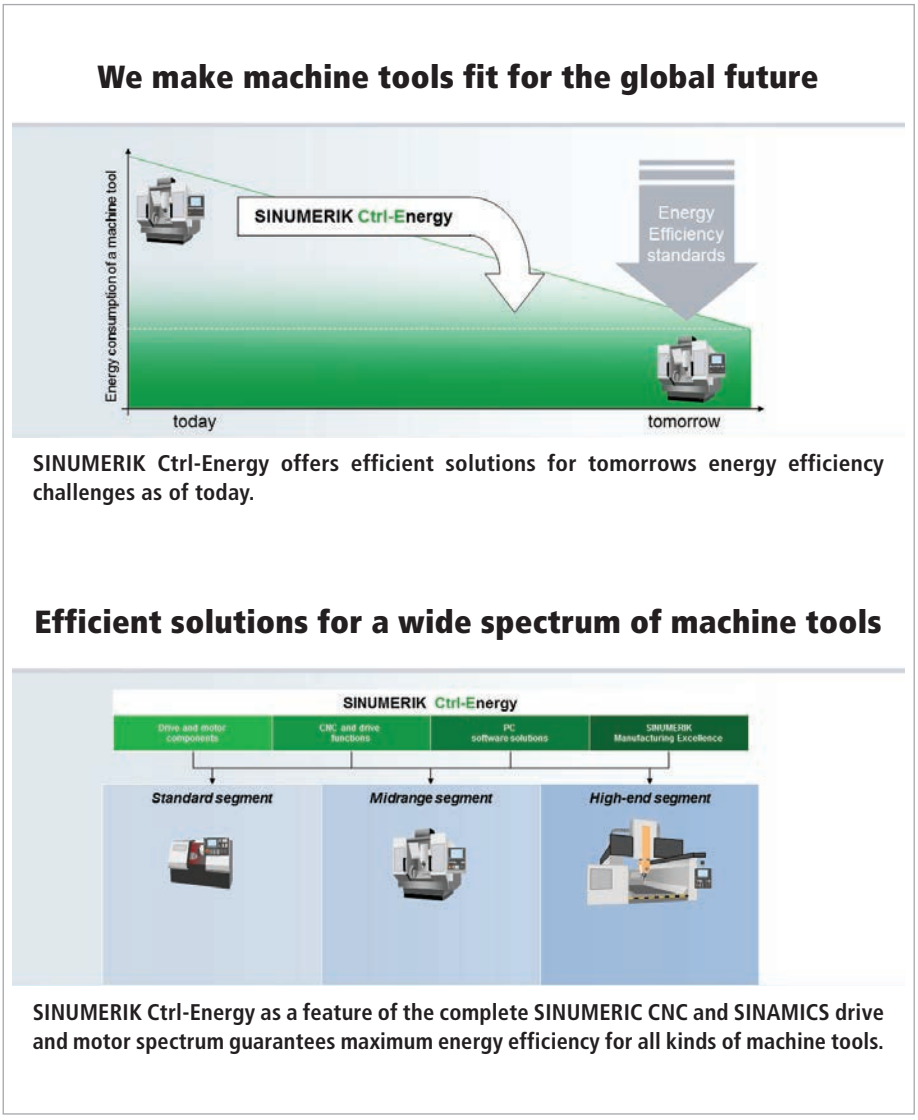
Energy Efficiency

efficiency of up to 45 per cent, internal-combustion engines in vehicles still offer sufficient potential to increase efficiency.

In contrast, the comparable main drive in a machine tool, i.e., the spindle and feed motors with the associated converters, exhibits only minimal potential for optimization. The efficiency of SIMOTICS synchronous and asynchronous motors from Siemens is between 91 per cent and 94 per cent, and the efficiency of Siemens SINAMICS drive modules is between 97 per cent and 99 per cent. Thanks to the feedback–capable drive technology, the braking energy generated during the machine operation is fed back into the power grid with practically no loss.

Previous investigations into improving the energy efficiency of CNC machines were always performed on machining centers. These were usually medium–sized to very large machines with additional automation components such as large tool magazines, tool and pallet changers, or hydraulic pumps. These machines appeared to offer the most starting points for seeking potential energy savings. However, today it has been realized that the smallest possible savings in energy is also a must and thus, the focus is not only on large machine tools, but also on standard machines that maybe turning or milling, and all associated peripherals in the machine.



Source: Siemens Ltd

SINUMERIK Ctrl-Energy offers efficient solutions for tomorrows energy efficiency challenges as of today.

SINUMERIK Ctrl-Energy as a feature of the complete SINUMERIC CNC and SINAMICS drive and motor spectrum guarantees maximum energy efficiency for all kinds of machine tools.

Efficient management of auxiliary units

The focus is on the drive technology for coolants, chip conveyors or hydraulics. These auxiliary units are responsible for up to 50 per cent of the energy consumption of a typical machine tool. The intelligent, appropriate use of auxiliary units is therefore a central focus of machine manufacturers seeking to increase the efficiency of their machines. This is where the SINUMERIK function Ctrl-E Profiles comes in, offering the machine manufacturer an easy–to–use project–planning interface for energy profiles. With the help of Ctrl-E Profiles, auxiliary units can be automatically switched off in an unused machine.

Rapid set-up and minimal machine downtime

An equally simple and effective approach is to keep the 'chipless' utilization time of the machine to a minimum during set-up. Sinumerik Operate helps reduce the programming, set-up and program testing times. By using the SinuTrain programming and training software, which is identical to real control systems, programming and program testing can be partially shifted to the work preparation stage. With virtual machine simulations based on the Sinumerik CNC core, such as those offered by INDEX, for example, complete set–up and program testing processes can be carried out on a PC to save energy. The machining performance in production is largely determined by the technological process as well as the machining strategy. Machining strategies with low downtimes such as workpiece or tool change times – in turn lead to a minimization of the chipless utilization time. Tool sequence optimization in ShopMill multiple clamping and workpiece flow control in ShopTurn help increase the energy efficiency here.

Onboard computer for machine tools

Returning to the vehicle analogy, the onboard computer ensures transparency regarding the vehicle's consumption. In machine tools, this transparency is provided by the Sinumerik function Ctrl-E Analysis. With the key combination Ctrl + E and a Sentron Pac power monitoring device, the energy consumption of the entire machine is visualized. This means that the energy consumption of different production strategies can be compared. It is also possible to compare different measurements. Ctrl-E Analysis therefore offers an ideal basis for energy optimization in the production process. Finally, it should be emphasized again that several parameters can help reduce energy consumption. In addition to the right choice of the machine in terms of size, performance and degree of automation, these parameters also include consumption–optimized parameterization of all drives as well as the use of energy–optimized components with feedback effects. MMI

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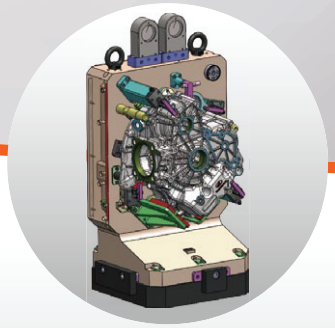
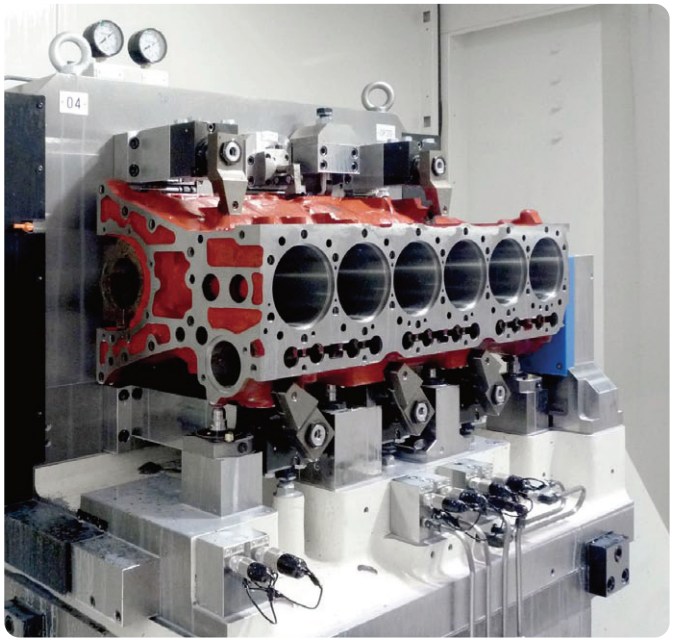
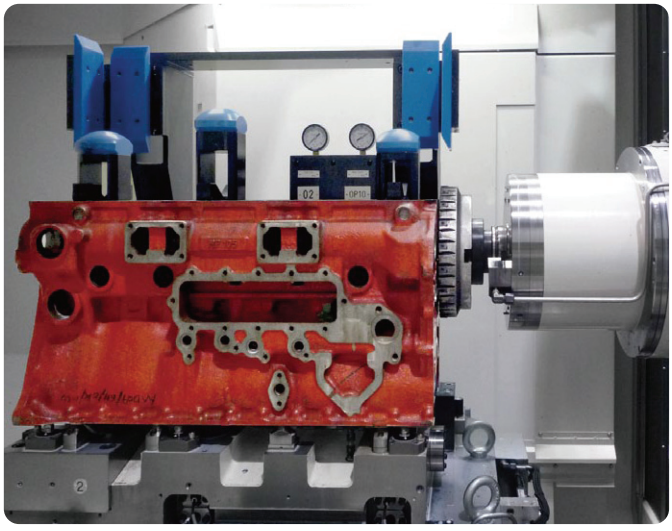


3D Design

Actual Fixture Without component

Actual Fixture With component





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Let's Build the Future

This year, innovative technologies will be showcased at the world's largest machine tool exhibition—EMO MILANO in Italy. Read on to find out some interesting solutions that will be exhibited at the event.

The global machine tool industry is all set to converge at the world's largest machine tool exhibition—EMO MILANO in Milan, Italy. Scheduled to be held from October 5–10, 2015 the mega event will showcase the latest range of machine tools in the market and also offer a platform for industry players to network with the who's who of the business.

Industry speak

Promoted by CECIMO, European Association of the Machine Tool Industries, industry stalwarts are all praise for one of the most prominent shows in the machine tool market. Managing Director, Ace Manufacturing Systems Ltd, P Ramadas says, "International events such as EMO provide a great opportunity for machine tool companies to demonstrate their innovations to an international community. It also allows existing and potential new customers to visit and meet machine tool manufacturers and hence create brand awareness amongst such visitors. Such events also provide an opportunity to strengthen the relationship with our existing dealers or distributors and build business relationships with new partners." Agreeing to this, President–Global Sales, Jyoti CNC Automation Ltd, Mihir Baxi opines, "Exhibiting our products at EMO increases our global presence and thereby increases our market share. In addition to this, we can compare our products with that of our competitors and also understand the future trends of machine tool technologies. This will help our technocrats to think about the future challenges and also develop products that meet the requirements of global consumers." EMO is truly an international machine tool show. Executive Director, Grind Master Machines Pvt Ltd, Sameer Milind Kelkar says, "The decision makers and technology advisors from all over the world visit this show. This gives an excellent opportunity to inform about our technology updates to worldwide buyers. It also provides the right platform to initiate or take forward the technology co-operations worldwide. We often find the right technology and channel partners through this exhibition." With various advantages, this event proves to be an ideal business platform for industry players.

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Let's Build the Future

What's new!

Launching innovative and new products is one of the key highlights of this event. For instance, AMS will be showcasing two varieties of products at EMO. The first product is a cost effective high speed drill tap machining center called 'Super–Dart'. Ramadas explains, "This high rapid traverse machine is configured with a side arm tool changer with an option of up to 30 tool pockets, which is rarely available in its product segment. It is also used for producing components of different materials including forged steel, cast iron, aluminium, etc." The second machine that will be displayed at the event is the twin spindle machining center Gemini–XL. The twin spindle machines have created a niche market in high volume production of automotive component manufacturing. Ramadas adds, "The machines are available in different (fixed) center distances and spindle sizes. With two spindles machining the components simultaneously, the productivity nearly doubles as compared

Source: EMO

EMO Milano's last edition was held at the exhibition center in Italy.

"International events such as EMO provide an opportunity to strengthen the relationship with our existing dealers or distributors and build business relationships with new partners."

Managing Director, Ace Manufacturing Systems Ltd, P Ramadas

"Exhibiting our products at EMO increases our global presence and thereby increases our market share."

President- Global Sales, Jyoti CNC Automation Ltd, Mihir Baxi

"We often find the right technology and channel partners through this exhibition."

Executive Director, Grind Master Machines Pvt Ltd, Sameer Milind Kelkar

to the single spindle machines." The machines also have advantages in energy consumption, floor space occupied, coolant consumption, and operator fatigue. It is also available with a rotary pallet changer as an option to mask the load–unload time.

In addition to this, Grind Master Machines Pvt Ltd is eager to launch the SMP500E_SC, the latest model in their NanoFinish range of machines that makes use of the size control technology. Kelkar explains, "The model is a revolution in the processing of automotive transmission parts. The technology eliminates the need for expensive and maintenance prone grinding operations. The NanoFinish Superfinishing machines are recognized as reliable solutions for finishing of automotive transmission shafts, steering parts, pump parts and turbo charger shafts." The NanoFinish control system is a step towards 'smart manufacturing.'

Jyoti CNC Automation Ltd will also be exhibiting numerous machines including the MX 8 M, a high performance 5-axis machining center with turning option; KX 50, a high performance 5-axis double column machining center; K3X8 Five, a high performance 5-axis vertical machining center; K Mill 10, bridge type machining center; VX 18 – 3-axis vertical machining center – large; AX 300, a twin spindle turn mill center and TS 120, a twin spindle chucker with gantry robot.

Industry trends

Technologies such as mill-turn, turn-mill, multi-spindle, 5 axes machining centers are gaining popularity. Ramadas opines says, "Customers are looking for one stop shop for all their machining needs. The parts requiring multiple operations can be machined in minimum number of set-ups using mill-turn and turn-mill centers. Multiple spindle machines are more suited for components demanding high volume production. 5-axis machining centers are on huge demand for aerospace and die & mould application, which involves intricate cutting of complex components in a single setup."

Apart from this, automated machines are also becoming popular among market players. Baxi opines, "Customers are now looking for high-precision multitasking machines with automation. This trend is already established globally within developed countries and is being followed by developing nations. Hence, the fast developing nations are on the lookout for fully automated machines, considering the need to manufacture components with precision and at a competitive cost."

In conclusion…

With numerous new technologies emerging in the machine tool sector, one can be assured that the high profile event will display technologies like never before. So, book your dates and be ready to witness some of the best technologies across the globe. See you at the event! **MMI**

Mighty Drill Tap Center

Ace Manufacturing Systems' Super-Dart is a compact and powerful Drill Tap Center designed to match every possible application. Though the machine is designed specifically for drill/ tap applications, it is loaded with full milling capabilities. These machines are built with optimally designed structures to take care of cutting forces and cushioning at high speed rapids of 50 m/min. Loaded with a table size of 900 x 450 mm, stroke of 600/450/500 mm and 20 tool side mounted ATC makes it an ideal choice for any production shop demanding high speed and accurate machining.

► **Ace Manufacturing Systems Ltd**
Hall 11 / Stall G10

3D Printing Technology

WFL is displaying an M80 MILLTURN / 4500 mm at EMO 2015 at Milan. With the integration of a 6KW high performance laser it is not only possible to achieve industrial utilizable material melting, but also precise and low distortion hardening of tribological threatened surfaces. When using the technology cladding, it is possible to achieve with high build-up rates not only linear ways, but through the use of the many NC-axis of a MILLTURN you can create nearly any geometric form. Therefore complex cooling channels or curved connecting flanges can be efficiently manufactured.

► **WFL Millturn Technologies GmbH & Co KG**
Hall 3 / Stall E14

NanoFinish Superfinishing with Size Control

The NanoFinish model SMP500E_SC by Grind Master is a revolution in the processing of automotive transmission parts. It is built to achieve both size and finish in one process – NanoFinish with size control. Achieving stock removals of up to 20 microns, the machine guarantees an output size within ±5 microns, at the same time achieving fine finish values of Ra 0.1. Combined with hard turning technology that is available in the market, NanoFinish with size control eliminates the need for expensive and maintenance prone grinding operations. NanoFinish Superfinishing machines are recognized as reliable solutions for finishing of automotive transmission shafts, steering parts, turbo charger shafts, etc.

► **Grind Master Machines Pvt Ltd**
Hall 14 / Stand H32

Compatibility with Modular System

Owing to an adapter ring, the round Spanntop and the hexagonal profile Toplus are now compatible with the Hainbuch modular system. The existing Mando Adapt mandrel and jaw module work perfectly with the new Spanntop mini. The Toplus version does not use an adapter ring, instead it has ring of attachment holes for fixing the jaw module, and next year it will get its own Mando Adapt series of adapters. And finally, as another piece of good news, Spanntop and Toplusminis both have full through-bore and are available in three standard lengths to suit all machines and drawtubes.

► **HAINBUCH GmbH**
Hall 4 / Stand B06

Machining centres with SLIMline Control

DMG MORI will be exhibiting the new generation – ecoMill V series that offers the highest accuracy of 6 µm in its class and cutting performance of 12.000 rpm as standard. Now, it also has an additional highlight – the control variety. The new DMG MORI Multi-Touch SLIMline Control (19" / Operate on SIEMENS / 400 V) with the highest screen resolution and touch operations is practical, user friendly and ergonomically optimized. One can simulate the machining process in advance – of course in 3D. The Control (19" / Operate on SIEMENS / 400 V) is the step to the next level with its extended advanced programming with the capacity of 4 GB instead of 5 MB in comparison with its previous version.

► **DMG MORI**
Hall 4 / Stall D01

Multitasking machine

Whether in the automotive, instruments, hydraulic or electronics industry – the AX series by Jyoti CNC Automation Ltd offers ideal performance options for sophisticated machining for bar, shaft & chucking components. The frame sizes with different options are unique & contribute to the success of this series; they have been designed for flexible tailor-made solution to meet varying demands. Multitasking is carried out with a combination of two electro spindles and live tool turrets with one component clamping with the C & Y axis.

► **JYOTI CNC AUTOMATION LTD**
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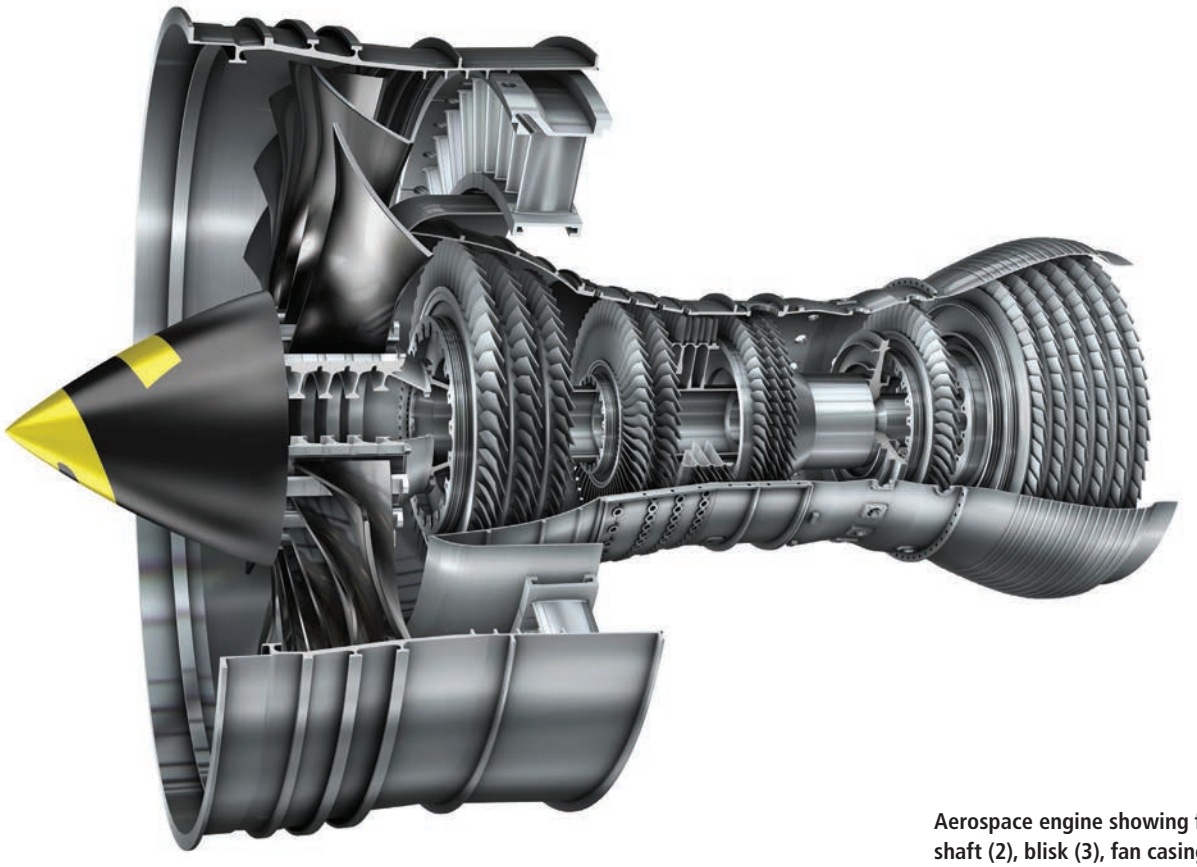

Source: Sandvik Coromant

Aerospace engine showing fan disc (1), shaft (2), blisk (3), fan casing (4), spool (5), turbine disc (6) and combustion casing (7).

Aero Engine Machining Gets a Tune-Up

Exploding or dissecting a typical aero engine reveals there are a series of core components that have their own unique demands in terms of feature generation and material. Here, Sandvik Coromant outlines the principal strategies and solutions that have the greatest potential for competitive gain.

Machining of aero engine parts has always been a challenge. The materials have to have set characteristics and the machining techniques have to be in line with them, so as to not change the material properties. The following are strategies for machining aero engines, part by part.

Turbine discs

These complex turned parts feature profiled pockets, internal and external grooves, scallops and off-centre bosses and holes, all typically with challenging clearance requirements. Adding to the scale of difficulty is the material, which is normally a hard-to-machine alloy such as Inconel 718, Waspaloy or Udimet 720.

For machining pockets and grooves that are difficult to access, 90°, 45° or T-shape angled inserts are a necessity, preferably featuring sharp, ground geometries. Grades with a PVD coating score are best as they can maintain sharp edges over a longer time in cut. Other grade properties to major on include superior notch wear resistance and good edge line toughness.

With regard to the turning operations, the deployment of a modular tooling system with blades designed to fit turbine disc profiles and pockets is a good strategy. Select a tool that delivers the necessary radial and axial clearances, and use round inserts with high-pressure coolant (HPC) capability as these offer the best productivity in both roughing and finishing operations on tough materials.

Interestingly, it can be demonstrated that

Source: Sandvik Coromant

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CoroMill 316 with Coromant Capto integrated coupling.

Source: Sandvik Coromant

by choosing trochoidal turning for roughing operations over the more traditional ramping method, productivity can be doubled with the added bonus of improved security and tool life. Trochoidal programming maintains chip thickness throughout the machining operation, which minimizes the risk of heat and pressure variations. This allows the optimization of harder, more productive grades and insert types resulting in reduced cycle times.

For machining turbine disc scallops, exchangeable head milling cutters provide economical solutions as their shorter cutting length designs are not only optimized for small depths of cut and close tolerances, but also for stability. Of course, this is in addition to the obvious benefit of tool change and tool setting times, which are reduced substantially in comparison with traditional end mills and chucks.

Turbine/combustion casings

These large, complex turned parts are conical in shape and feature round and square external bosses, as well as circumferential and axial holes. Inconel and Waspaloy represent the typical alloys of choice, and large amounts of material need to be removed.

Using a turn-mill machine, rough milling around an external boss can be optimized using a light-cutting face and profile mill with through-spindle coolant. In combination with round inserts, which reduce notch-wear and allow high feed rates, these provide smooth entries and exits; thus, delivering vibration-free use in extended reach applications. Sandvik Coromant, for example, uses ceramics on this application very successfully.

The same cutter can be used for the helical ramping of the casing's larger holes from solid. Here, the cutting forces produced are much lower than in conventional drilling – in fact, the latter also struggles with the interrupted exit into the bore. It should be possible to ramp down to diameters as small as 32 mm.

Finish the bores using a suitable end mill and circular interpolation. Again, one tool can finish a range of diameters to reduce tool inventory. Indeed, the same theory applies to chamfers. Rather than deploying a dedicated cutter, always select a chamfering tool that can also perform de-burring operations – and not just on holes.

For smaller holes, ensure the solid carbide drill technology selected provides geometry that is optimized for heat resistant super alloys such as Inconel and Waspaloy. This will help produce a high number of drilled holes with security and low axial cutting forces, which is particularly important on thin-walled casing sections.

The face milling of turbine casings using ceramic inserts in conventional/up milling mode can remove metal from turbine casings up to five times faster (1000 m/min) than conventional carbide inserts in climb milling mode. As a result, metal removal rates of 106 m^3/min are achievable. No coolant is deployed.

For finish profile milling, an end mill with 50° helix facilitates the required light cutting action. To maximize productivity, shallow radial cuts and high axial cuts work best.

Fan casings

These hollow bowl shaped components offer plenty to test production engineers. Aside from a series of external and internal profiles and grooves, fan casings are machined from titanium, a material renowned for its low machinability. Unlike nickel-based alloys, ceramic inserts cannot be applied to titanium. As a result, keeping the cutting temperature low is the key to success, with a nod to both insert shape and HPC. A quick change tooling system in combination with a high specification toolholder is also necessary to help deliver the right support and stability at the right clearance when machining difficult-to-access fan casing features, particularly on VTLs.

VTLs of course offer a significant advantage, as they allow HPC to be piped through the ram directly to the spindle. This means there are no coolant pressure restrictions, as is the case with turret lathes and rotating spindles.

From an insert perspective, round inserts offer the best accessibility and productivity due to reduced entry angle and chip thickness. However, for highly effective semi-rough turning into fan casing shoulders, an insert is required that combines the advantages of square 45° lead approach angle tools and rhomboid 90° lead angle tools. Such an insert will allow an increase in feed and speed, leading to a potential doubling of metal removal rate.

Spools

Spools feature deep internal chambers and external blade tulip grooves. Dampened blades deployed with a high specification toolholder will help overcome the tendency to vibrate as well as provide effective chip evacuation.

To machine internal spool chambers, which are typically up to 150 mm deep, long and slender tools are required. Using oval serration blade systems, normally with 100 mm high


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Source: Sandvik Coromant

The modular CoroTurn SL70 tooling system features blades that fit typical profiling and pocketing features.

Dampened blade tools with ceramic round inserts.

Coromant Capto VTL solution.

blades, will offer the best coolant delivery to assist in chip removal. Here, profiling and pocketing using trochoidal turning strategies combined with a ceramic grade insert can reduce the number of machining passes required, often allowing productivity to be doubled as the superior notch wear resistance permits higher depths of cut.

For other turning operations, selecting a carbide insert that fits in the same pocket as the ceramic insert will reduce the number of tools, as well as the set-up time. A geometry offering low cutting forces and good chip control is preferred.

Blisks/impellers

Machining these complex parts is best facilitated on a five-axis machining centre with good simultaneous dynamics. Inconel or titanium is the most likely work piece material.

When roughing impellor slots in titanium, the best machining technique is point milling. Because this operation demands full slot milling, the axial depth of cut is limited to half the diameter of the tool. A bull nose exchangeable insert cutter will provide a great balance of productivity and economy.

When performing the same operation on impellers made from Inconel, the application of trochoidal milling with high speed machining techniques will prove advantageous. It is best to program the tool with a roll entry and exit from the cut as this will control the arc of engagement, giving low cutting forces. A ball nose end mill with a 50° relieved shank provides both axial depth of cut twice the diameter and low radial cuts.

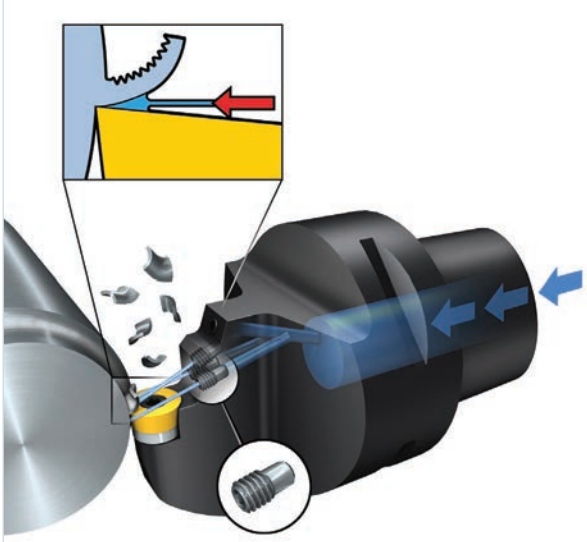
For finishing the blade profiles, flank milling (high axial depth of cut) is the fastest option where the component, CAM software and tool allow. Stability combined with reach is the goal and conical ball nose end mills can serve well here.

Fan discs

Made from titanium, these components have deep internal chambers and large tulip grooves. To rough-machine the former, the most productive and secure method is with direct grooving. As a point of note, it is imperative to select an insert with geometry that can split the chips into separate segments and avoid jamming situations. Once the bulk of material has been removed, a round carbide insert together with HPC profile and strong cutting edge geometry will deliver the best results.

Traditionally tulip slots have been broached, but with new technology this has been replaced with milling. Machine shops should use tailored side and face cutters for rough groove and pre-form opening, and profile end mills for semi-finishing and finishing. MMI

Source: Sandvik Coromant



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Fitting Investments at Bertol

Danijel Bertol's company, established in 1983 but run by him since 2003, has grown at 30 per cent year-on-year, a good deal of which is attributable, he says, to the affordability and performance of his Haas CNC machine tools.

The late 1990s was not an easy time in the life of young Danijel Bertol. The Croatian War of Independence had raged for four years, ending finally in 1995 with the country ravaged. Then, just two years later, his father died unexpectedly, leaving his small machining business idle and the family, like so many in the country at that time, to rebuild their fractured lives.

Danijel, then 24, was in college pursuing engineering. But after completing just two years of his studies, he ditched his books and returned home to Velika Mlaka on the southern outskirts of Zagreb, with the intention of picking up where his late father had left off. With the blessing and support of his mother, Danijel began plotting an ambitious future for the company.

"Croatia was rebuilding after the war and many new buildings were coming up. Glass was an important element in all these structures," Danijel says. "So, it seemed to me like a sector with some potential. I began to research, design, and manufacture glass fittings. Although I had no experience in this particular field, I used to help my father in his garage, operating machine tools, so I knew enough to get started on making some prototypes."

Source: Haas Automation

Source: Haas Automation

Bertol's first Haas machine, a VF–1 vertical machining centre, arrived in 2005. Since then, the company has added a VF–2 vertical machining centre and four Haas turning centres, including two ST–10 models.

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Fitting Investments

The beginning of change

Post 2003, the resurrected Bertol company was in full swing, but Danijel understood that growth would be limited severely if he did not invest in some new, better–quality CNC machine tools to replace the manual machines. "I knew we would not be competitive enough, so the decision was taken to invest in a new machine, even though it would represent a significant financial commitment," he says. "At first, we considered pre–owned machines, but my professor from high school who had left teaching to run his own engineering business recommended Haas machines. He was all praise about the machines and the local Haas Factory Outlet (HFO), Teximp."

Bertol's first Haas machine, a VF–1 vertical machining centre, arrived in 2005. Since then, the company has added a larger VF–2 vertical machining centre and four Haas turning centres, including two ST–10 models that arrived in 2014. "Every time we plan on investing in new machines, we assess the market," says Danijel. "When we go through the specifications and performance of the alternatives, we found out that Haas always provides the best all–round offer."

New investment plan

If 2015 goes well, Danijel will invest in

Haas again, this time with his eye on a new VF–3 vertical machining centre. Like the company's existing Haas machines, the new machine will be set to work producing the company's growing range of innovative, contemporary glass fittings, which includes clamps, handles, knobs, levers, point fixings and flexible joints, as well as system fittings for showers, balustrades, sliding and rotating doors. In all, Bertol currently offers around 500 different types of parts, 90 per cent of which are machined from high–quality stainless steel.

The result

"In terms of accuracy, we can achieve 0.01 to 0.02 mm using the Haas machines. But typically, aesthetics are just as important as precision in our industry – the products have to look good to match the high specification commercial and residential projects with which we are associated," says Danijel. "Virtually everything we do is bespoke; we work closely with the customer to devise optimum solutions that look nice and can be installed easily and quickly."

Today, Bertol has 10 employees, four of whom are trained to program the Haas machines. "Our team is our most important asset," says Danijel. And it is not just Croatian customers who have discovered Bertol's innovation and machining skills: around 60 per cent of the company's output is now exported, with most of it going to Germany.

Source: Haas Automation

The Haas machines produce the company's growing range of innovative, contemporary glass fittings, which includes clamps, handles, knobs, levers, point fixings, and flexible joints, as well as system fittings for showers, balustrades, sliding and rotating doors.

In conclusion

"Purchasing Haas machines has proved to be a good decision for us," says Danijel. "Moreover, we also receive excellent support from the HFO, Teximp. In fact, our sales contact at the outlet, Nenad Macan, even came up with a novel and effective solution for part holding on one of the Haas machining centres. The multi–component, quick–release fixture we made in–house uses motorcycle brake calipers hooked up to a mini hydraulic system. It is simple, low cost, reliable and works like a treat!" Ultimately, Danijel perceives his organization as a creative business that can offer great flexibility in its product line. Bertol has already earned the reputation of fulfilling a variety of customer requirements, as well as short delivery times.

In the aftermath of war and family loss, not many people accomplish success in their business. But because of these hardships, Danijel Bertol embodies an uncommon energy, a sense of opportunity and destiny. Now that Croatia is part of the EU, he along with his contemporaries can look forward to a more secure future. MMI

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The Best of Both Worlds

Combining different processing steps in one machine is attractive for several reasons: it saves space, a component can be machined in a single setup, and higher accuracy can therefore be achieved. Hybrid machines, where additive manufacturing processes are incorporated in one machining centre, are currently in fashion. Renowned companies in the sector, ranging from DMG Mori and Hamuel to Hermle and Mazak, in the meantime offer suitable machines.

For a long time it has been one small step after the other. What began as rapid prototyping slowly developed towards tooling and manufacturing. Today, additive production is on everyone's lips in the form of 3D printing. But in spite of all the growth forecasts, not every component will come out of the printer, even in the future. Even if, according to Wohlers' report, the global market for additively manufactured goods and services is expected to rise from $3 billion in 2013 to around $21 billion by 2020, this will not be achieved without metal cutting.

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The allegedly competitive process to metal cutting even offers opportunities for the machine tool manufacturers – in that it combines both techniques. And more and more suppliers are placing their trust in such hybrid machines. The subject has attracted increasing attention ever since industry leader DMG Mori introduced the Lasertec 65 3D at the Euromold trade fair for the first time in December 2013.

Berthold Hermle AG entered the field of generative manufacturing even earlier. The 100 per cent subsidiary, Hermle Maschinenbau GmbH with its headquarters in Ottobrunn near Munich, has been offering the Metal Powder Application process (MPA) since the spring of 2013. Hybrid manufacturing is possible thanks to the incorporation of an applicator into a five–axis machining. "The decision to offer this technology as a service to Hermle customers only was the right one," says Managing Director, Hermle Maschinenbau GmbH, Dipl Phys Rudolf Derntl explaining the concept. "The customer is able to use existing know–how from years of MPA development for his product without having to invest in an MPA system."

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BOTH WORLDS

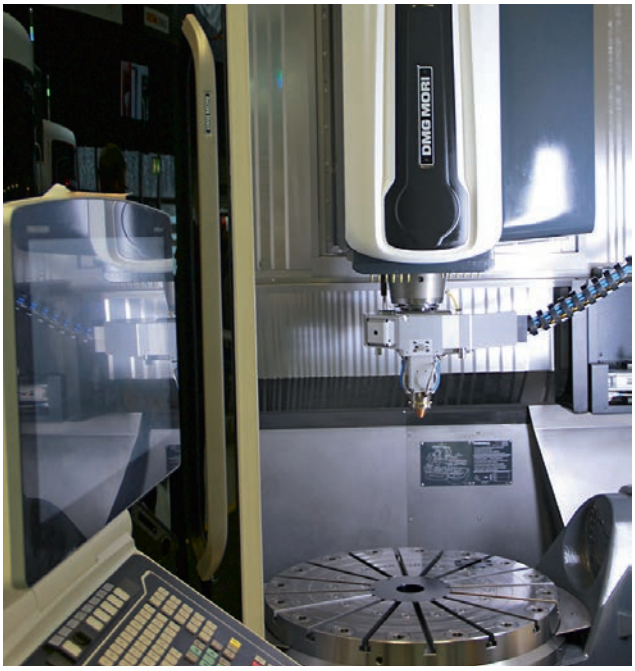
Source: DMG Mori

In DMG's hybrid machine, the laser ensures the deposition of the material.

Alternate deposition and removal on five axes

MPA technology is a thermal spray process for metal powder. When depositing the material, powder particles with grain sizes of 25 to 75 µm are accelerated to very high speeds by means of a carrier gas and applied to the substrate via a nozzle. The material is deposited in layers until the contours of the component are accessible for milling. After machining the contours, the deposition process is repeated. "Alternate deposition and removal is carried out on five axes using an in–house CAM development, Hermle's MPA Studio," says Derntl. "Up to six powder conveyors can be controlled

Source: Kroh



View of the work area of the DMG Mori 65 3D hybrid machine. The laser head can be changed automatically.

simultaneously. This enables functionally graded materials to be produced and material mixtures to be generated. There are therefore no limits to the process in the metal sector."

According to Derntl, the strength of MPA technology lies in the deposition of large volumes on semi–finished products with free–form surfaces in combination with cavities such as cooling channels or integral heating wires. "These are applications which cannot be covered by any other generative manufacturing process. Workpiece dimensions of more than 0.5 m x 0.5 m with total weights of several hundred kilograms are nothing unusual for us." He also emphasizes the possibility of combining materials, a feature which laser deposition welding does not provide. "In contrast with deposition welding, in the MPA process, the deposited powder is not fusion bonded, which means that the resulting stresses in the component are very small," says Derntl.

DMG Mori's hybrid machine is equipped with a 2 kW diode laser. It is based on a DMU 65 Monoblock and was developed by Sauer Lasertec in collaboration with DMG Mori USA. "The absolutely unique feature of Lasertec 65 3D is that it enables laser deposition welding and five–axis milling to be combined in a single setup, thus making it possible to produce highly complex components," says Sales Manager for laser machines, DMG Mori Seiki AG, Friedemann Lell. "For example, many 3D geometries with undercuts can be realized in this way. This opens up design options which would have been unthinkable before." A component can therefore be designed for optimum functionality without taking into account specific manufacturing restrictions.

Laser head with integral cooling and process monitoring

Lell expands further on the concept: "Our experience with the integration of laser heads into machine tools has stood us in good stead with the hybrid machine, as demonstrated by the automatic shuttle handling for changing the laser head and the HSK-63 interface. However, for laser deposition welding, we

"We want to establish MPA technology as a valuable addition to the existing, conventional manufacturing processes already present in the market."

Managing Director, Hermle Maschinenbau GmbH, Dipl Phys Rudolf Derntl

use a new laser head with integral cooling, process monitoring and an integral camera that controls the process optically and adjusts the laser power online."

Coaxial inert gas prevents oxidation during the build–up process

According to DMG Mori, the machine first deposits the metal powder—stainless steel or different aluminium or nickel–based alloys for example—on a base material, one layer at a time, by means of a powder nozzle. It is then fused with the base material by means of the laser so that it is free from pores and cracks. A coaxial inert gas prevents oxidation during the build–up process. After cooling, a layer of metal forms which can then be machined mechanically. The build–up rate is said to be 1 kg/h. "This means that laser deposition welding is ten times as fast as laser fusing in a powder bed," emphasizes Lell. "Wall thicknesses lie between 0.1 and 5 mm." In contrast to laser fusing in a powder bed, laser deposition welding using a metal powder nozzle enables large parts to be manufactured. Complex 3D contours can also be generated layer–by–layer without supporting geometry.

Hamuel has been offering the 'Hybrid' option for the five–axis turning and milling centres in its HSTM range for about a year. "As standard, the add–on includes the laser beam source with cooling, a special laser fume extraction system, adaptive software including measuring probes, the laser tool and a docking station," reports Manager Global Key Account, Hamuel Maschinenbau GmbH & Co KG, Alexander Pieler. "The hybrid machine works additively, that is to say by adding material in the form of metal powder, and adaptively, which means it calculates and produces one or more CNC programs before machining based on measured values," he continues. "In–process measurement after laser deposition welding and finishing, by means of metal removal, it ensures that the original shape of the component is achieved every time without undercuts or transitions."

Ideally suited for the repair of turbine blades

The design advantages can be seen at Hamuel in the horizontal machine layout for the rotary axes. "These are ideally suited to repair flow components such as turbine blades or blisks," stresses Pieler, "as the workpiece does not have to be positioned and moved by means of a rotary/swivel table." The component accuracies that can be achieved and the dynamic response of up to seven axes acting simultaneously are significantly greater as a result. In addition, horizontal clamping of the workpiece means that the torques acting during machining are very small as compared with vertical machining centres.

According to Pieler, the highly compact laser welding unit with HSK interface can be moved in and out by means of the integral tool changer. The inert and carrier gases, the metal powder and the power supply to the laser tool are connected via a patented interface. "This interface is so universal that it also allows alternative machining processes such as laser drilling, laser marking, laser–assisted metal cutting or laser hardening."

Mazak, too, embarked on generative manufacturing at Jimtof 2014 in Tokyo. With the Integrex i–400 AM multifunctional machine, metal powder is fused using a fibre laser. Coating heads apply the molten material layer–by–layer. The component is then finish–machined. The coating heads are fitted in the machine's tool magazine and can be loaded into the milling turret by conventional automatic tool changers. The Japanese offer two types of coating head: a high–speed head and a precision head.

According to Mazak, this system enables different types of material to be welded together, which is a particularly convenient and efficient way of repairing worn or damaged components. The aerospace industry, for example, would benefit from this, as turbine blades can be repaired in this way. The hybrid machine is also suitable for the production of small batches of parts made from materials which are difficult to machine in the energy sector and in medical engineering.

Premiered at Jimtof in Tokyo: a generative manufacturing process is integrated in Mazak's Integrex i–400 AM hybrid multifunctional machine.

Source: Mazak

"Laser deposition welding is ten times as fast as laser fusion in a powder bed."

Sales Manager for laser machines, DMG Mori Seiki AG, Friedemann Lell

The remaining companies that were surveyed responded in a similar way. "We believe there are applications in tool and mould making, the aerospace industry, the automobile industry and in medical engineering," says Lell. At Hamuel, the emphasis is initially on deploying the hybrid machines for manufacturing new and repairing turbine blades and blisks for the aerospace industry as well as for energy production.

Other applications and markets not ruled out

Over the years, the company has earned a good reputation in these global niche markets, and has accumulated an enormous amount of knowledge which it intends to use for additive and adaptive machining. "However, this does not mean that we are ruling out other markets and applications," emphasizes Pieler.

Three MPA systems and two machining centres are currently deployed at the Hermle subsidiary in Ottobrunn. Expansion of the machine range will depend on the demand and how orders develop. And this is believed to be positive. "Along with prototype manufacturing, we are also an attractive proposition for serial production," says Derntl. "With automated MPA systems and reproducible production quality, we have already completed the step from rapid prototyping to rapid manufacturing. The object is to establish the MPA technology as a valuable addition to existing as well as conventional manufacturing processes that are already in the market." MMI

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The Future of Making Things!

This year, Autodesk's subsidiary Delcam hosted the Asian Technical Summit (ATS) at the Ritz-Carlton Hotel in Bengaluru from August 3–5, 2015. The event showcased several new enhancements to the software and also case-studies from end-users. Read on for more….

The Asian Technical Summit is hosted by Delcam every year in select cities across Asia. This year the edition was held in India. This was done in-line with rotating the event so that the local communities who could not make it to the other summits would have a chance to see live demonstrations and updates from the company. Also, this year holds special place for India as Delcam celebrates 15 years in the country. Therefore, it only seemed apt for the company to host the event in the subcontinent.

South Asia & Middle East Managing Director, Delcam, Vineet Seth informed, "The ATS is a platform to showcase to the industry, local community, and media about what we have been up to cumulatively as a global company."

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This year's edition did not disappoint. Several case-studies covering everything from the manufacture of shoes to the development of extremely complex aerospace components were presented by company representatives as well as global end-users.

Mutually beneficial growth

The main focus that could be clearly seen is the way the company wants to play catalyst to the manufacturing sector. Vice President, Delcam, Pete Baxter at the event spoke about how product innovation has changed with the introduction of cloud services and mobile technology. This has made design innovation and time to market highly flexible and intelligent, brining a new meaning to the collaborative design and manufacturing model.

He asserted, "We want to help our customers drive the direction of a future product. We help them understand the rapid advancement in new materials through innovative methods of manufacturing; thus, supporting them in understanding how they can use those methodologies to their advantage in order to shorten time to market and increase efficiency, etc."

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The Future...

Source: Delcam

Vice President, Delcam, Pete Baxter addressing the delegates at the event.

India focus

The company's focus in India is to further emphasize the benefits of metrology. Speaking on his plans for India, Seth comments, "As a company, we are aggressively looking to bring to the forefront the advantages of integrating machining and inspection in the manufacturing sector."

The product in question is 'PowerINSPECT'. The software makes complex inspection tasks simple on a wide range of measuring equipment. The 2015 R2 release of Delcam's PowerINSPECT inspection software makes it easier to complete fast and accurate inspection of complex assemblies. The new version includes more options for automation of inspection sequences, including automated probe changes, automatic feature extraction for point cloud batch inspection, and greater control over collision checking.

Furthermore, the software has included collision detection for many years to warn the user when there was a possibility of any collision between the probe and the item being inspected. Until now, the user had to make the required changes to the probe path to avoid the collision. With the PowerINSPECT 2015, the software adjusts

"We want to help our customers drive the direction of a future product. To help them understand how they can use our tools to their advantage."

Vice President, Delcam, Pete Baxter

the probe path automatically if a direct move between inspection features could produce a collision. The software will calculate a new motion path that avoids the obstacle, typically by moving up and over the obstruction or around it. This enables users to shorten cycle times and hence increase productivity.

Case study example

Standardizing on Delcam's PowerINSPECT program as its sole inspection software has helped Shenyang Liming Aero Engine (Group) Co Ltd to implement an enterprise-wide digital inspection platform and also improve the efficiency of its enterprise management systems as well as the quality and consistency of its production.

Founded in 1954 in Shenyang in North-east China, Shenyang Liming is a key part of China's main aircraft producer, the AVIC organization. The company found obtaining quality-control data and integrating those results into the enterprise-wide systems challenging because it was using a variety of brands of CMMs, fitted with various types of inspection software. The overall result was that the company's inspection data was fragmented and did not integrate well with the existing information systems. This made it difficult to monitor product quality and, therefore, to identify any areas that needed improvement.

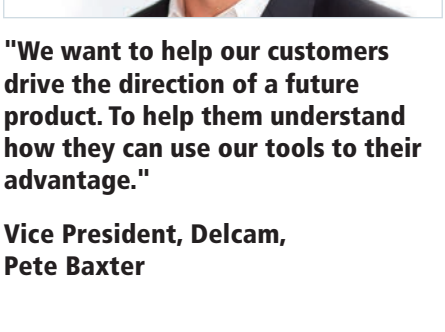
To overcome these problems, the company standardized on Delcam's PowerINSPECT software, using a combination of PowerINSPECT OMV for on-machine verification on its machine tools and PowerINSPECT CNC for its computer-controlled CMMs. For each piece of equipment, PowerINSPECT has been customized to provide a dedicated inspection system for that machine.

While the main benefit has been the ability to integrate the results seamlessly with its management systems, Shenyang Liming has found many other advantages since its incorporation. Another important factor is PowerINSPECT's ability to read all types of CAD data. This makes it easy for Shenyang Liming to receive design data from other manufacturing companies within AVIC.

The change to PowerINSPECT at Shenyang Liming has greatly improved the efficiency of its inspection processes and management of all the results.

Robotic Machining

Another product that the company featured at the event was Delcam's PowerMILL Robot module. This software allows the programming of robots for multi-axis machining operations. The new release enables manual and CNC programming to be combined in a single program so as to provide maximum programming flexibility.



"The ATS is a platform to showcase to the industry, local community, and media about what we have been up to cumulatively as a global company."

South Asia & Middle East Managing Director, Delcam, Vineet Seth

The PowerMILL Robot will have uses in industries such as pattern making, woodworking, automotive and heavy engineering. The range of robots supported by the system has been increased and now includes KUKA, ABB, Fanuc, Yaskawa Motoman, Stäubli, Hyundai, Comau, Kawasaki Robot, Nachi and Universal Robots equipment, in all cases eliminating the need for any third-party translation software.

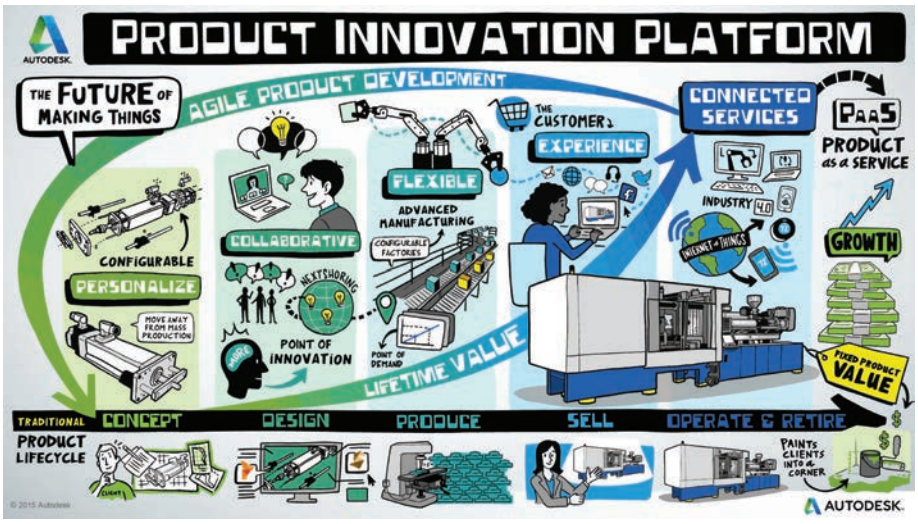
With PowerMILL Robot, robots can be programmed for tool-to-part applications, making them ideal for machining large parts, such as composite panels that need to be trimmed, or for part-to-tool applications, such as grinding or finishing. The working area can be extended with linear tracks and rotary tables for even greater flexibility over the size and types of parts that can be manufactured.

Investing in the future

The company attributes its success to its willingness to respond to customers' needs as well as providing the highest levels of training and support through its network of over 500 Delcam and sales partner offices in 80 countries around the world.

Apart from this, the company is also part of the bloodhound project. This global initiative involves building a supersonic car powered by a jet and a rocket that will aim to achieve a new world land speed record of 1000 mph. The endeavor is to inspire the next generation to enjoy, explore and get involved in science, technology, engineering and mathematics. If you missed this year's edition of the ATS, be sure to catch it next year! MMI

Source: Autodesk



A comparison of a traditional product lifecycle to an innovative one.

Delhi Machine Tool Expo 2015 – A Grand Success

Giving a new platform for SMEs and MSMEs in the Northern region, Indian Machine Tool Manufacturers' Association (IMTMA) launched its series of regional machine tool shows. The first in the series took place at Pragati Maidan, New Delhi. Here is a report on the same.

Realizing the need of having a regional show for SMEs and MSMEs, Indian Machine Tool Manufacturers' Association (IMTMA) had organized a series of exhibitions in the country. The first amongst them was the Delhi Machine Tool Show, which took place in Delhi from August 20–23, 2015.

Though it was just the first edition, the show received a satisfactory response from exhibitors. The Delhi Machine Tool Expo covered an area of around 10,000 m^2 in four halls (Hall No 8, 9, 10 and 11) at Pragati Maidan, New Delhi. With a footfall of 13,500, the show also received participation from five countries and group participations from China, Taiwan and the United States.

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Inauguration

The expo was formally inaugurated in a glittering ceremony, which was graced by President, Automotive Component Manufacturers Association, Ramesh Suri and Additional Secretary Department of Heavy Industry, Government of India, Ambuj Sharma. President, IMTMA and Managing Director, TaeguTec India Pvt Ltd, L Krishnan welcomed the guests, exhibitors and visitors at the maiden Delhi Machine Tool Expo. Underlining the importance of a regional platform, he said, "The show has been organized to cater to regional aspirations of seeking contemporary manufacturing technology solutions. It will help SMEs and MSMEs to be competitive on the global map."

Suri underlined the importance of the machine tool industry for the auto component manufacturers. He states, "The auto component industry is slated to take a quantum of leap from $38.5 billion in 2014–15 to around $100 billion by 2020. To enable such growth requires a strong and consistent support from machine tool manufacturers. Such regional shows in the machine tool sector will help auto component manufacturers to achieve new heights."

Source: IMTMA

Ribbon cutting ceremony by the delegates at the Delhi Machine Tool Expo 2015.

Boosting the industrial growth

Speaking about the Government of India's point of view, Sharma noted, "Unfortunately, around 2/3rd of the machines required by the manufacturing industry are imported. However, in order to reverse this situation, we are working closely with IMTMA. Regional exhibitions

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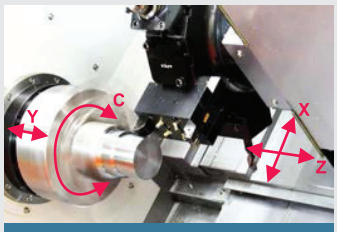

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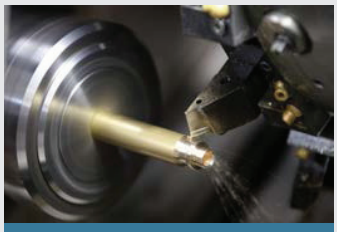

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"The show has been organized to cater to regional aspirations of seeking contemporary manufacturing technology solutions. It will help SMEs and MSMEs to be competitive on the global map."

President, IMTMA and Managing Director, TaeguTec India Pvt Ltd, L Krishnan

such as these will help SMEs to upgrade themselves and build world-class machines. Indirectly, the exhibition will help us to reduce the dependence on imported machines."

Seconding the same, opined Vice President, Indian Machine Tool Manufacturers' Association (IMTMA) and Chairman & Managing Director, Jyoti CNC Automation Ltd, PG Jadeja added, "Exhibitions such as the Delhi Machine Tool Expo plays a vital role in providing a platform for foreign companies to meet their existing and potential customers, distributors, etc., and hence enable them to grow. In turn, they will invest in the Indian market, thus contributing towards the 'Make in India' initiative."

The result of favorable policies and a booming market could be seen at the exhibition. Taipei Economic and Cultural Center in India, Economic Division, Dr Guann-Jyh Lee said, "We are keen on supporting the Indian government's 'Make in India' program. Taiwanese companies can offer auto ancillary, wind turbine parts, medical equipment and precision mold and help India to grow faster. Many of the sectors in which we have expertise are those that have been identified as priorities under the 'Make in India' program."

Exhibitors speak

Sharing his experience of participating at the Delhi Machine Tool Expo 2015, General Manager–CSP, Dürr Ecoclean, Mangesh Agarwal mentioned, "The exhibition is an excellent platform for marketing, brand building and B2B networking. The show opened different avenues to exhibit a broad range of efficient parts cleaning solutions to a wide spectrum of manufacturing industries."

Alternatively, Country Manager India & Southeast Asia, FARO, Harkiran Sandhu said, the event provided a platform, where big machine tool component makers as well as SMEs come together under one roof to share their performances and requirements. As a result, it created a win–win situation for all."

In addition to this, there were a number of industry delegates that participated at the event including Hero MotoCorp, JBM Auto Ltd, Global Autotech Ltd, Hindustan Aeronautics Ltd, Raunaq Automotive Components, Shriram Pistons and Rings Ltd along with other leading companies from the industry.

"Organizing an event of international standards on the lines of IMTEX would be an opportunity to reach out to niche domestic markets."

Director General, IMTMA, V Anbu

Showcase

Numerous companies displayed their latest technologies at the show. "Some of the latest innovations included demonstrated at the event include the Chip Compacting Machine, Chip Crusher and our latest Compact Power Pack, Koolkat Power Pack along with other high pressure products," explained Head–Marketing & Business Development, Yuken India Ltd, Rakesh Kumar.

Mitsubishi Electric also showcased its new controllers at the show. The company's CNC solutions such as M800/M80 series and E70 attracted customers towards the Mitsubishi booth at the exhibition.

Visitors' point of view

Visitors also seemed to be satisfied with the wide display of products. Trainer, BSDC – Jaipur, Raghvendra Inda, said, "The show was well organized and the display of the latest technologies and solutions was interesting." Seconding the same, Manager, Stamina Machine Tech Co Ltd, Kevin Wang said, "The products displayed by SMEs and MSMEs were highly impressive and hence, caught my attention."

Conclusion

In all, the show was well received by exhibitors as well as visitors. It offered a perfect platform for participants to see and discuss the latest products and technologies in the market. The next edition of the Delhi Machine Tool Expo is scheduled to take place in 2017. MMI

Source: IMTMA

Industry players take a look around the various stalls at the expo.

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Torch for Plasma Cutting System

Hypertherm, a US based manufacturer of plasma, laser, and waterjet cutting systems, has launched a new Centricut brand quick change torch for use with ESAB plasma cutting systems. The torch, which incorporates proprietary Hypertherm technology, is designed to replace ESAB PT-36, PT-600 and PT-19XLS torches. Its performance will be at par with the original ESAB single piece torch design, whilst increasing productivity. The two-piece quick-change design allows operators to replace consumables up to three times faster or, through the use of multiple torch heads, which load consumables for the next job while cutting the current job.

▸ **Hypertherm (India) Thermal Cutting Pvt Ltd**
T: +91 (011) 40521201/2/3
www.hypertherm.com

App for Smartphone

TaeguTec has launched TTAPP, a comprehensive technical mobile app for tablets and smartphone devices, in order to offer end-users access to the full spectrum of TaeguTec tools. TTAPP is TaeguTec's virtual cyber salesperson offers the company's ongoing innovative products and machining solutions. By inputting key words or searching by application, the e-Catalog option pits the company's search engine with its electronic catalog. This guides industry professionals to select the right tool for their ideal solution.

▸ **TaeguTec India Pvt Ltd**
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Level Indicator

Elesa+Ganter offers the HCK-G column, a level indicator, for several applications in which fluid level monitoring of hydraulic systems is neccessary. The HCK-GL is composed by two assembly ends made of polyamide based technopolymer, a transparent tube in PYREX glass, an aluminum support and a transparent front protection made of polycarbonate. What makes this product unique in the market is the modularity of its individual components that can be chosen between the standard executions or customized with special lengths up to 1500 mm.

▸ **Elesa + Ganter India Pvt Ltd**
T: +91 (120) 472 6666, E: info@elesaganter-india.com
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Aqueous Industrial Parts Cleaning

Dürr Ecoclean's Universal 81W cleaning system is a low-cist, highly efficient system which, owing to its modular design, can be used for a wide range of applications in cleaning parts. Depending on the features installed, the system is suitable not only for removing oil and emulsion from mass-produced parts but also for fine cleaning of the assembly parts. The cleaning and drying process is performed in a closed and vacuum-proof work chamber featuring a multi-step washing/rinsing process with hot-air and vacuum drying. All the cleaning stages use an immersion process and aqueous media. Rotation and oscillation movements support the cleaning and drying effect.

▸ **Dürr Ecoclean India**
T: +91 (020) 30585002-04, E: info.india@ecoclean.durr.com
www.durr-ecoclean.com

Gear Pumps

Yuken India has introduced a new range of gear pumps. These pumps feature a high strength aluminum extruded body. Other features of the pump include a hardened and ground integral gear shaft and special aluminum alloy bush bearing. These pumps are capable of handling viscosity range of fluid medium 10~300 cSt. Additionally, these pumps are known for operating on low noise levels even at high speeds and pressures.

▸ **Yuken India**
T: +91 (080) 28457893, E: marketing@yukenindia.com
www.yukenindia.com

Milling Grade

Seco Tools has increased the versatility of its MS2050 milling grade with new variations that bring optimized cutting performance to shops process that parts from titanium and high chromium content steels. The latest additions span a wide scope of insert sizes, radii and geometries along with special coating technology. The grade's new silver-colored PVD uni-coating provides enhanced heat-resistant capabilities as well as virtually eliminates the occurrence of built-up edge when cutting sticky materials such as titanium.

▸ **Seco Tools India (P) Ltd**
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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:

Power Chucks

After the success of the SCHUNK ROTA THW plus wedge bar power chucks, SCHUNK transfers the principle of the fast jaw change to CNC lathes with short stroke cylinders. The universal SCHUNK ROTA NCX power chuck can replace conventional lathe chucks without a jaw quick-change system 1:1 without any conversion on the machine. It minimizes the effort for set-up, and extends the productive machine running times. Within 60 seconds, a new jaw set is retrofitted with a repeat accuracy of 0.02 mm. The ROTA NCX is suitable for finishing, and volume metal cutting.

Grinding Toolholder

The new generation of tool grinding toolholders—PRISMO3 from SCHUNK—promises more efficiency during production grinding and re-sharpening of tools. PRIMSO3 directly clamps every shank diameter between 3 and 20 mm fully automatically without using collet chucks or intermediate sleeves on the fly at a run-out and repeat accuracy of less than 0.005 mm. The tool shank is automatically centered in the toolholder during the clamping operation. An optimized interfering contour ensures a better interference between the grinding wheel and the toolholder even in case of demanding operations.

Robot Accessories

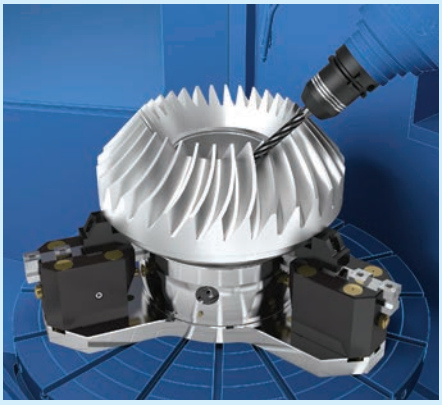
For controlling gripping modules, valves, or sensors during continuous rotations without a mess of cables and hoses, the SCHUNK rotary feed-through has proven itself for a long time. The dynamic forces and moments of the DDF 2 are absorbed by a steel shaft instead of an aluminum shaft. Smooth-running and long-lasting seals ensure a low loosening and continuous torque. Additionally, smaller and economic drives can be used, allowing particularly gentle rotary motions. The DDF 2 is offered in three versions—for pneumatic feed-through, feed-through of electric signals, and for the combined feed-through of pneumatics and electric.

Gripping System

SCHUNK eGrip is the world's first fully automatic 3D design tool for additively manufactured gripper fingers, and is now available for free on the SCHUNK website. Minimal data are required for the fully automatic calculation of the optimal 3D contour, pricing and delivery time. The license-free, browser-based web tool from the competence leader for clamping technology and gripping systems, SCHUNK reduces the design and ordering time for customized gripper fingers to only 15 minutes. With the intelligent software, the user has to upload the workpiece or component as a STEP or STL file and enter additional specific information, such as the weight, installation position of the gripper and finger length. In a few seconds, the user receives a detailed offer containing the 3D contour, the delivery time and the price.

Manual Lathe Chuck

SCHUNK has developed the highly flexible manual chuck ROTA-S flex, particularly, for users that want to machine a possibly wide workpiece range on milling/turning machines. It is a combination of the proven lathe chuck of the series ROTA-S plus with extended guideways, and transforms them into large, light chucks, which are particularly versatile in use. Compared to conventional lathe, chucks used for large clamping diameters, the weight with ROTA-S flex drops down to 60 per cent. At an identical table load much heavier workpieces can be machined, and due to the low height enough space remains for the workpiece and the tools.



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