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The official magazine of Indian Machine Tool Manufacturers' Association

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Horizontal Machining

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AEROSPACE MACHINING

Innovating to Machine Better

CNC & MACHINE CONTROLS

Taking the Long View on Short Runs

REPORT

Third Grinding Symposium

CHEN HUAGUI

Chairman, Taizhou Machine Tool & Tools Industry Association and CEO, Jack Machine Tool Co Ltd

"India and China working together will not only increase trade between the countries but will also bring together a stronger manufacturing hub in Asia"

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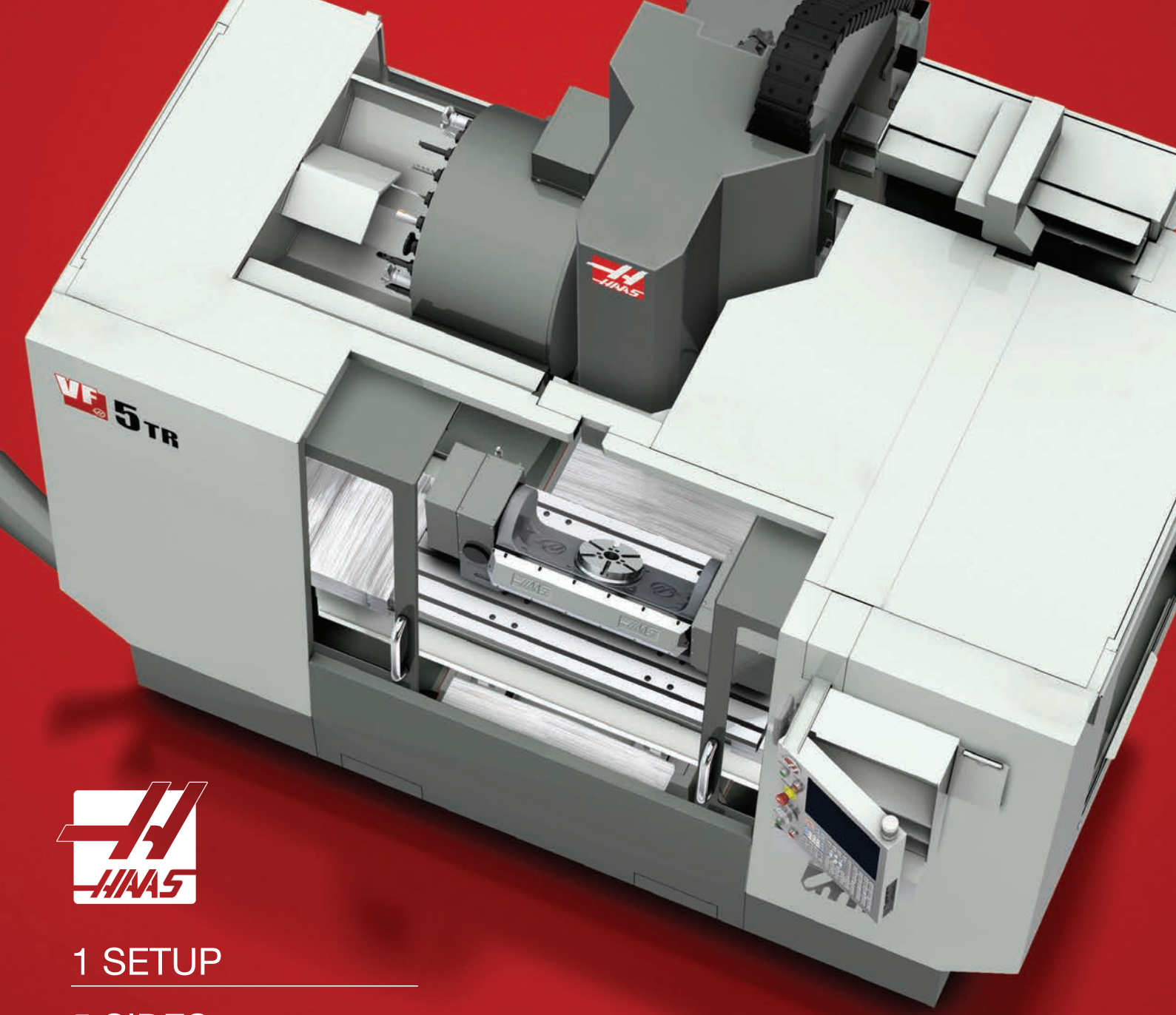

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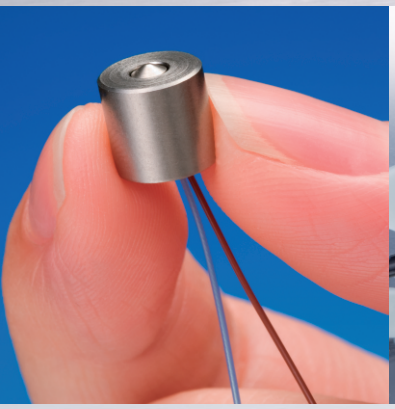

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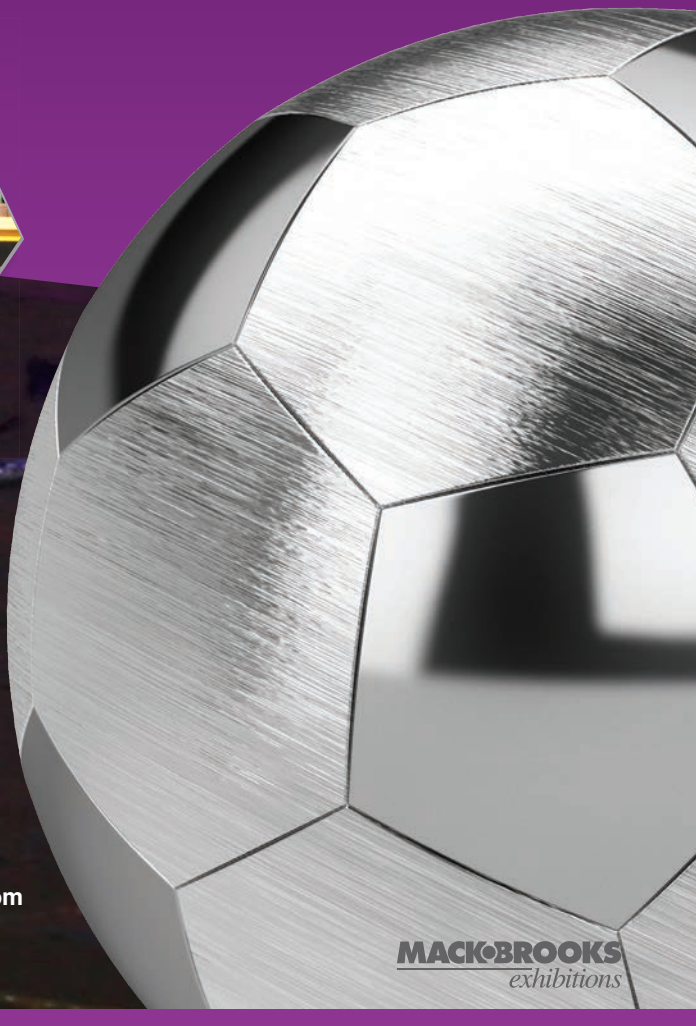

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L Krishnan
President, Indian Machine Tool Manufacturers' Association (IMTMA) and
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After Cricket and Football, It is Season for Championing the Cause of Productivity

Greetings!

IMTMA witnessed a slew of activities in past months ranging from Machine Tool Industry Summit; Regional Council meets in North, West and South; high level workshop on development of National Occupational Standards for the entire capital goods sector in Bengaluru and most important – a meeting with the Hon'ble Minister, Ministry of Heavy Industries and Public Enterprises, Anant Geete in Delhi on June 25.

During the Southern Regional Council Meeting, at BIEC, Bengaluru, an interactive session was also organized between machine tool manufacturers and paint manufacturers to discuss various issues and concerns related to painting of machine tools.

I am excited to share that a joint study has been launched by your association and ACMA to understand and address concerns related to the capability and capacity of the machine tool sector. This will further enhance capability of the Indian machine tool industry to cater to future needs of the auto component sector, which by far is the biggest consumer of machine tools today.

IMTMA receives many enquiries to cater to training demands from the aerospace sector, predominantly related to manufacturing processes and machining of aerospace materials and composites. A breakthrough session is being organized by IMTMA Technology Centre in the forthcoming months in Bengaluru.

IMTMA has also announced two regional exhibitions – 'Delhi Machine Tool Expo 2015', proposed to be held in Delhi between August 20-23, 2015, at Pragati Maidan and 'Ahmedabad Machine Tool Expo 2015' proposed to be held between September 24-27, 2015 at Mahatma Mandir, Gandhinagar.

Finalists from 2014 IMTMA – SIEMENS Productivity Championship Awards are making their way to Chennai to showcase their case studies. The National Productivity Summit, offering more case studies this year, provides a more valid reason to be in Chennai from August 20-21, 2014. On the outset of the announcement of the Union Budget, wherein the new government of India has declared positive directional moves like extention of investment allowance from ₹25 cr to ₹100 cr for the manufacturing industry, the Productivity Summit is expected to receive thriving response.

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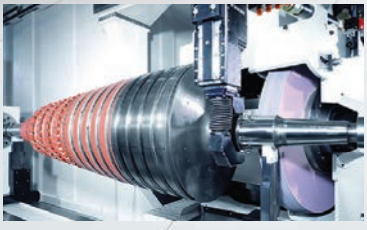

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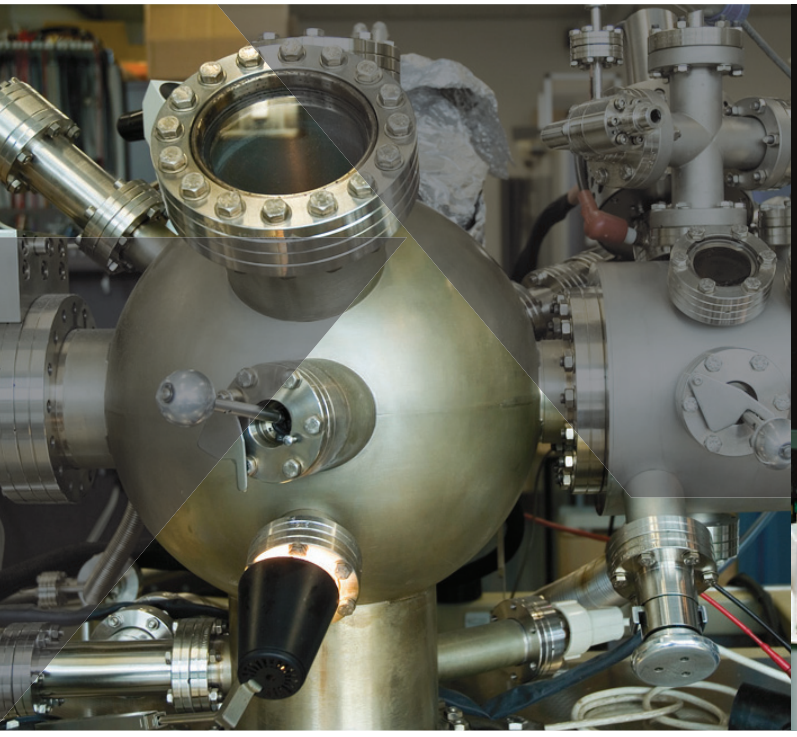

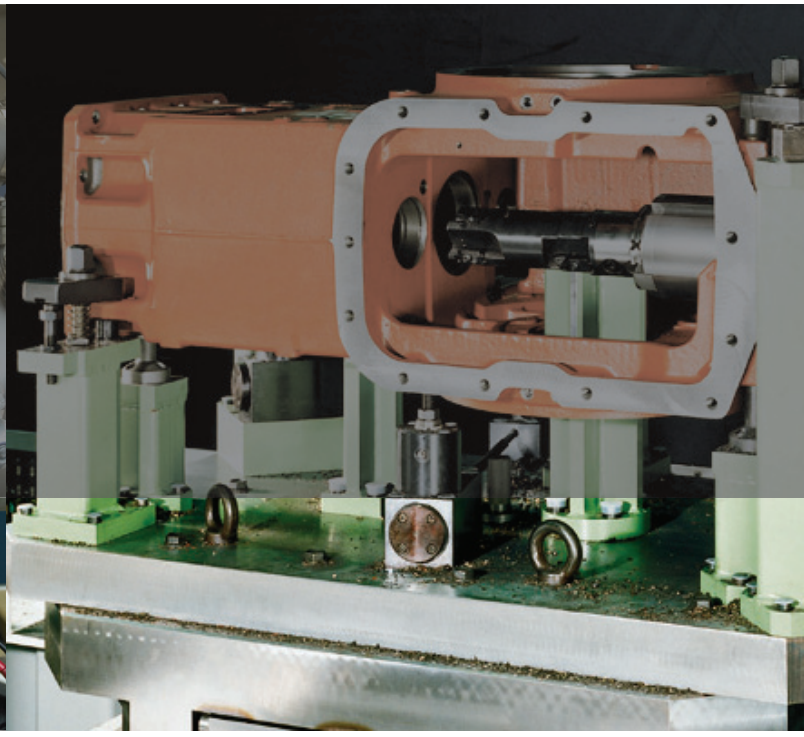

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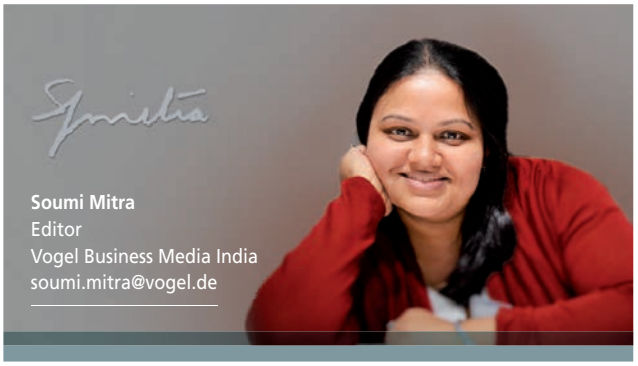

Soumi Mitra
Editor
Vogel Business Media India
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Appropriation for Investments: **Encouraging the Right Growth**

It is that time of year again when companies decide how to best plan their financial investments based on the budget released. The new government's first Union Budget reminds me of the old adage that the poor man's budget is full of schemes. With the budget aimed at a 7–8 per cent growth over the next three to four years, lower inflation, less fiscal deficit and a manageable current account deficit gives us a ray of hope. The fiscal prudence shown by the government in the revival of the sluggish economy and opening of new avenues of resource generation especially provides a major impetus for the growth and development of the Indian micro, small and medium enterprises (MSME) sector. As these sectors are the backbone of the nation's industrial output and employment, promoting entrepreneurship and start-up enterprises seems to be just the right thing!

Unless and until the spirit of entrepreneurship is encouraged, manufacturing cannot grow in leaps and bounds. Hence, the government's proposal to set up ₹10,000 crore fund will act as a catalyst to private capital by way quasi-equity, soft loan, and other risk capital for start-up companies is slated to pave the way for a strong manufacturing base in India.

"Unless and until the spirit of entrepreneurship is encouraged, manufacturing cannot grow in leaps and bounds."

Well-acknowledged it is that the manufacturing sector is of paramount importance for the growth of our economy and has multiplier effect on the creation of jobs. Therefore, this budget provided investment allowance at the rate of 15 per cent to any manufacturing company that invests more than ₹25 crore in any year for new plant and machinery.

On this positive note, we are participating in the forthcoming events that include the EMTE-EASTPO show in Shanghai and the AMTEX 2014 (Asian Machine Tool Exhibition) in Delhi to witness the positive implications the budget will have on India's manufacturing potential. While we come back with our perspective, we wishing you a happy read!

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ROBERT DAVID
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Make Selling Strategies 'Consumer Centric' not 'Product Centric'

"It is important to recognize a customer's individuality as each customer is different and should not be treated the same. Hence, it is imperative that your business model be aligned to how your customers want to buy instead of how you want to sell."

CEO, Micromatic Machine Tools Pvt Ltd, TK Ramesh

It is not easy to anticipate the thought process behind potential customers' decision of buying or not buying your product — be it a CNC lathe, a VMC or a grinder. Even if you have researched your competition, studied the market and have found satisfactory solutions to all the objections that are brought out, would it be a certainty that you will win and you will be able to make that sale?

Selling based on logic rarely gets results but neither does selling based purely on the cerebral and emotional needs of potential customers.

Customers' changed mindset

Gone are the days when sellers were in control of the purchase. Today's savvy customer has researched your product, read testimonials and checked competitors' products as well before approaching you for a solution. Thus, standard marketing techniques will not work well in this day and age. There is a need to turn your strategy from 'product centric' to 'consumer centric'.

Understanding that there is no fixed strategy

So how do you know which protocol to choose when picking selling styles? Companies that sell their products successfully have one thing in common. They have salespersons who know their business, i.e., industry, products, process, commercials, etc. They know how to plan and organize factors such as time, collaterals, attitude and willingness to help. Finally, they understand their own behavior and that of their customers. They know that each customer is different and will alter their approach based on each customer's particular personality.

Recognizing differences

It is important to recognize a customer's individuality as each customer is different and should not be treated the same. Hence, it is imperative that your business model be aligned to how your customers want to buy instead of how you want to sell.

There are four main types of customer personalities—the analytical, the driver, the amiable and the expressive. Understanding which of these best describe the customer can help a perceptive salesperson capitalize on this knowledge and operate accordingly, thereby greatly increasing the possibilities of a sale.

Being in a customer's shoe is the key to make sale

There is one important point to keep in mind; just as a salesperson should be intuitive about the customer's personality, he should also be aware that a customer will also interpret the salesperson's behavior. For instance, where a salesperson might think he is being determined but to a customer he may come across as pushy.

Hence, it is of utmost importance for a good salesperson to see himself as the customer sees him.

In conclusions, there is no one size that fits all solutions. You have to continuously re-evaluate processes within your company and understand that it is very important to integrate customer support into the customer buying process, wherein you are adding value to your customers while helping them make the right choice for them as opposed to making a sale for your company. MMI

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

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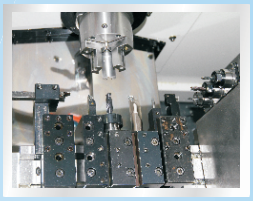

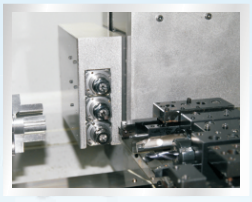

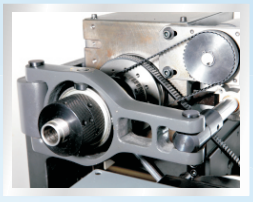

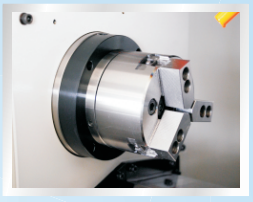

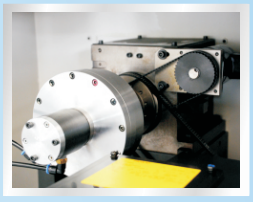

- 1.Y-axis 3 pcs of power tools
- 2. Dovetail sliding Guide way
- 3. Double-V-shape sliding guide rail
- 4. Proper Permutation Structure
- 5.High Precision feed
- 6. High rigidity

Sales and Service Agents of XKNC, North India:
Tach india (Emtex Marketing Pvt Ltd)
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Contact: Mr Manik Singla/Mr Rajan
Phone:+91-9999747294, +91-8588867025
Email: sales@tachindia.com, info@tachindia.com
Website: www.tachindia.com

Xi'an Kitamura Precision Machine Works Co.,Ltd
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Skype:XKNC-kenny We-Chat:Kenny1573
Email:Kenny@xknc.com/Kennysense@live.com
Web:http://www.xknc.com/eng
Alibaba:http://xknc.en.alibaba.com/

MAKING THE RIGHT MOVE?

Automation is here to stay and with Integrated Drive Systems (IDS), it is easier than ever to integrate mechanical and electrical components into complete, coordinated automation systems. Read on to find out how to discern the optimal choice to make for processes as per your needs.

We are producing high-end special purpose machines for the automotive sector. Owing to the increasing complexity of machines and demand of the users for quick identification of faults, we are looking for a controller that provides detailed fault diagnosis on its own via the display itself. Please advise.

Pune, Maharashtra

There are few PLC brands, which offer you such controllers. However, you need to check which one best suits your needs based on the requirements (performance) and input costs (price for the same) as well as the ability of the supplier to offer a pan India service for the same.

Such controllers offer extremely fast processing of inputs / outputs for the requirements placed by applications. There are controllers that come with integrated displays to show the CPU status and alarms on the controller itself that enables quick identification of faults

Most complex machines today have HMI and drives integrated. Usually the engineering of each of the elements in the automation solution (i.e., PLC, HMI and drives) requires different engineering platforms and know-how. This escalates engineering time and costs too. Additionally, machines have slight differences based on the end users' requirements. This makes a change in the application program a time consuming task. A totally integrated frame work can offer the required flexibility and quick response to modified machineries as per changing market demands.

I have been reading about Integrated Drive Systems (IDS). What exactly is it and how will it help me? I procure and assemble drive train components from different vendors.

DGM, Marketing, Anupam Industries, Ganesh Jalvi

When you procure drive train components from different vendors, there is a need for excessive project management. It increases operational cost throughout the entire life of the machinery. Purchasing an Integrated Drive System allows a single vendor to employ system engineering principles that provide benefits from the initial specifications throughout the installed operational life. It also provides additional benefits that include:

- Purchase agreements, service agreements, and warrantees that are handled more efficiently by managing the relationship with only one vendor.
- Single vendor system, which is efficient at optimizing the design of each component.

Being an EPC, my biggest challenge is to complete a project on time and within budget. How can this be achieved through IDS?

VP - Electrical & Instrumentation, Thyssenkrup Industries India (P) Ltd, Sunil Sagane

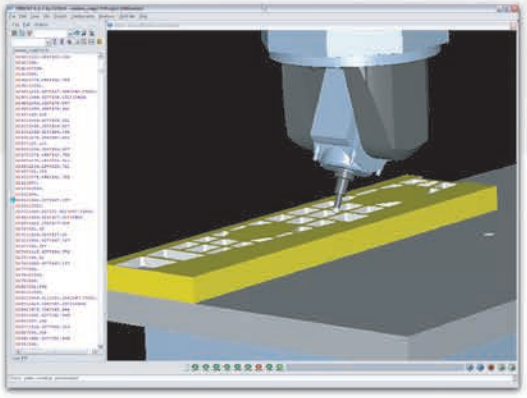
Timeliness can be achieved by cutting down on engineering cycles.

The core element of IDS is the three-way integration of the drive train — horizontally from coupling and gearbox to the motor and converter along the flow of energy as an intelligent mechatronic unit; vertically within the automation pyramid into the control architecture of industrial manufacturing process, based on the proven concept of 'Totally Integrated Automation' (TIA); and thirdly within the product lifecycle for all industries with the end-to-end integration.

Horizontal integration essentially helps to improve machine productivity, production quality and machine efficiency. It also increases the plant availability up to 99 per cent. Vertical integration increases plant productivity as well as production flexibility and transparency. With TIA portal engineering time can be cut up to 30 per cent. Lifecycle integration offers consistent integration over the entire lifecycle of a product and the associated production system and can cut the maintenance cost up to 15 per cent.

To sum-up, the three-level integration of IDS leads to increased efficiency, reliability & productivity and enables noticeably shorter time to market & profit.

Afraid of 5-axis Machining?



VERICUT is the world's leading CNC simulation software – used in all industries with all CAD/CAM/PLM systems to simulate CNC code, whether programmed manually or post-processed from your CAM system.

Is the fear of a costly collision preventing you from getting the most from your 5-axis CNC machines?

VERICUT's virtual machining environment allows you to simulate and optimise the entire machining process. With VERICUT, you can:

- Prevent crashes
- Increase tool life
- Eliminate prove-outs
- Boost CNC efficiency
- Shorten cycle times
- Be more competitive

Improve your workflow and CNC simulation performance with VERICUT 7.3. Shipping Soon!

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POWERED BY
Indian Machine Tool Manufacturers' Association

A Celebration of Productivity Achievements and Innovations in the Metalworking Industry

Productivity Summit and Awards, events organized by IMTMA, provide a platform to participants to showcase their excellence in productivity improvement. At the same time, the industry gets a chance to understand their know-how in depth. Read on…

Manufacturing companies are continuously challenged to reduce costs through productivity improvement measures. Focused efforts in improving productivity holds the key to enhance and sustain competitiveness in the Indian manufacturing industry. The answer lies in adapting highly productive manufacturing solutions through superior machining process, alternative processes, automation, efficient machines and the key differentiator – motivated manpower.

Indian Machine Tool Manufacturers' Association (IMTMA) has been in the forefront of championing a productivity movement in the metalworking industry by organizing the Productivity Summit. This event showcases best productivity improvement projects in the metalworking industry, which has excelled in achieving superior performance through sustained productivity improvements. The Productivity Summit offers a unique opportunity to understand and learn from the experiences and best practices of other companies. This platform brings together productivity gurus, champions and aspiring leaders on a common platform to share experiences, ideas. Also, it is an unmatched forum for networking with decision makers, experts, peers, researchers, academia, customers and suppliers of productivity equipment. The Summit addresses and demonstrates a wide variety of productivity improvements in metalworking through live case study presentations, keynote addresses and plant visits.

Source: IMTMA

Source: IMTMA

Winners of IMTMA-SIEMENS Productivity Championship Awards 2013

Productivity Summit 2014

IMTMA is holding this annual event successfully since 2006. The key highlights of the Productivity Summit 2014 are the inspiring keynote presentations and 12 interesting case studies on productivity practices from Ashok Leyland, Bajaj Auto, Bosch, Delphi TVS Diesel Systems, Hero MotoCorp., Lucas TVS, Mahindra & Mahindra, Maruti Suzuki, Reliable Autotech, Tata Motors, Wheels India. These case studies will contest for IMTMA-Siemens Productivity Championship Awards 2014 that gives away cash awards worth ₹10 lakh.

IMTMA-SIEMENS Productivity Championship Awards

Attaining a quantum leap in productivity is a journey that requires sustained efforts by the entire manufacturing industry at all levels and across industry sectors. It embraces several disciplines both technical and managerial and requires application of the latest techniques and tools, supported by learning from the best practitioners in the field. It also calls for a committed management to continually support and guide these efforts. Moreover, it needs committed professionals to search for ways

GUEST SPEAKERS VISITING PRODUCTIVITY SUMMIT

Name of the Speaker	Topic
Principal Adviser, Mahindra Group of Companies, Anjanikumar Choudhari	Using TQM as a Strategic Business Management Tool - the Mahindra experience
Speaker, Coach and Author of 'The Habit of Winning', Prakash Iyer	The Habit of Winning
Executive Director, Lucas TVS, Chennai, Dr Ravichandran	Nurturing Next-Gen Engineers for Sustainable Manufacturing Excellence
Vice President-Operations, Tractors and Farm Equipment (TAFE), S Kumaradevan	Role of Automation in Operation Excellence

Source: IMTMA

to improve productivity in their operations and implement these measures. Several companies have completed this journey attaining success.

IMTMA firmly believes that it is necessary to showcase such instances to the industry, which will aspire and encourage the industry to improve. With this objective, IMTMA has instituted the Productivity Championship Awards, to be given to outstanding contributors to productivity improvement in the Indian metalworking industry.

SIEMENS graciously came forward to sponsor the awards, and the IMTMA-SIEMENS Productivity Championship Awards were instituted and awarded at the first Productivity Summit in 2006. Since then, SIEMENS has been a partner with IMTMA in all the Productivity Summits.

The 'IMTMA-SIEMENS Productivity Championship Awards' recognize and reward outstanding efforts in improving productivity in metalworking industries creates a spirit of competition.

This awards event has become the flag bearer of the productivity movement in the country. Participation from leading companies, sharing of experiences, recognition of achievers and engendering an enthusiastic competitive spirit has contributed to the stature of the Summit and Awards. These awards have become prestigious and symbolic of high productivity standards achieved by the Indian manufacturing industries.

Plant visits

Apart from the presentation and speeches, the summit also includes plant visits, which have been organized on August 19, 2014. Plant visits to Wabco India, Lucas TVS, Ford India and Rane TRW Steering will provide an excellent opportunity to delegates to witness productivity improvements on the shop floor.

With knowledge enriching speeches, case studies and planned plant visits, delegates will have a lot to take away from the show. Most importantly, it will aspire them to implement similar productivity improving ideas at their shop floors, which will continue the journey of productivity improvement. **MMI**

Ace Micromatic Hosts House Show on Turbine Blade Machining

Hyderabad – Ace Micromatic Group recently concluded its house show in Hyderabad. This was the first house show wherein a live machining demo was made specifically for turbine blade manufacturers. The vertical machining center, 'Super Winner' manufactured by Ace Manufacturing Systems, an Ace Micromatic group company, was displayed.

The component which was machined during the demo was a twist and tapered turbine blade of 190 mm length. This was machined from rough to finish with a cycle time of 2 hour 10 min, which is approximately 20 per cent lower than the cycle times achieved on similar machining centers available in the market.

The house show attracted majority of the visitors from the Patancheru and Balanagar Industrial areas. More than 100 customers visited the house show with total footfalls exceeding 300 in number. The house show evoked tremendous response and appreciation from all customers who showed keen interest in the outstanding machine performance and features.

Source: Ace Micromatic Group

Visitors viewing the live demo of the vertical machining center — Super Winner at the house show

Blaser Swisslube Holds Productivity Trophy Award Ceremony 2013-14

New Delhi – Blaser Swisslube recently held the Productivity Trophy Award Ceremony 2013-14 in New Delhi. The company holds this award annually in order to focus on the significance of selecting the right coolant and understanding how best to improve manufacturing processes in terms of productivity, efficiency and quality of machining.

CEO, Blaser Swisslube AG, Marc Blaser elucidated, "To be competitive is a global challenge in the metalworking industry today and we aim to impart education regarding the benefits and leveraging effect of Blaser Swisslube Liquid Tool in this aspect."

Agreeing with this sentiment, Managing Director, Blaser Swisslube India Pvt Ltd, Punit Gupta averred, "We want to build sustainable long term partnerships with our customers and unfold different dimensions of productivity improvements with Liquid Tool in manufacturing."

The productivity trophy in India was awarded to five winners — Subros Ltd, KA Industries, Baharat Gears Ltd, Vijaya Auto Products, and Carraro India Ltd, in the categories of metalworking fluid optimization, productivity, process reliability, tool life optimization and environment, health and safety, respectively.

Source: Blaser Swisslube

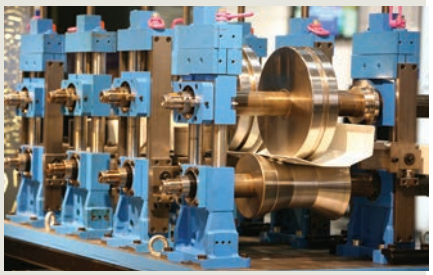
CEO, Blaser Swisslube AG, Marc Blaser addresses the audience at the Productivity Trophy Award Ceremony 2013-14

EuroBLECH 2014 Presents Online Competition

Hannover, Germany – EuroBLECH 2014, the 23rd international sheet metal working exhibition, is presenting an online competition to recognize high standards, best practices, innovation and excellence in sheet metal working. The competition, called 'Champions in Sheet Metal Working', will have five winners in total, one winner for each of the following five categories: production in a record time, solution for a complex problem, outstanding customer service, production of an unusual product made of sheet metal and excellent teamwork.

Winners will be formally presented with an award in a ceremony at EuroBLECH 2014, held from October 21 – 25, 2014 in Hanover, Germany. In addition to the award, each of the five winners will also receive a EuroBLECH mini football table. Detailed information about the competition can be found on the show website www.euroblech.com/english/competition and companies of all sizes in any country are invited to participate.

The entries of the participating companies will be featured on the EuroBLECH website in the coming days, followed by an open online vote to elect the winners.



Source: EuroBLECH

Innovation seen at a previous edition of EuroBLECH

Southern Journey of Siemens Productivity Trailer

Hyderabad – The Siemens trailer has been busy highlighting innovative technologies for productivity and efficiency improvement in the states of Karnataka, Kerala, Tamil Nadu, Andhra Pradesh and Telangana, and is currently in Hyderabad.

Close to 10,000 visitors from various industries thronged the trailer to gain an experiential insight into the features, advantages and benefits offered by Siemens products. The road show attracted maximum visitors from the industrial zones of Coimbatore and Salem of Tamil Nadu. The trailer featured technologies such as the Totally Integrated Automation (TIA) Portal—an engineering framework with numerous new functions, SINAMICS Drives, CNCs and controllers. The entire range of products was well received by the all the visitors.

The trailer, so far, has been to 130 cities and 14 states of the country. Continuing the journey, in the coming months, the trailer will cover the eastern zone of the country, thus completing one round of the vast country, India.

Source: Siemens Ltd

The numerous solutions with the Siemens Trailer

Siemens PLM Software Conducts Faculty Development Program (FDP)

Mumbai – Siemens PLM Software, in association with DesignTech Systems Ltd, organized a special Faculty Development Program on Product Lifecycle Management (PLM) software for 33 senior professors of mechanical engineering from colleges affiliated to the University of Mumbai. The five-day program was conducted at Fr C Rodrigues Institute of Technology, Mumbai.

The program was held on May 30, 2014 in the presence of Pro-Vice-Chancellor, University of Mumbai, Dr Naresh Chandra; Dean, Faculty of Technology, University of Mumbai, Dr SK Ukarande; Managing Director, Fr C Rodrigues Institute of Technology, Fr S Almeida; Chairman, Board of Studies, Mechanical Engineering, University of Mumbai, Dr SM Khot, and Principal, Fr C Rodrigues Institute of Technology, Dr Rollin Fernandes. The programme included training on Siemens PLM Software's NX software, Teamcenter portfolio and Tecnomatix portfolio.

The training program also included Siemens PLM Software's Teamcenter portfolio, the world's most widely used digital lifecycle management software.

Source: Siemens PLM

Representatives of various colleges affiliated to the University of Mumbai

Source: Haas Automation

Scuderia Ferrari, the most successful team in the history of Formula One, will now have Haas Automation as one of its partners.

Haas Automation Partners with Scuderia Ferrari

Oxnard, USA – Beginning with the 65th British Grand Prix at Silverstone, Haas Automation is featured on the lower sidepods of the Ferrari F14 T piloted by championship - winning drivers Fernando Alonso and Kimi Räikkönen.

Haas Automation branding will be seen on the cars for the remainder of the 2014 Formula One season and throughout the 2015 season.

"Haas Automation is a premium brand, and there's no better way to drive that point home than to connect it with Scuderia Ferrari on motor racing's biggest stage," said Founder, Haas Automation, Gene Haas.

"We are pleased to welcome Haas Automation as our newest official supplier," confirmed Team Principal, Scuderia Ferrari, Marco Mattiacci. "This agreement strengthens our existing connections with US, an important market not only for our company, but also for Scuderia Ferrari, as it is one where the team already benefits from several important partnerships."

Lightweighting – The Future of Automotive Design

From the viewpoint of energy efficiency, lightweighting of vehicles plays an important role. Even a small difference in the weight of each vehicle makes a bigger impact on carbon emission while looking at the larger picture. Read on to find out more about lightweighting.

By 2016, India is expected to exceed every major European market in automotive sales, making the country the 4th largest automotive market by volume in the world. The number of 2 and 3-wheelers is much higher in India, which gives an impression of a truly diversified road transportation system.

Considering today's global fleet for passenger and freight transport, the impact of weight reduction becomes obvious by looking at the numbers (fig 2). The annual energy saving would be apparent if every means of transport would be light-weighted by just 100 kg. Because of the comparatively large number of cars and commercial vehicles, their effect on global CO_2 footprint is extraordinarily huge. Today, there are more than 25 million cars and trucks running on roads in India, a number which makes it clear that there is an immediate need for improving energy efficiency by lightweight initiatives.

Rüdiger Heim
Director of R&D division - Structural Durability, Fraunhofer LBF
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Material selection

A key to success in the Indian market is to approach cost-effective, pace-setting solutions. Steel material plays a key role when one is looking for light weighting. However, India is far-off from being aligned to frugal engineering only. TATA Motors recently announced that it wants to build a family of world-class passenger cars, which will be based on a new, flexible architecture dubbed the Advanced Modular Platform (AMP).

Lightweight initiatives have to deal with more than just the material selection. Fraunhofer LBF has introduced a structured process for creating lightweight products, which starts by top-level decisions related to targets and constraints and comes through fundamental load mechanics to the final step for verification and validation. In the automotive industry, the targets have to be defined carefully, beyond any functional target there are always requirements for operational life and reliability. Therefore, the path towards light weighting starts by the definition of how long the product will be in service and which effects will be cumulated within that time. The better the operational profile is defined, the more successfully the product can be designed. Typically body and chassis components of a vehicle are not aligned to regular maintenance or repair, so all those components have to pass durability requirements. Hence, adequate vehicle lifetime targets help to optimize the material usage by design and reliability.

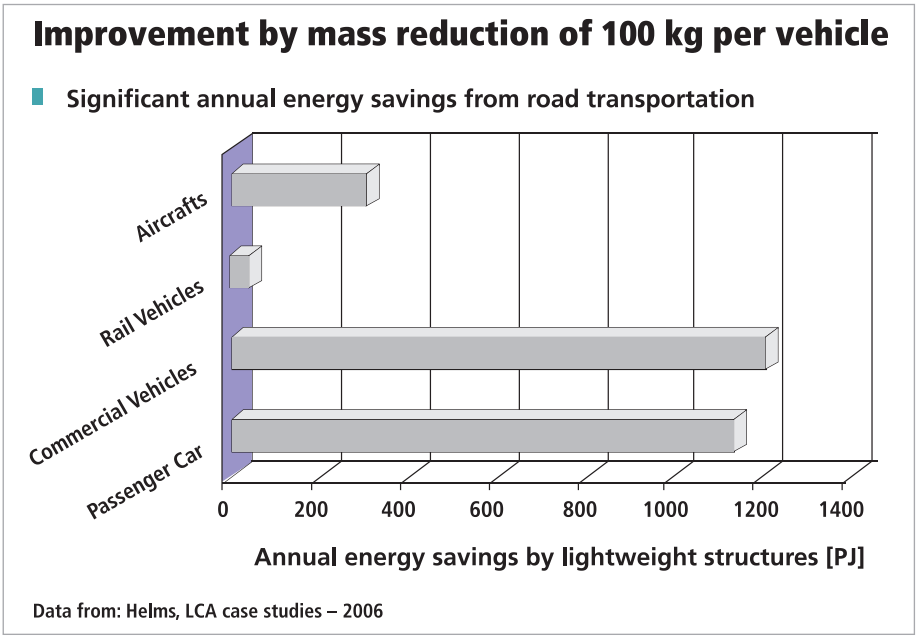
To generate representative operational data, wheel force transducers are mounted on the car instead of the original wheels. Thereby, the actual loads to the structure can be examined and subsequently analyzed as an input for the design process. Once the loading is known, one can work on an optimal design.

Source: Fraunhofer LBF

Full vehicle road simulator for early stage approval testing (Fig1)

Solutions

Today, product development is led by predictive engineering eliminating the need for



Annual energy saving by mass reduction of the global fleet (fig 2)

early prototype stages. Computer aided technologies are applied to novel concepts including multi-domain simulation. Whenever traditional solutions are limited with regard to mass efficiency, so-called smart systems can lead to significant improvements. Here, a new class of materials provides unique capabilities with regard to actuation technology. As an example, it was shown that an ultra-fast actuator, based on shape memory alloy (SMA), activated a lateral stiffener just before a side impact. By means of such an adaptive safety feature the B-pillar intrusion was significantly reduced, or alternatively, the B-pillar structure can be down gauged without compromising the baseline crashworthiness.

By being adaptive in real time – weight reduction can be realized for many NVH related applications as well, simply by eliminating material and layers related to vibration damping. That is called adaptronics.

Mastering the challenges of light weighting typically means using new materials such as high strength steel, cast iron grades, aluminum, composites, etc. Combining the benefits of each individual material for a complex product then leads to a multi-material design that is a clear direction for future lightweighting. Here, an in-depth knowledge about the material properties as well as reasonable joining technologies are the key to success. Hence material characterization, component and system testing are mandatory to create the information needed for product optimization. A cost and time efficient verification and validation process is enabled by accelerated life testing using laboratory test rig hardware (fig 1). Again, service load simulation guarantees good agreement to real load-time-histories and gives direct feedback regarding the level of reliability prior to market introduction. **MMI**

Paving the Way Through Mitsubishi CNC's Cutting Edge Technology

In the manufacturing segment, Mitsubishi Electric offers an array of technologies and solutions. These technologies not only make manufacturing operator-friendly but also help the environment with its energy efficiency. Read on to know more about advancements that the company has brought in this sector.

Source: Mitsubishi Electric

Mitsubishi CNC E70 Series for compact turning/ milling/grinding applications

Seeking easier usability and higher cost efficiency, the E70 Series, a new standard CNC series offers high performance and high operability. With primary features such as lesser wiring, compact size and latest hardware, the E70 Series is best suited to simple lathes and milling machines.

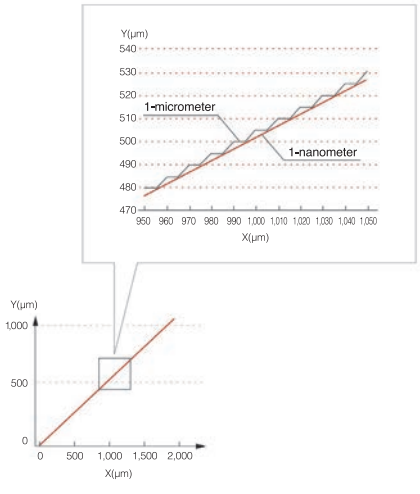
Features

- Simple operations free operators from burden
- With the latest hardware installed, this CNC realizes high cost performance

Number of control axes	M	L
Max.number of control axes (NCaxes+spindles+PLC axes)	6	
Max. number of NC axes	3	
Max. number of spindles	1	2
Max. number of PLC axes	2	
Max. number of simultaneous contour control axes	3	
Max. PLC program capacity	8000 steps	
Least command increment	0.1 µm	
Least control increment	1 nm	
Memory capacity	230 KB	

High-accuracy machining with complete nano control

From NC operation to servo processing – the complete nano control takes place in the nanometer. Furthermore, this advanced machining control technology supports next-generation ultra-precision machining.



Features

- Enhanced machining accuracy and reduced cycle time
- Easy and advanced operation contributing to setup time reduction
- Compact size

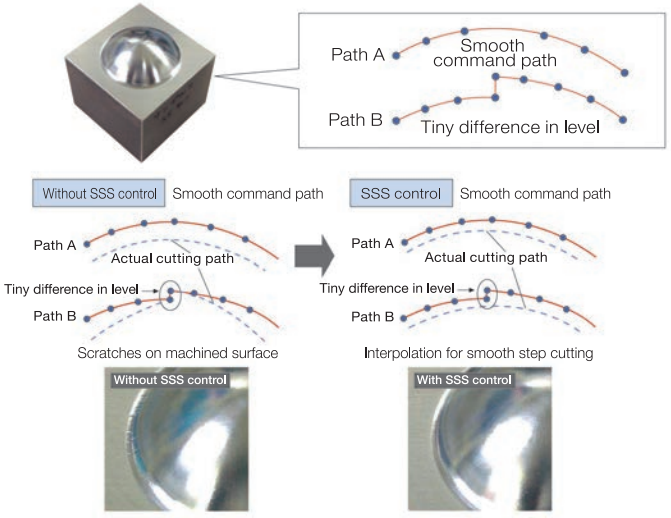
Number of control axes	M70-AVU		M70-BVU	
	M	L	M	L
Max.number of control axes (NCaxes+spindles+PLC axes)	11		9	
Max. number of NC axes	8	9	5	
Max. number of spindles	2	4	2	3
Max. number of PLC axes	6			
Max. number of simultaneous contour control axes	4			
No. of Part systems	2		1	
Max. PLC program capacity	32000 steps		20000 steps	
Least command increment	0.1 µm			
Least control increment	1 nm			
Max. program capacity	2 MB		500 KB	

Mitsubishi CNC M70V Series for stranded applications

The CNC M70V series is especially made for pursuing high speed and accuracy. The system can deliver remarkable reduction in cycle time, optimum performance for various applications such as compact milling machine, tapping machine, multi-axis machining center, compact lathe, etc. Additionally, it is equipped with various support functions like data backup, program restart, ground fault detection for each motor, etc., which help minimize the downtime. The main features of the system include –

High-quality machining with balanced accuracy and speed (SSS)

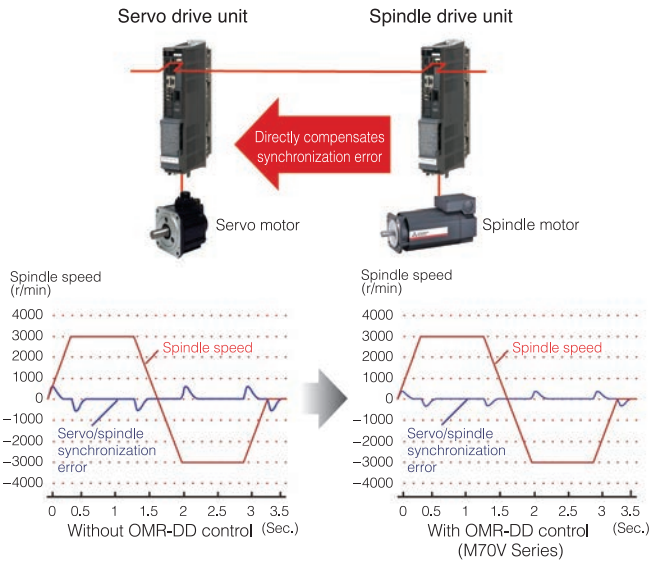
SSS control ensures high machining stability and quality. This helps maintaining consistancy in cutting shape and speed. Hence, smooth surfaces can be easily achieved while machining time can be reduced by 5 to 30 per cent.



High-speed and high-accuracy tapping

A high-speed error-compensation function is used for controlling the spindle and servo.
This ultimately enables accurate tapping.

OMR-DD Control (Optimum Machine Response Direct Drive)

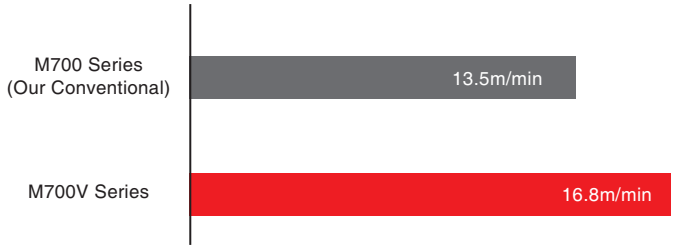


Die/mold machining time reduced

Complete nano control technology enables high-speed and high-accuracy machining at a maximum fine-segment feed rate of 168k Block per Minute (BPM).

High-speed and High-accuracy Control

Machining speed atained with 0.1mm - pitch NC program



Mitsubishi CNC M700V Series for high-end applications

Mitsubishi CNC M700V Series is a state-of-the-art model that provides high-speed and high-accuracy machining and advanced control technologies. These functions are for customers who keep pushing for a higher production output.

M700VS Series is an integrated control unit and display type. M700VW Series also comes with Windows XPe.

These two types of Mitsubishi CNC M700V Series support top level manufacturing.

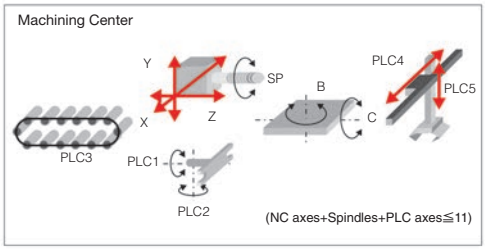
Features

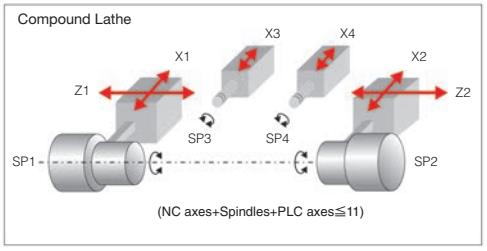
▶ The latest RISC-CPU is installed to achieve advanced complete nano control
▶ Easy operability that significantly reduces machining setup time

Number of control axes	M720-VS		M730-VS	
	M	L	M	L
Max.number of control axes (NCaxes+spindles+PLC axes)	12		16	
Max. number of NC axes	8	12	16	
Max. number of spindles	4		4	6
Max. number of PLC axes	6			
Max. number of simultaneous contour control axes	4			
No. of Part systems	2		2	4
Max. PLC program capacity	1,28,000 steps			
Least command increment	0.1 µm		1 nm	
Least control increment	1 nm			
Max. program capacity	2000 KB			

Multi-part systems multi-axis

A maximum of two part systems and 11 axes can be controlled for both the machining center and lathe.





Mitsubishi CNC C70 Series for machining lines

iQ Platform Compatible CNC C70 Series is incorporated with the company's state-of-the-art technologies

Features

- Compatible with the Mitsubishi FA integrated solution, 'iQ Platform'
- High-performance CNC integrated with high-speed PLC offers high-speed control to reduce cycle time
- Compact size
- A wide variety of FA products helps construct flexible lines

Number of control axes	M	L
Max.number of control axes (NCaxes+spindles+PLC axes)	16	
Max. number of NC axes	16	
Max. number of spindles	7	4
Max. number of PLC axes	8	
Max. number of simultaneous contour control axes	4	
Max. of Part systems	7	3
Least command increment	0.1 µm	
Least control increment	1 µm	
Max. Program capacity	2000 KB	

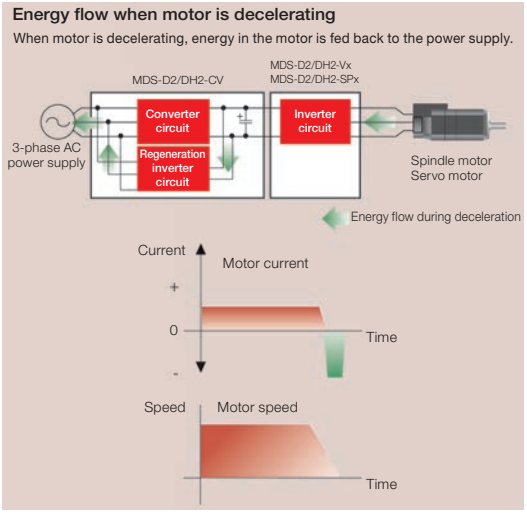
Manufacturing support software

The company provides optimal solutions for manufacturing plants by offering a combination of rights software.

Energy savings

Drive units - Application of the power regeneration system allows energy generated during deceleration to be efficiently used as a power supply. Use of low-loss power devices enables reductions in loss of power.

Spindle motors/ Servo motors - Energy loss of spindle motors during high-speed operation has been substantially reduced. Drive current of servo motors has also been reduced by downsizing the motors while increasing the torque.



Customer support

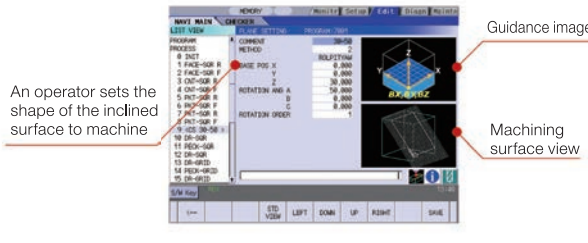
Along with the technological advancements and innovative solutions, the company also provides following services to its users and customers:
Maintenance service - The company has service centers, which are spread across the country. Through it's widely spread service centers, the company is capable of offering prompt services to the users located in any part of the country.
Part supply - As each service center keeps maintenance parts in stock, the downtime after a failure can be reduced. This can help users minimize the loss of revenue.
One-year maintenance contract - Mitsubishi Electric provides maintenance services after expiration of warranty period in one-year units. Should there be any failure, the company's engineer in the closest service center offers support almost immediately.

Simple programming functions and machining menu for Navi Mill / Navi Lathe systems

- Programs are automatically created for each process when an operator selects machining process and inputs data on screen. A tool path can be graphically drawn for the program check.
- This function also supports inclined surface machining.

NAVI MILL (Machining center system)

NAVI LATHE (Lathe system)



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The Costs and Benefits of Horizontal Machining

The shift from vertical to horizontal machining was even more expensive than this shop anticipated. It was also more valuable. Most of the shop's machining centers are HMCs now—here's why.

Back when Advance CNC Machining of Grove City, Ohio, relied on vertical machining centers, company president Jeremy Hamilton resisted the advice to invest in horizontals.

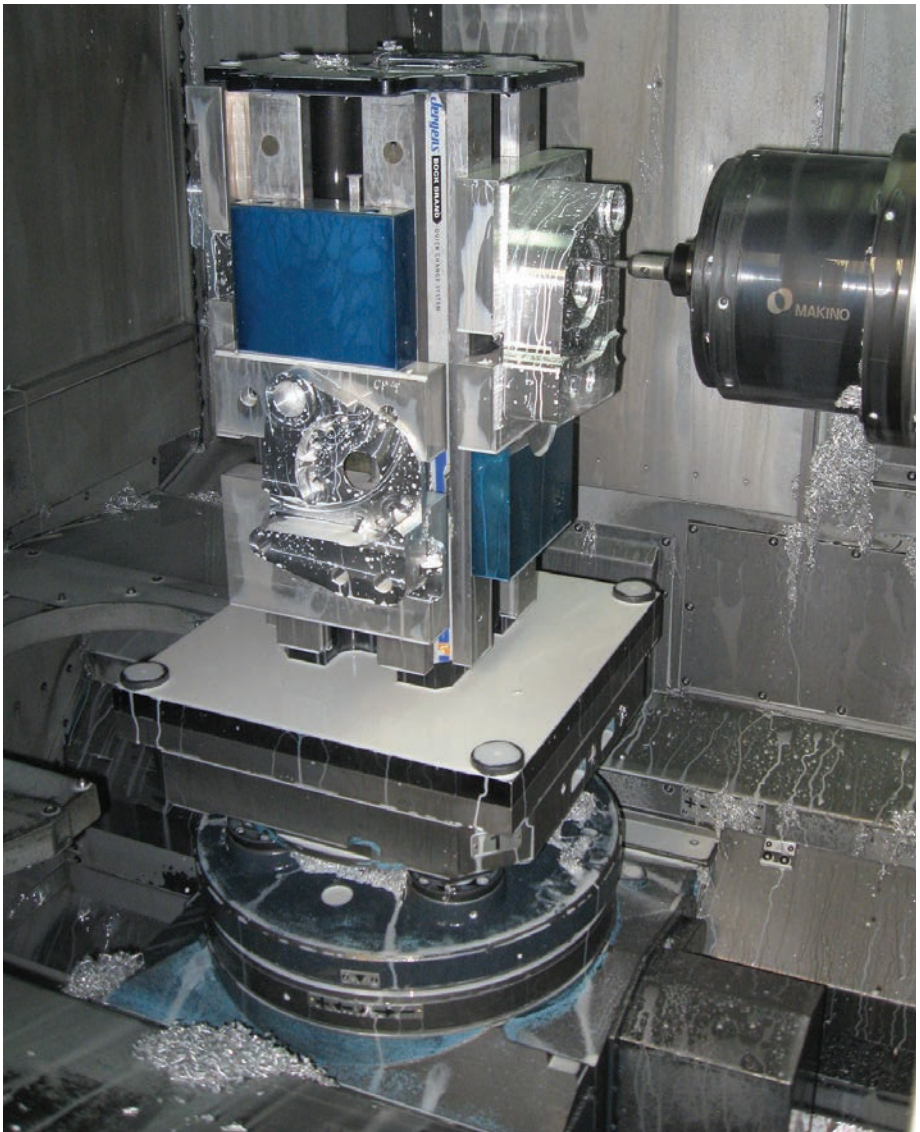
"I could not see spending that much for a machining center," he avers. "For the price of one horizontal, I could have bought three more verticals."

Kyle Dunaway, who is now the company's VP of manufacturing, was the one advising him to consider HMCs. At a previous job, Dunaway had worked with HMCs every day. With Advance, he was working with VMCs every day. The difference was apparent to him.

Ultimately, though, it was not what Dunaway said that made the case so much as what this employee was able to do—and what most prospective employees were not able to do. The VMC work at Advance often entailed numerous setups, with the part shifted from one vise to another to another, and rotated at each step to present a different face to the spindle. Every step was critical, and every setup had to be precise. Dunaway, a career machinist, could perform these setups accurately, as could other experienced machinists in the shop. But when Advance needed to expand into a second shift to meet customer demand, the company could not find enough additional hires who had this level of skill.

An HMC seemed like the solution to this problem. Because a horizontal holding a part on a column or tombstone can pivot the work with its B axis to reach various faces in one cycle, fewer setups are needed. Therefore, the shop could buy an HMC to get more capacity, and staff this machine with new employees who had less machining experience. Hamilton went to a builder he was confident in, Makino, and purchased

FIG 1: The freedom to machine various surfaces of a part in one setup accounts for part of an HMC's efficiency advantage, but Advance CNC Machining says the benefits extend well beyond this.



Source: mmsonline.com

Peter Zelinski
Senior Editor
Modern Machine Shop
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one of the company's least expensive HMCs. That was in 2010.

He never looked back. The shop has since purchased HMCs at the rate of about one per year. Today, it has five of these machines. All of the subsequent HMCs have been higher-price models with more features and capabilities than that first one.

Part of what Hamilton discovered, back when he finally began to use that first horizontal, was that he was wrong in his sense of how expensive an HMC would be. The HMC actually proved to be even more expensive than he had expected, because additional investments were necessary to use the machine effectively.

However, the HMC was also even more productive than he had expected. It was so productive that it more than made up even for the unexpected expense. In fact, starting with the second HMC, the shop began to take advantage of the machine's speed and precision to implement high-speed machining techniques that leveraged the machine's capabilities even further. The shop, therefore, went from a different type of machining center to a different type of machining.

Now, even though Advance has raised its hourly shop rate by 50 per cent for work it runs on horizontals, it can run work so much faster on these machines that its quoted prices are routinely 25 per cent lower than the best it could have achieved when verticals were the only option. The more expensive machine actually enables the shop to win jobs by bidding lower prices.

And Hamilton says lower price is only the beginning. When work is done on an HMC instead of a VMC, he says his customer benefits in various other ways as well.

Small batches

Advance's business is a 50-50 split between maintenance machining—that is, making custom components for plants that are repairing or altering their machinery—and machining production parts. On the production side in particular, the company is now seeing work it never could have won if not for the HMCs.

One of the two machined parts in the figure 4 is an example. On VMCs, the part in the foreground that is machined out of cylindrical stock would have required too many setups for the shop to have quoted a competitive price. And even if the shop's price had somehow been acceptable, its workflow would not have been. To make cost-effective use of all that setup time, the shop would have wanted to machine the entire 2,000-piece order in a single batch, even though few customers want so much inventory at once. Making the part instead in small, incremental batches—what the customer prefers—would be awkward on a vertical, but horizontal machining makes this the natural way to produce.

Source: mmsonline.com

FIG 2: This round part is an obvious candidate for turning, but in fact turning is now used only for finishing cuts. High-speed milling on a machining center has proven to be a more effective way to rough out the stock.

Indeed, the photo (ref to figure 4) shows this part together with a machined part for a different customer because, on the day the photo was taken, the two parts were being produced in alternating batches on the same HMC. After one machining cycle ran three pieces of the cylindrical part, the machine would swap pallets to run two pieces of the rectangular part while the operator loaded the next set of cylindrical blanks. In this way, shipments for the two different customers were filled simultaneously by one machine through the course of a single shift.

This freedom to keep cutting during job setup or part loading, combined with the horizontal's benefit of reducing setups by pivoting the part as well as the ability to keep various setups in place and ready to run by using different faces of a column fixture all add up to considerable machine utilization.

"On a vertical, a highly skilled employee on a good day might be able to keep two machines cutting 75 per cent of the time," Hamilton declares. "With the horizontals, an attentive employee on any day can keep two machines cutting better than 90 per cent of the time."

And then there is high-speed machining, which the shop has been able to cultivate into a particular area of expertise.

High feed rates

On the four Makino HMCs, the company purchased after its first, one of the extras the shop opted for was the machine tool maker's 'Super Geometric Intelligence', a CNC toolpath look-ahead algorithm that permits fast milling by maintaining tight precision at high feed rates. The shop has learned from

The Costs of Horizontal Machining

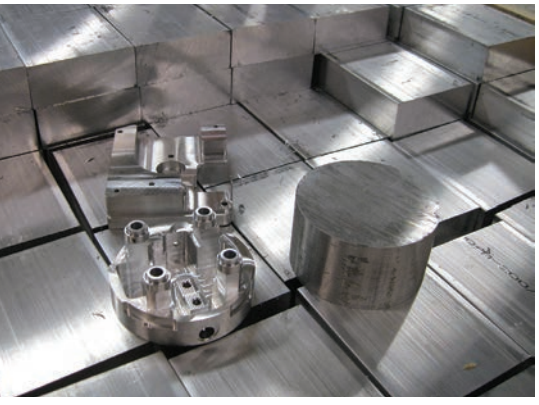
President, Advance CNC Machining, Jeremy Hamilton says the machine tool itself is just the beginning of the move into horizontal machining. To make full use of the higher-level machine, other parts of the process need to be raised to a higher level as well. Here is a partial list of the additional investments his shop made:

- **Inspection equipment** - As part complexity and production rate increased, the shop had to elevate its capability to validate production. One example of a new inspection resource is a 6 ft portable CMM arm from Faro, which enables shop personnel to validate particularly complex components while the part is still on the machine.
- **Computers** - The processing speed of the shop's computers had never inhibited programmers before. Now, with the complex machining routines made possible by merging various faces into one setup, plus the technique of milling with many fast, light cuts, NC programs grew much longer and processing speed became a limitation. The shop bought new computer hardware.
- **Coolant** - High-pressure coolant delivery required a higher caliber of coolant.
- **Tool presetter** - Tool offsets used to be measured at the machine tool. Setup time was long enough on the verticals that the additional time for tool measurement did not seem like a big loss. That changed with the HMCs. Measuring tools at these machines would waste valuable time. The shop bought a Parlec presetter and now measures tools offline while the machine is cutting.
- **Fixturing** - Workholding for Advance used to mean just vises. On the HMCs, workholding often entails a column fixture mounted in the machine using the Ball Lock system from Jergens, a system that assures rapid clamping and precise setup location. This system pays for itself when customer demands suddenly change, because the Ball Lock tooling enables jobs to be rapidly swapped in and out of a machine.
- **Tool vending** - The HMCs are too expensive to be brought to a stop for lack of a critical tool. To save itself from running out of a needed cutter, the shop bought a tool vending system with automatic reordering of stock items so it can maintain its tool inventory levels.

experimentation how much it can do with faster cutting and how much additional freedom this option gives to its programmers. Often the most efficient way to machine a job is not with deep milling passes, says Dunaway, but with light milling passes in which the reduced depth of cut is more than overcome by what he previously would have imagined to be an extremely fast feed rate. This same choice can also extend tool life and reduce the variety of tools that have to be used.

The cylindrical part pictured illustrates (refer to figure 4) this as well. Achieving the intricate detail of the part traditionally might have required various tool sizes for rough milling, combined with various other tools for finishing the details. But Advance found out that it could achieve a much shorter cycle time using a continuously arcing path that keeps one tool at consistent high feed rate and consistent material engagement throughout the milling of this part's form. Advance used Mastercam's 'Dynamic Milling' feature to generate this tool path, which allows a single small end mill to machine all of the part's detail except the drilled holes, eliminating the time that would otherwise be lost for tool changes.

Precision at high spindle speeds and feed rates also lets the shop take advantage of newer cutting tool options designed for this kind of machining. Advanced cutting tools were generally counterproductive on the verticals, which lacked the speed and rigidity to use them. Now, tool vendors come to Advance offering samples of new cutters for the shop to try on its HMCs. The ability to capitalize on some of these offerings makes a productive machine more productive still.



Source: mmsonline.com

FIG 4: Rectangular blanks and cylindrical blanks are used to machine two different part numbers for two different customers. By unloading finished pieces and loading blanks for one of these jobs while the other job is in cycle, Advance CNC Machining was able to use one machine to seamlessly alternate between these part numbers throughout the workday.

Source: mmsonline.com

FIG 3: Since the success of the first horizontal, the shop has been buying additional HMCs at the rate of about one per year.

In one recent case, local Iscar representative Jerry Ward suggested a new high-feed milling cutter that has enabled the shop to realize a significant decrease in cycle time in a deep pocketing operation.

The high-speed machining even makes the HMCs competitive with entirely different types of machines. One machined part resembling a Bundt cake pan was formerly machined entirely through turning, but the shop was burning through turning inserts to machine so much stock out of the round part. The shop switched to the horizontal machining centers instead, milling away the material at light depths and high feed rates. A single end mill now removes an amount of stock that had formerly consumed a dozen or more edges of turning inserts.

Elbow room

A part Dunaway cites to illustrate how far the shop has come is one he calls the 'elbow', a component formerly requiring seven operations on three VMCs. The complex part has features at various angles, some of which have to locate accurately with reference to datums on three different faces. He knew the part personally because its setups were so finicky that it was difficult for him to trust anyone else to run it.

Now, plenty of employees run it. Two setups on an HMC accomplish all of the machining. Features referenced to three datums of the part always locate correctly, because those features are now machined in the same cycle as all of the relevant datums. Thanks to the efficiencies of consolidating machining into fewer cycles, plus the gains the shop has realized through high-speed machining, the total machining time for this part has been reduced from 14 hours to 6 hours, and that doesn't even include saved setup time. On a more expensive machine, the shop has realized a less expensive process.

To be sure, the initial price of the machine was significant. And employing a more capable machine soon led the shop to other investments, such as more capable tooling and workholding, better coolant and better inspection, and even steps the shop had never taken before such as presetting. However, in the case of each of these investments, what the shop was doing was raising its game, and that eventually brought the shop up into a different league.

"We used to compete with numerous small job shops," Hamilton states, but "we rarely have to do that now." Instead, the shop now bids on work for which the smaller shops don't have the capability.

Advance also no longer serves just its local market. With the help of a marketing manager and a quality website, the company has taken its more efficient capabilities and gone national. Today, prospects find the shop from far away. Advance has customers in 24 states and counting.

Conclusion

The investment continues. All of those previous expenses have paid dividends, and this bigger league is where Hamilton wants his company to keep playing. Thus, he says he is no longer so resistant about spending money where it is needed. For example, he intends soon to address a missing qualification that has shut his shop out of the chance to bid on some recent jobs. The next step, he says, will likely be ISO certification. MMI

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The Right Alliances Favor Mutual Growth

China is the one of the world's biggest manufacturing bases. With technology being showcased at the forefront, the country has grown substantially over the past 20 years. Chairman, Taizhou Machine Tool & Tools Industry Association and CEO, Jack Machine Tool Co Ltd, Chen Huagui details on what he hopes for the manufacturers of the country and how India will play a key role to growth of Chinese manufacturers. Excerpts of the interview follow...

"India and China working together will not only increase trade between the countries but will also bring together a stronger manufacturing hub in Asia."

Chairman, Taizhou Machine Tool & Tools Industry Association and CEO, Jack Machine Tool Co Ltd, Chen Huagui

In what way does the Taizhou Machine Tool & Tool Industry Association help its members exchange and share knowledge on technology developments in machine tool and allied industries?

Chen Huagui: The association has several initiatives to help members keep up-to-date with the latest technology developments. For instance, we have alliances with universities, wherein members make use of research centers for investigation and discussions. Additionally, training sessions are also organized for technicians to keep them abreast on new techniques and technology concerned with not only machines but also electrical parts, auto parts, hydraulics, etc.

Facility visits of member companies are also arranged in order to let our members get to know more about each other and gain an understanding of the machines used at respective facilities. Deliberations are then held during the visit wherein suggestions and feedback are given on improvement of management, product quality and technology development, international marketing promotion.

Apart from these, we encourage and help our members visit international exhibitions such as CIMT, EMO, IMTS, AMTEX, IMTEX, JIMTOF, etc., as a means to know the latest innovations and developments.

How does the association promote Indo-China relations in the machine tool industry?

Huagui: China and India are complementary when it comes to the machine tool sector. Both countries have a lot to offer each other. To encourage ties between the countries, the association makes use of all possible

opportunities available to help its members to take part in machine tool exhibitions in India, including AMTEX and IMTEX. This is to be able to provide India insight into what Chinese manufacturers can offer them especially since India is a cost conscious market. The next event we are participating in is AMTEX 2014. Here, we will have all our stalls in one area so that visitors can see and make business transactions in a single visit.

Could you give a brief on how Chinese private enterprises have helped boost China's manufacturing growth?

Huagui: In recent years, an increased number of private companies have invested in the manufacture of machine tools. There are two groups of new private investors in China's manufacturing industry. One consists of the old state-owned companies that have transformed to private companies and the other consists of people who know machines or have partners who have expertise in machines.

These new private investors are more active in machine tool industry. They know how to reduce production cost and make economical machines suitable for customers and even have marketing strategies in place. Most of these companies started small but have grown tremendously in the past eight to ten years. This growth is the reason for China's quick development over the past 20 years or so.

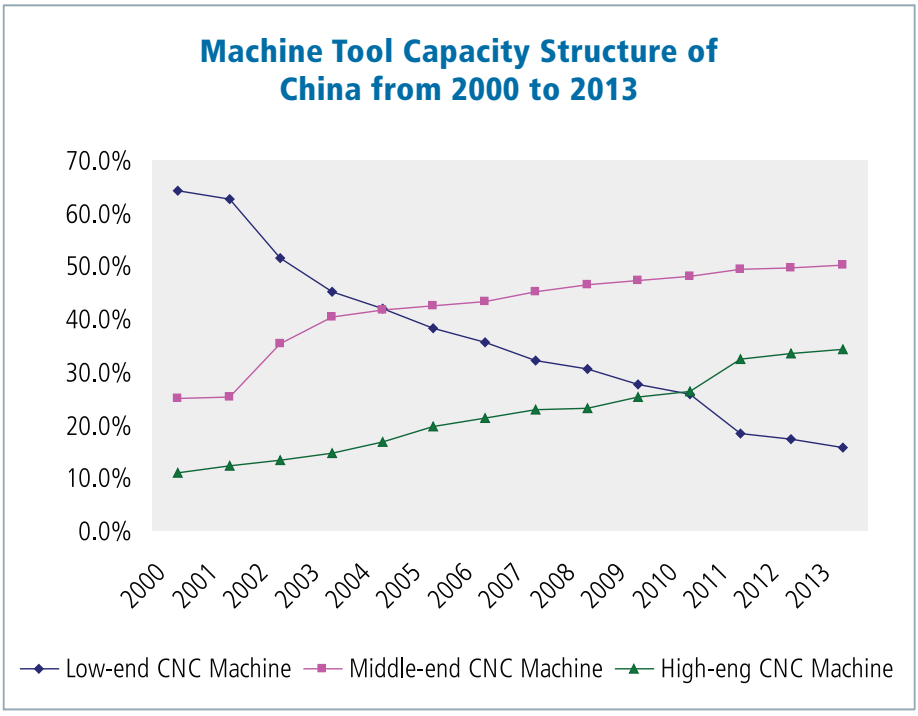
In your opinion, how has China been able to make such a big place for itself in the manufacturing sector?

PERSONAL

"China and India are complementary when it comes to the machine tool sector. Both countries have a lot to offer each other. To encourage ties between the countries, the association makes use of all possible opportunities available to help its members to take part in machine tool exhibitions in India."

Chen Huagui

Huagui: As China's domestic market is the driving factor for its growth in the industry, the local competition plays an important part in encouraging improvement in processes and technology. It is this competition that has also paved a way for manufacturing technologies to become more cost efficient. Furthermore, Chinese manufacturers are not only improving internal designs but also developing better aesthetics. Looking at the current trend, in a few years' time, Chinese technology will catch up with those of Korea and Japan.



In the last 30 years, China has paid a lot of attention to producing in bulk to cater to the fast growing economic development wherein consumers want products in shorter timelines. Manufacturers did not concentrate on better product development. However, in recent years, manufacturers are focusing more on the quality than quantity. And as long as customers want high-level, advanced products, technology too will need constant improvement and innovations.

According to you, how meticulous and important is the R&D sector of the machine tool industry in China? How has this attribute set Chinese machine tool builders apart from other machine tool manufacturers?

Huagui: R&D is an important aspect for product development and, moreover, Chinese manufactures of late have seen the benefits of giving it importance. Many of the manufacturers have tie-ups with European and Japanese companies to ensure that they develop and incorporate the best technology in machine tool manufacture. Improving quality and aesthetics is also important to Chinese machine builders.

With a plethora of advantages such as having a rich material base, large quality of labor available, technology advancements, etc., China can cater to massive demands without compromising on quality and without increasing costs.

What is your message to the Indian companies who want to enter the Chinese market?

Huagui: India provides good machine tool accessories and products. And India could take advantage of this as China has a good demand of these parts in the manufacturing sector. I would recommend Indian companies to attend exhibitions in China and then set up alliances with partners to increase the product range in the country.

India and China working together will not only increase trade between the countries but will also pave the way for a stronger manufacturing hub in Asia. Furthermore, the Chinese government is opening a free trade zone in Shanghai this year. This will provide a really good opportunity for investors to enter the China market. MMI

The interview was conducted by:
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E-mail: nedra.pereira@vogel.de

ECM machine with multi-stations for the machining of turbine disks in aero engine manufacture

Source: EMAG Automation

Innovating to Machine Better

The manufacture of aero engines has always been a complicated task as the materials used to machine the components need to be of high-strength and be able to handle high stress. Here's a look at how EMAG has further innovated the Electro Chemical Machining (ECM) technology to help manufacture better aero engines.

The need for better quality aircraft construction is rising and as a result, development pressures are enormous in this sector. One of the reasons for this is the fact that market expectations ask for rapid growth in the sector while legislation is getting stricter with regards to the CO_2 emission of aircrafts. The consequence of this development is that aero engines are becoming a focal point. The engines need to show a reduction in fuel consumption and also have to guarantee greater propulsion values. It is obvious that such requirements have a massive effect on the components used in the engines. These components are made from extreme materials that have to withstand high stresses. The question is — how can one machine these materials with speed, precision and process integrity? EMAG experts have a highly effective answer to this question — Electro Chemical Machining (ECM) technology. Cutting processes often lose out in the decision making. ECM machines from the company open up new opportunities in aero engine manufacturing.

There is one important correlation to be found in the manufacture of aero engines,

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i.e., the higher the temperatures generated by the engine, the more efficient it is. Thus, the aircraft will consume less fuel over the same distance and increase its flying range. It is easy to imagine what this means for the materials used in the bowels of an aero engine. The higher temperatures irrevocably lead to the use of extremely hard wearing materials that perform better under stress. But that is only 'half of the truth' as at the same time many components are becoming more complex and still have to be machined at the highest precision. It is the only way to achieve the targets set over a decade ago by the aero engine sector, namely a 20 per cent reduction in both CO_2 emission and fuel consumption.

An exceptional option

ECM is not an unfamiliar development as the automotive sector provides a similar example. However, in aircraft manufacture, it has more extreme consequences. And the industry has arrived at a crossroad. Experts estimate that over the next two decades air traffic will increase by 5 per cent per annum. The prediction voiced by Airbus is that there will be a demand for 7,600 new engines every ten years. Although this predication offers great opportunities, it is certain that to conquer new markets, aero engine manufacturers will have to constantly come up with greater improvements.

Precise Electro Chemical Machining (PECM) technology is an outstanding option that ensures the manufacture of new high-performance engine components, even though many developers and design engineers have not yet recognized the fact. This process comes into its own where complex components are to be produced from demanding materials, as it machines high-tensile alloys and similar materials with minimum tool wear. The surfaces are of outstanding quality – with no burrs and no changes in the microstructure of the material. In contrast, using cutting processes could lead to a number of problems. The temperatures generated by traditional machining methods often have a negative effect on the microstructure of the material. Tool life in the machining of high-tensile materials is short, and the high infeed rates required to make the machining process economically viable, make the machining of filigree geometries difficult. It should therefore not come as a surprise that the demand for ECM is increasing in aero engine manufacture. Machines using this technology are used to machine central components, such as blisks, disks and individual blades in nickel alloys at high-speeds and precision.

Selective development of the process

The electro-chemical process ensures a particularly soft removal of the material. The workpiece acts as a positive anode and the tool as a negative cathode. Between the two flows an electrolyte solution that dissolves metal ions on the workpiece. The contour of the cathode and the workpiece with their active, current-conducting sectors, are matched, to ensure that the material removal on the workpiece leads to the desired contour of the component. Contours, channels, grooves and cavities are generated without touching the component and tool wear is minimal. With PECM, EMAG has developed the ECM technology further. The gap, through which the electrolyte solution flows, is particularly narrow. The flow is optimized by a mechanical oscillation. This guarantees a particularly effective and precise removal of the material. The possibilities this technology opens up are best shown by the example of blisk productions.

An example of how accurate and precise the end result can be is the 11 machining stations EMAG has brought out for machining of turbine blade disks. These machining stations carry out drilling, contouring, radius machining and polishing operations in one machine. High-tensile Inconel material can be machined at a feedrate of 5 mm per minute, without burrs or negative thermal effects. The tolerances achieved are between 0.1 and 0.3 mm. The life expectancies of ECM tools are very high, making sure that the tooling costs in production are much lower than those using cutting tools for the process.

Customizable solution for future innovations

Large batch sizes, hardest possible materials, precision results without negative effect on the material, perfect surfaces – this is the background against which the outstanding market opportunities for the machine builder and their technology in aero engine manufacturing are generated. The company offers a modular machine concept that can be quickly tailored to suit individual component requirements. The customer also benefits from the generally high degree of expertise in the development and manufacture of machine tools. Pivotal innovations, such as Mineralit machine base, intelligent software and hardware interfaces and effective automation solutions are part of the company's developments. It ensures that EMAG ECM can create tailor-made (P) ECM turnkey solutions. In fact, the machine builders at Gaildorf are convinced that their technology will prove indispensable for many future innovations in aero engine manufacturing. MMI

Source: EMAG Automation

Machining of blisks using Precise Electro Chemical Machining (PECM) technology, which ensures no change in the microstructure of the material

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Taking the Long View on Short Runs

Certain jobs require a processing strategy that strikes a balance between the needs of high-volume production and low-quantity toolroom work. Reorganizing material flows and investing in machining centers designed specifically for small lots helped this manufacturer find that middle ground.

Burr Oak Tool is running out of space. Assistant Vice President of Operations, Jeff Clark says meeting future growth projections will require expanding the existing plant or purchasing a second facility somewhere nearby.

This situation is largely a result of what Burr Oak has done with the space it already has. The company's 200,000-square-foot plant in Sturgis, Michigan, is a very different place today compared to just five years ago. EDM equipment now resides in an area that once housed offices, and grinding machines are no longer clustered in a single department, to name a few changes. Spurred by pressure to reduce prices and delivery times, the company's ongoing reorganization has delivered improved material flows, reduced waste and achieved faster lead times that Clark cites as major drivers of the company's recent growth.

Yet, management recognized early on that the overall success of these efforts would depend on revamping the production process for one particularly troublesome segment of the product mix. Standard, higher-volume work would pose few problems, at least as long as the company could keep the spindles turning on its tombstone-equipped HMCs throughout its two 10-hour shifts each day. Likewise, one-offs and lower-volume work could be handled in the tool room, where machinists have the flexibility to strategize about the best way to run these jobs on three-axis bed mills. The problem lay in between, with jobs that are too high-volume for the bed mills, yet do not justify the production mindset associated with HMC machining.

For these parts, the company invested in a third processing alternative. Available from Southwestern Industries, the Trak LPM is a three-axis VMC equipped with resources for programming, workholding, tooling and job management to form a complete production system. For Burr Oak Tool, some of these features are more valuable than others. Regardless, LPM lead man, John Delarye states the machine's overall concept embodies the philosophy that an effective approach to small lots requires streamlining setups and change-overs while putting control in the hands of the operators. With three of these systems in place, the company has freed valuable capacity on its HMCs without sacrificing the speed and efficiency required to meet ever-more-stringent delivery goals.

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Source: mmsonline.com

Toolchangers, conversational programming and other features make these three machines the go-to resources for small-lot production at Burr Oak Tool.

Ripe for Change

Burr Oak's facility-wide reorganization began in 2008. The manufacturer of fin dies,

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fin lines, tube processing machinery and other equipment used in the production of heating and air conditioning systems had become aware that its primary competitive advantage—quality—was no longer sufficient by itself. Customers also demanded lower prices and shorter delivery times. Overseas competitors were more than happy to oblige, as were various domestic shops seeking work outside their traditional comfort zones in the wake of the economic downturn.

In response to these pressures, the company implemented a series of reforms aimed at improving communication at all levels and making the flow of material through the plant more efficient. Although these changes were facility-wide, the company's approach to the short-run production work described above can be viewed as a microcosm of both the reasons for these changes and their overall effects on the business.

Source: mmsonline.com

LPM lead man, John Delarye, programs a job using a conversational CNC. He attributes many of the company's gains in short-run production to control capabilities that streamline setup and change-over.

Falling through the cracks

Parts that do not lend themselves to either high-production or toolroom strategies can be a problem for any manufacturer. For Burr Oak, however, an effective strategy for such work is particularly critical because of the wide variation in the company's product mix. In a given year, 80 CNC machine tools process more than 15,000 standard part numbers, though Clark is quick to add that the term 'standard' can be a misnomer. Oak-brand machines and tooling are often tailored to the needs of customers, so dimensions, tolerances and other attributes can vary from component to component. Add one-offs and truly non-standard parts, and the result is a product mix in which runs considered 'high-volume' might amount to only 50 pieces by the company's standards.

Nonetheless, there are still enough truly standard components to keep the company's five Mazak HMCs at full capacity. Many parts produced in batch sizes too low to justify running on one of these machines are also too complex for cost-effective production on one of the tool room's 14 Trak DPM SX5 bed mills from Southwestern Industries. Historically, such work was routed to a selection of three-axis VMCs (the machines that were replaced by the LPMs). Although these machines were capable enough, bottlenecks still arose.

The problems began in the programming department. Offline CAM programming has always worked well for the Mazak HMCs and their standardized setups, but developing separate sets of tool paths to account for part-to-part variations on the VMCs proved difficult and time-consuming. Later, any required toolpath fixes or alterations required VMC operators to stop their machines and make a phone call or even a trip across the facility to consult with programmers who were likely busy with other tasks. The case was similar when operators had to consult with departments handling downstream operations, such as finish grinding and EDM.

As work piled up, directing parts elsewhere was often the only option. This resulted in capacity problems as both the toolroom machines and HMCs became bogged down with work for which they were ill-suited. "This was absolutely killing us on deliveries," Clark recalls.

Source: mmsonline.com

These HMCs handle most of Burr Oak's higher-volume work. Operators inspect parts at the machines using height and surface gages at each station.

Filling a niche

The solution—involving a theme the company has followed across the entire facility—was to streamline communication and material flow by splitting up isolated, far-flung departments organized by machine type and arranging equipment according to point of use. For the low-batch work, this meant relocating a selection of grinders and EDMs as well as replacing the aging VMCs with the Trak LPM machines. These machines are now grouped in their own area, with the grinders and EDMs on one side and the tool room on the other. Two lead men—Delarye and Dennis Barkby—oversee production on both the LPMs and the DPM bed mills in the tool room.

This works well, the lead men report, because the approach to production on the LPMs is more similar to that of the DPMs than the HMCs. However, features that also facilitate a more production-oriented mindset put these machines in a separate category. Delarye avers the following advantages make the machines ideal for taking on that critical segment of short-run work that, until recently, had fallen through the cracks:

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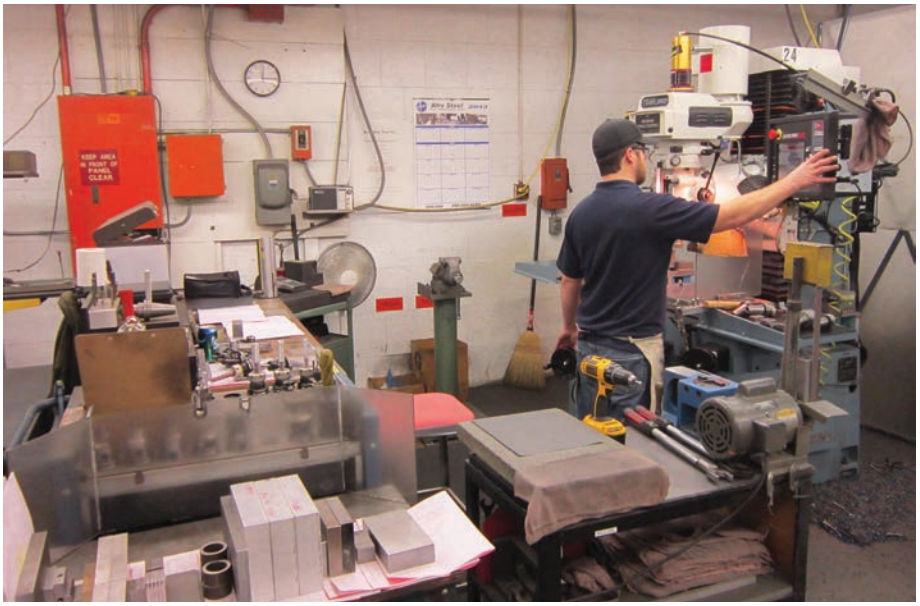

Toolroom machinists like master mill hand Sam Handyside play the role of programmer, setup technician and inspector. However, many jobs are not quite appropriate for either the tool room or the production HMCs.

These upper and lower cutoff blades for progressive die machines exemplify the sort of short-run work that is ideal for the Trak LPMs. Although the company produces more than 1,000 of these components every year, mounting hole locations, clearances for the curved cut-outs, overall length and other attributes often vary from part to part.

Conversational CNC - The old VMCs were CAM-programmed. With their conversational ProtoTrak CNCs, the LPMs are a marked contrast. Tool choices, order of operations, approaches in and out of the work and other considerations all are determined on the shop floor by operators who no longer have to rely on decisions made in a separate area of the facility. "Lead times are shorter because all you need to start manufacturing a part is the print and the raw material," Delarye expresses.

Automatic toolchanger - The 16-position ATC makes the LPM a machining center as opposed to a toolroom mill, Delarye confirms. Eliminating the need to stop the machine to change tools enables operators to tend to other tasks. That is a key reason why the three LPMs can be run by only two people, one of whom is often a trainee, whereas each DPM in the tool room requires its own operator. In fact, compared to the bed mill, the presence of a toolchanger opens the way to a more efficient approach to machining. On a bed mill, the operator typically machines one side of a part at a time. But with a toolchanger, the operator can conduct operations on different faces of two vise-mounted pieces, within a single program, stopping only to load/unload and refixture pieces between cycles. Delarye adds that this machining also makes use of the CNC's capability to merge multiple subprograms into one master program.

Fast setups - Just as that CNC capability speeds setups and change-overs, so does another helpful CNC feature: a 'job staging' capability that lets operators work on a future job while the machine is running the current one. In addition, the machine table comes pre-installed with locating bushings at precise locations that contain receivers for Jergens' Ball Lock zero-point locating system. Given that the LPMs at Burr Oak incorporate vises rather than fixture plates, the company doesn't get as much use from this as another shop might, Delarye says. Nonetheless, the bushings still save time during setups because the distance from a given bushing to a given portion of the vise is always known. This makes it much easier to calculate offsets and zero locations compared to other machines, most of which require using an edge finder.

As a result of the facility-wide changes the firm has made during the past half-decade, typical delivery times for capital equipment have gone from 18 months to six, Clark says. In the future, he expects to achieve four-month deliveries. Finding an efficient approach to short-run production was critical to these improvements.

"We just had a very large order from one of our major customers, and in years past, we would have quoted a 16- to 18-week delivery," Clark declares. "This time, we quoted it at 10 weeks, and all of the parts in that product group ran across the LPMs." MMI

Source: mmsonline.com

Burr Oak Tool makes equipment used in the production of HVAC systems. The progressive die press shown here is an example.

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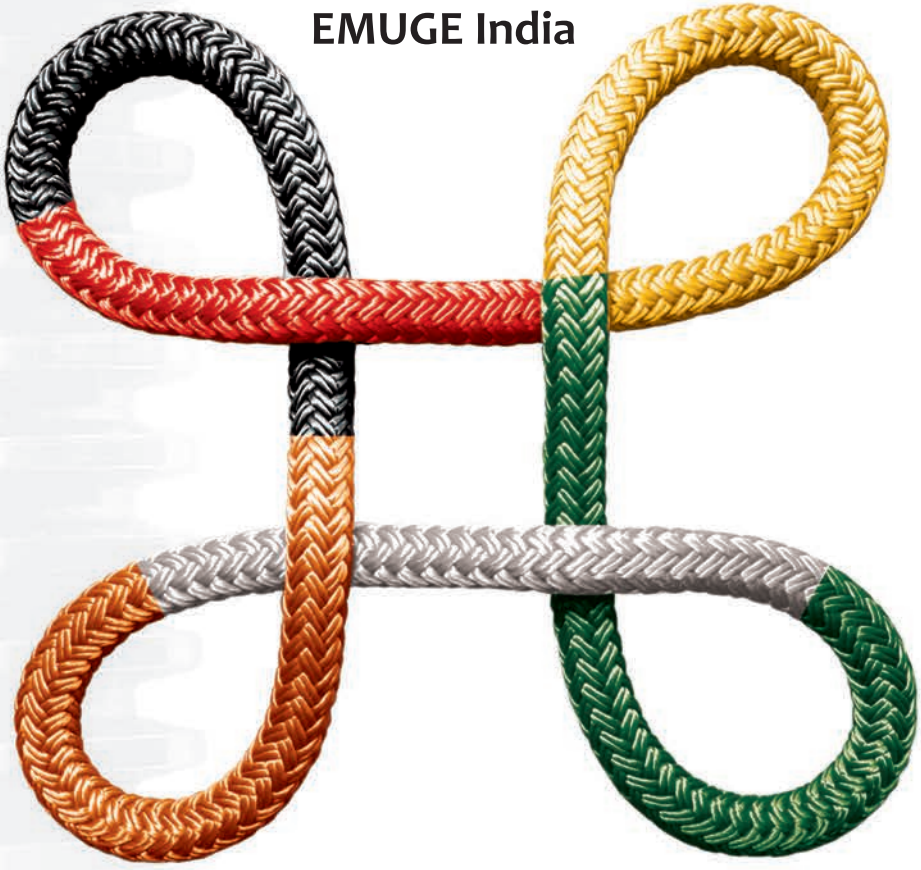

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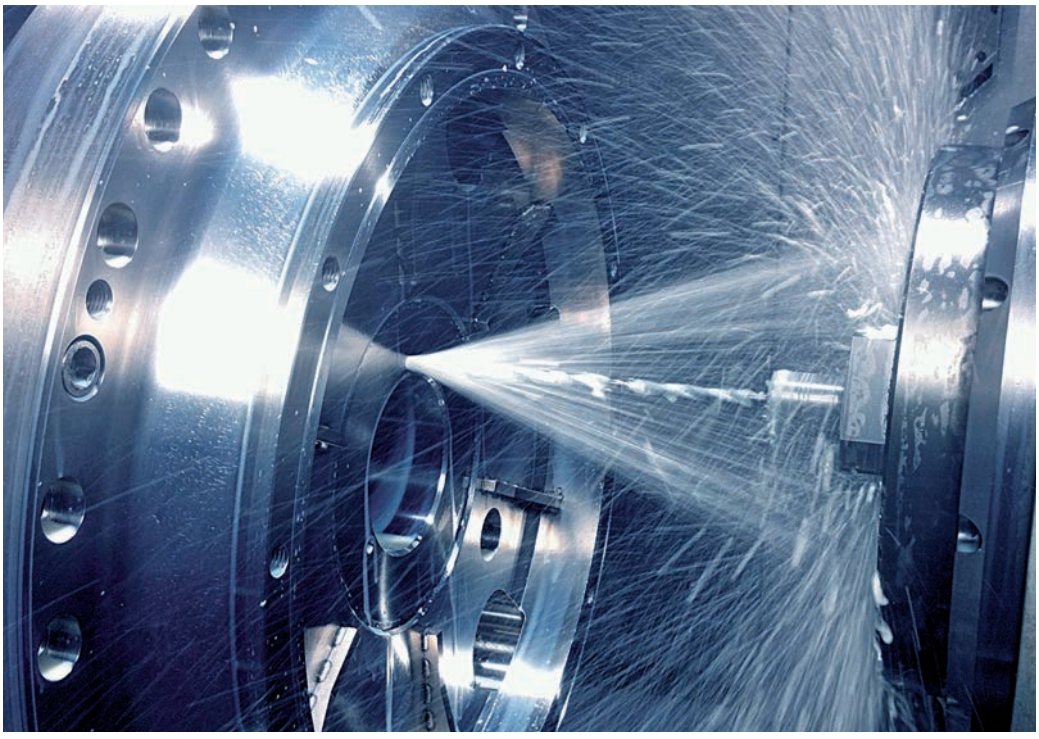

Deep-hole drilling makes special demands on the tools. The cooling lubricant plays a decisive role here in chip removal.

Fast, Secure Ways to Complete Deep Drilling

Boring deep holes present a special challenge for tools. With large length-to-depth ratios, the process has to be optimally planned, especially for hardened steel. Required is a combination of high process speed and top boring precision. Read on to know more about challenges that deep drilling posses and new age deep drilling solutions.

When looking at demands on boring tools, deep drills certainly represent one of the most important niches. This is how Technical Manager, Mapal Competence Centre, Ulrich Kreuzer, sees the market for such precision tools. More specifically, "Around 80 per cent of all bores are less than 5 × D, for example, while bores of over 20 × D constitute hardly 5 per cent of all bores required, but these are without doubt critical for the functioning of the components in question and cannot be done without more elaborate technical work."

He explained that one should not underestimate the positive effects that the development of deep-hole borers have on shorter borers because the sophisticated geometries of the deep borers improve the performance and service lifetime of shorter tools when they are used there.

Defining the process of deep hole drilling

When does one begin to talk about deep-hole drilling? Senior Product Manager - Hole-making, Walter, Helmut Gschrey said, "In our view, deep-hole boring starts at 16 × D; here, it is important to be process-secure." These tools must represent highest quality. Moreover, above 16 × D, a certain drilling strategy is required – pilot bore, insertion, start main bore, withdrawal with reduced rotational speed.

As there is no official statistics for deep bores available, one can make only rough estimate about its annual market volume. According to Krenzer, the requirement of the German industry for solid carbide and single-lip deep borers lies between €20-25 million. HSS spiral drills, ejector and BTA systems could account for up to €15 million.

Mapal has two models of spiral deep borers in stock as standard. In its cutting

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material and geometry, the Mega-Deep-Drill is designed for cutting steels, while the Mega-Alu-Deep-Drill is for aluminum and non-ferrous metals.

How to make perfect spiral chips

The critical factor in spiral borers is chip channel, which is also known as tightly rolled cutting. They determine the form of cuttings at the tip of the drill and demand very high pressure in the cooling fluid. "Mapal drills, therefore, have a sophisticated channel profile, changing from the drill point upwards in such a way that cuttings can be washed out even with moderate cooling fluid pressure," Krenzer said. The whole effect is supported by very smooth polished surfaces and coatings. Director–Drilling Tools, TBT Tiefbohrtechnik, Jürgen Bek, pointed out the direction that the technology has taken. "In the development of deep-hole tools, the trend is clearly towards raising performance through new tool geometry and ultra-smooth coatings in order to enable reduction in the number of machine tools and machine footprint space," he added.

In the development of deep-drilling machines, structures are determined predominantly by finite element methods and simulations. Further development of such methods, specially matched to the needs of deep drilling, plays a central role. According to Deep-drilling Product Manager, Gühring, Lothar Künzel, "Customers would primarily like to achieve the best possible machining results." Here, he distinguishes between two different requirements – the highest possible machining speed and the highest possible drilling precision. Spiraled deep-hole drills have clear advantages with regards to machining speed (cutting speed and feed), while classical deep-hole drills provide maximum bore quality.

Simplicity is the key

Moreover, there are demands for improvements in the processing quality of spiraled deep drills. "Increasingly significant are deep-drill processes, in which bores of up to 75 × D are carried out on conventional machines," Künzel informed. The range of nominal diameters where this is demanded is between 2-16 mm.

Drilling Processes and Tool Holder Product Manager, Sandvik Coromant, Thomas Bruchhaus described the requirements on the tools by saying, "Today's deep-drilling tools must be simple to use and offer a choice of different geometries, hard metal types and coatings." Few wearing parts and short delivery times are further positive points. Regarding machining processes, a distinction must be made between serial production and one-off production: in serial production of low-cost components, the cost per bore is the factor in the foreground, while more elaborately produced higher-cost components call for process security and reproducibility. Furthermore, with some components, a good chip break and straight bores with low deviation are desirable.

"All our deep-hole tools are suitable for machining high-performance working materials," Bruchhaus voiced. "For high heat-resistance alloys, for example, we have developed special cutting materials. In standard processes, our tool solutions effortlessly achieve bore depth ratios of up to 150, but we have also already realized processes with ratios over 300," he affirmed.

Source: Mapal

(LtoR): The deep-hole borer MEGA-Deep-Drill with special TiAlN coating is suitable for processing steel and castings while the uncoated deep-hole borer MEGA-Alu-Deep-Drill is suitable for processing aluminum and non-ferrous metals

Former Manager, Hoffmann Group, Bert Bleicher discussed one of the company's products. "Our new Garant deep-hole boring system is designed for bores of up to 50 × D." Geometries, tip angle and cut tolerances are exactly matched to each other for the required bore depth. In this way, a series of tools can be employed in uninterrupted succession during a production process. In choosing the right tool, a colored ring system offers support: for light working materials such as aluminum, products with yellow rings are suitable; for steel, including rust and acid-resistant steels, those with green rings.

Enough emulsion for lubrication in deep channels

There is no question that, above all, users require a secure, fast boring process that enables a product result within the specified tolerances. To meet this demand, Director, Research and Development – Hard Metal and Reaming Tools, Komet Group, Reinhard Durst noted, "For this, it is important that the cuttings are short at break-off and come securely out of the bore; in addition, the deep drilling should, wherever possible, take place on processing centers without deep-boring lubricant, using only emulsion in the usual concentration." Komet is said to be permanently involved in optimizing the geometry, surface and coating of the deep-hole drill KUB Drill-max XL. Here, it is always a question of meeting the user specification as well as of very good chip control.

Of course, the responsibility for process-secure, stable and cost-effective deep drilling does not only lie with the deep-drilling tool. Drilling Product Manager, Iscar Germany, Herbert Volk, explained the situation. "Influence is also exerted by the right combination of tool, machine and cooling lubricant. It is therefore, extraordinarily important to employ the cooling lubricant correctly." In deep boring, the cooling lubricant is said to play a decisive role in the lubrication of the tool, the cooling of the cutting tip and cutting removal. "In addition, it contributes to prolonging service lifetimes and also to improving the surface quality and drilling precision," Volk added.

Overcoming heat and lubrication problems

Deep drilling has several facets. On the market, there is competition between different procedures, such as gun drilling, BTA and ejector deep-hole processes. The application area of gun borers generally covers bore diameters between 0.5 and 40 mm – with inserts going beyond this. This enables, with special deep-hole boring machines, bore depths well in excess of 100 × D to be achieved. The disadvantage of these borers lies in the small feed rates attainable and in the very high cooling lubricant pressures that these borers require for chip removal. On processing centers, therefore, the preference is for using these solid carbide borers for bores of up to 30 × D, since they enable substantially shorter process times and simpler handling.

BTA and ejector deep borers are used mainly for bore diameters larger than 20 mm on special deep-hole boring machines. These processes are indeed cost-effective, but, because of the special cooling lubricant feed and chip removal, not universally applicable. Their use is, therefore, mostly limited to series components such as hydraulic cylinders.

Increasing productivity with the right cutting tool

Senior Engineer, Institute for Machine Tools and Factory Operation (IWF) at the Technical University, Berlin, Sebastian Richarz averred, "The use of long spiraled solid carbide borers enables, in comparison to single-lip deep-hole drills, significant raising of productivity due to the substantially higher feed rates realisable." Besides raising productivity by a factor of around 6 to 8, a decisive role in the use of spiral drills, depending on the application, is played by the specified bore quality and, in particular, process security.

The prime focus of IWF is maintaining a high aspect ratio for the process chain for manufacturing tools for hard drilling processes. Another area where the organization is concentrating is the development of holistic production strategies, with the capability to use tools process-securely and with long service lifetimes in processing hardened heat-treated steel on universal processing centers.

How to work hard materials

Carbide tools combined with PVD coatings are used in deep drilling of hard materials. The substrate, as bearer of the coating, has a decisive influence on the service life span of the tool. As Richarz emphasized, "Ultrafine hard grain metals are one of the latest developments in the drilling tools sector. It is proving to be more suitable as a substrate material, as compared to conventional hard metals due to its hardness and toughness. Thus, it enables the use of spiraled tools with twisted coolant channels at high feed rates."

For deep drilling of hard materials to be carried out securely on processing centers, it is particularly important to thoroughly examine the production unit with its additional functions and clamping situation. In addition to this, the drilling tool and the process sequence need to be precisely matched to the working material.

"The crux of this technology is to have an adequate supply of the cooling lubricant in order to be able to remove chips along relatively small chip channel cross-sections, even from great drilling depths, and to ensure a sufficient cooling and lubrication of the cutting edges," Richarz explained. One method for reducing increased friction is to employ cooling lubricants that have a fat content higher than 10 per cent.

Slight inaccuracies in the machine tool, such as concentric run-out errors in the main spindle or positioning inaccuracies in the linear axes, can lead to overloading of the tools and thus to breakage. "In particular, the need is for the lowest possible angular deviations of the linear feed axis," Richarz sstated. He concluded that by depending on the process, even slight angular deviations could have a fatal effect on positively driven tools with an aspect ratio of 30 × D, leading to breakage of the tool. MMI

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Source: Siemens Ltd

Rotor of an STG6-5000F gas turbine during assembly

Gaining a Technology Edge in Power Generation

In today's age, profitability, safety and environmental compatibility are crucial factors in the power industry. Increasingly complex ways of generation and production of electricity are demanding more adaptive and better performing automation technology. Siemens has developed advanced ways for machining efficient power generation components.

Today, with almost two-thirds of the global energy being consumed by cities, energy-efficient and sustainable power supply is the need of the hour. Efficient power plants, increased use of renewable resources and low-loss power transmission can ensure reliable energy supply. Due to current economic demands, one can foresee the increasing significance of technologies for generating renewable energy.

During component production for gas, wind, water or solar energy industries, performance and production quality are key areas.

Gas or steam turbines are used in many conventional power plants, including those fired with fossil fuels. For such turbines that are also used in nuclear power plants, the temperature of the live steam can go up to 600°C and the pressure inside the housing to 300 bar. In the combustion chambers of gas turbines, temperatures rise over 1400°C. This takes place when the turbine is at a very high speed of 3,600 revolutions per minute (rpm), depending on the design.

Therefore, a diverse array of precise and high-performance automation, drive and monitoring technologies is needed for the

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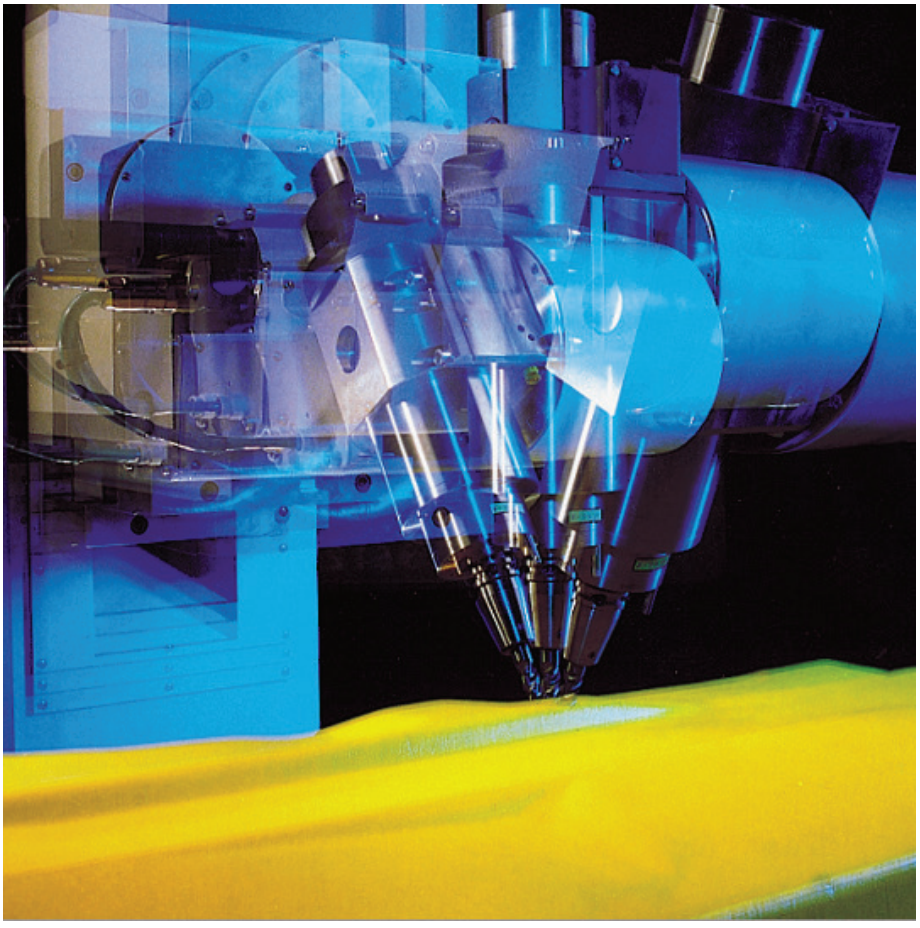
production of highly stressed components such as turbine blades, turbine vanes, turbine vane rings, turbine nozzles (vane segments) and engine & turbine casings. Whether for milling, grinding or non-destructive procedures on the turbine rotors and blading or gear machining of transmission components, reliable and error-free automation technology is of utmost importance.

The major requirements for turbine rotors and blading production are 5-axis milling, turn milling/mill-turn, grinding technology, laser machining, non-destructive testing, thermal coating, broaching technology, cranes, etc. Turn milling/mill-turn, grinding technology and machining of gears are required for gear production while laser machining is required for production of condensers.



Source: Siemens Ltd

Turbine machining require a diverse array of precise and high-performance automation, drive and monitoring technologies

5-axis milling

In power generation industry, the production of highly stressed work components involves machining away a high proportion of the material. With 5-axis machining of structural components, up to 90 per cent of the raw material can be removed during machining. This calls for extremely high metal removal rates, which can be achieved only with highly efficient machines. High quality turbine parts are increasingly milled from a solid piece of metal. Thus, the emphasis is more on maximum dimensional accuracy and surface quality. The most efficient way to achieve this accuracy and quality is through 5-axis milling, which is one of the most advanced metal-cutting disciplines. The control systems used in 5-axis machining centers must incorporate specific programming, motion control and compensation functions for the complex machining tasks in addition to high performance of hardware. The rigidity and accuracy of the machine has considerable effect on precision and surface quality. Therefore, it is important to improvise these with the usage of special CNC and drive functions.

Turn milling/mill-turn

Frequent re-clamping of components during machining proves to be a challenge in terms of quality and cost. Completing turning, milling and drilling in one clamping saves both on alignment and steps involved in setup, thus reducing errors and the time spent.

A control for complete machining on turn-mill machines will provide functionality for the most varied technologies and make it simpler to use and control them despite their complexity. During machining itself, special tool retraction strategies are required to avoid damage to machine parts and workpieces, thus ensuring the safety of operators and machines in all situations.

By using the tools at varied angular positions and for left and right machining, the control helps reduce the number of tools required. Also, simultaneous use of two cutting edges during 4-axis turning halves the cutting time. The equivalent package for milling includes a cycle for spiral infeed, which permits considerably higher feed rates for pocket milling. Interpolation of up to 5-axis permits machining of any geometrical shape at almost any angular position. Thanks to the cylindrical surface and end-face transformation features, it is also possible to directly program in workpiece coordinates.

The other multi-tasking machine technology, mill-turn, is perfectly suited for highly complex workpieces in power generation industry. In addition to the mechanical prerequisites, a powerful, easy-to-operate control is vital to multi-function machining. The flexibility, openness and high-performance features of the controller of Siemens make the CNC an optimal choice for mill-turn applications.

With 'virtual machining,' one of the advanced features of a CNC control, a higher level of process reliability can be achieved even prior to the initiation of production. This reduces the risk of damage to machines and components considerably.

Grinding technology

Whether the process is surface, profile or cylindrical grinding, the demands on grinding processes include:

- Minimal heat absorption into the work-piece
- Favorable internal stress at the grinding surface
- Complete processing with drilling and milling operations on one set-up

All the above need to be achieved with minimum possible investments in state-of-the-art facilities and with high performance grinding tools that provide a quick return on the investment in the form of high-quality output and produced in minimal

Source: Siemens Ltd

Simultaneous 5-axis machines incorporate specific programming, motion control and compensation functions for complex machining tasks

cycle times. Meeting these demands require a perfect harmony between the control and drive technology and the machine. Apart from high-performance hardware, standard programming and monitoring functions are required for the challenging tasks, which help simplify the work for users and guarantee safety of processes. Besides, the stiffness and dynamics of the machine exert a great influence on precision and surface quality that are enhanced with CNC and drive functions.

Laser machining

Laser technology applications are increasingly gaining prominence in manufacturing processes in the power industry. Laser drilling involves application of sufficient energy at one point on the workpiece to achieve controlled evaporation of the material. Thanks to its great precision and fast machining time, it is quickly overtaking other technologies, such as conventional drilling and spark erosion, as the method of choice for machining hard materials. One significant aspect of laser machining is that tapered holes can be drilled in the rotor and guide blades of a high-pressure turbine, which improve distribution of airflow over the surface of the component. The increased cooling effect permits higher turbine inlet temperature, resulting in better efficiency.

The advanced functions such as intelligent motion control of the machining head, distance control between the machining head and the workpiece, breakthrough detection via threshold value control, etc., help in more precise operations of laser machining.

Non-destructive testing

Reliable, end-to-end quality assurance is an elementary requirement for the effective operation of components in the power industry. Nondestructive test methods based on ultrasonic or eddy currents are used to avoid any damage to high-grade components. Increasing the level of automation makes these test systems more efficient and economical in operation. Ultrasonic test methods, such as the squirter, immersion and contact techniques require a coordinated control system that is flexible to use in order to precisely control the motion of the test heads along different components. Innovative automation is also necessary for solar simulators to allow the measuring devices to operate on several axes and the test operation to remain aligned with the production cycle.

Thermal coating

This process is principally intended to protect highly loaded turbine parts (blades, bearing surfaces) from increased wear and tear due to mechanical, thermal, and/or chemical influences. With its state-of-the-art automation technology, Siemens makes a significant contribution to increased performance and continued product quality and productivity improvements in the use of this specialized technology.

Broaching technology

It is a high-speed precision metal machining process used in the turbine industry for machining blade attachment slots in turbine discs and root forms on turbine blades. This requires high cutting capacity and accuracy, which can be achieved by using efficient numerical controller.

Machining of gears

A gear that runs smoothly and quietly must be produced on a machine that also is endowed with the same attributes. This is because the gear surfaces are memories of vibrations that are present in the manufacturing of the gear. A machine that rises to the challenge of precise, high-quality gear production must be mechanically and electronically stiff over a wide range of disturbance frequencies due to the tooth count of the cutter and its rotational velocity. This is achievable with a CNC solution since this control and its companion servo drives and motors are developed from the inside out to lead the way in smooth contouring of high-precision, high-speed stock removal.

Manufacturers of components for power generation industry demand the ideal automation solution for manufacturing specific components. Innovative CNC solutions offer the best possible consistency and transparency over the entire production process as well as minimize training and maintenance expenses, thus curtailing the lifecycle cost. The wide range of solutions for the power generation industry has not only been expanded to reach a new level, it has also opened up a new chapter in industrial automation technology. **MMI**

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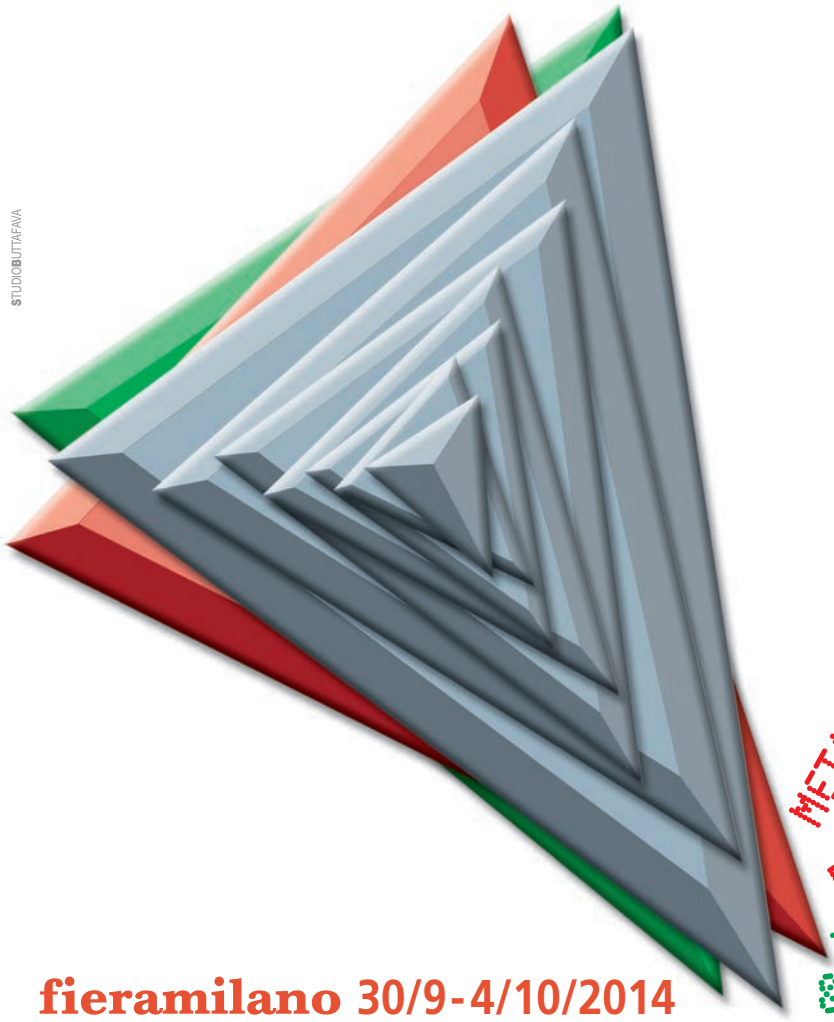

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Bridging the Gap

With advancing technologies, complexities in the auto components are increasing and hence, so are the level of challenges for machining the components. Read on to know more about innovative technologies used to machine new-generation auto components.

In automotive suspension, a steering knuckle (or spindle knuckle or axle arm or stub axle) is a part that contains the wheel hub or spindle and attaches to the suspension components. Materials used for knuckle parts are basically cast & SG iron and alloy steels.

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The material used depends upon the type of the vehicle. One can see forged steel as a material widely used in heavy vehicle while SG iron in passenger cars. (Refer to FIG 1)

The major amount of material removal in the knuckle is done by face milling, drilling and gap milling.

Face milling and drilling can be addressed with standard products. Applications like gap milling really calls for an engineered solution according to the knuckle design.

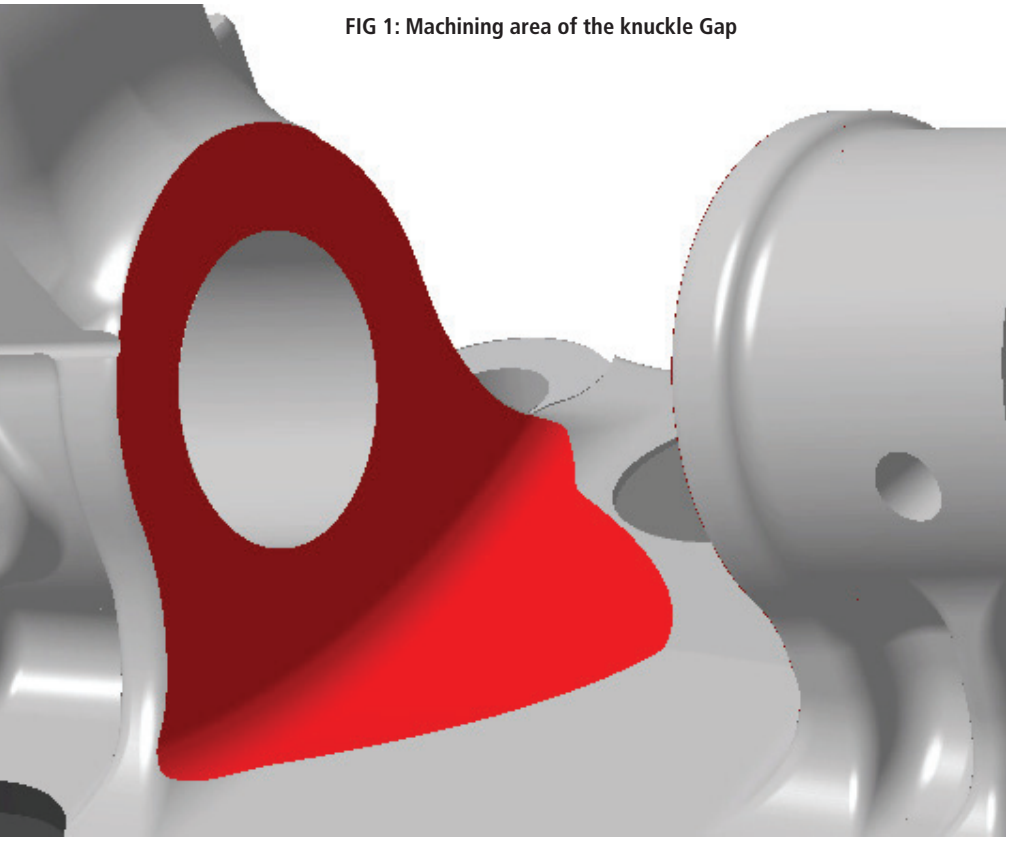

FIG 1: Machining area of the knuckle Gap

Source: TaeguTec India

Gap Milling – Roughing

Forged material, which is widely used in heavy vehicles, can be milled using different ways. Here are two different approaches to mill the same.

Approach 1: Special purpose machines (SPMs) with good power availability (i.e., 11 kW and above)

SPM approach is more suitable for transfer lines where only one particular operation is performed. This can be used for rough machining of the gap where the stock levels will vary from 2–8 mm. This option is capable of running at low to moderate cutting conditions.

Example 1: The cutting speed can be from 80–120 m/min and table feeds can be from 60–100 mm/min. Here one can use the options of inserts with cutting edges on both sides.

Example 2: Square insert with eight cutting edges with a specific corner radius requirement. In this combination, one can look at using corner radii up to 3.2 mm. When the corner radii requirement is more than 3.2 mm, having more number of cutting edges becomes a limitation due to increase in the insert size, which will result in less number of teeth and higher cutting resistance. Here, one can opt for single sided inserts, which can be triangular shape or square shape with 3 and 4 cutting edges respectively.

Case Study (Refer to Table)

Application: Rough machining of knuckle gap (112+/-0.25 mm)

Cutter used: Dia 250 mm Right Hand and Left Hand for the front and rear sides. And

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D 250-14 mm thick + Dia 250; 59.5 mm thick cutters for inside milling. (Refer to FIG 2)

In the above combination, double-sided square inserts were used in all the cutters. The outer cutters have inserts with chamfer and inside gap machining cutters have R3 corner radius. This combination can give a tool life of 200~250 components per edge set at a cutting condition of 80~100 m/min and a feed of 60–120 mm/min.

The work piece clamping rigidity plays a vital role in this set up. The clamping of the work piece must be good along with machine capability because we are not only machining the gaps, also the front and rear sides.

Approach 2: Machining Center route

This approach is more suitable for controlled depth of cuts. The depth cuts cannot cross 3~4 mm. When the depth of cut (DOC) is higher, more number of passes are to be opted. This particular approach is good for the recent market trend, where there is high demand for model change. The machine can accommodate the model change by changing the fixture locating plates and clamps.

TABLE : KNUCKLE ROUGH GAP MILLING

Source: TaeguTec India

Maker	TaeguTec	Competitor
Tool hoder / Cutter	TSMF D285-40N-40R-1154	D285 - W30
No of Inserts (Z)	24 - Zeff - 6	18 - Zeff 6
No of Corners / Insert	8	4
Insert Description	SNKC 150630 - 1154	Special insert tangential mounting design
Grade	TT8020	PVD Coated
Cutting Speed Vc (m./min)	80	80
Spindle Speed (RPM)	89	89
Feed (mm / Z)	0.26	0.26
Feed (mm / rev) (f_r)	1.08	1.08
Feed (mm/min) (f_m)	140	140
Depth of cut (mm) (a_p)	6 ~ 10	6 ~ 10
Coolant	WET	WET
Tool life components / insert set	120 / CPC 20	75 / CPC 45
	No of passes 3	No of passes 4

Although, there will be a limitation of cutter diameters and tool holding capacity of the machine. The radius formation inside the gap will be by interpolation of the cutter. Here, the radius of R158 is achieved by using a Dia 240 cutter. This kind of solution can be used at cutting speeds between 100~180 m/min and a feed rate of 200-400 mm/min with controlled depth of cuts.

Tool length in this case is to be carefully considered. If the tool length is longer owing to the knuckle design or the clamping mechanism, cutting conditions have to be optimized.

Gap Milling – Finishing

When it comes to the finishing of the knuckle gap, irrespective of SPM approach or Machining Center approach, there is a wide range of insert choices.

a) Tangential mounting of inserts on the cutter. (Refer to FIG 4) One can see the cutter is chopped from both sides in order to accommodate on the machine ATC.

This kind of tangential mounting gives good surface finish values between Ra 1.6~2.3 and the flatness on the walls lesser than 0.05 mm. This kind of solution can be used at cutting speeds between 150~200 m/min and with a feed rate of 0.07-0.15 mm/min.

It is always better to keep stock levels for finish as 0.7~1.2 mm considering the corner radii of the inserts.

b) Radial mounting type with triangular inserts (Refer to FIG 3)

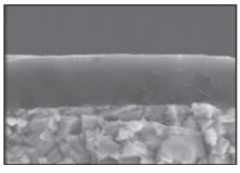
Here, the design for SPM machine where two different cutters are mounted on the arbor with a spacer and is used for finishing of the gap. For machining the center, there can be a single cutter with inserts on both sides.

The component can be machined by Z-axis movement or by B–axis rotation. MMI

Source: TaeguTec India

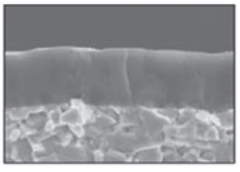
Suitable grades for use in steel applications:

TT 8020 / TT8030 / TT8080



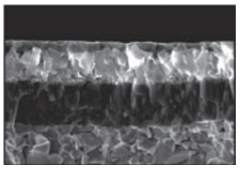
Very Tough substrate with PVD coating for impact load resistance suitable for machining steel knuckles in wet / dry condition

TT6030 / TT6080 / TT9080



Very hard substrate with PVD coated grade for applications where higher wear resistance is required

TT7800



CVD coated grade for forged steels and alloy steel materials

Source: TaeguTec India

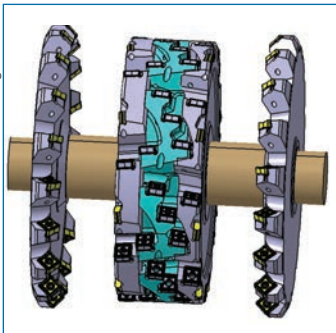


FIG 2: Rough machining knuckle gap in the SPM

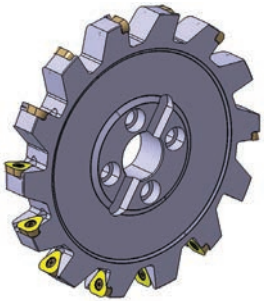


FIG 3: Radial mounting design

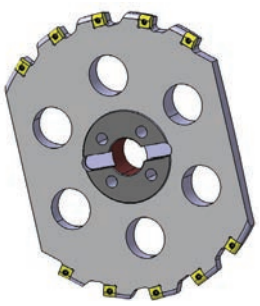


FIG 4: Tangential mounting design

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EVENT CALENDAR

Event Name	Contact	Date & Venue
AMTEX 2014	Wg. Cdr (Retd) Anand Tel: +91 (080) 4330 7414 www.amtex2014.com	July 25-28, 2014 Pragati Maidan, New Delhi, India
IMTS 2014	Whitney Brown wbrown@AMTonline.org www.imts.com	September 8-13, 2014 McCormick Place, Chicago, Illinois, US
BI-MU	Tel: +39 0226 255 860 bimu.esp@ucimu.it www.jimtof.org	September 30-October 4, 2014 Fiera Milano, Milano, Italy
EuroBLECH 2014	Tel: +44 (1727) 814400 info@euroblech.com www.euroblech.com	October 21-25, 2014 Hannover, Germany
JIMTOF 2014	JIMTOF Fair Management Tel: 03-5530-1333 www.jimtof.org	October 30-November 4, 2014 Tokyo Big Sight, Tokyo, Japan
Hand Tools/ Fastener Expo	V B Sudeep sudeep@itei.in www.iihtexpo.com	November 7-9, 2014 Chennai Trade Centre, Chennai, India
Machine Tool Indonesia 2014	Pamerindo Indonesia Tel: +62212525320 www.pamerindo.com	December 3-6, 2014 Jakarta International Expo Kemayoran, Jakarta, Indonesia
IMTEX 2015	Balasubramanian Pillai bala@imtma.in www.imtex.in	January 22-28, 2015 BIEC, Bengaluru, India
TIMTOS 2015	Tel: +886-2-2725-5200 timtos@taitra.org.tw www.timtos.com.tw	March 3-8, 2015 Taipei world Trade Centre, Taipei, Taiwan
Northwest Machine Tool Expo	Tel: +1 (800) 547-7377 info@cygnus.com machinetoolexpos.com	April 1-2, 2015 Oregon Convention Center, Portland, US
INTEC 2015	Tel: +91(422) 2222396 intec@codissia.com www. intec.codissia.com	June 5-9, 2015 Codissia Trade Fair Complex, Coimbatore, India
IMTOS 2015	Kamlesh Gohil Tel: +919328899503 www.kdclglobal.com	July 4-7, 2015 Pragati Maidan, New Delhi, India

To suggest an event, please send details to kruti.bharadva@vogel.de

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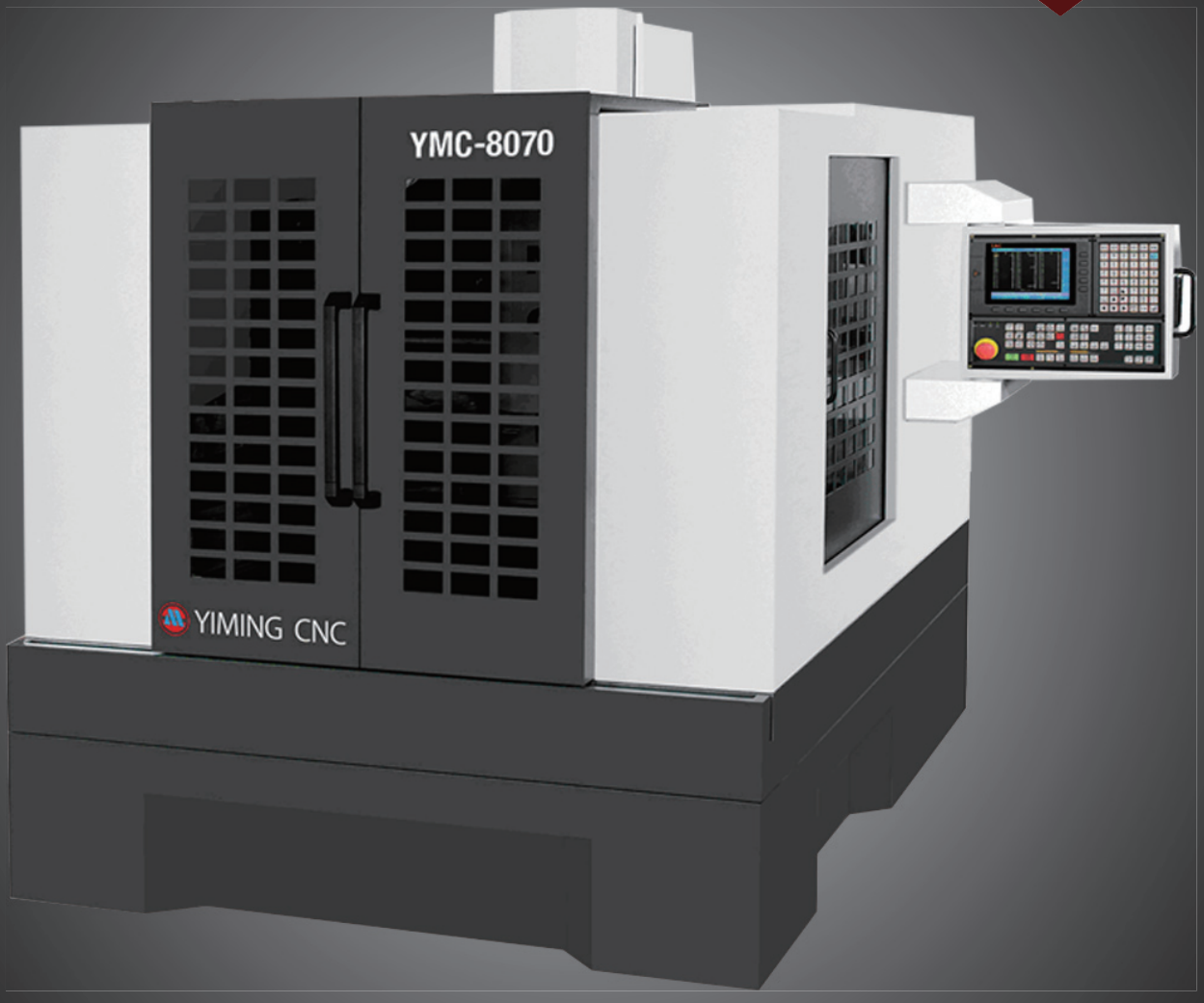

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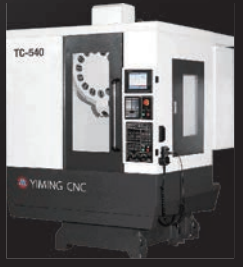

Source: UNITED GRINDING Group

A UNITED GRINDING Group representative giving a live demonstration of the machine from Group's brands

Precisely Passionate!

Nestled in the impressive Alpine landscape of Bernese Oberland, Thun in Switzerland played host to the third Grinding Symposium organized by the UNITED GRINDING Group AG from May 21-23, 2014. With precision machining as the focus, the largest international grinding technology confluence was themed around the company's core philosophy "Anyone who stops wanting to be better, has stopped being good." A report…

With an objective of making its customers more successful, the UNITED GRINDING Group AG displayed a total of 30 machines at 14 stations during the Symposium. Five new machines were unveiled, which garnered enthusiastic responses from around 1,400 visitors daily from 40 countries including 70 international trade journalists. The mix of 154 technology presentations, 20 cross-cutting lectures delivered by industry experts and partner stands provided a glimpse on how the company walks its talk by offering its customers more than just the right grinding technology.

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In this context CEO, UNITED GRINDING Group AG, Stephan Nell said, "We also consciously deal with topics that are not directly connected to grinding. Trends and multiple opportunities for optimization in a wide range of fields play a central role in making our customers more successful and offering them added value in addition to the machines."

Echoing on these lines COO, UNITED GRINDING Group AG, Michael Horn oriented the company's PuLs program which stands for precision and passion. This in-house coined Six Sigma philosophy aims to eliminate all waste and optimize internal procedures and production processes for the benefit of its customers.

Information imparted

The lectures and presentations delivered covered topics from global trends and innovations in grinding —from the materials used in grinding tool development to the ways to increase productivity in the design of grinding processes and to reduce grinding forces or processing and auxiliary times. These offered each participant the opportunity to discover specific advantages of the machine innovations.

Innovations unveiled

The five new machines unveiled during the Symposium by the brands of the UNITED GRINDING Group were a hallmark of efficiency and process reliability for its customers' production and manufacturing operations. These included: BLOHM PROKOS XT, JUNG JE600, STUDER S141, SCHAUDT CrankGrind, and EWAG LASER LINE ULTRA.

Grinding the change

BLOHM presented its PROKOS XT for the first time at the Symposium. The highly dynamic drives and linear motor technology of this grinding machine allows acceleration values of up to 2 g and axis speeds of up to 120 m/min, making the PROKOS XT ideal for speed stroke grinding. Its optimized tool changer reduces tool change times to a minimum. 24 positions provide space for all tools that are required for complete machining: grinding wheels, cutters, drills and measuring probe. These can be changed even while the machine is in operation, thanks to an external setup station. A special highlight of the PROKOS XT is the software developed by BLOHM and JUNG for CAD/CAM connection: SmartCAM.

Highest level of profile accuracy

The new J600, JUNG presented a modern surface and profile grinding machine for the highest precision and surface quality. This first machine in a new J generation has a host of potential applications — from individual component production to small batch production for all industries. Designed for a grinding range of 300 x 600 mm, the J600 realizes its full potential particularly when grinding demanding applications in tool and die making.

Internal grinding for long work pieces

S141, a state-of-the-art internal cylindrical grinding machine, from STUDER was displayed. It is ideal for grinding spindle shafts, spindle housings, rotor shafts or axes. The newly launched machine's axes are equipped with linear drives, while integrated StuderGuide guide way system ensures fast and high-precision axis movements. Automatic swiveling of the workpiece table for axis-parallel grinding of cones / tapers and the perfect dressing strategy for every application, with up to two dressing stations bring ease to the process. Moreover, its Granitan machine bed comes with outstanding damping characteristics. These features and more make the machine an ideal choice for users with demanding applications.

Source: Vogel Business Media India

"Trends and multiple opportunities for optimization in a wide range of fields play a central role in making our customers more successful and offering them added value in addition to the machines."

CEO, United Grinding Group AG, Stephan Nell

"PuLs illustrates our corporate philosophy, which is to align all processes with our customers' requirements to find and utilize potential for optimization and minimize waste."

COO, United Grinding Group AG, Michael Horn

Crankshaft grinding to perfection

The new CrankGrind from SCHAUDT celebrated its world debut at the Grinding Symposium. This machine is perfectly designed for high speed grinding of crankshaft main and pin bearings. It is equipped with a dual cross slide and enables synchronous machining of adjacent main and pin bearings with two wheels with a minimum grinding wheel distance of 15 mm. The machining time is thus significantly reduced, while the grinding quality is improved. The basis for high-precision, stable grinding processes is provided by the proven Granitan machine bed, which is characterized by its high thermal stability and optimum vibration damping.

A quantum leap in the production of ultra-hard tools

In addition to the existing technologies of grinding, eroding and measuring, laser technology is also covered with the LASER LINE ULTRA from EWAG. WALTER EWAG is hence the unrivaled full service provider for the complete tool machining technology spectrum. It is loaded automatically by a standard integrated 6-axis articulated-arm robot with triple gripper head for autonomous production. The machine's robot cell is equipped with two pallets as standard. A 50W high-power picosecond laser including laser control and water-water heat exchanger is integrated into the machine structure. The laser control is fully integrated into the machine software.

Constant endeavour to progress

The vast array of innovations at the symposium reaffirmed the maxim that constant process and product innovations are the key to success. As Nell concluded, "We try to provide our customers with the best possible support throughout the entire product life cycle, so that their production is as efficient as possible." MMI

Audience listens attentively during various presentations

Source: UNITED GRINDING Group

Creating a Technology-focused Learning Environment

The Automotive Engineering Show 2014 gave an opportunity to the auto components industry to gather under one roof. Furthermore, it helped the industry accelerate growth by the exchange ideas, display of cutting-edge technology, etc. Additionally, in the long run this platform of learning about innovations and the presence of experts will prove to be very beneficial to the industry.

The eighth edition of the Automotive Engineering Show ended on a productive note, with several brands collaborating and closing deals on the show floor. Attracting decision makers from OEMs, auto component manufacturers and machine builders from May 29 - 31, 2014 at the Auto Cluster Exhibition Centre, Chinchwad, Pune, the trade fair witnessed more than 3,000 trade visitors over its three-day run. Over 100 brands chose this platform to showcase their latest innovations and manufacturing solutions to the Indian automobile sector. With visitors thronging the venue, the show established itself as a destination to access the latest cost-optimizing solutions in automotive manufacturing.

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Source: Messe Frankfurt Trade Fairs India Pvt Ltd

(LtoR): Exhibition Director, Messe Frankfurt Trade Fairs India Pvt Ltd, Sameer Khedkar; Commissioner, Pimpri Chinchwad Municipal Corporation, RR Jadhav; Managing Director, Messe Frankfurt Trade Fairs India Pvt Ltd, Raj Manek and other dignitaries at the inauguration ceremony of Automotive Engineering Show 2014

Inauguration

At the inauguration ceremony, Commissioner, Pimpri Chinchwad Municipal Corporation, RR Jadhav exclaimed "An event like Automotive Engineering Show targeting cost challenges faced by the industry is the need of the hour. I am glad that the show was organized in Pune, one of the biggest automotive hubs in the nation." He further stated, "With the large pool of a talented workforce and customer base, India is already on its way to becoming the world's biggest automotive hub. By bringing forward new innovations and facilitating interaction between manufacturers and OEMs, the Automotive Engineering Show serves as an important platform in taking this sector to the next stage."

On the occasion, Managing Director, Messe Frankfurt Trade Fairs India Pvt Ltd, Raj Manek said, "The automotive sector is the key driver of any growing economy. Combining our expertise in organizing automotive and automation sector fairs worldwide, we hope to transform this remarkable show into a world-class platform in the coming years. Together, with Automotive Engineering Show and ACMA Automechanika New Delhi, we envision to provide the Indian automotive sector access to more advanced solutions and make way for international partnerships and collaborations."

Product display

Spread across 3,000 sq mt of exhibition space, one could see pioneering technologies and products on display. Manager – ODEC (Pune), Product Creation & Delivery, Jaguar

Exhibitors as well as visitors participated in the show wholeheartedly, which led to good amount of business generation

Source: Messe Frankfurt Trade Fairs India Pvt Ltd

"Combining our expertise in organizing automotive and automation sector fairs worldwide, we hope to transform this remarkable show into a world-class platform in the coming years."

Managing Director, Messe Frankfurt Trade Fairs India Pvt Ltd, Raj Manek

Land Rover, Richard Cole said, "The location of the Automotive Engineering Show in Pune makes it much easier for automobile companies like ours to visit the fair and interact with professionals from the engineering services industries. The diverse selection of exhibitors here gives scope to more discussion with exhibitors for an overall understanding of the automotive engineering processes."

Panansonic's virtually indestructible Toughbook, the world's smallest, lightest, and most affordable contact/non-contact portable measurement system – The FARO Edge ScanArm ES, SICK's unique deTec4 Core safety light curtain, Water transfer printing process showcased by Autofina and the award-winning ECOPHOTOx-CR – Waste Coolant Recovery & Reuse System by Praj Industries grabbed attention and were some of the key highlights of the fair.

New product launches by 3C Solutions India Pvt Ltd, Bettinelli Automation, Steepgraph Systems Pvt Ltd, HumiSeal, Micromeasures Metrology Pvt Ltd and Axxon also enthralled visitors. "We encourage our employees to explore the unknown and in the process, create value for the company. The Automotive Engineering Show is one such important forum for our engineers to understand and review the latest technologies available in the market," said Officer – Engineering, Bajaj Auto Ltd, Aditya N Mishra.

Conference

Apart from the innovative display of products and solutions, the delegates and visitors also appreciated the knowledge sharing platform that the event created concurrently with the exhibition. The one-day conference on 'Lowering Costs in Automotive Plants' organized was also well attended. Participants unanimously agreed that low-cost automation to improve productivity and operational excellence was the need of the hour and the sessions coupled with real life case studies provided a good insight as to how one can implement these practices in their organization.

Sr. Project Manager, Bosch, Geeta V Karanjkar, remarked, "The Indian market is moving towards hybrid cars and battery operated technologies. The subject of automation in the automotive industry was rightly taken up at the Automotive Engineering Show seminar as the industry is moving towards automated processes. Some of the sessions were really interesting. As an industry professional, it helped me learn small things which can improve productivity and lower costs. I hope to see more direct strategies and solutions being put forward in future editions."

One of the speakers at the seminar, Ex-General Manager, Tata Motors, Anil Parasharami averred, "The Automotive Engineering Show is an excellent platform where you can network with experts from various fields and exchange new ideas. I had a very good experience at the seminar. The audience was very responsive. Platforms like these help in triggering new concepts and ideas that can take the industry to the next level."

Conclusion

Shows such as the Automotive Engineering Show create a technology-focused learning environment. In order to help the industry grow, it is imperative that the Indian auto component industry comes together and puts forth cutting-edge manufacturing solutions for the sector. MMI

Source: Messe Frankfurt Trade Fairs India Pvt Ltd

Visitors taking a closer look at the at exhibitor's displayed technology

Encouraging Industrial Growth through Innovation and Technology

ACMEE 2014, a biennial event, in its 11th edition brought with it a plethora of innovations and technology for all things concerning the manufacturing sector and allied services. The five-day exhibition provided an ideal platform for networking with industry stalwarts and bearing witness to the latest innovations and trends.

ACMEE 2014 was recently held at the Chennai Trade Centre, Chennai from July 19 – 23, 2014. Organized by the Ambattur Industrial Estate Manufacturers' Association (AIEMA), the biennial event in its 11th edition witnessed the coming together of the best in the industry. Not only exhibitors but also visitors gathered at the venue with great enthusiasm. The event witnessed a record number of 45,600 visitors.

Chief Guest, Managing Director, Wheels India Ltd, Srivats Ram inaugurated the event in a ribbon cutting ceremony along with the Platinum sponsors—Managing Director, Ace Micromatic Systems, P Ramdas; Deputy Managing Director, Yamazaki Mazak India Ltd, S Ravi Shankar, and Managing Director, Schunk India, Satish Sadasivan, and committee members of AIEMA.

Nedra Pereira
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A future of possibilities

At the inauguration, Chairman, ACMEE 2014, S Chandrasekaran, enthusiastically welcomed the audience to the international machine tools exhibition. Extremely happy with the overwhelming response of participation, he claimed, "Around 450 exhibitors have registered their participation including 120 participants from 25 countries. Additionally, machine tool manufacturers from Japan are partaking in a big way in this edition—11 per cent of the entire exhibition space has been bought by them—which is an indicator of how ACMEE is proving to be an ideal international platform."

Chief Guest, Srivats Ram addressing the audience averred, "ACMEE 2014 has set the stage for growth. The industry must gear up for the growth phase and invest in getting ready for the upturn. Better times are ahead of us and with the new government taking lot of initiatives to boost the industrial growth, we as the industry must also do everything possible to ride the curve." Speaking on the necessity of technology upgradation, he continued, "As 60 per cent of machine tools are bought by component manufacturers, I urge the machine tool builders to update machine design to incorporate advancements such as digitization, adaptive controls, etc., that will make systems more transparent, reduce costs and reduce change over times. If machine builders incorporate these changes now, they will be able to reap the benefits in the future when demand increases."

Source: ACMEE

Dignitaries at the ribbon cutting ceremony of ACMEE 2014

Further highlighting the importance of the event, Chairman, ACMEE 2014, S Chandrasekaran stated, "With world leaders in the field of machine tools participating, the trade show has the potential to act as the best marketplace for sourcing the latest and the best in machine tools."

The product display at the event was spread over 18,000 sq mt of exhibition space across four halls, namely the AMS Hall (Hall 1), Mazak Hall (Hall 2), Schunk Hall (Hall 4) and Hall C (Hall 3) of the Chennai Trade Centre.

Unique launches

The exhibition had on display everything concerning the manufacturing sector, i.e., CNC machines, CNC and PLC controls, CAD/CAM systems, special purpose machines, cutting tools and accessories,

hydraulics/pneumatics, instrumentation and so on as well as related IT and consultancy services, etc. Various launches were also seen at the event. One worthy of mention was the launch of the World's 1st CNC in one of India's oldest languages — Tamil by FANUC India Ltd (FIL).

Till now, no other global CNC manufacturer has given any attention to Indian languages. The idea came to FIL as they observed the CNC market grow to a peak of 16,000 units per year. This directly translated to a need for about 48,000 additional operators as Indian manufacturing is yet to adopt robotic automation.

"We observed that the acute shortage of operators was mostly being met by untrained manpower who were neither comfortable with machines nor with English," asserted Kulkarni. "In fact there have been instances where FIL witnessed women operators who carried sheets of commands in English (which they simply cannot read) and the equivalent in Tamil just to get their job done on a daily basis," she continued. With this effort, FANUC believes it will improve not just the life but efficiency of such operators substantially.

Exhibitor speak

ACMEE 2014 was a lively stage. A few of the exhibitors gave their views on the importance of the show and the opportunities it provides. "It's our first time participating at ACMEE 2014, and it has provided us with a platform to connect with our customers and also gives us the opportunity to meet potential customers and get new leads whilst showcasing the latest developments of the company, " avered Dy Managing Director, Yamazaki Mazak India Pvt Ltd, S Ravishankar.

Industry veteran Managing Director, ACE Manufacturing Systems Ltd, P Ramdas spoke about how Chennai gave his company the encouragement to reach the position the company is currently in and hence always look forward to participating at ACMEE. He commented, "We have participated at various editions of ACMEE. The Chennai market is the reason why we grew; it gave us our start. Participating at ACMEE allows us to reinforce our commitment to our customers. Becoming sponsors for the event allows us to give back to the locals the opportunity that was given to us."

Agreeing with the sentiment of Chennai being a the ideal venue for an event like this, Managing Director, SCHUNK Intec India, Pvt Ltd, Satish Sadasivan said, "Chennai is an important hub for the automotive sector as 33 per cent of automobile output comes from here. The show attracts quality crowd and decision makers; hence, we as exhibitors look up to ACMEE especially in terms of generating new business. For start-ups, ACMEE is the best platform."

ACMEE 2014 AT A GLANCE

Visitors: 45,600
Exhibitors: 450
Country participation: 25
Area covered: 18,000 sq mt

International participation

ACMEE 2014 proved to be an event of international caliber. Around 25 countries including Australia, Canada, China, Denmark, France, Germany, Italy, Japan, Malaysia, Norway, Poland, Russia, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, the Netherlands, Thailand, Turkey, UAE, UK, and the US participated at the show, along with two country pavilions, viz., Korea and Taiwan.

Concurrent events

The exhibition also witnessed a series of technical discussions and seminars. Additionally, an International Conference on Manufacturing Technology was also organized by the Chennai Institute of Technology, the academic partner of ACMEE 2014, during the event.

AIEMA's efforts

ACMEE is an opportunity to showcase what Chennai has to offer to not only the entire country but also the world. AIEMA has, over the past 50 years, taken many initiatives up with the intention of growth of small and medium scale sector units in the Ambattur Estate, in Chennai, such as the AIEMA Common Creche, AIEMA Silver Jubilee Trust, AIEMA Civic Exnora, etc. President, AIEMA, VK Parthasarthy touched upon these initiatives and concluded on the note of wishing the participants, "I look forward to seeing all of you in our 12th edition in the year 2016." MMI

Recharging the Industry with New Opportunities

As the Indian machine tool industry is set to take a leap, AMTEX 2014 is looked upon as an enabler for the same. The fair is expected to reflect the changed perceptive of the industry towards the market, which subsequently will translate into business generation. Read on to know more about the ninth edition of AMTEX.

As per the recent industry survey, the Indian machine tool industry stands 13th in production and sixth in the consumption of machine tools in the world. The country is, therefore, set play a key role in the global landscape of the machine tool industry. However, the industry has lately been hit by unfortunate market conditions. In such a scenario, Triune Exhibitors Pvt Ltd has organized AMTEX 2014 (Asian Machine Tool Exhibition) to help encourage the manufacturing and machine tool industries by providing it a sorely needed formal environment to generate more business. The ninth edition of AMTEX 2014 is scheduled to be held at Pragati Maidan, New Delhi during July 25–28, 2014.

Talking about the show, Managing Director, Triune Exhibitors Pvt Ltd, Cyril Pereira said, "Since its inception in 2001, AMTEX has grown phenomenally to become one of the largest shows in machine tools, machineries and manufacturing industries in the country. The exhibition is an effort to create a knowledge-sharing forum for these industries."

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Global participation

In order to create a right platform for the latest technologies and solutions, the venue plays an important role. For this show and its exhibitors, the Delhi and NCR region presents immense prospects. With the large market, significant resources and conducive investment policies, NCR is proactively attracting national and international investors towards it. Regions like Gurgaon and Noida have attracted MNCs, which have in turn made way for R&D activities in this region.

Source: Triune Exhibitors Pvt Ltd

The view of the previous edition of AMTEX

"With the present stable government in place and optimism all around, the participation profile of AMTEX 2014 exhibition with the prospective visitors from the automobile sector/s in the North, there is definitely a scope for meeting these challenges."

Managing Director, Triune Exhibitors Pvt Ltd, Cyril Pereira

However, the region has equal presence of micro small and medium enterprises (MSME). Talking about the same, Pereira noted, "The Northern region is dominated by MSME units producing conventional machines. Hence, participation at AMTEX 2014 in New Delhi will be a distinct advantage for these units, wherein they can learn more about new technologies especially from giants and foreign participants."

Against this backdrop, comparing the Indian industry with others he added, "In the modern times of 3D printing and composite manufacturing, technology is changing as if there is no tomorrow. On the other hand, the Indian machine tool industry still largely follows traditional processes, uses dated equipment, and remains at the mercy of overseas suppliers for precise and sensitive parts such as CNC systems, ball-lead screws, guide-ways, etc.,"

In this scenario, Pereira feels that AMTEX is the ideal platform for the MSME sector to rub shoulders with the giants in the machine tool and manufacturing sectors. Apart from the small scale and giants from the Indian industry, it is a forum where foreign companies also participate enthusiastically. This edition of AMTEX would witness separate pavilions from countries like Taiwan, China and Korea while there is also a sizeable participation from Germany, Turkey, Singapore, Japan, etc.

With this right mix of Indian and foreign exhibitors, visitors are certain to witness a plethora of display of new launches and technologies. As the exhibition caters to varied industries, the organizers are expec-ting fervent footfall from professionals across industries such as aerospace, automobiles & auto components, defense, medical engineering, railways, capital goods, etc.

Meeting challenges

Such collaboration of professionals from varied industries would help the industry meet challenges that the whole manufacturing industry has been facing for the last few years. "The machine tool industry has been quite drastically affected by uncertain market conditions. Piles of ready machines built against confirmed orders lie in wait for months as the customers dilly-dally to pick them up. The workforce is disenchanted because of low or no rewards. The dog-eat-dog competition is relegating business ethics and norms to the background," said Pereira.

However, according to Pereira the situation seems to be changing. He observed that "With the present stable government in place and optimism all around, the participation profile of AMTEX 2014 exhibition with the prospective visitors from the automobile sector/s in the North, there is definitely scope for meeting these challenges."

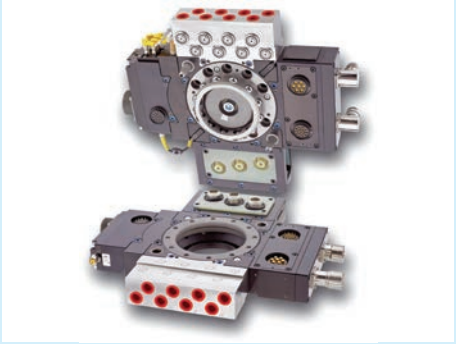
Conclusion

With the overwhelming response from the exhibitors and their positive attitude to beat the adverse market conditions, outcome of the exhibition is also expected to be satisfying. Considering the changed attitude of the industry and its optimism, Pereira concluded by hoping that AMTEX 2014 will offer a galore of opportunities to each participant. MMI

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

Miniature Gripper

The precision version of the miniature parallel gripper MPG-plus from SCHUNK has been specifically developed for the automated assembly of electronic components and other small parts. The standardized module has been manufactured with tolerances that are tight enough so that high-precision applications are feasible. Its exchange accuracy amounts to 0.1 mm, the eccentricity of the gripping center amounts to 0.05 mm, and the equal height is 0.02 mm. The maximum accuracy of the mounting surface to the clamping center is always ensured. With this precision gripper, even filigree parts can be exactly positioned. Moreover, it is possible to locate several modules next to each other on a mounting surface at the same height.



Heavy Load Change System

With SWS-L heavy load change system from SCHUNK, users can experience sophistication of modular quick-change systems. The series is suitable for the quick changing of large stroke grippers, vacuum lifting devices or welding tongs and for pneumatic or electric tools. The quick changing head and adapter are pneumatically interconnected on the SWS-L by a self-holding interlock system with integral sensors monitoring the interlock. The patented 'No-Touch-Locking-System' allows the secure interlock of the quick-change system even if the head and adapter are still up to 2.5 mm apart. The square modules of the SWS-L have a standard screw-on flange on all four outside surfaces.

Compact Powerhouses

On the basis of the company's experience with the first PowerCube generation, which has been successfully used in laboratory, research, and industry applications, SCHUNK has further developed the modules of the second PowerCube generation. This time the company has focused on heavy-duty use in industry. With the PR 2, PDU 2 and PSM 2 high-performance rotary modules, SCHUNK has expanded its mechatronic program with three especially compact drives with compact performance. All regulating and power electronics have also been fully integrated into the new modules. This saves the need for an external controller, minimizes the cabling necessary and reduces susceptibility to errors.

Pick and Place in Confined Spaces

SCHUNK has added the pneumatic rotary lift unit DRL 20 to its program for modular high-performance assembly and hence the size of the unit has become more compact. This unit allows highly dynamic and smooth pick and place operations in confined spaces of the complex assembly plants, assembling electronics, medical and consumer goods with rotating angles of 90° or 180°. Its minimum pivoting radius amounts to 42 mm, measured from the center to the mounting surface. Since the unit is directly located between the pick and place position, space-saving handling solutions can be implemented. Since the unit is positively driven behind the movement of the vertical cylinder and the rotary drive by a cam roller, both can be switched sooner. The added advantage is, compared with conventional rotary lift units, the cycle time is considerably shortened. At minimum loading and a rotation angle of 180°, 75 cycles per minute can be achieved.

Mobile Gripping Systems

SCHUNK has optimized its 5-finger hand concept study. The motor controllers have been completely integrated in the wrist of the latest anthropomorphic gripper hand, and therefore very compact solutions are available. Via defined interfaces, the gripper hand can be connected with the lightweight arm. For mobile applications, the energy supply of the 5-finger hand requires a battery-servable 24 V DC. The gripper hand is available as a left and right hand version. It is amazing how much it resembles its human model in size, shape and mobility. By means of nine drives, its five fingers can carry out various gripping operations. Moreover, numerous gestures can be constituted, whereby the visual communication between human and service robot is simplified and the acceptance for applications in the human environment are increasing.

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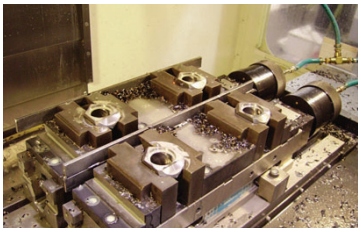
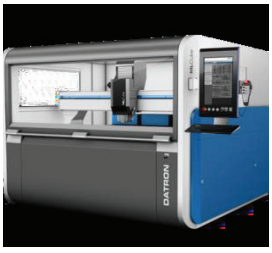
High-Pressure Vice



The twin high-pressure vice from Arnold allows the clamping of different different types of components at ease and at less cost. Vice comes with a spindle integrated with a hydraulic pressure booster, which boosts the pressure up to 40 KN just by using hand rotational movement. Furthermore, it has a pressure regulator that controls the clamping force at different intervals. This enables clamping rigid components at high-pressure and slender components at accurate and lighter pressures. Additionally, this equipment can be operated manually, pneumatically with minimum pressure of 6 Bar and by hydraulic pressure with 300 bar.

▸ **Fresmak Arnold Precision Engineering Pvt Ltd**
T: +91 (080) 6765 4250, E: info.india@fresmak.com
www.fresmak.com

Machining System



DATRON has recently released MLCube, a new machining system. This latest system is the best choice for cost-effective sheet machining, for example, for the production of front panels, housings, profiles and other aluminum workpieces milled in nested form. Other non-ferrous metals or composite materials can also be processed efficiently with the system. Its short setup times and ability to use different clamping techniques simultaneously provide long-term and extremely high profitability. Moreover, low power consumption and excellent price-performance ratio even for low production volumes adds into the profit.

▸ **DATRON-India**
T: +91 (080) 26765265, E: info@datron.co.in
www.datron.co.in

Insert for Shoulder Milling Application

TaeguTec has lately introduced WNGX 08, a tool that compliments the company's existing 6NGU 06 and 09 inserts for shoulder milling applications. The newly launched tool is a double sided insert that is most suited for shoulder milling applications at lower to moderate cutting parameters. It consumes less power than any other conventional four-cutting edge positive shoulder milling inserts. Some of the dominant features of the insert are 6 cutting edges, 90° approach that is suitable for face milling and shoulder milling. The insert is applicable for cast iron, steel and stainless steel components with suitable grades.

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

Heavy Duty Cylindrical Grinding Machine

Danobat's moving table grinding (HG) machine range has been designed to fulfill the requirements of wide range applications that combine external, internal, face and taper grinding of components such as transmission shafts, electric motor shafts, gas and wind turbine shafts, railway shafts, machine tool shafts, landing gear components, etc. The machine base and sub-assemblies are made of stabilized perltic iron. In order to obtain the maximum machine performance, HG machines can be equipped with in-process measuring systems, automatic wheel balancing system incorporating gap and crash, axial positioning system and taper correction systems, etc.

▸ **DANOBAT Group India**
T: +91 (020) 66064531, E: danobatgroupindia@danobatgroup.com
www.danobatgroup.com

Double Column Radial Drill Machine

Prakash Engitech Pvt Ltd has recently introduced Prakash DC410 – 42 mm, a double column radial drill machine. It features a double column structure with 225 mm Dia column with its inside ribbed. All gears, shafts, pinion, spindle and quill are made up of NiCr steel with a hardness of 50-55 HRC. It is equipped with 12 spindle speeds and six autofeed options with near geometric progression for all processes like drilling, reaming, boring, etc., to be done. Additionally, overload safety clutch ensures protection of tools and machines.

▸ **Prakash Engitech Pvt Ltd**
T: +91 (0) 9898142441, E: sales@prakashmachines.com
www.prakashmachines.com

Vertical Honing Machine

Wendt has launched CNC Vertical Honing Machine E3500S. This addition to the company's family of honing machines is made by keeping the precision honing needs of various components manufactured for mass and batch production application in mind. It is a versatile machine with tool expansion and stroking speeds through servo drive with Siemens' control systems. Moreover, it is equipped with a stroke of 500 mm with diameter ranging from 3-25 mm with rotary indexing table and in process gauging as optional.

▸ **Wendt (India) Ltd**
T: +91 (4344) 276851, E: SajuAbraham@wendtindia.com
www.wendtindia.com

Train Your Engineers at IMTMA Design Institute

IMTMA has taken a positive initiative in providing state of the art facilities and industrial expertise to establish a high-end Design Institute at Bangalore for the cause of moulding engineers into specialized machine tool designers. The training programmes offered by IMTMA Design Institute are structured very systematically to provide the participants an in-depth knowledge in the subject of machine tool design and an orientation of the industry. This is complimented by hands-on group projects and plant visits that emphasize the development of practical design skills of the candidates.

Experienced design faculty with ample industry exposure guide the participants and enable them to achieve highest standards of professional expertise. Participating candidates have been associated with Bharat Fritz Werner, Batliboi, Kirloskar, CUMI, MGTL, Toyota Kirloskar Textile Machinery, Mechlonics, Colton Industries, Klad On Industries and UCAM etc.

Indian machine Tool Manufacturers' Association
@ Bangalore International Exhibition Centre (BIEC)
10th Mile, Tumkur Road, Madavara Post, Bangalore - 562 123
Tel : 080 6624 6600 ; Fax : 080 6624 6661 ; Website : www.imtma.in

For details contact -

H. V. Rajashekara
Director - Design Institute, IMTMA
tel : 080-66246808 email : rajashekara@imtma.in
cell : 9740192645

Crown Wheel Deburring Machine

Grind Master offers an automatic machine for deburring both edges of the tooth simultaneously with two deburring heads. Crown wheels or gears up to 450 mm dia and module from 1 to 10 mm can be deburred. The job rotation speed can be varied from 1 to 6 rpm by AC speed variator. The job axis can be swivelled to the extent of 20° to obtain uniform chamfer quality. The deburring heads have all round easy adjustments to take all types and sizes of gears.

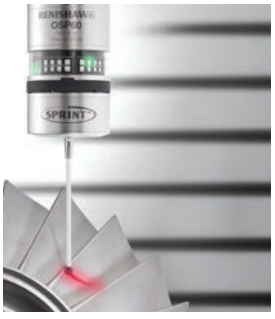
▸ **Grind Master Machines Pvt Ltd**
T: +91(240) 2374104, E: sales@grindmaster.co.in
www.grindmaster.co.in

Core Drilling Machine

FEIN core drilling unit features an ideal power/weight ratio and extended drilling capacity. Also, it is equally good at performing installation jobs as well as in the workshop. With its compact dimensions and rugged construction, the unit is ideal for working in confined spaces. It is easy to attach to the workpiece and high magnetic holding force enables reliable and safe working. FEIN's core drilling unit is not only durable, powerful, precise and cost-effective butit is also one of the safest tools on the market.

▸ **FEIN Power Tools India Pvt Ltd**
T: +91 (044) 43578680, E: info@fein.in
www.fein.in

Scanning System



The Sprint system from Renishaw incorporates a new generation of on-machine scanning technology that will deliver a step-change in the benefits of process control, enabling fast and accurate form and profile data capture from both prismatic and complex 3D components. The machine's tool scanning system has been designed to provide a game-changing capability for high value CNC manufacturing processes. For multi-task machining applications, the Sprint machine tool scanning system offers users new process control capabilities, including exceptionally repeatable diameter measurement cycles.

▸ **Renishaw Metrology Systems Ltd**
T: +91 (080) 6623 6000, E: india@renishaw.com
www.renishaw.co.in

Stand Alone Marking Machine

Gravotech offers Stand Alone Marking Machine, which features very easy installation. Users can just unpack and plug and start marking. The all-in-one machine consists of a keyboard and software. Also, it features all the traceability functions such as text, counters, dates, serial numbers, data matrix codes, logos, etc. Thanks to wide screen and graphic preview, users can easily create their marking files. Additionally, logos (.plt) and files can be exported or imported via USB.

▸ **Gravotech Engineering Pvt Ltd**
T: +91 (020) 41030000, E: contact@gravotech.com
www.gravotech.com

Accurate Form Tester

Carl Zeiss offers RONDCOM 54, a highly accurate form tester. It delivers higher throughput through fast and automatic alignment. Its large deflection range, high resolution of the detector and stylus system also contribute towards accurate output. Moreover, it features more precise measurement via CNC pivot around the measuring sphere. The instrument is available with SD version with different bases and tables or as a space saving DX version with active vibration insulated measuring table and integrated computer.

▸ **Carl Zeiss India (Bangalore) Pvt Ltd**
T: +91 (080) 4343 8000, E: imtindia@zeiss.com
www.zeiss.co.in

Direct Drive Rotary Table

The latest UDDR-T-200/100 model from UCAM is a high dynamic performance direct drive rotary table, which drastically reduces component machining cycle time in demanding working conditions. With much lesser number of parts as compared to conventional worm gear driven rotary table, this direct drive rotary table has high acceleration / deceleration characteristics and reliability. The table has peak speed of 200 RPM and clamp torque of 650 Nm at 5 bar pneumatic pressure. With these features, the table is ideally suitable for present day high speed machining centers for varied precision applications for both indexing and rotary interpolation applications.

▸ **UCAM Pvt Ltd**
T: +91 (080) 40744777, E: sales@ucamind.com
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Indian Machine Tool Manufacturers' Association
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