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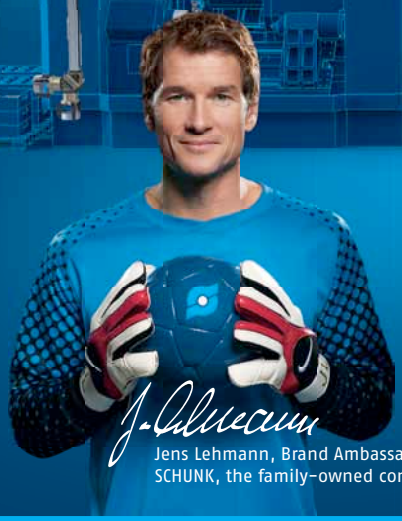

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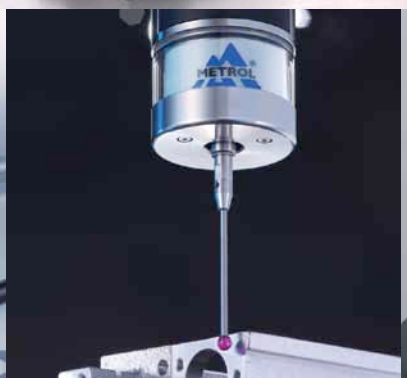

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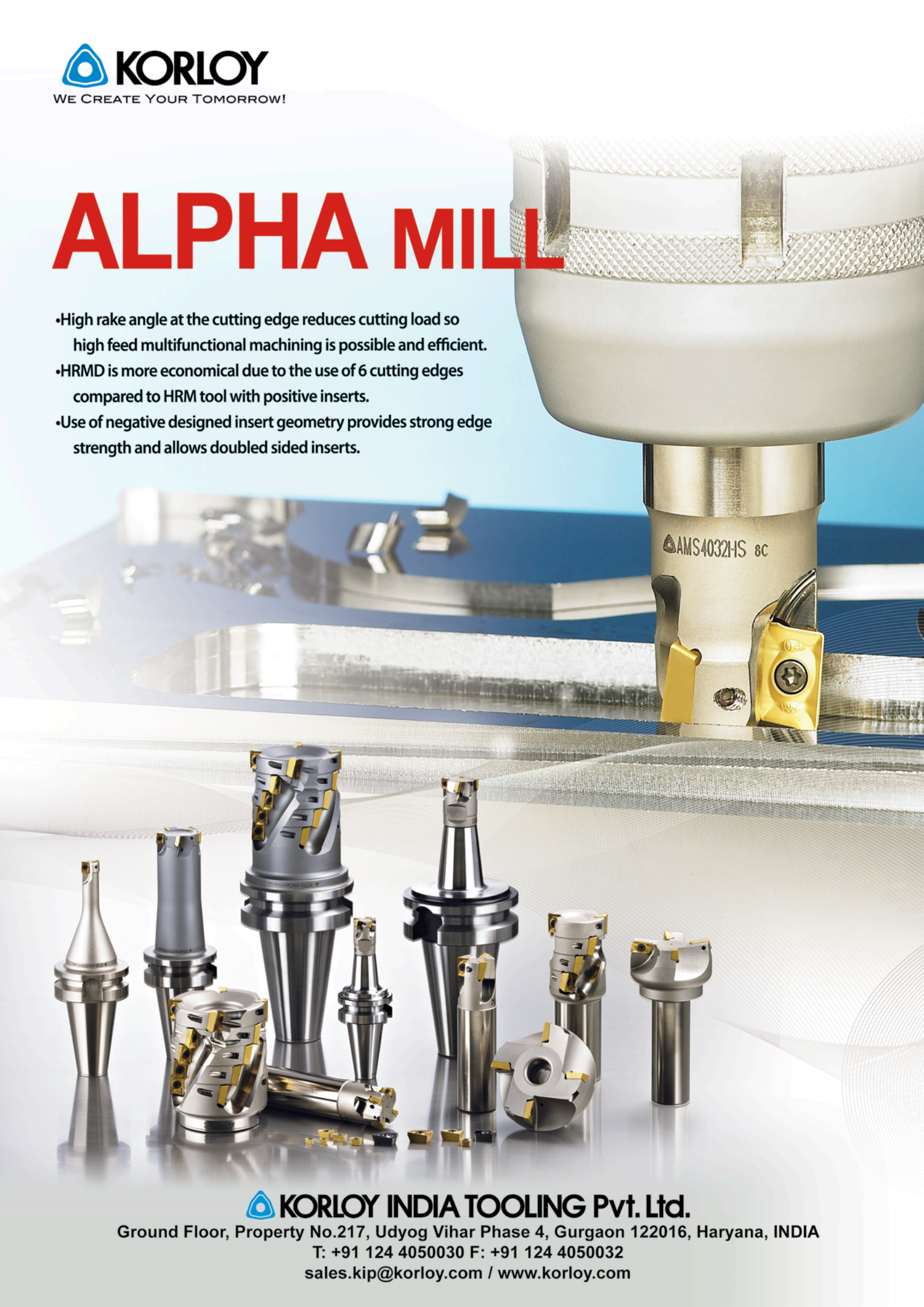

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L Krishnan
President, Indian Machine Tool Manufacturers' Association (IMTMA) &
Managing Director, TaeguTec India Pvt Ltd

Putting Growth Back in Manufacturing

A famous and well-proven adage, "With great power comes great responsibility" testifies what most of us in the corporate confront ever so often, if not daily. One such great responsibility bestowed on me by the Indian machine tool industry is the presidency of Indian Machine Tool Manufacturers' Association (IMTMA). I am honored and humbled by the gesture, and the faith that my industry has shown in me.

Though our industry is in the thick of challenges given the current economic conditions, I am immensely optimistic about the industry's ability to tide over these tough times. IMTMA is committed to supporting the industry in all possible ways including export development, government advocacy, training etc. The recent events and activities by IMTMA point to the endeavors made in this direction.

Modern Machine Shop (MMS) 2013 organized at Pragati Maidan, Delhi, turned out to be a spectacular forum for building partnerships between professionals, system integrators and customers. For a small show of its kind, MMS 2013 had a rich display and garnered good participation from across the industry. Exhibitors from countries other than India provided ample scope for international reach and networking. Overseas participation in shows like MMS lends a major boost to the SMEs in our country.

Indian participation at EMO 2013, Hannover, also had a lot to take away from the show. On one side, it was an excellent opportunity for our exhibitors to learn about new and innovative developments in the world of manufacturing technology, and on the other, long term business relationships were forged.

To support our SME segment, IMTMA, with support from UNIDO, also organized a technology mission of 20 CEOs to visit EMO 2013 and interacted with Spanish companies in the Basque region of Spain. The main objective of the mission was to expose our Indian SMEs to the latest technology trends exhibited in EMO 2013 along with promoting mutually beneficial technology tie-ups between Indian and Spanish manufacturers.

I would like to conclude by calling upon the industry in India to join hands with IMTMA towards bringing back robust growth in the manufacturing sector and for positive change in the long run.

In this edition of MMI, know more about the recent initiatives of IMTMA in connecting the Indian manufacturing industry with the global customer base. I hope it will prove useful for all the readers.

I wish you all good luck and good cheer this year end.

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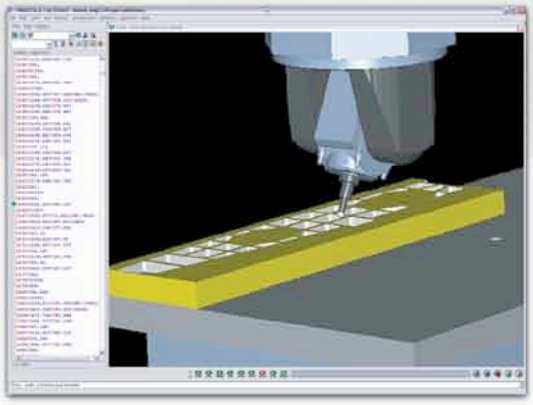

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Accomplishing Mammoth Feats

India jubilantly celebrated its mammoth financial accomplishment and technical milestone lately with the successful launch of Mars orbit mission or 'Mangalyaan'. It is said that the entire Mars mission costed the Indian Space Research Organization (ISRO) a mere ₹450 crore and took around 15 months to put together. While drawing a comparison, it was reported that the NASA's similar MAVEN Mars project costed 10 times more and took three times longer. The way ISRO has reduced satellite assembly costs to a tenth of NASA's, given its shoestring budget of $700 million (₹4,270 crore) in 2012-13, speaks volumes of its remarkable achievements.

Hence, this latest feat is widely quoted as an example of frugal engineering and India's ability to produce high-end technology at parsimonious costs. Similarly, it was heartening to see the perception of the global audience changing towards the Indian manufacturing sector in the recently concluded EMO-Hannover. The overwhelming acceptance of the brand 'Made in India' machines reflected how the machine tool sector has come of age in terms of technology and automation offerings. The deluge of footfalls in the Indian exhibitor stalls clearly established that Indian manufacturing has set a benchmark for itself by adopting the best-in-class manufacturing processes.

"The overwhelming acceptance of the brand 'Made in India' machines reflected how the machine tool sector has come of age in terms of technology and automation offerings."

In this context, we present in this issue, the significance of Total Quality Management and many other end-user stories that highlight the importance of adopting advanced technology and approaching the right manufacturer.

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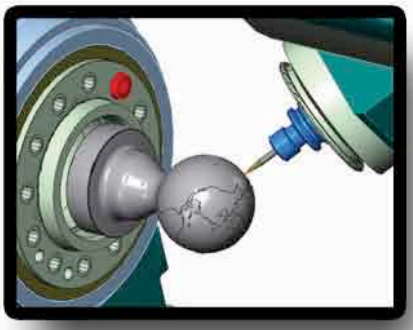

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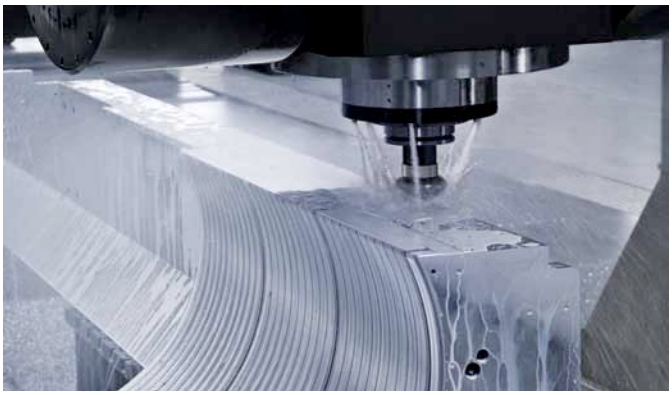

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Connecting Indian Manufacturing with the Global Market

In the current age of competition, every company looks for global partners and clients to enhance its business. In the machine tool sector, Indian Machine Tool Manufacturers' Association (IMTMA), helps Indian companies grow and expand abroad with its various initiatives.

Indian machine tool manufacturing, a US$800 million estimated industry, currently ranks number 13th on a global ranking in production. Over the years, the industry has improved to see overall growth in dollar terms. Simultaneously, capacities and facilities of the machine tool companies have also improved and are today regarded at par with the global standards. However, the stagnation due to current economic trends and global recession has put the industry on a back foot. Now that, the Indian consumption growth also has slowed down, what is the way forward for the Indian manufacturing industry? Unless the industry successfully connects to new global markets and makes its credentials accepted worldwide, the current scenario is unlikely to change.

Source: IMTMA

Indian manufacturing industry

For this, Indian manufacturing industry needs to concentrate on its exports. As per the study conducted by IMTMA, Indian machine tool manufacturing industry majorly caters to segments such as auto, defense, railways, power and consumer goods. The overall Indian exports have been to the tune of US$40 million, merely six per cent of the total turnover. Majorly concentrated in Bangalore and represented to some extent in Chennai and Coimbatore in South, a few pockets like Pune, Mumbai and Rajkot in West, and Delhi NCR and Ludhiana in North, the Indian machine tool sector is well organized by IMTMA. The association stands as the single point of contact for around 1,300 companies in this sector. Over a period of time, the Indian manufacturing sector has matured enough to cater to global standards in terms of quality and reliability through high-end technology and lean, efficient manufacturing.

Global scenario

Global consumption of machine tools has been around US$85-87 billion for the last two-three years. Here, China, US, Japan, Germany and Korea precede India, pushing it to a number 6th worldwide. By all standards, China is the biggest producer and consumer of machine tools worldwide whereas Japan, Germany, Korea and even Taiwan have positive production to consumption ratios as per a study in 2012. Consumption in most south east Asian countries has increased over last few years and European markets have began to concentrate their efforts in selling to such

Source: IMTMA

UCAM participation at EMO 2013

new-found markets. India needs to brace up and utilize all its efforts towards building a positive net production story.

When only six per cent of its entire production is used for exports and 65 per cent of its consumption is met by imports, Indian machine tool industry has a long way to go to compete with Japan, Korea, Taiwan and Germany on the global arena. With inroads into Chinese markets and encouraging results from Germany, France and Russia, Indian manufacturers feel confident of matching the required standards and competing on the price war with global players.

Maximizing Participation

- UCAM has participated in most of the trade delegations and technology missions till date. Over the last five years alone, the company has participated in more than ten such missions to Korea, Germany, Turkey, Chicago, Russia and many more. With the help of aggressive marketing overseas and in machine tool publications, the company could soon set up its German branch by name UCAM GmbH in Stuttgart. This subsidiary has now grown enough to have a decent budget for conducting marketing activities overseas.
- Today, its export department is much rejoiced on the overall experience and response from the recently concluded EMO participation lead by IMTMA. UCAM is exporting to countries like Italy, UK, France, Germany, Turkey, China, Thailand etc.

IMTMA's initiatives

IMTMA has been spearheading a transformation in the machine tool industry in India. Whether as an advocacy to government or being instrumental in bringing new technologies to the shore, in organizing mega trade fairs and in being the sole point of contact for the metalworking industry in India, IMTMA has been in the forefront for the last 67 years. With its vision documents, policy effecting initiatives, export development efforts, training endeavors and confidence building measures in the industry, IMTMA stands committed to lead the industry higher.

To connect to global markets, Indian companies need initial handholding in terms of participation, networking and at later stages, building joint ventures and establishing overseas offices and brand building exercises on foreign waters. Providing a clear road map for developing exports and guiding the industry in achieving its potential through productivity building and competitiveness enhancing initiatives, IMTMA has yet again come forward to the cause of the industry.

Before entering the global markets on a large scale, Indian companies will have to look inward to find answers to questions related to various aspects such as quality and reliability standards, competing with other Indian players, delivery and maintenance issues and setting up offices on foreign shores. Lately, bigger Indian companies have established successful marketing offices in

Connecting the dots in China

- Ace Micromatic Group had been participating in CIMT as part of the IMTMA group participation since 2005. Since then the event has been a platform for the company in China to showcase its products in the Chinese market.
- To achieve this goal, the company started the Chinese market study by sending research teams for a year in 2005-06. These teams conducted a study to understand the Chinese industry, local market, competition, dealers and distributors network and legal and commercial issues of operation.
- Though a complex market, the company figured several options on how Indian players could enter the market. Further to this market research, the company realized that an internal control was necessary in the Chinese market to offer the products in local currencies to their customers. Hence, to achieve this goal, they started continuous activities to network and build the brand with dealers and partners by participating in several regional shows in China.
- As a result of these activities and efforts, a new company named Micromatic China was formed in 2007 to have a firm footing. Today, Micromatic China has two offices in the country and has sold over 300 machines till date.

Source: IMTMA

Technology Mission to Spain

countries like China, France, Germany and exports have been logged in towards China, Germany, UAE, Brazil; but it is sure that these efforts need further boost in order to mean anything significant.

Connecting India to the world

Widening their vision and focusing towards exports, the Indian companies have started to understand the importance of dollar and euro trade and IMTMA has taken many steps forward in order to connect the Indian manufacturing to the global market. One such initiative is to regularly participate in the international trade shows of repute. Recent participation of growing contingents from India have been led by IMTMA to the various machine tools events such as EMO, Germany (25), Metalloobrabotka, Russia (7), CIMT, China (6) and technology Missions to MF TOKYO, Japan (1), SPAIN (20); wherein the main areas of attraction were technology study and searching for partnerships. Few other significant participations have been on cards for Vietnam, Indonesia, Turkey, Italy and so on and modalities are being worked out by IMTMA to increase the Indian exhibitors' participation to a maximum.

It is interesting to note that a smaller island country like Taiwan has much larger participation in these reputed trade shows related to machine tools and the country has jumped to become the sixth largest producer of machine tools worldwide with a US$5.4 billion production figure. A significant amount of its production is exported to countries like China, Germany, Japan, US, Hong Kong, Singapore and most others in south east Asia. Indian players definitely need to sit-up and notice as plenty is there on stake.

Technology mission

On the home front, IMTMA has been extremely successful in creating a thriving ecosystem for the metal working and manufacturing industries to connect to their potential partners and customers from India as well as from across the globe. Apart from IMTEX, the flagship show organized by IMTMA on a grand scale, Modern Machine Shop (MMS) has also started to gain momentum and is attracting international participants from Belgium, China, Germany, Japan, Turkey and US.

IMTMA Technology Missions, organized with UNIDO, provide much needed impetus to SMEs by exposing them to the developments taken place across the world of metalworking. One such technology mission of 20 SMEs was recently taken to attend EMO 2013 in Germany and to visit various prominent metalworking units in Spain. These technology missions also help to understand the respective regional and local factors from up close and have been instrumental in creating a customer base and providing a networking opportunity for probable ventures.

Participating in various trade fairs around the world is a very important step in connecting with the global market. There are many parameters which influence attention of global customers. Is the quality of the Indian products acceptable in the global market? Is productivity of our Indian players at par with the international requirements? These questions still need to be answered. One major area for development is the productivity of our workforce. The Technology Centre set up by IMTMA has the solutions for improving the productivity and competitiveness of Indian metal working industry. IMTMA organizes about 150 training programs and short term seminars across a stream of diverse topics ranging from quality, productivity, reliability, maintenance, design to automation and manufacturing technologies.

Other initiatives

On the quality and technology front, IMTMA regularly organizes many international seminars and brings in renowned speakers and technology savants from the global metalworking industry for the benefit of the Indian audience. Organizing mega events regularly like Productivity Summit, International seminar on machining technology and International seminar on forming technology, IMTMA ensures that Indian machine tool players who do not have budgets for foreign market studies and technology study missions also can keep themselves abreast of latest technologies and in turn be ready for global market requirements.

Indian machine tool companies are on the right path in establishing their brands globally. IMTMA has taken many positive steps over the years towards connecting the Indian manufacturing with global markets. The association's initiatives include organizing trade fairs, leading Indian participation in major international shows, laying down a road map for export development, convening vision documents for the industry, initiating technology missions, imparting industry wide training and being the voice of the industry to the government for laying down guidelines and policies for the benefit of the industry. Connecting to the global market has become the need of the hour and IMTMA is leading the Indian machine tool industry on the designated path. MMI

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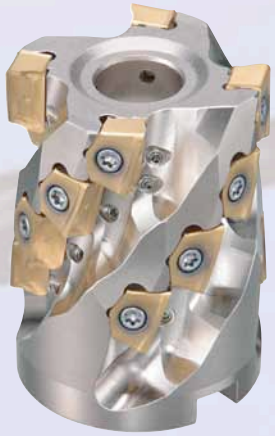

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BFW Receives Export Award

Source: BFW

(Fourth from left) Kerala Minister for Industries and Information Technology, PK Kunhallikutty awarding the Silver Shield for Star Performer - Large Enterprise' to BFW's R Keerthi

Thiruvananthapuram – Indian machine tool major, Bharat Fritz Werner, has been honored by the Government of India for outstanding export performance in 2011-12. Kerala Minister for Industries and Information Technology, PK Kunhallikutty awarded the 'Silver Shield for Star Performer - Large Enterprise' to BFW's R Keerthi in a ceremony at Thiruvananthapuram.

A majority of the company's exports in 2011–12 were to Renault plants in France, Turkey, Spain, Russia, Romania and Portugal. Honda plants in Japan and Thailand and manufacturing houses in Germany, Dubai and Ajman were other major recipients of the BFW products. While the ₹25 crore export largely consisted of special and regular machining centers, it also included the company's landmark product, general purpose conventional milling machines. The number of their products worldwide is close to 30,000. BFW is contemplating growth through measures usually considered unorthodox in the machine tool industry.

National Instruments Unveils Flagship Products

Bengaluru –National Instruments (NI) recently hosted NI Days 2013. The event was attended by more than 700 engineers, researchers and scientists. The keynote was delivered by President, CEO, and Cofounder, NI, Dr James Truchard. This conference highlighted the impact of NI technology on solving engineering challenges in India.

Source: NI

President, CEO, and Cofounder, NI, Dr James Truchard

The company introduced the latest version of LabVIEW system design software, LabVIEW 2013, that utilizes the most current and powerful technologies to make the design of complex systems more intuitive than ever. The software facilitates the management, documentation and debugging of increasingly complex systems. Furthermore, it adds support for the Linux Real-Time OS, giving developers access to dynamic, community-sourced libraries.

The event witnessed participation from NI customers and alliance partners across a range of industries including health care, semiconductor, aerospace, automotive, life sciences, robotics and telecommunication.

Siemens to Drive Skill Upgradation

Gandhinagar – Siemens in India is strengthening initiatives for skill upgradation of the industrial workforce. In line with this, it recently signed a Memorandum of Understanding (MoU) with the Ministry of Industries and Mines, Government of Gujarat for establishing five 'Centers of Excellence (CoE) for Skill Development' in Gujarat.

The first of its kind in the country, these CoEs will address diverse industry segments such as automotive, industrial machinery, industrial automation, aerospace, defense and shipbuilding. Siemens will manage the CoEs for two years and then will entrust it to the state government. Speaking on the occasion, Chief Minister of Gujarat, Narendra Modi said, "The agreement signed with Siemens for five CoEs is not just an academic activity, but an initiative to meet the emerging education needs and aspirations of not only Gujarat, but also our country as a whole."

Source: Siemens

Signing of the Memorandum of Understanding between representatives of Siemens and the Ministry of Industries and Mines, Government of Gujarat in the presence of Chief Minister of Gujarat, Narendra Modi (Center).

VDMA holds Engineering Summit

Source: VDMA

LtoR: Commissioner for Industrial Development & Director of Industries and Commerce, M Maheshwar Rao; Consul General of Federal Republic of Germany in Bengaluru, Joern Rohde; Senior Vice Chairman, Indian Institute of Finance, Prof Aman Agarwal; MD, VDMA India, Rajesh Nath, and MD, Foreign Trade Division within VDMA Frankfurt, Ulrich Ackermann

Bengaluru – The 2nd VDMA Engineering Summit was held lately at Bengaluru. Attended by around 110 members, the event offered a platform for knowledge exchange in the engineering sector and an opportunity to expand the network within VDMA members.

The summit started off with a welcome note from Managing Director, VDMA India, Rajesh Nath. He mentioned that the exports of German machinery to India touched €3.2 billion in 2012. The Chief Guest, Consul General of Federal Republic of Germany, in Bengaluru, Joern Rohde, reiterated the strengthening bonds between India and Germany. He finds immense potential for growth in the country but feels that it has been at a slow pace specially in the last few months.

The 3rd anniversary issue of the VDMA India Quarterly Newsletter - German Machinery Industry was also released on this occasion.

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Dagger Master, MPK and Zecha Expand their Range of Products

Mumbai – In order to be able to better serve the worldwide demand for high quality cutting, stamping and forming tools, three globally active partners, enhance the market through a strategic partnership for optimum sales channels and production plants.

Zecha Hartmetall–Werkzeugfabrikation GmbH from Königsbach-Stein, MPK Special Tools GmbH from Schwäbisch Gmünd and Dagger Master Tool Industries Ltd in Mumbai, India have joined hands to provide an extensive range of carbide tools. The products will ensure production quality and quantity in various sectors, such as the electronics industry, automotive, avionics and aerospace technologies, medical and pharmaceutical industries. In this partnership, more than 280 associates are responsible for the development, manufacture and marketing of high-quality and extremely precise cutting and stamping/forming tools to Europe, USA and Asia.

Source: Dagger Master

In the strategic partnership of Zecha Hartmetall-Werkzeugfabrikation GmbH, MPK Special Tools and Dagger Master Tool Industries Ltd, high-quality tools are sold worldwide. They manage the skills of the three companies (LtoR): Arjun Nevatia, Vidhu Nevatia, Reiner Kirschner and Stefan Zecha.

LMT Group Opens a Production Facility in India

Pune – The LMT Tools Division of the LMT Group has recently opened its first production plant for precision tools in Pune. The new factory, spread over 4,000 sq mt, produces tools for the car industry and general engineering.

Speaking on the occasion, Chairman of the Management, LMT Group, J Müller, said, "In recent years the Indian economy has developed rapidly and become increasingly important as a sales market for our products. The opening of our own production facility demonstrates our strong commitment and links with this country and our customers here."

Source: LMT Group

View of the factory building in Pune

CGTech and ZOLLER Join Hands

Bengaluru – CGTech, the developer of VERICUT CNC verification and simulation software, and ZOLLER, a leading presetting and measuring machine manufacturer and expert in the field of tool management, have announced a new product to better serve the customer base of the two companies.

"Our interface to the ZOLLER TMS Tools Management Solutions provides a direct link between VERICUT and TMS," said Product Marketing Manager, CGTech, Bill Hasenjaeger. "A complete set of cutting tools for a job are quickly and easily transferred from the ZOLLER TMS database to VERICUT."

VERICUT simulates CNC machining to identify errors in the NC programs (such as collisions, over-travel, gouges, etc.). Using the software, manufacturers can verify the accuracy of the program before it is loaded on the machine; thereby reducing or eliminating the need for time-consuming manual prove-outs.

"ZOLLER TMS Tool Management Solutions combines cutting tool information provided by cutting tool suppliers as well as actual physical tools that are scanned through the ZOLLER presetter and measuring machine product line in 3D," said President, Zoller Inc, Alexander Zoller.

Source: CGTech

VERICUT Software with the ZOLLER interface

HaasTEC Open House 2013 a Success

Manesar – The latest HaasTEC Open House event in India closed recently with glowing reports from exhibitors and visitors alike. Now in its third year, Haas Automation says the 2013 event proved even more popular than the two preceding editions. Staged at Manesar near New Delhi, the open house attracted over 1500 visitors from across the Gurgaon district and the wider State of Haryana.

The Haas Factory Outlet, a division of CNC Servicing and Solutions India Pvt Ltd, provided the venue for HaasTEC 2013, where visitors found a wide selection of Haas technology on display for applications ranging from high-speed milling to multi-axis turning.

"We had all six machines running continuously, cutting parts with aggressive parameters to showcase our machining capabilities, along with advances in tooling, programming strategies and workholding," said Managing Director, Haas Automation India, Terrence Miranda.

The excellent response from industry partners and visitors alike has set the stage for the next HaasTEC, which will be held in Navi Mumbai, a rapidly expanding township in western India from January 16–19, 2014.

Source: Haas Automation Inc

Visitors at HaasTEC Open House 2013

NORTH

EAST

WEST

SOUTH

Production, research and training - BFW milling machines continue to play key role in this jet-set age of machining across the country. Mr Sudhir Shanbhag of Paramount Engineers and Peregrine Apex down South bought his first BFW milling machine in 1984, and never looked back. Mr Sanjay Shah of Shah Hitech Auto Alcast in the East and Lubi Industries in the West use BFW milling machines for 15 years. Mr Ranjan Bhatia at Swam Pneumatics in North is using the BFW milling machine continuously since installation in 2007.

Bajaj Motors, Godrej & Boyce, L&T, Mahindra & Mahindra, Maruti Suzuki, Tata Motors, Indian Institutes of Technology ... the list of BFW milling machine users runs in thousands!

North, East, West and South, everywhere the BFW milling machine is relied upon. Is that news? Not really, but then, no news is good news!

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Ideating Concepts by Streamlining Processes

Munjal Showa Ltd was given an order to manufacture Bottom Cases for Honda Scooters & Motorcycle India. The company did not have the necessary equipment to machine this critical part. Here's an overview of how Munjal Showa brought about a solution that transformed a cumbersome machine into a lean one.

In 2010, Honda Scooters & Motorcycle India was developing a new design—Motorcycle KYJ. Munjal Showa Ltd (MSL) was given the order for a fresh design of front fork shock absorbers, with a very tight development time frame. On the request of then JMD, Munjal Showa, Terada San, a representative was sent to Showa Japan (Assaba Plant) to study the manufacturing process for KYJ manufacturing. The task was to bring back key takeaways in order to build in-house machines for the new operations capable of machining bottom cases.

Rakesh Atre
Associate Vice President - Business Excellence
Munjal Showa Ltd
ratre@munjalshowa.net

Design specifications

The required part to be manufactured was a bottom case. A bottom case is a part used in the front fork assembly of two wheelers. As per the agreement between MSL and Showa, Japan; design and other technical inputs were provided by Showa and the manufacturing was to be carried out at MSL's end. MSL did not have the authority to change or modify both parts as well as the process designs.

Source: depositphotos.com / Petr Ciz

A product's entire value stream can be streamlined through identifying and eliminating waste

KYJ bottom case processing

To study the entire process and understand the KYJ front fork manufacturing and assembling, the author went to Showa, Japan. To machine and manufacture the Bottom Case (BC), which is one of the critical parts in front fork assembly, 12 different operations are required, according to Japanese process design manufacturing. At the Showa plant, these 12 operations are done by seven machines that arranged in series. Layout of machines (Schematic 1) is done in a particular sequence. The fifth machine takes care of drilling, facing, chamfering and tapping operations and the sixth takes care of axel hole-slitting. The sixth was also a special purpose machine. Washing, leak testing and cleaning operations are carried out in last machine.

Challenges faced by MSL in processing BC

On evaluation of the process, it was discovered that MSL did not have two out of the seven machines required for the manufacture of BCs. The two were, namely, the fifth and sixth machines aforementioned. A solution had to be brought on that would compensate for MSL not having these machines. Both the machines were big occupying 64 sq ft and 70 sq ft of floor space, respectively.

Possible options available

In order to start manufacturing KYJ bottom cases, the company needed to install machines with the capabilities to do operations such as drilling, facing, counter chamfering, tapping and axle hole slitting operations. Three options were available:

- To import machines from Japan,
- To purchase machine from an Indian manufacture or
- To manufacture the machine in-house.

The major constraint in making a choice between the options was primarily cost, which was very high and unaccounted for in their existing plans, and the time factor as the project from Honda was bound under specific timelines.

Importing a Showa machine was the proven and easiest option available to the company but this option required a long lead time of over seven months and an investment of around ₹7.3 million. Hence, this option was not viable. The next option of purchasing a machine from an Indian manufacturer required approximately five months of lead time and an investment of around ₹4.6 million. Here too, the cost and waiting time were factors to declined the option. The third alternative was the most challenging one—which was to develop the machine in-house. This seemed to be the most practical decision both in terms of timelines and cost.

In-house manufacturing

MSL decided to build a machine that was leaner, smaller, with increased productivity and was operator-friendly. This was achieved by the incorporation of lean TPM concepts in rebuilding old machines and manufacturing new ones. The following steps were used to go about the entire process.

Step 1: Activity mapping of existing operations

Current activities of Showa machines were analyzed in detail and an activity map of both CNC and axle hole slitting machine (SPM) were developed. These activity maps were integrated together to develop a combined activity map for better understanding of entire processes. Based on this integrated activity map, the actions were divided into value adding and non-value adding ones. Customers pay only for value adding actions and hence time, money and energy spent on non-value adding actions were considered a waste; which had to be either eliminated or minimized.

Operations at CNC machine had 25 actions; out of these 25 actions only five were value adding actions. In the case of SPM only one action out of the seven actions was adding value.

Step 2: Eliminating non-value adding activities

It is essential to deliver high quality products at the lowest possible cost and time. In order to achieve this, only those activities that customers demand needed to be incorporated into the machine. More parts equate to break downs, and more break downs translates to less output. Majority of parts in both the Showa machines were not adding value to the operation; but increased the complexity of the machine and process.

Special tool design

The activities that were to be performed at CNC machine are Ø6.7 mm drill, Ø8.5 mm drill, facing operation using Ø20 mm end milling tool, counter chamfering operation using Ø12 mm drill, and finally M8 tapping operation. After analyzing the activity map of the fifth machine, it was found that in order to carry out these five activities the machine was performing fifteen non-value adding activities. Every value adding activity was supported by three non-value adding activities—picking the tool from Automatic Tool Changer (ATC) by Tool Gripper, carrying tool up to the job, and then the tool went back to home position to drop.

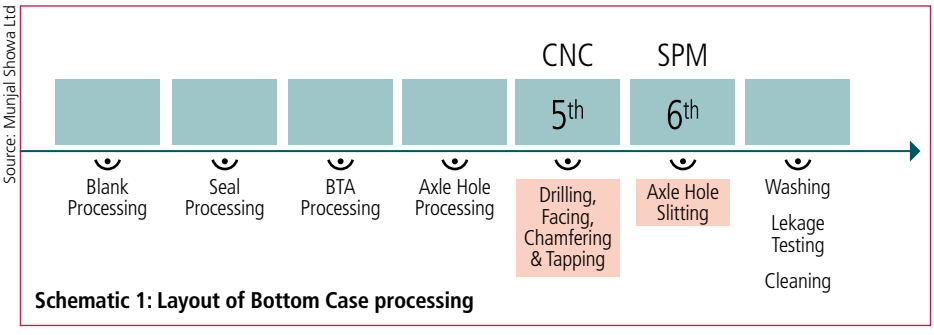
Furthermore, facilities like automatic tool changing sub assembly when added to the machine make it more bulky and complicated. To reduce the non-value adding supporting activities to a minimum level the number of tools used for operations needed to be reduced. Hence, a single tool, which performs five operations, was developed.

The tool would go on to perform drilling Ø6.7 mm and Ø8.5 mm, facing, counter chamfering and tapping. According to the process design of Showa; Ø6.7 mm thru drill goes first , after that Ø8.5 mm drill goes up to half depth, then its the Ø20 mm end milling cutter for facing, after which Ø12 mm drill tool is used for counter chamfering and finally the M8 tool for tapping operation. Spindle speed requirement for tapping operation is different from the rest of the operations. Hence, if the tapping tool is separated from the rest of operation, the diameter of tools could be placed in the ascending order. This is the basic criteria for integrating tools. If

Source: Munjal Showa Ltd

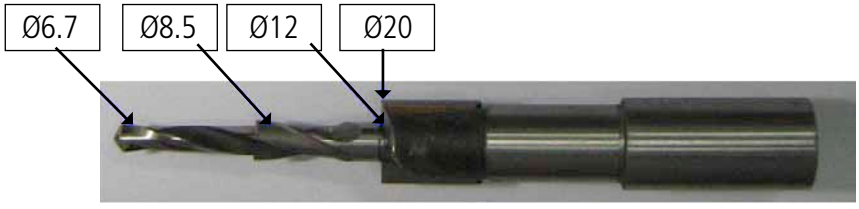
CNC machines at Showa, Japan

Source: Munjal Showa Ltd



Schematic 1: Layout of Bottom Case processing

Source: Munjal Showa Ltd



Four-in-one special tool developed by Munjal Showa for MSL

separate tools are used for countering operation, facing operation has to be done before countering operation. But by integrating countering tool with drilling tools; countering operation can be done before facing operation because drilling tools act as support. Hence, the sequence of activities was changed such that the countering operation comes before facing operation. The sequence of operations done by newly designed special tool is 6.7 mm drilling, 8.5 mm drilling, countering operation, and facing operation.

Redesigning complex activities

Showa's machines had heavy manually operated doors that needed operators to physically open and close them. In the machine designed for MSL, the heavy metal doors were replaced by small automatic doors and the operator could open and close the door at the touch of a button. In Showa's CNC machine design, the tool had the capability to move in three axes (X, Y, and Z) with one rotary motion.

Integrating machines

Integration of two or more machines helped reduce non-value adding activities, as the task needed only one job setting, for opening and closing of doors and unloading. This reduced the cycle time considerably. Just by integrating the Showa CNC and SPM design into a single machine, MSL eliminated seven non-value adding activities in addition to the twelve non-value adding activities eliminated by special tool design. Eliminating the non-value adding activities and components by applying lean and TPM concepts enabled the development of a leaner, smaller and more productive machine.

Source: Munjal Showa Ltd

New small and compact lean machine

Small and compact lean machine design

Here, MSL also saved on shop floor area. If both the CNC and SPM machines were added to the shop floor, the machines would occupy 134 sq ft of floor space. The newly designed machine was 12 sq ft in size and saved 122 sq ft in floor space. Also the distance between all the stations was reduced in order to reduce cycle time and increase productivity.

Benefits

The idea of manufacturing the in-house machine generated lot of benefits. The new line has only six steps to do the job. Thus, less number of steps leads to use of fewer resources. Owing to reduction in the number of steps in machining line, the total cycle time was reduced by 41 per cent, which further helped to decrease physical fatigue of the workers.

The manpower requirement was reduced by 50 per cent. All the controls were right in front of the operator; thus, reducing the motion loss for checking the operating parameters. Production increased from 145 pieces per operator to 500 pieces. The machine productivity had increased 3.45 times as against previous standards.

The production of the BC machining line increased by 1.7 times vis–à–vis the earlier machine line. In terms of production number of units produced increased from 290 pieces to 500 pieces per production shift.

Reduction in costs

Three types of costs were considered here (all the cost are per piece)

a. Electricity cost
b. Machining cost
c. Investment cost

Electricity cost

This is the cost of electricity used in manufacturing one piece of unit from this machine. There is a phenomenal reduction of 81 per cent in the cost of the electricity consumed per piece that was manufactured. This reduction happened because non-value adding activities were removed from the manufacturing process and also by using optimum size and less motors. As the new manufactured machine was smaller in size and it performed all the operations in one go, the cycle time was reduced. Hence, the machine runs for a smaller duration and consumes less electricity.

Machining cost

It is defined as the total cost incurred while manufacturing any product from a machine. This total cost includes the wear and tear cost of the machine. We can see that there was a drastic improvement of 83 per cent. The reduction happened owing to the distance travelled by the tool to the job position. As the distance travelled is less, so is the wear and tear in the machine.

Source: Munjal Showa Ltd

The axel hole splitting machine (SPM) at Showa, Japan

Investment cost

Given the three options, in-house manufacturing looked like the best option as it had the least investment and lead-time. So by selecting this option the investment cost was drastically reduced by 95 per cent. If the machines were imported from Showa, Japan, then the total investment would be around ₹73 lakh, which was reduced to ₹3.4 lakh.

Manufacturing time

Since the option chosen was in-house manufacturing, the machine manufacturing time reduced by 79 per cent. Time to manufacture was 43 days; this was far less than if they had sourced it from Japan.

Conclusion

Given recent increases in global competition, scarce resources, increasing costs and fluctuating economies, manufacturing organizations have taken to lean production system which has become critical to the long-term survival. According to the Toyota way: To be a lean manufacturer requires a way of thinking that focuses on making the product flow through value adding processes without interruption (one piece flow), a 'pull' system that cascades back from customer demand by replenishing only what the next operation takes away at short intervals, and a culture to improve. This is a perfect example of how lean management philosophy can help focus on identifying and eliminating waste throughout a product's entire value stream. MMI

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"TQM Requires Continuous Learning at all Levels of Organizational Hierarchy"

Chairman & Managing Director, TQMI International Pvt Ltd & President, International Academy for Quality, Janak Mehta, elaborates on the importance of deploying TQM and the challenges that need to be addressed to stay afloat in this competitive world. Excerpts of the interview…

Having originated in the automotive sector, how well-accepted is Total Quality Management (TQM) in other verticals of the manufacturing industry?

Janak Mehta: TQM principles, concepts and methods have been adopted by organizations from all sectors of the economy, be it manufacturing or the service sector. However, the spread varies in different sectors, depending upon the degree of competition. Unlike the automotive sector, there are still certain sectors in India that are not open to international competition and hence do not feel the need for such approaches. International organizations bring with them the best practices and insist their suppliers follow the same. This prompts the use of approaches like TQM. This is particularly relevant to organizations that are expanding to export markets in the developed world.

What TQM challenges do you perceive in the Indian manufacturing sector in terms of a lack of risk-based analysis and senior-level involvement in supply quality management?

Mehta: The most important challenge is the inability of the top management to feel the need for TQM from a business perspective. Sometimes the management perceives the need but is not able to communicate it with people across the organization. Another challenge is to understand quality from the customers' perspective. In many organizations, quality assurance is structured as an inspection and auditing agency, with little focus on a proactive approach to prevent problems. This requires complete organizational redesign of the quality assurance function. This is often not realized until it is late, owing to the vested interest in the current system. Functional management is another challenge that tends to optimize functional performance often at the cost of organizational performance.

Source: TQMI International Pvt Ltd

"The most important challenge is the inability of the top management to feel the need for TQM from a business perspective." - Janak Mehta

As TQM is a constant organizational improvement process and calls for continuous improvement, how can an organization keep itself oriented to make continuous efforts to improve proficiency?

Mehta: TQM is a long-term journey that requires continuous learning and efforts at all levels of organizational hierarchy. Successful organizations have created an environment where all employees are encouraged to be conscious of quality, problems and improvement through structured approaches. At the shop floor (Gemba), some organizations have been able to achieve 20 to 40 individual improvements (kaizens) per employee per annum. To this they add more functional improvements through small group activities like quality control circles. Eventually cross-functional improvements which are more challenging are done by the teams of middle and senior managers. This is managed through a robust system that is designed, implemented and continually improved using appropriate reward and recognition systems. For breakthrough, the improvement policy management approach is used. Benchmarking is another approach often used by organizations to set challenging goals and to continuously improve.

Please elaborate on how TQMI facilitates Indian companies to achieve the coveted Deming Prize

Mehta: I have been fortunate to be associated with many Deming Prize winning companies since 1990, when this journey started in association with renowned Japanese experts. The Deming Prize is given to organizations that set quality-focused, customer-oriented and challenging business goals, follow TQM approaches, and thereby achieve those goals.

Engaging top management leaders through proper understanding of TQM is the first requirement. Common elements to the approach are to carry out a diagnosis of the entire business with a particular focus on understanding customer perspective, quality assurance, people involvement and the system of management. Based on the gaps identified, a plan is developed to train and guide employees to use appropriate TQM approaches with the objective of achieving business goals. The challenge is to train and guide executives to learn, practice and train others. The ability to develop new products to meet customers' future needs at target cost and time, and making breakthrough improvement of critical processes is the key requirement. Often the difficult part is to guide this in non-manufacturing processes.

How do you think the European Foundation for Quality Management model (EFQM) can provide a means for implementing TQM?

Mehta: EFQM provides a model to evaluate an organization's performance against a given criteria. TQM is an umbrella approach under which various models can be used. These models are often designed to suit the socio-economic situation in the region. For example, Europe is an industrially developed region with a strong system-based thinking and work culture. EFQM was developed in 1992 by 14 large corporations of Europe who were already known for excellence in their products and processes, but were still concerned about losing market in the integrated world. It is important to recognize this while applying the same model in India. In the mid-90s when India was in the process of moving from a controlled economy to the initial phase of economic liberalization, most organizations had systems that were far from robust. In addition, we have an informal culture where non-compliance to the systems is taken casually. While there is more commonality in the way organizations are managed in different societies, there is a need for adaptation to meet the differences in local social norms. Japan is a classic example of having learnt quality management from the West but developing its own way of application. Any model can be used while practicing TQM principles, concepts and methods. There is no conflict. The ultimate purpose of meeting business goals with a focus on customer and quality should be served.

PERSONAL

"The ability to develop new products to meet customers' future needs at target cost and time, and making breakthrough improvement of critical processes is the key requirement."

Janak Mehta

As the manufacturing sector is process-based, how does TQMI contribute to companies in the sector during the new product development (NPD) stage?

Mehta: NPD is at the core of TQM. Without developing new products, an organization cannot satisfy the future needs of the customer. The Deming Prize gives 20 per cent weightage to NPD. It is a cross-functional process involving almost all functions of the business. About 75 per cent of product cost gets determined at this stage. TQMI has worked with many organizations in designing the NPD process and using the same for designing products that have been successfully marketed, achieving planned objectives. Our approach is to use cross-functional teams to start with field data and customer satisfaction. This is followed by product planning, design, manufacturing and is concluded by sales and service to evaluate product performance in the field.

Please highlight the initiatives TQMI takes to bring awareness among the industry peers regarding the Total Productive Maintenance System (TPM).

Mehta: TQMI believes any approach to improvement is secondary to the business needs of an organization. Without looking at methods and tools it is important to identify an organization's business needs and then use an appropriate methodology or tool. If the basic condition of equipment is poor, it is advisable to begin with TPM approach. If the equipment is in good shape while quality is an issue due to input, environment or process variables start with TQM. If the equipment is in good shape and quality is in reasonable control we use Lean to focus on cycle time, productivity and waste through the Lean approach. It is recognized that there are many more common elements in the philosophy of TQM, TPM and Lean, than the differences. The emphasis varies in these approaches. There are many organizations we work with under the approach of TQM that have incorporated key aspects of TPM and Lean. At other organizations we have taken the classical TPM approach. We do not see any conflict between these approaches. In fact these are complimentary approaches. TQMI took seven TQM/TPM/TPS study missions to Japan in late 90s to understand the inter-relationship between these approaches through Komatsu Career Creation Ltd. It is heartening to note that in many Indian organizations, all these approaches have been successfully integrated and are working in harmony.

Where do you see TQM evolving over the next few years?

Mehta: TQM in its classical form is currently being practiced in Japan and some regions of East and South Asia. In the western world, classical TQM had a short life and was quickly discarded to use its own version that incorporated most elements of TQM under different names. When viewed in this wider context, irrespective of the name, TQM is continuing to evolve, however, at a slower pace. There have been a few revolutionary changes similar to the ones that happened in the last half of 20th century. According to Dr Kano there were more things taking place in the field of quality management in India as compared to the rest of the world, from mid-nineties to the middle of the last decade. That was the period when a bulk of the economic liberalization happened in India. Since then, the pace of liberalization has slowed down considerably and hence quality is taking a back seat in the eyes of many organizations. One can still see a great zeal in Western Europe, North America and parts of East Asia straining to improve quality. My sense is while India was bridging the gap until about 7–8 years ago, the gap is now widening with the developed world. MMI

The interview was conducted by:
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Flabbergasted! That is what I felt on entering Godrej & Boyce Mfg Co Ltd's behemoth campus at Vikroli, Mumbai. Spread across the 3500 acres, the premises houses 14 business units within one campus. Occupying about 60000 sq ft of this campus is Godrej Tooling that specializes in making press tools, die casting dies and industrial machines. What started out in 1935 as a captive toolroom for internal business turned into a commercial toolroom in 1993. Today, the division is the most preferred provider of value added tooling solutions in India.

Sophisticated machines and software

The Tooling division has three manufacturing plants. While the parent plant caters to manufacturing of die casting and press tool dies the two other cater to the need of assembly and trials. The division currently serves the automobile sector – two and four wheelers and the commercial vehicle segment. It boasts of world class machining infrastructure with the shopfloor lined with medium to large high speed CNC milling machines and very large double column milling machines. Taking us through the machinery at the factory, Senior General Manager, Head- Manufacturing, Godrej Tooling, Vijay Kumar Saboo said, "We have a fleet of 45 CNC machines, 50 per cent double column milling machines which support multi axis machining. An array of horizontal milling machines provides us with an upper edge. Our competitiveness of demonstrating the state-of-the-art manufacturing equipment is through German and Japanese technology. A dedicated set of high performance Haas machines with suction units are there to meet our need of electrode machining. In sync with this, are the large and highly accurate CNC EDMs with 4th axis machinability and CNC wire EDMs maintained in a highly controlled environment."

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Source: Vogel Business Media India

The shopfloor of Godrej's tooling division is lined with medium to large high speed CNC milling machines and very large double column milling machines

Engineering know-how

Along with high-end machinery one needs to have the necessary tools to ensure customer satisfaction. For this division, the important tool that channelizes the growth is its high skilled personnel. Strategizing at every point, the division engages with their potential customers even before the inquiry stage. "That is our USP. As a strategy once the potential customer comes to us with his idea we start working on the engineering and if we feel modifications are necessary and possible we put forward our proposal to them. The customer might design a product that is aesthetically and functionally good but it may not be as cost-effective and may give problems in production. Hence, when we re-analyze it we give them probable solutions that could cut down their production stages which automatically will result in cost effectiveness and ultimately a reliable product. Thus, we already provide them with a value addition even before they've given us the order," averred Saboo.

The division's main business press tool & die-casting caters to the auto sector. "Here the need for accuracy is critical where fitment dimensions need to match with the mating parts without fail," specified Saboo. The division has a design department that prepares design/models (using software such as Pro-E, Catia, etc.) using input from its customer's 2D component drawing. The design is simulated using the Hyperform software to check for any failures and the necessary corrections are carried out upfront. There is also a separate 'programming cell' that programs as per machine requirement using software such as Delcam, Pro-e, Tebis.

"Godrej Tooling has innovatively developed twin cavity crank case dies that can run in the same machine as single cavity die. This has given tremendous benefit of double production from the same machine to its customers."

Executive Vice President & Business Head, Godrej Tooling, DK Sharma

For a job that requires machining at compound degree, compound angle machining is available at HDM facility (accuracy of 0.03mm) and the maximum job size that can be machined is 4140x 2200 x 800mm."We are really proud to say that every single motorcycle, every part of Honda on the roads of India, have been made by us. Looking at this success rate, Yamaha, Hero and TVS have also become our customers," avowed Saboo.

Innovations galore

Innovation is the major driving factor of growth for any organization and the same is applied to the tooling industry. Dies being a mechanical product are at a risk of getting duplicated once it is out in the field. The crank case forms an important part of the power train of an automobile and is a complex piece of engineering. Agreeing Executive Vice President & Business Head, Godrej Tooling, DK Sharma asserted, "The successful die development of crank cases within quality standards of auto industries is a challenge in itself. The problem becomes complex when multi-cavity dies are developed. Godrej Tooling has taken this challenge and innovatively developed twin cavity crank case dies that can run in the same machine as single cavity die. This has given tremendous benefit of double production from the same machine to its customers."

Toolroom operations are truly considered as a project environment where products with varied specifications are produced using standard processes of manufacturing. Designers at the company are involved from cradle to buy off of tools. Design and development translates the product specification and unwritten needs of customers into engineering language for downstream processes to follow. In this industry where the two and four wheelers have a fixed launch date it becomes critical for suppliers such as Godrej to deliver on time. Citing an example, Sharma stated, "Normal die development period for a medium size of 800 T die-casting dies is 10-12 weeks. On many occasions these standards lead times have been challenged by Godrej Tooling as per the demand from customers. We have tested our own capabilities to the extent of delivering dies in four weeks. The entire production product launch schedule of an auto major was at stake due to this particular part. However, this was also possible because the customer extended all the support of allowing tooling related changes in the part and by giving faster approvals to expedite the development process."

Poised for a dynamic year

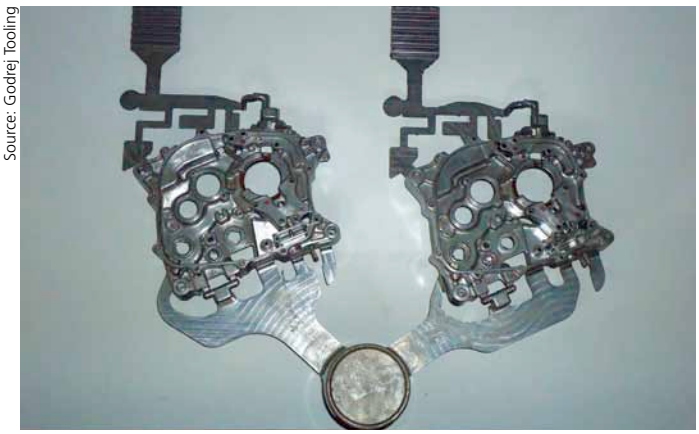
Catering to almost all the major OEMs like Maruti Suzuki, General Motors, Honda, Toyota and Daimler, the division is now looking to increase its share in the non - auto sector. "With major contributions to the railways, defense through turnkey projects, we are focusing on the service sector primarily the repair and maintenance needs of the tooling industry. All the three business verticals - combined together - have set out an ambitious plan to grow the topline of Godrej Tooling, to ₹850 crores, in the next 10 years," averred Sharma.

Obsessed with perfection, safety and environment, the division claims the highest quality for first try components. It's no wonder then that with its increasing customer base, state-of-the art software and machines that ensure high level precision, quality and timely delivery, the company looks like its poised for a super dynamic year ahead. MMI

"As a strategy once the potential customer comes to us with his idea we start working on the engineering. When we re-analyze we give them probable solutions that could cut down their production stages which automatically will result in cost effectiveness. "

Sr. General Manager, Head – Manufacturing, Godrej Tooling, Vijay Kumar Saboo

Source: Godrej Tooling



Godrej Tooling has innovatively developed twin cavity crank case dies that can run in the same machine as single cavity die

Source: Godrej Tooling

Godrej Tooling has developed and exported two sets of stamping dies, for panel dash component, for M/s General Motors, Colombia

Manufacturing Methods for Advanced Aerospace Engine Production

In today's global manufacturing environment, the demands of working with critical parts on high value machine tools can be exceptionally tricky without the right process knowledge and best-practice machining strategies. This article takes a look at the machining challenges of certain aero engine components and also shows how combining the latest application and process knowledge with the best possible tooling solutions can be the key to success.

Aerospace is one of the most technically demanding industries in the world. With increasingly difficult-to-machine materials, complex geometries, exacting specifications and constant time restraints, manufacture of aerospace parts has many limitations; still, production rates are set to increase.

Total component expertise is the key to success in such a competitive manufacturing landscape. These and other challenges dictate a production environment with complicated four and five-axis machines driven by CAM solutions. Choosing an industry partner that has the experience and resources to support all aspects of individual component development, including both the physical tool and the processing knowledge is crucial in this highly competitive industry.

Total solution support should encompass spindle interface, tool holder selection, programming methods, insert grade and geometry and surface integrity. All of the parameters produce the highest-quality parts. Aligning and optimizing these factors will help one compete on the global scale.

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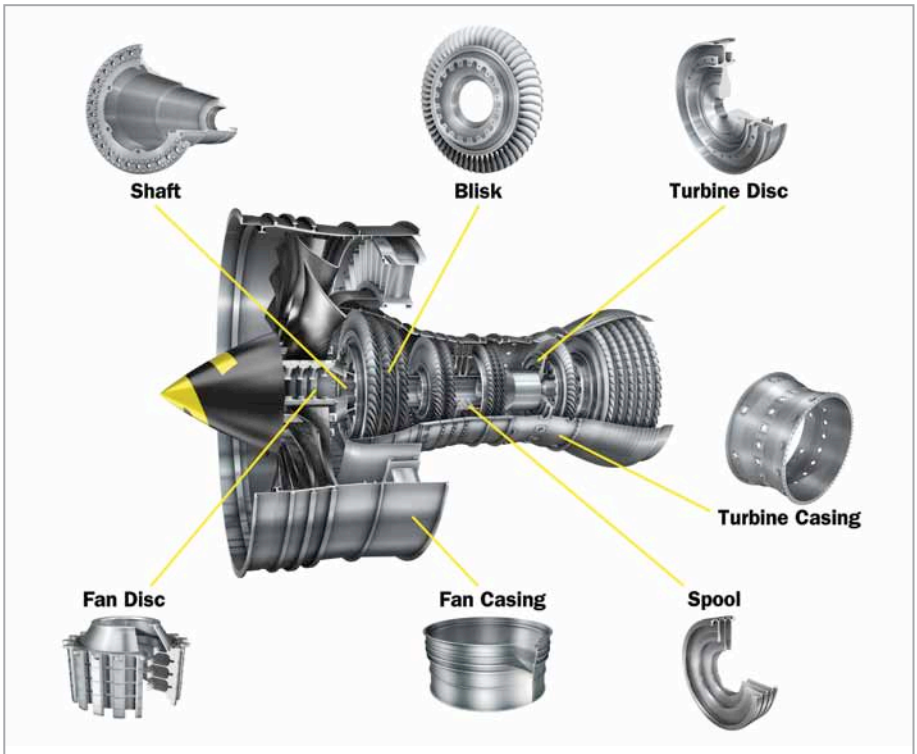
Source: Sandvik Coromant



A typical aero engine with its complex components

A look at aero engine components

The aerospace industry specifications, the nature of the materials and the component configurations all create some of the most challenging machining operations. These components are made up of some of the most difficult-to-cut materials and complex shapes, requiring extensive tool reach and the right tool path.

These high-temperature operations create demands for materials that are harder, stronger, tougher, stiffer and more resistant to corrosion or oxidation, such as nickel alloys, high-strength titanium, high-alloy steels and composites. These materials have much lower machinability than other more common materials, and require a great deal of processing knowledge. One can optimize machining productivity with the right combination of cutting tools, cutting conditions and machine tools.

Engine components are demanding workpieces due to its complex geometries. It is often extremely large in size, with critical strength and weight restrictions. This is further enhanced by thin walls, intricate geometries and complex shapes, which present new challenges in machinability.

A few machining challenges of certain aero engine components are here below. One can

certainly over come them with the help of a combination of latest application and process knowledge. Also, tooling solution plays an important role, acting as a key to success.

Component–Turbine Disc

The turbine disc is a complex turned part machined from difficult alloys such as inconel 718, waspalloy and udimet 720. This component usually features profiled pockets with difficult clearance requirements.

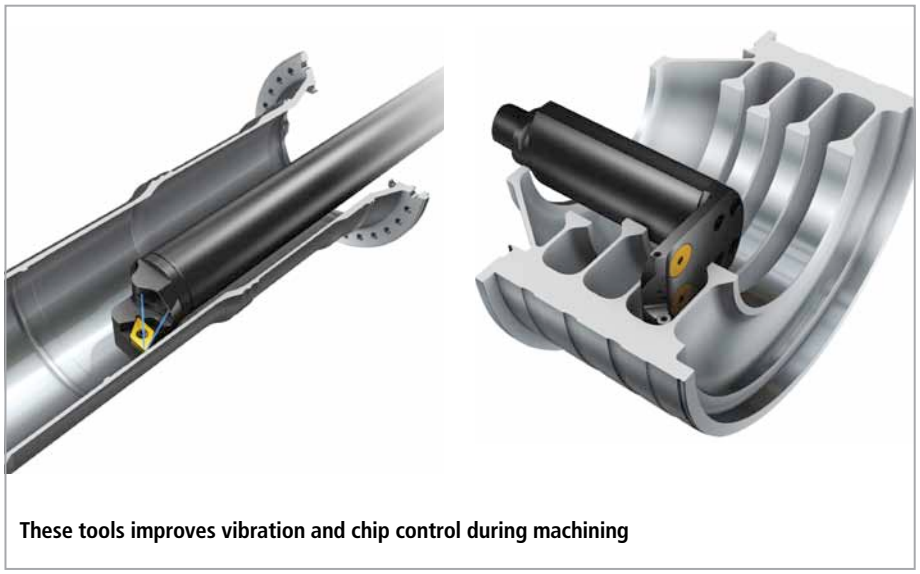
Tooling solution: The modular SL70 tooling system

Due to tough material, accessibility and productivity, round inserts offer the best method for both roughing and finishing. The large radius of these round inserts means a reduction in the entering angle without reducing the depth of cut, therefore, increasing productivity.

The modular SL70 tooling system is designed with blades to fit restricted pocket features without the need for special or modified tools. The range of adapters and blade alternatives for the tool gives it the flexibility to build many different tools from a limited tool inventory. These blades include the required radial and axial clearances for blades reaching deep into angled grooves, with high-pressure coolant supplied through the tool to the cutting edge. Having built-in dampening for ensuring performance at extended tool reach, these blades turn features in deep grooves often at higher feed rates, causing less vibration and increased tool life. In addition, the Coromant Capto interface provides excellent stiffness even in long overhangs and against high cutting forces.

Application: Trochoidal Turning

Trochoidal turning is a productive method for removing material in deep slots and grooves. By breaking the part into manageable pieces, trochoidal turning uses a roll-into-cut approach to reduce engagement on the insert. When producing grooves by turning, chip evacuation is always a critical factor. Because the material is being highly sheared, generating narrow chips is often more demanding. Hence, it requires a balance between the most suitable insert geometry and feed rate. It also maximizes straight line movements, which enables maximum feed rates for optimal productivity. This approach involves changing the cutting direction at the end of every pass. Alternating the direction of the cut makes the insert last longer because it never leaves the material. Trochoidal turning minimizes chip jamming, vibration tendencies and residual stress and is well suited to remove a large amount of material efficiently and securely.



Source: Sandvik Coromant

These tools improves vibration and chip control during machining

Turbine casing

The turbine casing is typically machined from challenging materials such as inconel or waspalloy. The structure of these components poses significant problems during milling due to the large amounts of material that must be removed. These components require a significant number of mill-turn and five axis operations to remove large amounts of material, resulting in very long cycle times.

Tooling solution: Ceramic Grade CC6060

Ceramic cutting tools have a much higher resistance to heat than carbide tools and have low reactivity with workpiece materials. Ceramic grade CC6060 is optimized for large-diameter components with long cutting lengths that allow it to cope with higher feed rates and longer continuous cuts. Thus, the tool is ideal for milling operations on turbine casing components. Excellent resistance to notch wear allows for higher depth of cut than other ceramic grades, for optimal productivity in medium to roughing operations in first and intermediate-stage machining. The grade is also the first choice for pocketing and profiling operations.

Application: Ceramic turn milling between bosses

On an average, 75 per cent of the total turbine casing machining is spent on removing material using mill-turn operations between the bosses. Mill-turning involves cutting with a rotating milling tool while the workpiece is also rotating. This operation is ideal for turned parts that require high metal removal and have obstructions such as ignition bosses. Turbine casing bosses are located around its cylindrical perimeter. Turn-milling with ceramic inserts reduces notch wear, increases feed rates and achieves higher metal-removal rates. It is the most productive way to remove material between bosses.

Fan casing

These large titanium components have low machinability and feature complex shapes and thin walls. However, unlike the nickel alloys, ceramic cannot be applied. This makes productive metal removal challenging. Keeping the cutting temperature low is essential when machining this component.

Tooling solution: Vertical turning lathes

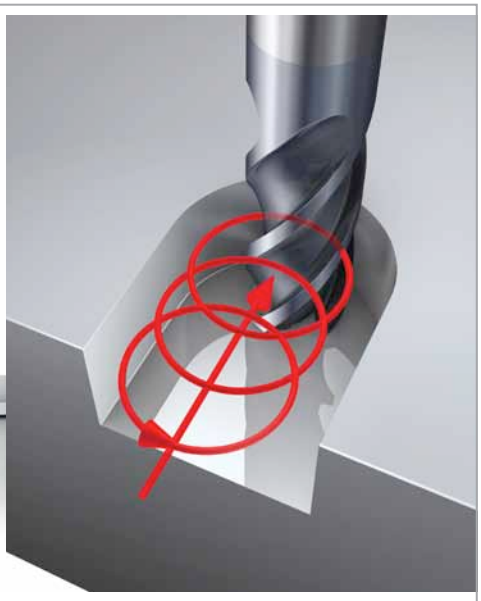
To achieve the unique combination of temperature control and superior component accuracy, machining should be done on a vertical turning lathe. Vertical Turning Lathes (VTL) by design need to have either manual quick-change or automatic tool-change. Particularly with automated tool changing, long chips present a high risk to component damage. However, with the coolant piped through the ram directly to the spindle, there are no coolant pressure restrictions, improving cutting conditions and process security.

Application: High-pressure coolant

One key to success in the machining of fan casings is the use of High-Pressure Coolant (HPC). HPC improves chip control and reduces the temperature in the cutting zone. Chip control is more secure, ensuring evacuation from tight pockets and grooves. This guarantees that the chips will not wrap

Source: Sandvik Coromant

Fan casing being machined using high pressure cooling delivery system



Trochoidal milling being carried out for removing material in scallops and pockets

around tools or drag across the component. Effectively cooling the machining zone will help minimize tool wear, prolong tool life by up to 50 per cent and provide a potential for 20 per cent higher cutting speed.

While the machine's pump can provide the pressure, getting the coolant to the right place is the responsibility of the tool. Making use of high-precision nozzles, the coolant is directed to the main cutting edge. This effective application can help evenly distribute and reduce heat during machining.

Components: Spool and fan Disc

The engine spool and fan disc present two of the same challenging features: deep internal chambers and tulip grooves.

Tooling solution: Dampened blades

Using dampened blades on these components will help control the common challenges of vibration and chip removal. Dampened blades are designed with a patented dampening device, for a more productive and secure process. This allows depth of cut to be four times greater than without dampening. These slender tools can access and effectively remove chips from the deep internal chambers for an extremely secure machining process.

Application: Vibration-free turning in deep grooves

Deep grooves present one of the most challenging features of these components. Deep grooving on spool applications can result in chip buildup in the pocket and lead to insert failure. For a more secure process, vibration-free turning is useful. Oval serration blades provide the best stability and accessibility, while 3 to 10 inch high blades allow for the best coolant delivery to assist in chip removal.

Shaft

The engine shaft is made from high-alloy steel or Inconel; its primary machining challenge is the length and internal features of the component. The biggest development in shaft manufacturing has come from the evolution of the multi task machine.

Application: Boring in deep cavities and holes

Boring in deep holes can lead to poor surface finish and vibration due to instability. The only cutting force component that does not need to be counteracted with support is the axial force. However, the radial force bends the tool out and away from the cutting zone in such a way that the tolerance and diameter of the hole is negatively affected. By applying increased axial load and radial load, the present frequency or a silent tool dampened bar absorbs any vibration in cut, improves chip control and can run at increased cutting data.

Blisk/impellor

Blisks are becoming more common in engines' high-pressure compressors due to the advantages of weight, efficiency and servicing. This component has narrow pockets, slots and deep complex geometries, more so than other components, that often requires 5-axis machining movements.

Key factors to machining success include five-axis machinery with good simultaneous dynamics, optimized software and a proper tooling selection.

Tooling solution: Plura 50° relieved shank

When roughing a slot in Inconel, the Plura 50° relieved shank, with a bull-nose design, is optimized for axial depth of cut twice the diameter and low radial cuts, for high-speed process.

Application: Trochoidal milling

Trochoidal milling is a high-speed machining technique for removing material in scallops and pockets. This application uses a roll-in entry and exit from the cut to control the arc of engagement, for higher productivity and improved tool life. It further enables high table feeds in combination with low cutting forces; generating low cutting edge and workpiece temperatures. This method utilizes the technique of chip thinning, resulting in less heat build-up in the chips and allowing the tool to run in at full depth. In addition, this can also cut down the number of passes. Trochoidal milling is not always the fastest method for roughing in slots, but does result in better tool life, better predictability and a better quality part. MMI

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Enhancing Machining Processes

Evolution is the basis for survival in every aspect of life. And it is owing to this evolution that the industry can boast of high precision goods. However, to keep ahead of the game various trends and strategies are being incorporated to increase and optimize machining processes; thereby increasing profitability. Here's a look at the various trends being incorporated in the world of CNCs.

CNCs have come a long way since the mid 20th century. In the 1950s and 60s, numerically controlled machines comprised vacuum tubes and mechanical relays as their primary controller sets. These controllers functioned along two axes. However, today's CNC machines offer a plethora of options including functioning along multiple axes. And just when one thought that its evolution has reached the pinnacle, innovation takes one by surprise.

For instance, modern controllers can now also communicate with the user and analyze program data; it can automatically monitor the quality of the job being worked on and send signals to other segments of the machining process to make for corrections in real-time for any necessary changes to be made.

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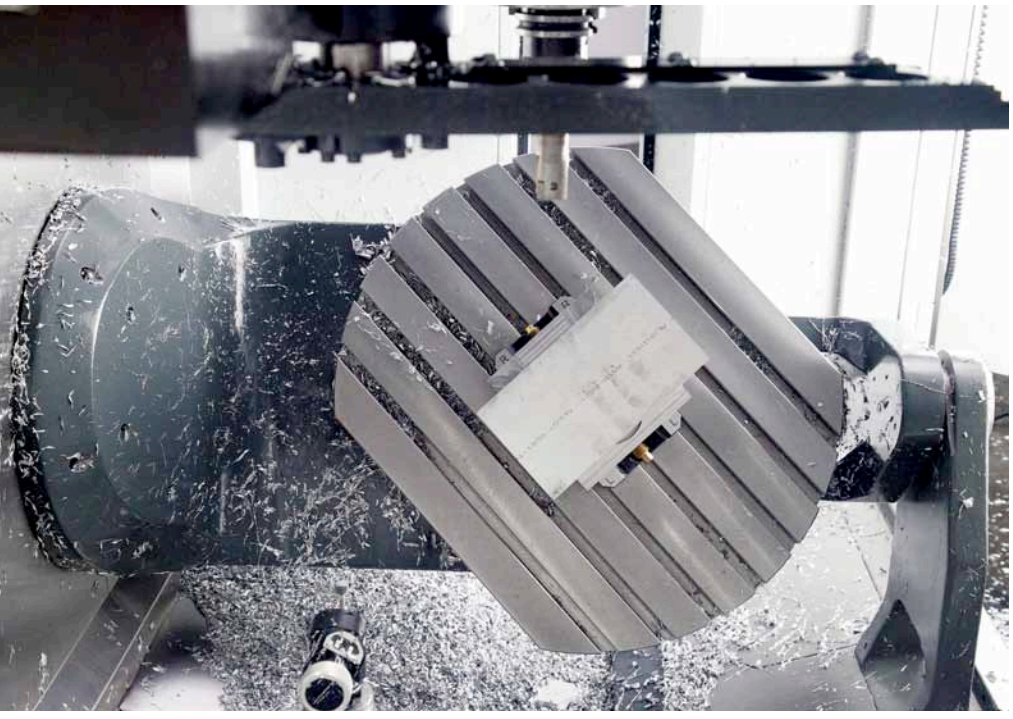

Source: Haas Automation Inc

High-speed, cam-driven rotary table that provides cutting and indexing speeds up to 830°/second

Talking about the various enhancements that the industry needs, Director, Abhijat Equipments Pvt Ltd, Sachin Doshi said, "The industry is open for high speed machining, software supporting multi axes machining, hard parts machining and low cost automation machines having remote controllable intelligence. Customers are seeking these features in new machines to improve upon their capabilities with respect to throughput, cost effectiveness, lower downtimes during machining as well as setups, and thus improve their overall reliability and also to get more and more business."

Gone are the days when having a three axis machine would be sufficient for repeated production. Rejection rates have gone from a few to nil thanks to some of the recent advancements. Adding to this, General Manager (MD - Design & Development), Premier Ltd, SD Joshi averred, "CNCs have features such as correction in process, tuning of drives, additional motion options. Some CNC machines are used without cutting oil as a means for chip disposal, which corresponds to increased productivity. The heat that is generated during the cutting process is reduced significantly by a provision to cool the tool using air and providing slopes for easy disposal of the trapped heat."

Latest offerings

The current scenario has seen various trends becoming norms in the CNC sector. The following are a few of the trends currently being seen world over.

"Customers are seeking new features in new machines to improve upon their capabilities with respect to throughput, cost effectiveness, lower downtimes during machining as well as setups, and thus, improve their overall reliability."

Director, Abhijat Equipments Pvt Ltd, Sachin Doshi

Robotics

Productivity and unmanned machines are the current norms in most manufacturing industries. Manufacturers are keeping this in mind when they build machines. Robotics is one such feature that is almost always being incorporated in the machines, even in the ones available off-the-shelf.

Robots aid in manpower reduction and serve functions like auto loading, unloading and gauging, which were otherwise performed manually. Specifically in a situation wherein there is a shortage of human resource, robots come in as a saving grace. There is also a need to reduce the dependency on manual skills and to have an effortless mass production line. Agreeing with this sentiment, Joshi averred, "Integrating CNC machine with robotics will definitely increase the productivity as there is no manual loading and unloading of workpieces, which reduces manpower. The accuracy of the produced part is also guaranteed."

Employing skilled labor is another task for companies. Here, using robots comes in handy as there is no room for error. "Manpower and that too efficient manpower is a core issue today world over in the field of machining. The complexity of components and accuracy of machining along with continuous process handling for mass output are also factors that cannot be neglected, and hence the entry of robotics in the field of CNC has happened as a complementary action," asserted Director, Macpower CNC Machines Pvt Ltd, Rupesh Mehta.

Tool evolution

The other factor determining the evolution of CNC machines and its tools is the grade of material to be machined. Latest offerings in tool materials are driven by requirements like improved machinability of hard parts and better surface finishes. There is an increased use of carbide tools that increase productivity and tool life. Coating the tools through methods such as Physical Vapor Depositions (PVD), Chemical Vapor Deposition (CVD) also increases tool life.

Joshi added, "Coating technology such as multi layered nano coating, soft coating, diamond coating will be useful for dry machining with increased productivity and cutter life. Also, geometrical options reduce various cutting forces coming on tool inserts. These new options are useful to cut materials like Ti alloys, Inconel etc. specifically for defense, aircraft like industries."

Monitoring functions

To further gain an edge over competitors, an upcoming trend seen in the sector is incorporation of intelligent technology such as intelligent processing, remote monitoring functions, energy consumption monitoring drives and so on. The other benefit of this is that companies are becoming energy efficient and hence more environment friendly.

Agreeing with this sentiment, Director, Avermark Automation Pvt Ltd, Deval Ghorecha said, "Energy efficient machines are today's most promising demand. People are so conscious about energy saving, as it ultimately saves their money and also helps the environment. Hardware and its parameters are being optimized with respect to machine performance. Along with this, software is being incorporated to ensure fast and intelligent performance."

"Energy efficient machines are today's most promising demand. People are also conscious about energy saving, as it ultimately saves money and helps the nation. These machines are manufactured by using optimizing hardware and its parameters to balance the machine performance."

Director, Avermark Automation Pvt Ltd, Deval Ghorecha

Unmanned operations

A result of energy efficient machines is

Source: Abhijat Equipments Pvt Ltd

Source: Avermark Automation Pvt Ltd

Source: Macpower CNC Machines Pvt Ltd

New age CNC machines incorporated with latest technology that help in enhancing quality & productivity

lights out machining. However, this trend that is gaining popularity world over is still being experimented within India and primarily by large scale production firms.

Doshi attributes this to lack of confidence of the industry to invest more for higher capital expenditure. He asserted, "With the evolvement of complete automation for standard mass production including complete implementation of robotics, lights out machining would be possible for mass sale manufacturers. To make lights out machining a success, the need for consistent quality input materials has to be fulfilled. Metallurgy, heat treatment industry, casting production industry and the likes will have to considerably improve to cater for lights out machining."

On a positive note, the industry as a whole is not far behind. Mehta explained, "India has started adopting robotic lines for production but full fledge lights-out machining is still not at par due to various reasons. One should have pre and post well defined procedures apart from an actual machining room as well as trained manpower to handle and monitor the entire system which is also a bottleneck to adopt a full fledge lights-out system."

Advanced software is the need of the hour for unmanned machining to be possible. Joshi averred, "On the shop floor, the use of software for detection of machine tool errors is highly effective. As soon as the production of the first component is complete, this technology can detect any variation in its accuracy for the component, its speed, feeds and size compensation, which can be then programmed for getting the accurate finished component."

"Manpower and that too efficient manpower is a core issue today world over in the field of machining. The complexity of components and accuracy of machining along with continuous process handling for mass output are also factors that cannot be neglected, and hence the entry of robotics in the field of CNC has happened as a complementary action."

Director, Macpower CNC Machines Pvt Ltd, Rupesh Mehta

"Intelligent processing and monitoring functions will increase energy efficiency of CNC machines. By selecting proper servo and spindle motors and with the use of linear motion guideways, the required torque and power for specific process can be calculated and motor rating can be optimized."

General Manager (MD - Design & Development), Premier Ltd, S D Joshi

Nano control

Future high speed machines will be with nano control. The least control increment is one nanometer, the command increment is ±99999.9999, and the rapid traverse rate is 1000 m/min. All processing from the analysis of machining programs to servo commands will be performed in nanometers. This will lead to smoother finishes, and saving in cycle time calculations.

However, Gorecha averred, "This is my personal opinion of machine manufacturing, but when it comes to adopting new high end technologies, manufacturers need to think for themselves especially with regards to their product and future plans. For instance, for me, using nano control for high-speed technology is the last option, as we have to plot the mechanics first, which include material selection, assembly techniques, inspection methods and so many others."

Therefore, the need to incorporate nano controls would be entirely dependent on the level of machining required. Mehta, too, agreed, "Some of the prominent controller manufacturers of the world have already started delivering nano controls for machining; however, this is not yet been fully incorporated in India because as of now the need for this technology is not that vital."

Conclusion

Through evolution and innovative enhancements in technology, CNC machine manufacturers have shown that by no means has the technology reached its peak. It will be interesting to see what the next decade brings about in relation to CNC machines. MMI

Source: Haas Automation Inc

The CNC lathe solution for small parts turning with reduced handling, in a compact package loaded with full-size features, including live tooling with C axis

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Bringing Down O&M Costs through Black Oxide-Coated Bearings

Wind energy companies are constantly seeking ways to reduce turbine operating costs. Black oxide-coated bearings is one solution, which can aid in reducing costs. Here's a look at an enhanced black oxidation process for bearings used in new and existing installations.

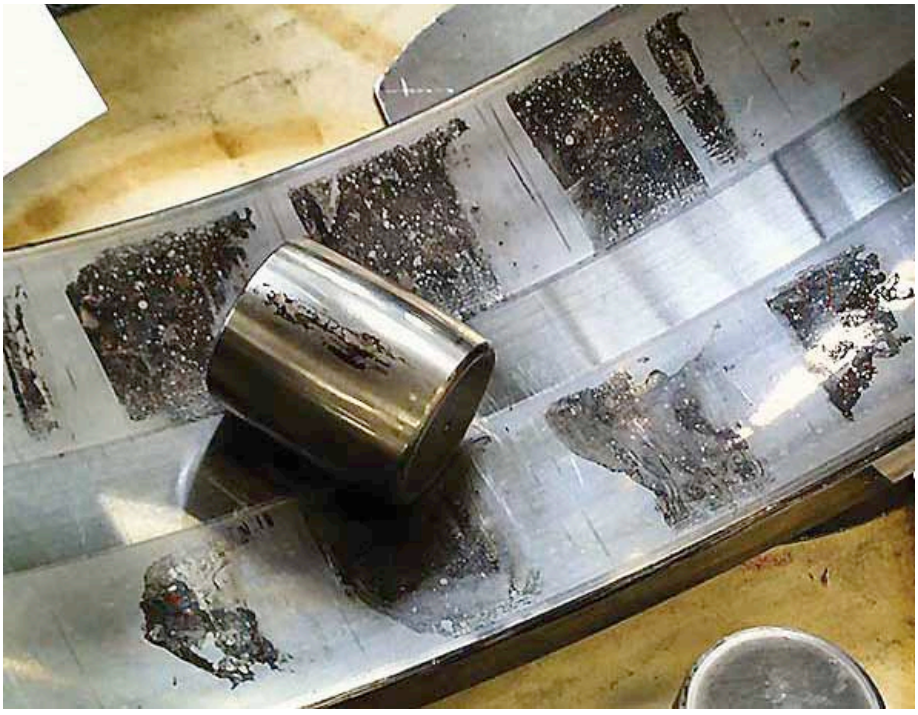
Operation and maintenance (O&M) costs can constitute a significant proportion of running a wind turbine, up to 25 per cent over the lifetime of a machine; thus manufacturers and maintenance service providers are keen to adopt any technology that makes a contribution to reduced maintenance and downtime.

Kenred Stadler
SKF Program Manager Renewable Energy
Application Development Centre,
Schweinfurt, Germany

Black oxide-treated bearings can replace conventional units as part of wind farm maintenance routines, as well as being specified for new installations. This means that the benefits of black oxidation can be applied across the entire wind energy industry.

SKF, as a global engineering company and a leading bearing supplier to the wind energy industry, has identified a number of opportunities to improve operational reliability through new products and processes such as the specially designed black oxidation treatment. This surface refinement process can deliver significant performance improvements at an acceptable cost.

Source: SKF



Moisture / standstill corrosion on a raceway

Increasing demands on installations

Wind turbines are subject to widely varying temperatures, speeds and loads. This means these conditions can sometimes considerably shorten the bearing life cycle if no preventive measures are taken. Also, as wind turbines have increased in size and generating power, further demands are placed on key systems such as the gearbox.

The black oxidation process offers enhanced protection against damage to bearing components, particularly for the challenging operating conditions created by a shift from onshore to offshore installations and for those constructions sited in increasingly harsh environments around the world.

Damage and failure rates of wind turbine gearboxes may vary according to the source of published data; for instance, a benchmark has been reported by the EU-funded Reliawind study, which came out around six per cent per year. While these figures may be considered low when compared with other causes of breakdowns in the field, such as electrical systems, the consequence of that failure can be heavy. Damage and failures in mechanical drive trains can result in high costs due to long downtimes.

The main failure mechanisms

The types of damage that can be alleviated by the addition of a black oxide treatment to bearing components such as the rings and rollers generally fall into the following categories.

Cracks

Many premature wind gearbox bearing damages result in a failure mode that does not follow classical Rolling Contact Fatigue

Source: SKF

Cracks or spalls seen in wind gearboxes

(RCF) mechanisms. These classical mechanisms are subsurface initiated fatigue as well as surface initiated fatigue and can be predicted by standard bearing-life calculation methods, whereas premature White Etching Crack (WEC) failures experienced in wind turbine bearings are not covered. WEC refers to the appearance of the altered steel microstructure when polishing and etching a microsection. Failures can be found at several bearing locations, namely the planet bearings, intermediate shaft and high-speed shaft bearings.

Smearing (adhesive wear)

In lightly loaded roller bearings, pure sliding between rolling elements and inner ring can occur when there is a large mismatch between the inner ring and roller set rotational speed. For demanding applications such as wind gearbox high-speed shafts, idling conditions and changing of load zones can sometimes lead to high sliding risk.

In radially loaded roller bearings, the most critical zone where sliding can occur is the entrance of the rollers into the load zone. While rotating, the rollers slow down in the unload zone of the bearing because of friction and subsequently have to be suddenly accelerated as they re-enter the load zone. Resultant conditions can cause smearing. The microstructure of rollers and raceways is altered, and this results in local stresses that ultimately cause spalling and bearing failure.

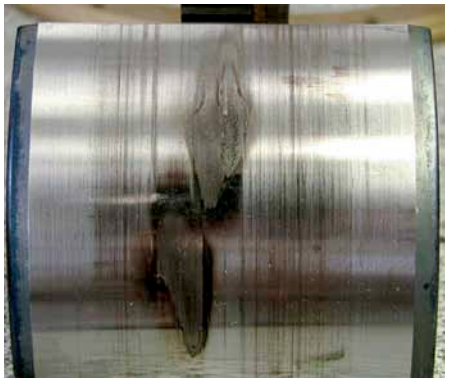
Full complement cylindrical roller bearings do not always have a separating lubricant film built up between the contacting rollers due to opposing surface speed. Thin film or even mixed lubrication under high roller-to-roller contact pressures leads to metallic contact between neighboring rollers. This then increases friction, which consequently can lead to smearing and surface destruction.

Surface distress/microspalling

Many machine elements having rolling and sliding contacts (e.g., rolling bearings, gears and cam-followers) can sometimes suffer from various types of damage. Amongst these are mild abrasive wear and microspalling. Surface distress or microspalling occurs because of an insufficient oil film to separate the moving contacts; it is a form of localized surface damage that occurs on both gear teeth and in bearings and is a common phenomenon found in wind turbine gearboxes. Gear teeth are usually more affected than bearings. Nevertheless, if it happens to bearings, it can be particularly detrimental to the bearing function. It alters the geometry of rollers and raceways, increasing internal clearance and resulting in local

Source: SKF

Fretting corrosion in the bore of an inner ring



Source: SKF

Sliding damage/smearing that can occur in wind gearboxes

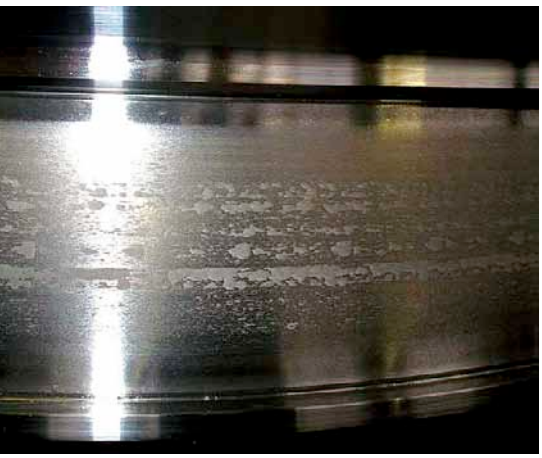
stresses that ultimately cause spalling and bearing failure. Contamination by water in wind turbine gearboxes could also be a contributing factor.

Moisture corrosion

The water content of wind gearbox oils is often underestimated. The large temperature gradients in combination with highly saturated water content (depending on oil type) can lead to the risk of 'free water' and standstill corrosion. Whereas the high risk to the application by free water is well known, the risk of different levels of dissolved water in gearbox oil is still unclear.

Fretting corrosion

When the bearing shaft interface (inner ring bore – shaft seat) or the bearing housing interface (outer ring outside surface – housing seat) are subjected to micro movements under varying loading conditions, the native oxide on the steel surfaces can be removed. Furthermore, surface asperities can corrode and are torn off. These particles become trapped in the contact, and if oxidizing agents such as moisture are also present, further corrosion happens at the surface. Under load, the trapped air and moisture corrode the surface further and can lead sometimes to further particle generation. These particles will act as grinding paste resulting in further loss in interference and increased ring creep, or in the worst case (if corrosion particles remain trapped at the seat) to ring through cracking by increased and too high local stress.



Source: SKF

Typical surface distress/microspalling in wind gearboxes

Black oxidation process

For all these potential failure modes, applying a specially designed black oxide coating on the bearing functional surfaces provides a significant degree of protection.

Black oxide is a surface treatment that is formed by a chemical reaction at the surface layer of the bearing steel and is produced when parts are immersed in an alkaline aqueous salt solution operating at a temperature of approximately 150°C. The reaction between the iron of the ferrous alloy and the reagents produces an oxide layer on the outer surface of bearing components consisting of a well-defined blend of FeO, Fe_2O_3, resulting in Fe_3O_4. The result is a dark black surface layer of approximately 1–2 µm in thickness.

The benefits of black oxide have to be judged for the individual application, but no detrimental effects of this treatment are known at this time. It has been successfully applied to bearings in other industries with particular operational challenges, such as paper machine rolls, machine tools and industrial fans.

The black oxidation process involves a wide variety of parameters. The total process consists of about 15 different immersion steps; in many of these it is possible to vary chemical content, concentration, temperature, immersion time and fluid behavior within the tanks.

Benefits

This black oxide layer adds beneficial properties to the bearing operation, such as an improved running-in phase, and results in equally improved surface properties after running-in, better performance under poor lubrication regimes and better lubricant adhesion, as well as enhanced smearing resistance. The risk of fretting, microspalling and crack formation can be reduced. Furthermore, the black oxide layer offers an elementary corrosion resistance as well as an enhanced chemical resistance when compared with untreated surfaces. The moderate corrosion resistance of black oxide is sufficient to suppress standstill corrosion and fretting corrosion, and the chemical resistance reduces detrimental effects from aggressive oil ingredients. It improves friction behavior and reduces wear, particularly under mixed lubrication conditions. Recent R&D results indicate that black oxide acts as a barrier to hydrogen permeation into the steel.

To give a comparison of the potential improvement in failure rates, a wind gearbox manufacturer has reported, in a sample of 1,000 standard cylindrical roller bearings in a gearbox application, a failure rate ranging from 40 to 70 per cent (after two years). Subsequently, in a sample of 1,150 black oxidized cylindrical roller bearings for a similar application, the failure rate was 0.1 per cent over the same period.

In summary, compared with untreated bearings, black oxide-coated bearings from the company in windmill turbine gearbox applications can offer the following benefits:

- improved running-in behavior
- better corrosion resistance
- improved resistance against smearing damage
- better performance in low lubrication conditions
- increased oil and grease adhesion
- reduction of chemical attack from aggressive oil additives on the bearing steel
- reduced hydrogen permeation in the bearing steel
- decrease of fretting corrosion risk in the fits.

With more than 50,000 black oxide-coated bearings in the field, the company has accumulated a wealth of evidence that this cost-effective process can deliver appreciable performance improvements for the wind energy industry that can result in fewer early failures and hence contribute to lower overall O&M costs. MMI

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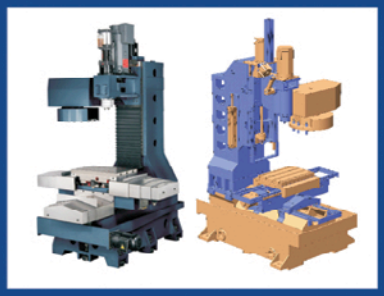

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Turning for Consistency and Growth

SAAB Engineering has been around since 1986. Starting off with only conventional lathes and second operation capstan lathes, the company initially faced problems with shortage of labor and productivity. After incorporating the CNC turning machines from the Ace Micromatic Group, the company has over the years seen an immense turnaround. Here's looking at their journey to becoming a well-known ISO certified firm.

SAAB Engineering started its business using general purpose machines to manufacture all types of automobile and engineering components. The initial challenges faced were primarily owing to the use of conventional machines. "Conventional machines have drawbacks and limitations, and are primarily dependant on labor. The accuracy of the job depends on the capability of the worker. It was difficult to find skilled labor. Additionally, a worker's productivity declines as the day progresses," said Partner, SAAB Engineering, Sanjiv Balagopal.

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With the conventional machines, a majority of the finished workpieces were not up to the mark in terms of quality and repetitiveness. This brought about not only losses to the company but also complaints from its customers' end. Hence, the decision to incorporate the use of a CNC turning machine to combat a majority of the problems was taken. "We wanted to automate the working on the job. CNC machines ensure quality and the machine takes care of everything. Of course a skilled workforce is required in terms of development of the component, but the operator is just there to facilitate the machine to run," Balagopal continued.

SAAB Engineering initially contacted Ace Micromatic for a CNC turning machine. Apart from cost being a major factor for their purchase, time to deliver was also a key factor. As the delivery from Ace Micromatic was longer than expected, the company decided to use a competitor's machine. However, there were problems with the machine right from the start.

Working with Ace

The company then approached the Ace

SAAB Engineering

Challenges

- Inconsistencies in quality
- Inconsistencies in number of jobs
- High rejection rates

Solution

Incorporating CNC turning machines by Ace Micromatic

Results

- Improved productivity
- Enhanced consistency in quality and number
- Good return on investment

Source: SAAB Engineering

Typical auto components produced at SAAB Engineering

Micromatic Group again, and this time they bought an off the shelf turning machine—LT 16. Satisfied with the machine, the company approached the group for another machine of the same model. However, by then the Group had launched the JOBBER at IMTEX, a turning machine that was priced at a much lower price than the LT 16 but also with all the features that SAAB Engineering was looking for.

SAAB Engineering has since bought over 100 machines from Ace Micromatic Group to date with about 80 of them still running on the shop floor.

Designing for SMEs

CEO, Micromatic Machine Tools, TK Ramesh averred, "When CNCs were first built by our company, they were very expensive and only certain companies could afford them. Also, programming these machines was relatively new. We realized as a group that our bread and butter is the SME sector, and hence it was essential that we made CNCs affordable. "

Apart from making affordable CNCs, the Group also provides assistance in terms of programming, training, use of the machine, tooling to a whole array of needs, including machine spare parts and service.

Since incorporating the turning machines, SAAB engineering has seen benefits in the form of rejection levels being minimized, guaranteed output with consistency in quality. In fact, the company exports 20 per cent of its turnover and 100 per cent of the parts exported are those that are made on Ace machines.

After sales service

Speaking on the service front, Balagopal stated, "We have a lot of machines from other companies, and when something goes wrong with the machine, we have found it hard to get after sales support from those companies. However, this is not the case with Ace Micromatic. They are very prompt with their service. For instance, if a critical part on the systems side has a problem, we need to contact the concerned company and get the part repaired, which can take up to one or two days. At a time like this, Ace Micromatic gives us a spare part, so in essence the machine stops only for the time it takes for the replacement or repaired part to be arranged, ensuring that the machine is running again."

"The after sales support from Ace Micromatic has been extremely good. They send their people who come in and check that everything is in working order. Also, if there is a problem with the machine, they usually respond and fix the problems within two hours of a call being placed."

Partner, SAAB Engineering, Sanjiv Balagopal

"It is essential that we provide our customers what they need as opposed to what is the best profitability we as a company can make. This is why when SAAB Engineering approached us for another machine of the same model, we recommended the then recently released JOBBER, which was less expensive and could take care of all their requirements."

CEO, Micromatic Machine Tools, TK Ramesh

"We are very happy with their service, and they generally respond very fast on all our queries," added Balagopal.

CEO, Micromatic Machine Tools, TK Ramesh said, "It is important for us that our customer always has his machines up and running at least 99 per cent of the time. In order to facilitate this, we also ensure that for every 60–65 machines present in an area, a Micromatic office is setup to guarantee efficient support, in terms of spare parts or reverting to breakdown queries and inspection. We are one of the only companies that have offices located in over 32 locations across India."

Ramesh also affirmed," We have a policy that we try to put back any machine that has broken down to a working condition in less than four hours from the time of receipt of the breakdown call. As of today 75 per cent of the service calls we receive have been attended to and the problems have been resolved in the stimulated time. Our aim is to convert this 75 per cent to 80 by 2015."

Conclusion

The association of the two companies that started in 1993 has continued over the decade and been mutually beneficial. In a true essence that the growth of a customer ensures the growth of a company is seen here. This case is an ideal example of how imperative it is for machine builders and suppliers to support and guide its customers to making right choices and providing support. MMI

Source: SAAB Engineering

Quality checks being conducted on the shop floor

Source: SAAB Engineering

Operator loading a CNC turning machine at the SAAB Engineering shop floor

Meeting Threading and Tap holding Needs

Selection of the right holders for internal threading operation depends mainly on the type of machine and its capability. Evaluating exactly this, Emuge India successfully provided the best fit solutions to companies like Bosch Chassis Systems India Ltd and Sharp Engineers. Here's a look at how the customers overcame glitches such as thread damage, leakage and higher machining time.

Chosing a right tool holder is a must to ensure productivity and efficiency. For example, in case of CNC machines with rigid tapping/synchronous tapping cycle, a company can select a rigid collet holder whereas in all the other types of machines, the company can select a length compensating holder to off-set the lack of synchronization on such machines. A company should take care while selecting the right collet holder for its CNC machines with synchronous tapping cycle. It is well accepted that minor synchronization errors exist even on CNC machines with rigid tapping / synchronous tapping cycle. Hence, the company should ideally select holders designed for synchronous tapping to compensate these errors in synchronization rather than mere rigid collet holders. While selecting holders for similar operations like thread milling, the company should select holders which can give better tool stability against the radial forces encountered during the milling process.

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Bosch Chassis Systems India Ltd

Challenge

- Thread damage and leakage
- Tool life improvement

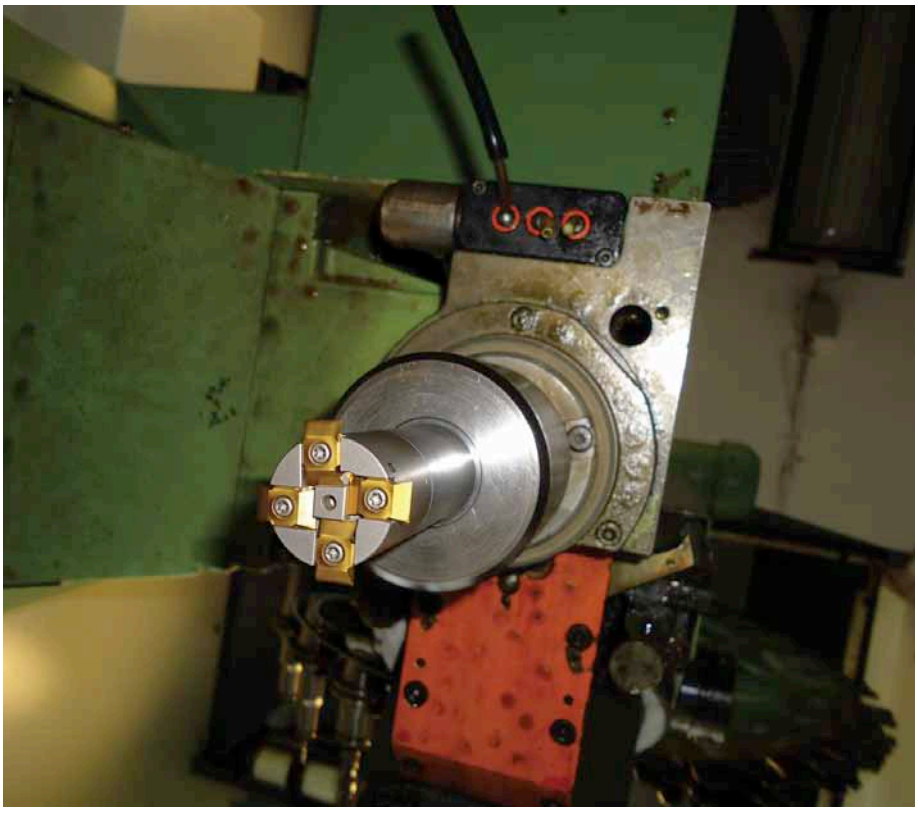
Solution

- Special design tap
- Emuge Softsynchro 1 tap holder

Benefits

- Leak proof perfect threads
- Target tool life – 3600 components
- Achieved tool life – 4200 components
- Per year saving – ₹24771

Source: EMUGE INDIA



GIGANT Thread Milling Cutter given by Emuge to Sharp Engineers which led to the operating time being reduced from 12 to 4.5 hrs

Overcoming thread damages

Bosch Chassis Systems India Ltd, a subsidiary of the Bosch Group in India manufactures Electronic Braking Systems (EBS) and hydraulic brake systems. Their customer base includes biggies like Maruti Suzuki, Tata Motors, Bajaj Auto, Toyoto Etios, etc. In fact the company has been the sole suppliers of Toyoto Etios's brake systems since the last three years. "In order to manufacture hydraulic braking systems one needs to have very specific threading requirements on the components to ensure leak-proof assembly. With our then existing tapping solutions, we faced issues of thread damage which lead to leakages in the end product. Also, we had

"In case of Sharp Engineer's, the requirement of cutting large size threads in the fastest possible time with no possible room for rejection due to tool failure pushed us into deciding a solution with thread milling cutters. With Bosch, the thread size was not large, but had a very specific profile requirement on the component which led us to recommend a tap."

Director, Emuge India Pvt Ltd, Sanjay Baljekar

problems concerning the tool life," avowed Manager Production, Bosch Chassis Systems India Ltd, Pradeep Nisal. In order to combat this problem the company came up with a new design, which was a challenging one. They were looking out for manufactures who could give them a suitable solution to prevent recurrences of the problems faced by them.

Customized solution

Having vetted amongst a number of companies, Bosch Chassis Systems zeroed in on Emuge India Pvt Ltd, a company that has established itself firmly in the manufacturing of machine taps, rigid tap holders and thread milling cutters. "After studying the requirements of Bosch Chassis Systems, we recommended one of our taps specially designed for the above specific application's needs. The taps were tried out and proved to be successful. With an aim of improving the tool productivity further, we additionally recommended our minimum length compensation collet holders called 'SoftSynchro' which gave an improvement of more than 15 per cent," stated Director, Emuge India Pvt Ltd, Sanjay Baljekar. These taps, which can be used only for brake systems and not in any other area, are special ones that have been developed only for Bosch. "It's a bell shaped tap and is used in components such as master cylinder, valves, etc. While using the earlier normal tap, in order to avoid leakage in the brake systems we had to press a metallic part. SoftSynchro has been integrated in the product itself and because of this it has reduced our product cost. We have witnessed an improvement of over 80 per cent with the special tap from Emuge compared to the previous normal taps. Currently there are about 120 CNC machines on our shopfloor and almost 100 machines are fitted with the Emuge tap," asserted Nisal. Discussing the other benefits that they observed, Nisal added, "They developed the geometry of the product in such a way that it did not damage our earlier pre machining area. There is a packing area which makes the chip removal easier. That is an important aspect and the company has put in their efforts to develop a solution for us that fit the bill perfectly."

"SoftSynchro has been integrated in the product itself and this has reduced our product cost. We have witnessed an improvement of over 80 per cent with special Emuge tap compared to the previous normal taps. Currently there are about 120 CNC machines on our shopfloor and almost 100 machines are fitted with the Emuge tap."

Manager Production, Bosch Chassis Systems India Ltd, Pradeep Nisal

Thread milling tools

While in the above scenario Emuge had to specially develop a solution, the below example shows how a standard product by the same company helped reduce the machining time. Sharp Engineering Services specializes in providing quality manufacturing solutions to the heavy engineering industry. "We basically are job workers and do not have a specific product," said Director, Sharp Engineers, Himanshu Kulkarni. "We manufacture components as per drawings and details given to us by our customers. This

Sharp Engineers

Challenge

- Reduction in CPC by faster milling
- Thread Size - M42X4.5

Solution

- Emuge Gigant Soft run Sprinter

Benefits

- Previous milling time - 12 hours
- Savings per components (time) - 7.30 hours

could be for any industry be it defence, power, energy, etc. We have good machines and manufacturing processes using which we can manufacture heavy parts required by our customers. We work a lot with the energy sector and majorly for steam turbines apart from wind."

When the company started with steam turbine casings, the size of the threading that they needed to do was very large. "The diameters and the size were very large and using taps was not such a good idea. Therefore, we had to go for thread milling and this was not possible with conventional machines. Hence, we went for CNC machines and one of our biggest customer's Bharat Heavy Electricals Ltd (BHEL) who was an existing user of Emuge products, recommended us to use their thread milling tools. Accordingly, we went ahead with this seven years ago and still continue to use only Emuge's products," averred Kulkarni.

Reduced machine time

Sharp Engineers also wanted support for their new project in machining of large sized components for the power sector. Accordingly, Emuge India provided those tools and the corresponding CNC programming support for their machining requirements. Since, the company is into machining of heavy engineering products and mainly caters to power sector companies; they were more interested in improving machine efficiency and obtaining the desired reduced machining time for threading. "We provided our thread milling solution and helped the customer achieve a saving of nearly eight hours of machining time per component," declared Baljekar. Sharp uses taps for smaller sizes (below 24mm diameter) and uses thread mills for sizes above it.

One challenge that they faced was the time for threading operation. For a size of M42x4.5 the time taken was around 12 hours, and considering the large size of the machines in operation, the operating costs were very high. Using Emuge special tool, the operating time was reduced from 12 to around 4.5 hours, which considerably also reduced the operating cost. "The cost per component too has reduced drastically. If taken into consideration the life of conventional taps and indexable tools there is a lot of difference in it and the speed. More than 50 per cent of the consumable/running cost has reduced. In terms of time we have seen an improvement of almost 100-200 per cent," ascertained Kulkarni. Elaborating further on the benefits of using the product, Kulkarni added, "Another aspect that we like about the company is that the variety of tools is different. As far as programming is concerned they provide their customers with standard software. With the other manufactures there is always a fear of going wrong with programming but with Emuge it's nice to have the support especially when we are trying it for the first time or when we have a problem. Their engineers guarantee proving the tools for trials to the customer. Hence, we are secured financially till the first time we use it."

"Using Emuge's special tool, the operating time was reduced from 12 to around 4.5 hrs, which considerably also reduced the operating cost. More than 50 per cent of the consumable/running cost has reduced and in terms of time we have seen an improvement of almost 100-200 per cent."

Director, Sharp Engineers, Himanshu Kulkarni

Providing the right solution

Both the companies posed a unique challenge with their differing requirements which required a lot of effort from the manufacturers technical and design team. After studying the component details, the products were selected on the basis of 'best fit' solution criteria. Agreeing Baljekar concluded, "In case of Sharp Engineers, the requirement of cutting large size threads in the fastest possible time with no possible room for rejection due to tool failure pushed us into deciding a solution with thread milling cutters. With Bosch, the thread size was not large, but had a very specific profile requirement on the component which led us to recommend a tap. We advocate finding the best solution in threading through our application engineering services, which requires a lot of positive interaction with the customers/ end-users. We expect them to continue supporting us in our endeavors to continually improve the quality of our products and its performances in this competitive world of cutting tools." MMI

Source: EMUGE INDIA

Tap holders provided by Emuge to Bosch Chassis Systems led to an improvement of more than 15 per cent and eliminated problems such as thread damage and leakage

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GARDNER BUSINESS MEDIA, USA

Trunnions Turn the Tables on Wasteful Setups

Sometimes even a small investment can offer high returns. Indelac Controls experienced the same by installing trunnion tables. The installation resulted in the company to reduce setups from six to two and cut cycle time by 40 per cent. Here is an overview of how the company increased productivity with the help of the two tables and fixtures.

Upgrading machine tool technology does not have to be an expensive undertaking that requires non-productive downtime and delayed return on capital expenditure. When Indelac Controls needed a better process for high-accuracy machining of electric actuator housing parts, it discovered a bolt-on trunnion table from Trunniontable.com that could be installed in minutes. The table immediately improved the shop's productivity by reducing setups. About 90 per cent of the company's parts can be run using the new workholding devices.

US-based Indelac Controls manufactures a variety of quarter-turn, multi-turn, spring-return and linear electric actuators. These devices are used in wastewater treatment facilities, power plants, refineries, pipelines, oil and gas exploration and a host of other process automation applications. They have advanced functions that go beyond simple open-and-close capabilities. Some are packaged with position-sensing equipment, torque sensing, motor protection, logic control and digital communication.

Source: Modern Machine Shop

Indelac Controls

Challenges

- Time consuming and costly production process of production

Solution

- Installation of bolt-on trunnion tables and fixtures by TrunnionTables.com

Results

- Fast production without compromise on quality
- Decrease in manufacturing cost
- Increased productivity

Source: mmsonline.com

Using trunnions and quick-change plates with Jergens ball locks in place of old homemade fixtures helped Indelac reduce cycle time by 40 per cent

Challenges

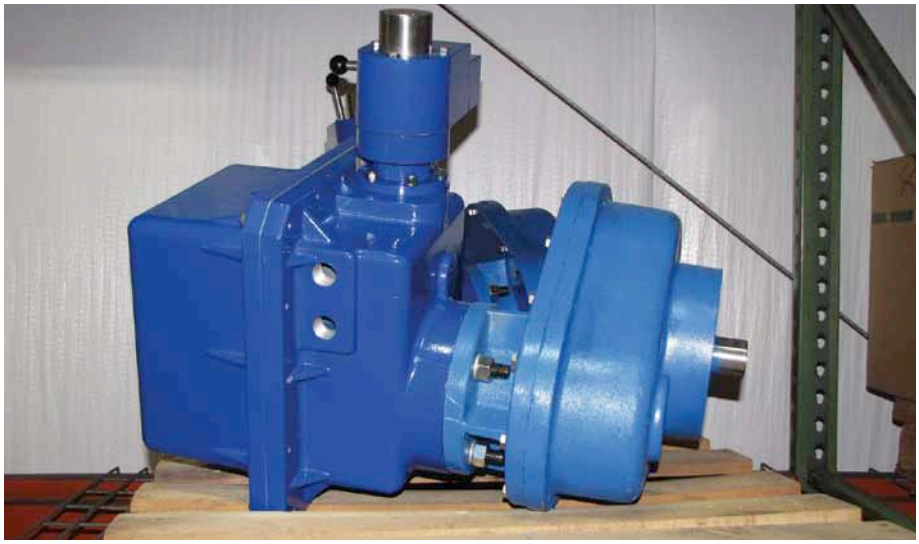
These high-tech functions make precision critical to proper function, so the company produces its machined parts with an accuracy of 0.0005 inch. However, holding such tight accuracies proved costly for the company in terms of both time and labor. Often, it would index off previously machined features using homemade fixtures, clamps and angle plates. "On top of everything else, locating on cast parts is more difficult because the surfaces can vary greatly from part to part," said Machinist, Indelac Controls, Clay Huff.

Parts were being batch produced, created stage by stage over a series of operations, and multiple part setups had driven cycle times up to 50 minutes or more. "Some of our housings require machining on all six sides and with our previous workholding methods, that meant six separate setups," Huff mentioned.

Improving cycle times

To improve cycle times, the company turned to Trunniontable.com, for a workholding solution that could reduce setup time, maintain accuracy and boost productivity. "I knew the President of Trunniontable.com, Stan Martin. He looked at our operation and immediately stated that they could help us," said Shop Foreman, Indelac Controls, Bill Robinson. The team worked to install bolt-on trunnion tables to the fourth-axis indexers of the company's two Haas VF4 vertical machining centers. Along with improved fixturing, the tables enabled producing the parts in no more than two setups.

The company purchased two custom-made tables and four fixtures from Trunniontable.com as well as a standard model Stallion 9\23, a double-sided table with quick-change plates, that is compatible with most verticals. The quick-change plates enable one-minute change-overs and 0.0005-inch repeatability. According to the company, 100 per cent return on investment (ROI) was realized within days.



Source: mmsonline.com

Indelac manufactures a variety of electric actuators used in wastewater treatment, power plants, pipelines and other automation applications

Increase in productivity

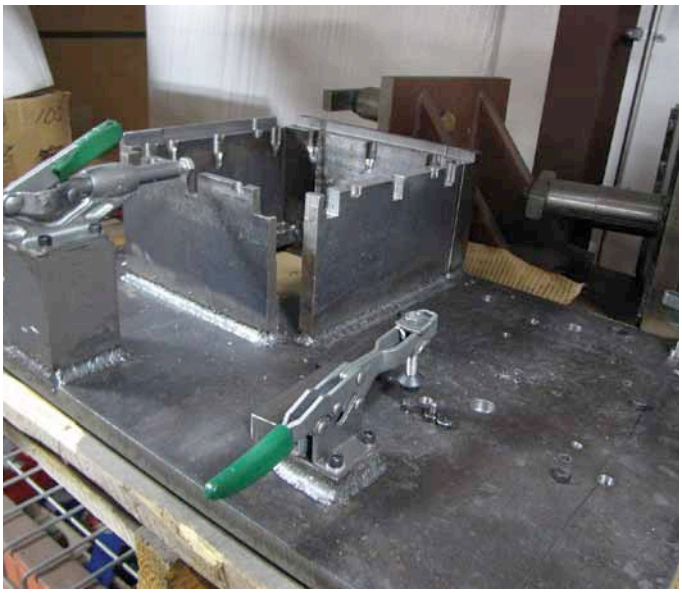
The time-consuming part locating was eliminated without compromising part quality. The trunnion tables and fixtures use locator pins for positioning and holding to ensure part-to-part consistency and meet the company's high-accuracy standards. Huff routinely checks every fifth part with a CMM for quality control. With fewer setups and part handling, meeting tolerances is a faster, easier enterprise. "With the old fixtures, we had to indicate repeatedly to make sure we had it right," Huff averred.

Since installing the new trunnion tables, the company's two Haas machines are now used to mill, drill, tap and even perform light contouring on 319 aluminum castings with 66 per cent fewer part setups. Continuous production has decreased manufacturing costs and increased productivity. "Our cycle time is down to about 30 minutes with the trunnions compared to 50 minutes or more with our old fixtures and we get a finished part off every time we hit the cycle start button," noted Robinson. He further mentioned that these tables have also eliminated work in process (WIP). Along with reduced cycles, this enables the company to quickly set up the machine to run a quick-turn order and get it out the door.

"We were pleasantly surprised to see that something so simple could exploit the fourth axis on our machines and have such a dramatic impact on our business," Robinson exclaimed. "We can now produce the same number of parts in a day that may have taken a week using our old methods. And compared to purchasing a five-axis machine, spending a few thousand to get the most out of our four-axis verticals is the deal of the century. Sometimes the simplest, least expensive method produces the desired results and that's what we found with these trunnions," he concluded. MMI

Source: mmsonline.com

According to Indelac, the bolt-on trunnion tables were installed on the fourth axis of its Haas VF4 vertical machining center in just minutes



Source: mmsonline.com

Indelac's old fixtures included manual clamps, angle plates and plugs. With this workholding methodology, parts could require as many as six setups. The new trunnion tables reduced setups to just two per part.

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Design Simplifying the Operation of Machine Tools

Designing in the machine tool sector had up till now been a production-centric approach. As a result, the industry faces various challenges and also loses time in training operators, etc. However, if the approach is changed to operator-centric, it can do wonders. This article gives an overview of how purpose-oriented design can simplify the operation of machine tools by easing the demands on users, thus ultimately improving their processing.

Machine tools are typically characterized by their high complexity. In order to simplify it for the operator, it is important to review the set targets right at the beginning, according to Industrial Designer and CEO, Design Tech, Jürgen Schmid. "For whom, for what and at which point does simplification bring economically relevant benefits for the user during operation? In service? In the training process?" he asks. The answer is clear, "Operation, ergonomy and handling are the first and the central tasks of the designer" said Schmid.

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Improving usability for the customer

In the end, it's all about the client, Schmid added. "We want and demand from ourselves, economically relevant benefits for our customers." The firm has thus developed a successful innovation strategy design. Before the team at Design Tech starts a project, it observes and asks the opinion of its customer's operators.

"In combination with a video analysis, our customers are repeatedly surprised how the workers risk their health and sometimes even their lives, by very risky actions. This misguided behavior can be ruled out by targeted measures taken on the machine tool," Schmid explained. The example of the Kadia HMC 100 control panel designed by Design Tech shows that, by unification and a process-specific operator structure on the user interface, familiarization times and operator errors can be reduced.

According to Schmid, with a modular system of operator units, manufacturing and logistics costs are reduced substantially. "To take a concrete example, a customer reduced training times by 30 per cent using an intelligent simplification concept," he elaborated. With smart solutions, it is possible to guarantee, without rebuilding or dismantling, that container and pallet dimensional tolerances are kept thus, bringing down the logistics costs. "A highly complex machine structure with high quality and precise inner technical working is given clear structures and a quickly graspable allocation system with the aim of significantly reducing the starting threshold for users and service personnel," Schmid explained. Examples are said to be the super-finish machines Cenflex and Race from Supfina Grieshaber, which, according to Schmid, were praised by specialist reviewers on their introduction to the market for the ease and

Source: The Kaikai Company

Coordinate measurement machines from the Wenzel Group use design to guide the actions of operators

security with which they can be mastered. With the Makino F8/F9, a well thought-through user-oriented machine structure and cladding concept simplified operations and accelerated access for the user and for crane loading, the designer noted.

Focus on communication between man and machine

Intuitive operator control is the goal of designer firm The Kaikai Company based in Munich. Marketing Director and Executive Partner, The Kaikai Company, Tim R Wichmann explained, "Communication between man and machine is becoming an increasing priority with products of growing complexity. A transparent design guides the user and shows him where an operational intervention must take place, can take place or is unnecessary."

Orientation by means of an intelligent design is said to help the user clearly identify where he is working on the machine and where the process itself is taking place without long familiarization. "As in a modern car engine, one can select the actions of the user and control autonomously. Here, a shaped cover shows clearly, for example, where only oil and water can and may be added. All other options are ruled out by the design," Wichmann said.

This can also be seen in the new Kaikai design of the coordinate measurement machines of the Wenzel Group. "In the process, the measurement and work area is shown to the user via a number of elements and details. The flap on the gear-tooth measurement machine is a fifth surface, inclined towards the user, which invites him to approach and indicates the working area," explained Wichmann.

Source: The Kaikai Company

Designer Tim R Wichmann (L) and Executive Partner, Christian Jaeger from the Kaikai Company, have developed MAG's new design system

This is underlined by the CI cutout, an element which constantly recurs in the firm's color on all newly designed products of the Wenzel Group. This cutout marks the area in which the measurement takes place. Creative Director and Executive Partner, The Kaikai Company, Christian Jaeger, described the concept. "Independent of the size of the machine in each case, this cutout always represents the heart, the precise measurement, and thus has a dual function. It helps imprint a recognizable characteristic, thus communicating the brand and also provides clear orientation for the user," he said.

Efficacy of machining is dependent on the user

Complexity, however, applies not only to the machines themselves, but also to the production environment, according to Wichmann. "In order to take into account the requirements of customers around the globe and the corresponding factory regulations, system provider MAG has adopted a flexible approach to the design of its machines and systems. With the EMO Design-Body-Kit announced for EMO (metalworking fair in Hannover, Germany), MAG leaves room for specific requirements."

This allows the customer to decide for or against the design option and the design kit is open for the relevant color regulations, automation interfaces etc. "It is also

important here to take an in-depth look at the multiple additional functions and analysis options that make a machining process more effective," the designer explained. "This efficacy is always influenced by the user."

Wichmann further said that in order to relieve the increasing workload on operators, there is need for new ergonomic solutions. He announced "MAG presented a control console concept which is in response to the increased demands regarding simulation, CAM or interconnection to production and resource planning or to training software."

In the opinion of the Lauterach, Austria based designer and the founder of Dominic Schindler Creations GmbH (DSC), Dominic Schindler, the high complexity of machine tools is often due to the fact that products are not primarily developed for the operator, but for efficiency in production or for simplification of component purchase. "Although these aspects should never be completely left out of consideration, there will be a clear move in the coming years in favor of development for the operator," Schindler predicted. Operation will, in his view, become more logical, more intuitive and therefore simpler.

Source: Dominic Schindler Creations GmbH

"Function is often taken as an excuse for bad design."

Founder, Dominic Schindler Creations GmbH, Dominic Schindler

Source: Design Tech

"Operation, ergonomy, handling are the first and central tasks of the designer."

CEO, Design Tech, Jürgen R Schmid

Operator codes for an all-round experience

When asked how the design can concretely simplify the operation of the machine, Schindler answered, "It is not merely a matter of making three buttons into one. Ultimately, the user must feel an all-round experience that may perhaps consist of making three buttons into four. As long as the operator is fast and feels better, the goal has been achieved." A discipline that is apparently becoming more and more important is not only to plan the hardware, but also to have intuitive use and design of software surfaces.

"We often have to smile when time is spent in making a machine faster by one second. Up till now, however, no one in machine construction has thought seriously about how the operator can become faster," Schindler observed. DSC, with its interaction design department, suggested that it has an answer. "This department is concerned exclusively with man-machine communication and attempts to connect the functions of the machine with the logic of man and thus to simplify," he said.

Source: The Kaikai Company

The new design of a MAG machine tool with optional design-body-kit and control console concept was presented at EMO 2013

Good design eliminates operator error

An example is the software for Fette Compacting or Bystronic. These were new developments by DSC. Schindler said it was not just a matter of colors and shapes, as most people mistakenly expect from a designer. "Attention was paid mainly to the operating sequences and the simplicity of operating the software surface. During development, it was interesting to see that the operator never used certain functions, or that he had absolutely no idea that certain functions existed at all. This was simply due to the fact that the classical operator, in our world today, is no longer prepared to read through handbooks for days in order to use a very simple function," he added.

DSC therefore wishes to continue not only making the product itself an experience, but also hopes to develop software surfaces for customers for which the operator no longer needs long, drawn-out preparatory reading or familiarization. "In future, he will be able to operate the software simply developed by us. This saves time and simplifies daily work, as with modern smartphones," the designer concluded. MMI

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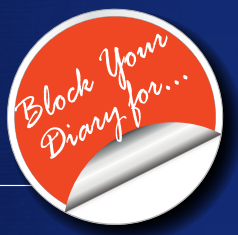

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Enhancing Machining Processes

In any machining process, there are four important elements – the machine itself, the cutting tool, the material being machined and the coolant. By using an optimal metalworking fluid, one can achieve higher productivity, cost optimization as well as the best possible machining quality. This article gives an overview of how these metalworking fluids can help manufacturers in their machining processes.

There has been a change in the mindset of people with regards to the use of metalworking fluids such as water-miscible coolants or cutting and grinding oils.

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Indian manufacturers have started looking at them as a value addition in the production process. Constant upgradation in the machining technologies, materials, regulations and competitiveness are acting as a driving force for this change in the mindset.

Increasing productivity

However, the influence of metalworking fluids on the machining process is often greatly underestimated or not taken into account at all. For example, during tests at Blaser Swisslube's Technology Centre on the drilling of Inconel 718, it was found that it was possible to increase the cutting tool manufacturer's recommended cutting speed of vc 30m/min to vc 75m/min. This impressive speed was possible by use of the optimal metalworking fluid. Therefore, thanks to these gains, the overall machining cycle time was reduced by more than 50 per cent.

Initially, the customer was drilling the part using a solid carbide 5mm diameter drill at 3x depth with the help of through tool coolant on a vertical machining center. The recommended cutting data for this drill on Inconel 718 was 30m/min at a feed rate of 0.06mm/rev. Following the evaluation by the technicians, the surface speed was increased to 75m/min, with the feed rate remaining the same. The result was a reduction in drilling time from 8 to 3.2 seconds.

Talking about this achievement, Industrial Partnerships, Blaser Swisslube, Max Zuber said, "For cutting tool manufacturers, it is simply impossible to provide cutting data recommendations for every metalworking fluid. As a result, working closely with customers plays an important role. It enables us to investigate specific applications and develop the optimum combination of metalworking fluid."

Source: Blaser Swisslube

High performance through water-miscible cutting fluids

Coolants

With this, it is obvious that a right metalworking fluid has a high potential to affect machining to a large extent. Besides the surface finish, a good cutting fluid also has an impact on reachable tool life and

geometrical accuracy of components. The coolant being used, along with the cutting tool, can help reduce frictional forces while machining. In many cases even the parameters required to machine efficiently can be affected by the choice of the coolant. Depending upon the design formulation and additivation, it can work on higher productivity, economic efficiency and machining quality improvements.

Productivity improvement

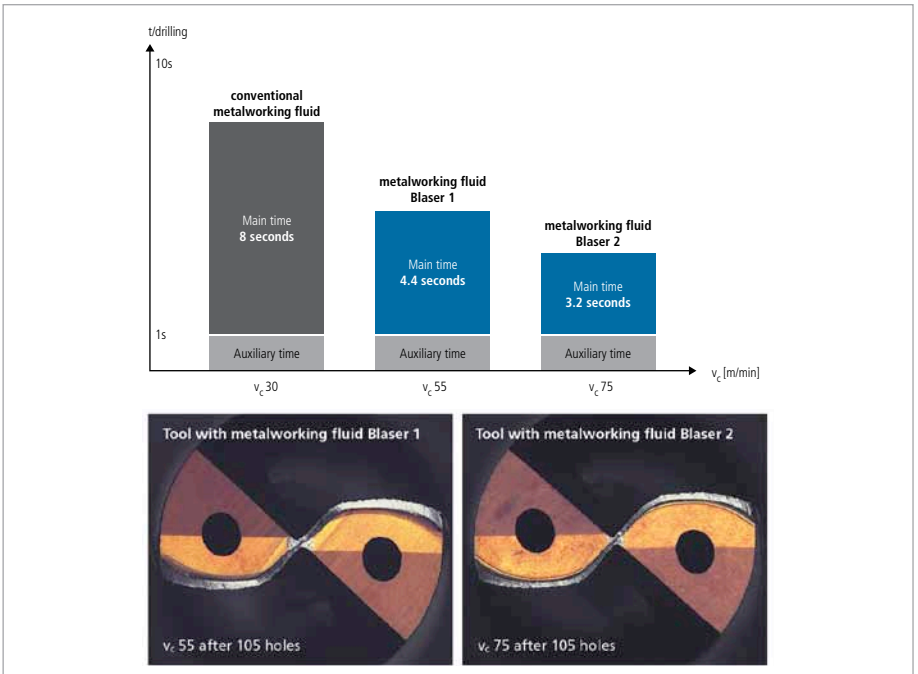
Coolants can enhance overall productivity by as much as 10 per cent or more. In terms of tool cost, optimization of a coolant can lead to ~20-40 per cent reduction. Choice of technology, raw material and formulation strategy of new generation coolants influence reachable tool life in a machining process and in some cases productivity. In many closely held studies at customer places, the company has been able to achieve productivity improvements in the range of 8-15 per cent by working together with customers. After the life of coolant is over, it is disposed off as per the prescribed norms by pollution control board.

Disposing off coolants is one of the areas which raises eyebrows specially in this day and age when health and environment become challenging topics. This is where Blasocut comes in.

Global trends

It is becoming a global requirement for all manufacturing organizations to contribute towards a greener planet. These initiatives are either due to global regulations or self-consciousness towards the environment. Blaser Swisslube has designed Blasocut, a concept which works in perfect harmony with nature. It enables colonization by stable primary bacteria that eliminate all other bacteria by taking over the available nutrition, thus, limiting their own growth as well. The result is long-term emulsion stability and one of the safest formulations to use across the world.

With such environment friendly coolants, emulsions, like Blasocut, need no tankside addition of bactericides. Water-miscible emulsions stay biologically stable inherently, without needing any bactericides. It uses an age-old law of nature whereby bacteria normally colonize aqueous media immediately. To implement this idea and help the bacteria grow, ideal conditions are created. These bacteria, also present in drinking water, build up a naturally stable biotope where undesirable bacteria have no chance of propagating. This is called as primary bacteria because it dominates and is the first to colonize the emulsion.



Source: Blaser Swisslube

Drill into Inconel 718 with 3 different metalworking fluids

Benefits to the environment

The most important benefit for users is the compatibility of coolant towards human health and environment. Since there are no undesirable bacteria, requirement of tankside addition of bactericides is eliminated. The cutting fluid avoids skin reactions or irritations of the respiratory tract resulting from overdosing with bactericide. Uncontrolled growth of unknown bacteria in conventionally formulated metalworking fluid emulsions generally shortens their service life. Such bacteria can reduce the pH value and cause bad odors or even corrosion. Fungal filaments can lead to filter clogging as well. That is why bacteria and fungi have to be minimized in conventional metalworking fluid emulsions. Moreover, primary bacteria also prevent the growth of undesirable fungus and bacteria that are bad for the emulsion and the user.

Conclusion

With the optimal choice of coolants, one can improve productivity, economic efficiency and machining quality. At the same time green manufacturing is also achieved with the help of coolants such as Blasocut. MMI

Source: Blaser Swisslube

Customer service laboratory at Blaser Swisslube

Creating the Ultimate Automation Solution

The automation team of a Texas shop deploys Equator programmable gauges from Renishaw plc for measuring and sorting mud-motor bearings. The results achieved are remarkable—the process-controlled hard turning cell pays for itself in just 18 days. Here's a look at what conspired.

Conroe Machine is doing what most machine shops only dream of—hard turning a family of parts around the clock in an unmanned cell that operates a 'self controlled' process. It has integrated a Fanuc robot with the Equator gauging system, using Renishaw EZ-IO software. This provides simple comprehensive communication functions for 100 per cent part inspection and auto-compensation of a twin-spindle Okuma 2SP-250 lathe. The cell also boxes and palletizes finished parts. The company states that the turning cell paid for itself in an amazing 18 days.

Conroe is proof that it is possible for any shop, ready to use the talents of today's young automation experts, to exploit new technology. In this instance, it is Renishaw's programmable Equators, with software and programming developed by Conroe Machine's, CNC Programmer, James Wardell and Robotics Technician, Jeff Buck.

The same automation team have gone on to create an unmanned part measurement/sorting cell for a customer, this time combining two Equators, a Fanuc robot, a vision system and multiple lanes of low-profile conveyor. In both applications, the Equator demonstrates the value of programmable comparative inspection by quickly measuring a family of bearing races, doing it cost effectively, and without fixturing, or problems from a shop floor environment.

Source: Renishaw plc

Conroe Machine

Challenges

- Production plateaued at 400-500 parts per day per hard turning cell

Solution

- Incorporation of Renishaw's programmable gauges-Equators-to automate one of the cells

Results

- The automated hard turning cell produces 600-700 parts per day

Source: Renishaw plc

In development - Conroe's new dual Equator automated cell

Moving up the automation ladder

The bearings at the company are currently roughed out on four Doosan Puma lathes that originally did both roughing and finishing, and were served by four operators. These machines are now split into two cells, loaded/unloaded by Fanuc robots, doing only the roughing operation. These cells were among the shop's earlier automation projects. The semi-finished parts are sent out to be case hardened to HRC 65 at a depth of 0.070" (1.7 mm) before the finish turning.

"Our production plateaued at 800–1000 parts per day with these two cells, so 400-500 per cell," explained Wardell. "We had a single

operator loading the machines and inspecting the parts. However, you can rely on an operator to correctly inspect only so many parts with this kind of volume, and we needed even more output."

Choosing Equator over other inspection methods

"For our next step up, we conceived a fully automated process for the finish machining, with automatic part loading, post-process measurement, automatic tool compensation, part engraving, and boxing/palletizing the parts," he added. "We had pretty good ideas for the components of such a system, except for the part measurement technology, CNC type and software for tool compensation. Inspection must be fast to keep up with the cycle times on the parts, which can be as short as 98 seconds. Originally, we looked at white light laser inspection because of its speed, but the parts are too reflective. We also looked at hard gauging and shop-floor CMMs. Hard gauging was very expensive and required setup attention, and the CMM gave no speed advantage. While working with Renishaw on other projects, the regional manager, Sheila Schermerhorn, introduced us to the Equator as a possible solution," averred Wardell.

Process-control tools and software

Equator is a low-cost, flexible alternative to dedicated gauging and uses the comparison method of measuring. A master part with known measurements taken on a CMM is used to 'master' the Equator, with all subsequent measurements compared to the master. Repeatability is 0.00007" (0.002 mm) immediately after mastering. To compensate for shop temperature changes, the Equator can be re-mastered at any time. It uses an SP25 probe for touch and scanning data collection, at speeds of up to 1000 points per second. Styli are stored in an integral six-port changing rack, and the system is programmed through MODUS Equator software. The Equator can be used manually with push-button ease, but in this case it is ideally designed for integration into Conroe's automated systems, with the EZ-IO software for automation.

"We attended an open house at Hartwig in early 2012 and saw the Equator in action, along with Okuma's twin-spindle dual-gantry lathe," said Wardell. "Apart from being automation ready for parts of our type, the lathe's Windows-based OSP dual-path control has an open architecture and PC-based, operating platform, which was important in our plan for developing our own auto-compensation software."

Equator as part of the automated cell

Wardell and Buck went on to install a cell consisting of the Okuma 2SP-250H, a single Equator, an engraving machine, and a Fanuc M20iA 6-axis robot. In practice, the lathe's dual part carousels are loaded with raw workpieces, approximately 300 parts. The lathe's dual gantry loaders feed the spindles and place finished parts on a chute leading to a conveyor for pickup by the robot. The robot places the part on the Equator for measurement and if acceptable, transfers it to the engraving machine, and finally boxes/palletizes the finished parts.

"We developed our own tool compensation software to run on the OSP control," Wardell added. "This software uses measuring results from the Equator, transmitted in the form of a CSV file, to offset the tools when the part deviates from tolerance." Machining removes about 0.015" (0.38 mm) from each side of the part, with the tightest tolerance at ±0.001" (0.025 mm) and an 8 microinch (0.5 micron) surface finish. Parts range in size from about three to six inches O.D. "The Equator is easily able to measure within our tolerances with a high margin," stated Wardell.

Controlling the process

"Our OD/ID stays spot on, with approximately 5 microns variation on radius. We batch parts by size, so changeovers of chuck jaws and other tooling are minimized. The Equator's speed allows it to easily keep pace with the process. We re-master only once a day, because our shop is climate controlled to 72°F (22.2°C).

Inspection principles and automated flexibility

The measuring methodology for the parts is surprisingly simple. "We made an aluminum block with a hole in the center which is placed in the center of the Equator fixture plate," Wardell explained. "We use this to determine our center and set our coordinate system. Each part is placed in the center of that block. We touch to get a center on the part, then surface scan for everything else. We planned the measurement process to work without a part fixture or stylus changing. The robot chooses, through the EZ-IO automation software, which measuring program to run for each type of part. We know the critical features we must measure to ensure the part is within tolerance."

Measuring/sorting used parts

The hard turning cell currently produces about 600-700 finished parts per day, so only one cell is now needed compared to two before. It has now led to a follow-up project involving a parts sorting cell for a customer. Based on a concept sketched out by Touchette, Wardell and Buck are developing a measurement and sorting cell for used mud-motor thrust bearing races.

In oil field service shops, used motors are disassembled, refurbished and put back into service. "The customer was visually inspecting used races to determine if the parts were reusable, and they knew they were throwing away some good parts – and money," ascertained Wardell. "We wanted to give them a plug-and-play measurement and sorting system that takes human judgment out of the process, so more good races can be salvaged." MMI

Source: Renishaw plc

An automated FANUC robot boxes and palletizes parts

Raising the Bar with Automation

With myriad choices and implementation methodologies available today, Tata Cummins Ltd has analyzed its shop floor processes and identified areas where the most benefit can be derived from automating tasks. Installing gantry robots from Güdel India, the company saw its productivity increase by a whopping 98 per cent.

They say that a chain is no stronger than its weakest link, which basically implies that even the weakest link can break the strongest chain. This is more so true when it comes to handling parts through automation systems. With every part being critical it is necessary to use the right solution that ensures every part goes seamlessly from one machine to the other. Doing exactly that are the gantry systems from Güdel India Pvt Ltd, which are installed at Tata Cummins Ltd (TCL), a group of complementary businesses in India that designs, manufactures, distributes and services engines, generators and related technologies. With its facility in Phaltan, Pune the company brings about pioneering initiatives at the best possible value to its users across the country. Enabling them to serve their customers better are the highly engineered gantry systems.

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Automating the shopfloor

TCL is a 50:50 joint venture between Tata Motors Ltd, India's largest automobile manufacturer and Cummins Inc., USA, world leaders in design and manufacture of diesel engines. TCL went in for a capacity expansion first at Jamshedpur and then at the Cummins mega site at Phaltan. Talking about the expansions, Manager–Global Mfg Engg, Cummins India, Joseph Robin Mathai said, "These expansions were designed with fully automatic lines needing a high degree of precision loading and interface with CNC machines. We needed something that was automatic, fast, enabled precision loading of components that weigh between 80 - 150 kgs into CNC machines with complicated fixtures and was able to cater to a production rate of 400 parts per day. Now that is an engineering challenge, according to me!" Having clearly defined what they wanted the company approached Güdel.

Tata Cummins Ltd

Challenges

- To deploy an automation solution that was able to cater to a production rate of 400 parts per day

Solution

- Güdel's gantry robots with a maximum flexibility of six degree of freedoms

Benefits

- Delivering a finished component every 154 secs
- Single piece flows
- Minimum inventory on shopfloor
- Enhanced operator safety
- Usage of minimum floor space

Source: Güdel India Pvt Ltd

Gantry systems used at TCLs factory that saw its productivity increase by a whopping 98 per cent

Choosing the automation supplier

Güdel manufactures gantry systems and complete automation solutions. "Gudel is a renowned name when it comes to

FROST & SULLIVAN

Enhancing Manufacturing Competitiveness: New Age Solutions Driving Change

Discrete Industry Summit - 27th November 2013 | Process Industry Summit - 28th November 2013
Courtyard By Marriott, Mumbai International Airport

With concerted efforts by the industry, end users have gradually realized the advantages of automation solutions in order to be competitive in today's global economy. Frost & Sullivan believes that an ecosystem that will insulate the complete value chain from the effects of short-term economic fluctuations has to be created. Creation of an ecosystem is critical towards achieving the longer term goal of 25 percent contribution from manufacturing sector by 2025. Developing solutions 'For India, In India' is the need of hour!

As a demonstration of its thought leadership, Frost & Sullivan's Industrial Automation Practice will host its event, "Enhancing Manufacturing Competitiveness: New Age Solutions Driving Change 2013" in association with Automation Industry Association (India's apex automation industry body) on Discrete Industries – 27th November 2013 and Process Industries 28th November 2013, at Courtyard By Marriott, Mumbai International Airport.

The event is a must-attend for all companies/individuals with interest in the Indian Manufacturing / Process space. Apart from knowledge gathering on future prospect for the market and its evolving dynamics, some of the key discussion at the event would focus on, Asset Management and Condition Monitoring, Virtualization and Cloud Computing, Integrated Enterprise and Real-Time Performance Management, Digital Manufacturing and Product Lifecycle Management (PLM), and much more.

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"When it comes to deploying automation solutions there are two costs involved – the cost of operation and the solution. Our systems have a high cost of installation because it's a highly engineered product but the running cost is zero. Secondly the uptime is very high (above 98 per cent) and hence so is the productivity."

Managing Director, Güdel India Pvt Ltd, Sunil Raibagi

automation. We worked with the best machine tool manufacturers from many parts of the world and all of them, at some point in time, had worked with them and had good experiences. Hence, we decided to approach them as well," averred Mathai. Güdel India is technically backed by its parent company in Switzerland. All designs, software and applications are standardized and verified by the parent company. "Moreover, Gudel India had a strategy of getting the critical parts of the gantry from their parent company in Switzerland and manufacturing the less critical components here in India. This, along with the trained and experienced crew locally available, was a good business model that ensured the best product at the right price," added Mathai.

Deploying automated solutions

The main scope of supply at TCL was ZP 6 gantries for the block line, ZP 5 gantries for the head line, ZP 4 gantries for torque plate handling, power conveyors for component transfer and turn over devices and small material handling equipment. The responsibility to ensure mechanical, electric and electronic interface to all other production equipment on the line was in the scope of Güdel. Reminiscing about the first time they started working with Tata Cummins, Managing Director, Güdel India Pvt Ltd, Sunil Raibagi avowed, "2009 was when we started working with Cummins. The company had never used gantry robots. The entire design from concept engineering to solution was a challenge for us but we completed it successfully." Giving his take on installing Güdel's products then, Mathai stated, "This was a new installation. The challenge for us was to have the gantry ordered here in India to mechanically, electrically and electronically interface with metal cutting equipment manufactured in Germany. The interface was to happen for the first time on the shop floor at TCL. We got their team to interact closely with ours and all other suppliers all through the build of the project enabling the project to come together right the first time. Designing, manufacturing and implementing a system that delivers a finished component every 154 secs is indeed an achievement!"

Cost benefits

Total cost of ownership encompasses many aspects like initial investment, running cost, cost of good/bad quality, downtime, rejections and manpower. Gudel gantries positively contributed in improving reliability, reducing cost due to breakdowns, reducing cost of bad

Source: Güdel India Pvt Ltd

Floor automation at TCL that ensures every part goes seamlessly from one machine to another

"We needed something that was automatic, fast, enabled precision loading of components that weigh between 80 - 150 kgs into CNC machines with complicated fixtures and was able to cater to a production rate of 400 parts per day. That is when we approached Gudel."

Manager–Global Mfg Engg, Cummins India, Joseph Robin Mathai

quality and improving operating efficiency at TCL. Seconding the same, Mathai ascertained, "The gantries have helped us in achieving high productivity and helped reduce errors caused by manual material handling. As most material handling is done by the gantry, operator safety is also ensured." Companies usually back off from installing automation solutions because of the high cost involved. Elaborating on the same, Raibagi affirmed, "When it comes to deploying automation solutions there are two costs involved – the cost of operation and the solution. Our systems have a high cost of installation because it is a highly engineered product but the running cost is zero. Secondly, the uptime (availability) is very high (above 98 per cent) and hence so is the productivity."

Automation ensures single piece flows. There is less inventory lying around in between machines – and thus the inventory and 'work in progress' parts lead to quality issues. Also, the automatic loading shields the operator from having to handle heavy parts. "This becomes all the more dangerous when cycle times are low. With automation there is the possibility to have statistical process control. Machines can now be programmed to automatically deposit every 10^{th}, 25^{th} or any number that the control plan states, for quality inspection and most importantly, with automation a lot of premium factory floor space is saved. This space can be put to better use. For example we decided to club both our block and head line together and run them in parallel, making line management a lot simpler," concludes Mathai. MMI

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Treading the Road of Success

Macpower CNC, now a well known brand, started its journey as an SME. Through its participation in various initiatives held by UNIDO–ICAMT, the company was able to imbibe practices that caused a turnaround. Here's an overview of what worked for this company.

Macpower CNC, established in 1985, started its machine tool business with lathe machines on a very small scale. Wanting to keep up with technology, the company moved into the growing market for CNC machines. As a result the company has been transformed into one of the leading CNC manufacturing companies in India.

The company now manufactures turning centers, vertical machining centers and turn mill centers for the aviation, aerospace, automobile, petroleum, construction, fire fighting defense and metal working industries. Through assistance of the International Centre for the Advancement of Manufacturing Technology (ICAMT), which is an International Technology Centre of the United Nations Industrial Development Organization (UNIDO), the company has developed technical abilities that have resulted in excellent product innovations. Macpower focused not only on its product range but also on its own shop floor—transforming it into a temple of productivity through efficient management practices.

Source: United Nations Industrial Development Organization (UNIDO)

Gap assessment

In order to make necessary changes to improve its capabilities, the company took assistance from UNIDO–ICAMT. The process began through an in depth diagnostic study/gap assessment carried out at the company's facility. The SWOT analysis conducted highlighted the various strengths and weaknesses of the unit while also identifying opportunities and threats. The resultant analysis and a market study were used to create an action plan, laying out mission and goals for it.

Undertaking various training programs for its engineers, exposure to new technologies and assistance in marketing, the company was able to make immense changes in its method of operations.

Source: UNIDO

The assembly selection section at the Macpower CNC premise

Exposure to latest technologies

The company, to increase its exposure to latest technologies, joined the UNIDO–ICAMT technology missions to Germany, China and Taiwan. Through factory visits arranged during the missions, first-hand experience of how international units set up their processes and shop floors was seen. The best practices witnessed during these missions were then transported by Director, Macpower CNC, Rupesh Mehta to the company's shop floor in Rajkot. Along with best practices the unit also focused on product innovation and used the center's assistance in trouble shooting mechanical and electrical issues in the development of its new products.

Lean manufacturing tools

Another aspect that helped the company achieve its current success is the incorporation of lean manufacturing tools. In its case the techniques used were 5S, lean manufacturing and Total Productive Maintenance on the shop floor. Experts were appointed for activities related to technology transfer, maintenance and quality assurance.

More than machining

To balance this investment in technology, the company had to increase its revenue through marketing and sales. This was initiated through participation in various national and international exhibitions. These activities

Source: UNIDO

The various certifications and awards Macpower CNC has won since starting its journey to enhance manufacturing processes

Source: UNIDO

The Macpower CNC facility at Rajkot

have brought the Macpower brand to the forefront in machine tool manufacturing.

The company, today, has more than 23 sales and service centers across India and it continues to explore new markets. The company has already generated business in Thailand, Europe and Turkey, and with its ability to manufacture 1200 machines per year.

As part of its strategy for offering services to all ranges of customer, the company has developed a product range that caters to both low, mid and high end customers.

Conclusion

Macpower CNC has managed to develop its dream of becoming the leading CNC machine manufacturer in India by incorporating lean management techniques and increasing their brand through sales and marketing. The continued transformation of Macpower CNC resulted in a new premises which in an area of four acres is now equipped with a well laid out machine shop, design room, pre assembly, final assembly and dispatch, electrical and electronics assembly, QA and QC room, paint shop and sheet and metal shop. Recognizing the need for best recognition for these practices, Mehta has also undertaken a range of certifications for the Macpower family of products. These include ISO 9001:2008 accreditation for design, through TUV Suddeutschland India Pvt Ltd. The company's products are CE Certified demonstrating the high standards the products conform to. Further, Macpower CNC has recently been awarded the prestigious FIE foundation award for 'Excellence in Design' for Model Turn O'Mill – 200 in IMTEX 2013. MMI

Educating Metal Cutting Professionals

Training and education play an important role in any organization and sector. When it comes to the metal cutting sector, its all the more important, as professionals here, need to be knowledgeable enough to select the right tool to cut the workpiece. Here is an overview of how Seco Tools trains its employees as well as its customers to work efficiently and effectively.

Cutting processes represent a major group of methods used in the manufacturing of workpieces. These processes include amongst others turning, boring, milling, drilling and reaming. The goal of all such processes is to manufacture workpieces with a high degree of production efficiency, i.e. at the quality level and within the period of time desired and at appropriate cost. Developments in the metal cutting sector have been aimed at improving production efficiency and performance. This can be done through providing better understanding of how an increase in quality and a reduction in both processing time and processing costs can be obtained.

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Complexities in cutting process

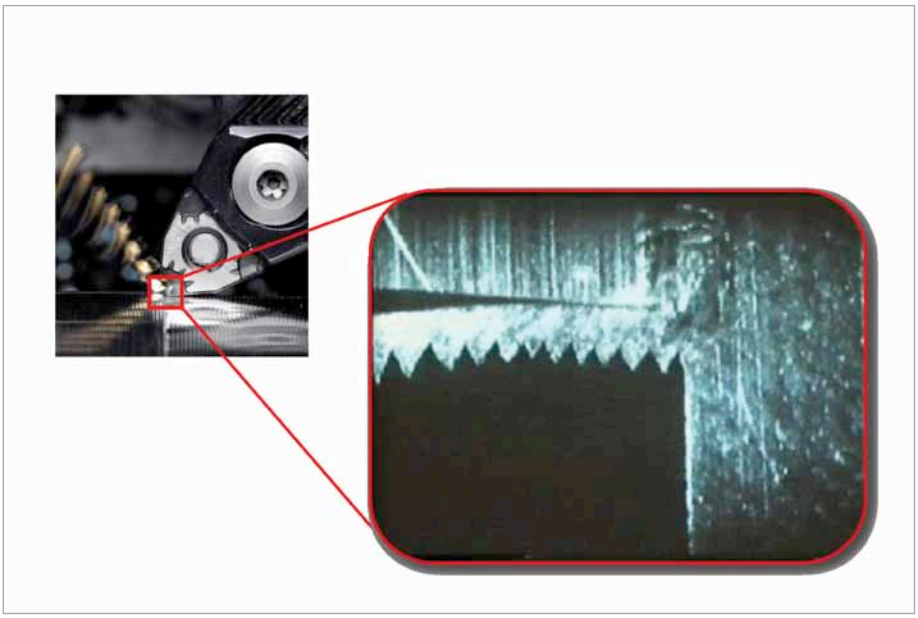
The complexity of the metal cutting process is apparent. Even after a significant amount of research has been performed during the last 100 years, gaps in the knowledge needed for understanding the interaction between the cutting tool and the workpiece material as well as other process parameters still remain. What is more important than that is, there is an increasing gap between the knowledge as such and how much of that knowledge is possessed by the people working in the industry. The tools developed based on the latest insights are available. However, do people have the correct knowledge levels for fully exploiting all the possibilities of the tools?

The cutting forces can be determined experimentally and/or modeled for different process conditions such as cutting data, tool geometry and workpiece material. They (cutting forces) can further be distributed along the active surfaces of the cutting tool in terms of level, distribution and location. This distribution results in tool stresses related to the mechanical load on the cutting tool. The cutting forces in combination with the cutting speed result in an energy consumption in the deformed workpiece material and on the contact surfaces between the tool and workpiece.

Multiple loads

With a well-functioned coating, the major part of the energy consumed by the machining process dissipates inside the workpiece material and is localized to the deformation zones of the machining process. Consumption of energy in the deformation zones results in increase of temperature, which constitutes the thermal load acting on the cutting tool. The thermal load could also give rise to thermal stresses, which should be added to the mechanical load stresses. The load acting on the cutting tool must be matched by the tool material properties both in terms of mechanical load and temperature.

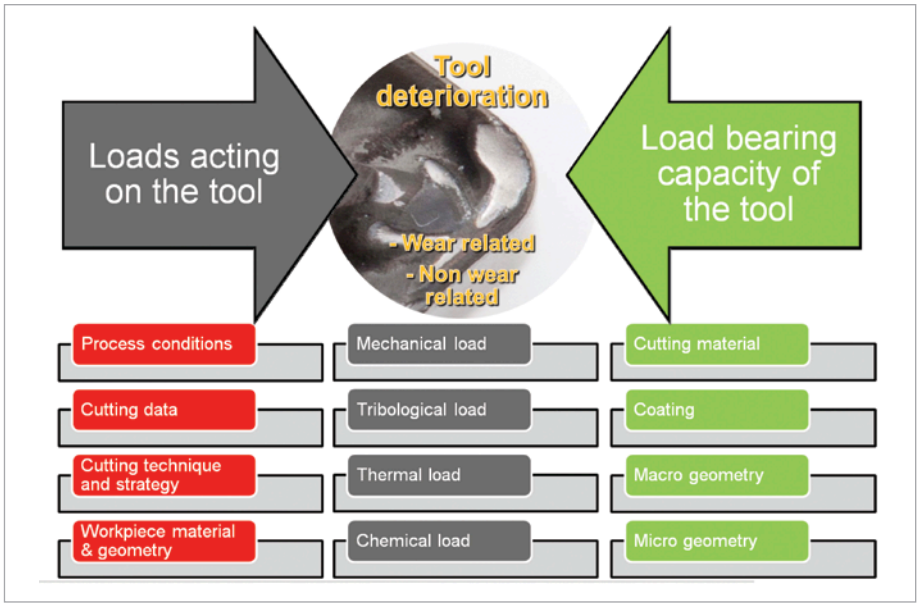
Source: Seco Tools



The complexity of the metal cutting process

The total load acting on the cutting tool may be controlled by varying the process data mainly in terms of tool geometry and cutting data. The wear and deterioration of the cutting tool is not only controlled by the tool load distribution but also by the tribological conditions acting on the contact between tool and workpiece. The mechanical and thermal load in combination with the machining time and travelled distance results in a tribological load.

In several cases there is also an addition of a chemical load in the form of chemical reactions and diffusion, which is normally accelerated by the thermal load. The forces acting on the surfaces of the tool in combination with the process temperature and the engagement time (distance) define the tool wear resistance, which can be described by a wear function. The tool life, material removal rate and therefore, the total amount of material, which is possible to remove per cutting edge, is determined by the balance between the tool material properties and the total load acting on the tool during the machining process. The tool life and practically possible material removal rate results in a certain cycle time and tool cost for manufacturing a certain part. If the cost for equipment, personnel, etc. is also considered, it is possible to determine the manufacturing cost for each manufactured part.



Source: Seco Tools

A scientific and technological approach to metal cutting

Experience plays a role

A metal cutting technician has to understand all of this and correctly interpret all the interactions between the different process elements and the results of these interactions. Being able to operate on this level is on the one hand a question of possessing the process knowledge and on the other side a matter of real life experience. The experience has to come with time, by making all the mistakes that lead to deeper insight in the process. However, when the starting level on knowledge is high(er), less time is to be spent in gaining experience by experiments. Educating and training young manufacturing engineers in metal cutting science and technology is a key element for every manufacturing factory that wants to keep a leading edge in the manufacturing sector.

A most important part in tool technology and engineering is the basic tool selection process. Having the most appropriate tool for the application at hand is a crucial starting point. If already from the beginning one starts with the 'wrong' tool, the rest of the exercise does not really make any sense and will never result in the best possible total solution.

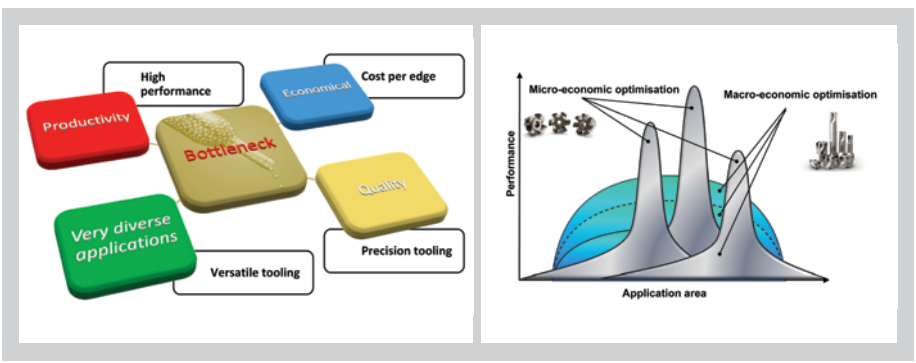
Tool selection

Tools can be selected in different ways. Off course, first of all the selected tools need to be seen in a technologic way, to do the job it is supposed to do, namely create correctly finished workpieces. But on a macro-economic level the selected tools must serve the selected target also. Tool selection could be done based on productivity goals. Here, the best performing tools should be selected. Another approach could be to select tools that offer the best total economic performance, where the target is cost-efficiency of the selected tool. Tools could thirdly be selected on the basis of its capacity to generate high workpiece quality. And last but not the least approach is to select tools that offer the broadest possible application possibilities. Here, tools with all-round capabilities should be selected. Which approach is most appropriate in a given application deserves serious considerations and analysis. This is the subject of production-economy science.

Seco Technical Education Programmes (STEP)

In order to train employees, Seco Tools has set up Seco Technical Education Programmes (STEP). This initiative not only educates it employees but also helps customers to be in touch with a rapidly changing industry. Thus, helping customers to achieve maximum production efficiency.

STEP helps the metal cutting industry increase competitiveness by substantial productivity increases, cost reductions, higher workpiece quality and more versatile approaches. The advantages are multiple; reduced manufacturing cost and machining cycle times through optimized cutting conditions, lower tool spending through elimination of tool waste and improved workpiece quality through process optimization. For the employees this offers greater work satisfaction, further development and retention, increased safety, and extra motivation. MMI



Source: Seco Tools

Tool selection process

Redefining Boundaries of Innovation

EMO 2013 recently concluded on a high note. It did not only create a buying-selling environment for the gathered metalworking industry but also offered a platform for business discussions. These discussions further led to forming new alliances. Also, exhibitors took advantage of this platform to astonish the world with their latest innovations. Here is a gist of what EMO 2013 offered to its visitors and exhibitors alike.

Under the theme of 'Intelligence in Production,' metalworking solution providers across the globe presented their innovations and solutions at EMO Hannover 2013. Around 2,100 exhibitors from 43 countries showcased their technologies that would automate, simplify or enhance the efficiency of the work sequences involved in the production processes. As EMO is considered a Mecca of metalworking industry, every participant, no matter how big or small in size, showcased the best of their capabilities. As a result, the event witnessed many innovations that amazed visitors.

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Innovations galore

One such novelty was the 3D printing technology. In order to improve efficiency of the production process, such new manufacturing technologies are being progressively integrated into ongoing production operations. The spectrum of structures that can be manufactured is thus, significantly extended. EOS GmbH outlined the possibilities unveiled by this technology in a presentation titled 'New Production Technologies in the Aerospace Industry.' This technology helps manufacture complex components. It is predicted that in the future around 50 per cent of a turbine's components will be additively manufactured, with projected weight savings of 450 kg in a turbine weighing 2,700 kg.

Alternatively, at the seminar themed, 'More Intelligence in Production,' the vision of Industry 4.0 was addressed in detail. Besides the modern-day information technologies, new production technologies were addressed in general. In its presentation, Siemens AG emphasized on how a production line can be optimized by using a 'Virtual Reality.' In the example, the output of a press line was increased by simulation and simultaneously its energy consumption was cut by 40 per cent.

Taking innovation to new heights, Liebherr-Verzahntechnik GmbH, a manufacturer of gear-cutting machines, premiered a new, intuitive system for operator control and for simplified make ready of its machines. It enables make-ready times to be shortened and error free.

Highlighting simplification of the job and operator-friendliness, Siemens Drive Technologies Division and Kuka Roboter GmbH announced a comprehensive cooperation. The central pillar of the cooperation is integration of Kuka robots and Siemens machine tool solutions (CNC) for loading machine tools. The CNC control from Siemens and the robot controls from Kuka are ideal for integrating robot and CNC technology production.

Like these two companies, even the then well known brand DMG Mori Seiki had an important announcement to make. Along with the 15 new machines, Chairman of the Board, Gildemeister AG, Dr Rüdiger Kapitza and President, Mori Seiki Co Ltd, Dr Masahico Mori, presented the new brand name – DMG Mori. By combining sales and service activities, DMG Mori offers a broad product portfolio and unique market presence. The cooperation covers sales and all technical services, such as customer services, training courses and technical support.

However, the highlight of the event was not is the record breaking sales that the company garnered during the show. "We have taken a positive stock of EMO in Hannover, with an

Source: www.emo-hannover.de

Latest innovations in milling machines seen at EMO 2013

"India's position as a supplier is improving due to the fact that Indian players are cost competitive, deliver quality and focus on after sales services."

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

"Fresh buying interest was seen in line with a revival of European economy. As a result, footfalls to Indian booths were remarkable. We encountered a bunch of business inquiries from across the globe."

Vice President, IMTMA and Chairman & MD, Jyoti CNC Automation Ltd, Parakramsinh Jadeja

order intake of €276.4 million and 1,137 products sold," informed Managing Director, DMG Mori India, Ramisetti Sridhar.

Novelties and latest trends

With such outstanding sales figures, one can see visitors' inclination towards modernization and thus simplicity. Elaborating on trends towards simplification at EMO 2013, President, Indian Machine Tool Manufacturers' Association (IMTMA) and Managing Director, TaeguTec India Pvt Ltd, L Krishnan said, "Improved machining concepts, control technology, software and tools were clearly visible trends at the show."

In the software category, Director – Sales and Marketing, CAMWorks, Geometric Ltd, Nishant Saini observed that all companies are looking to provide end-to-end solutions to the customer. "For example, we have introduced the true G-code machine simulation, which helps in reducing the setup time on the floor. This allows the customer to have end-to-end capabilities right from the design to manufacturing process planning to verification," Saini added.

Giving his take, Senior Vice President – Global Marketing, Bharat Fritz Werner Ltd (BFW), Sayed Amjed, mentioned, "A distinct focus on user-friendliness and application was evident at the event. Energy conservation, enhanced aesthetics and superior ergonomics were pronounced everywhere. The use of carbon fiber reinforced plastic (CFRP), claimed to weigh a fourth of steel was a novelty!"

Emuge-Franken showcased its capabilities with CFRP. The company displayed special shank extensions for machine taps, which enable efficient use of resources achieving weight reduction by combining steel and CFRP. As a result of incorporation of the new material, the lightweight extension offers stability and stiffness to the shaft.

Talking about this trend in tools and tooling category, Director, Emuge India Pvt Ltd, Sanjay Baljekar said, "Several innovative tool and workpiece clamping, for a shorter turnaround time and reduced setting times were visible at the show. Newer material matrix and improved finishing systems, for enhancing tool quality were also prominently displayed. In the tools and toolings space, new geometries with multilayer coatings were on display." For example, the tool manufacturer Kennametal Inc reported good empirical results with CVD-coated diamond as a cutting material. With this, in comparison to hard metals, the cutting speed has increased from 65 to 300 m/min.

Best of class machine tools

Likewise, EMO 2013 witnessed best of the capabilities and defined global trends in every segment of the metalworking industry. In the category of CNC machines, five or more axis machines were on display and in demand too. "EMO showcased some of the best in the machine tools world. The trend for flexible and fully automated machines with five or more axis was seen at the show," observed Business Head, Nimble Electric, Dr Prashanth Thankachan.

Apart from automation, Managing Director, Ace Manufacturing Systems Ltd (AMSL), P Ramdas observed a trend towards performing multiple machining operations on a single machine. "Complete machining solutions with automation were commonly demonstrated on the fair ground. Higher material removal rates with heavy milling and very high feeds were also on display. Additionally, machine tool builders widened their product spectrum by offering new and innovative technologies." For example, WFL Millturn Technologies GmbH & Co KG presented a machine that enables users to execute not only turning, milling and drilling operations, but also deep-drilling, grinding and honing. In addition, metrological technologies can be used for taking in-process measurements. Moreover, a capability has been integrated for internal turning of large drilling depths as a new process, making for a shorter path and a higher surface quality of the boreholes created.

Another example of the integration of several machining operations on a single machine comes from MAG IAS GmbH. With the Specht 600 Duo, the company displayed a CNC machine featuring a double spindle and integrated honing technology. This

"Complete machining solutions with automation were commonly demonstrated on the fair ground. Higher material removal rates with heavy milling and very high feeds were also on display."

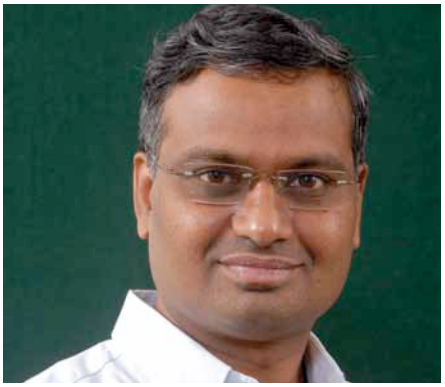
Managing Director, Ace Manufacturing Systems Ltd (AMSL), P Ramdas

"Indian machine tool players are taken seriously in the global arena. This further leads to increase in exports of the company and hence contributes to their success."

Managing Director, UCAM Pvt Ltd, Indradev Babu

"When our customers see us standing tall amongst exhibitors from the rest of the world, they are reassured about their right decision. It helps us to build a long-term business relationship with them."

CEO, Micromatic Machine Tools Pvt Ltd, TK Ramesh



"We have taken a positive stock of EMO in Hannover, with an order intake of €276.4 million and 1,137 products sold."

Managing Director, DMG MORI India, Ramisetti Sridhar

"A distinct focus on user-friendliness and application was evident at the event. The use of carbon fiber reinforced plastic (CFRP), claimed to weigh a fourth of steel was a novelty!"

Senior Vice President – Global Marketing, Bharat Fritz Werner Ltd (BFW), Sayed Amjed

machine is particularly designed for machining motors.

Showcasing India's best

Following the same global trend of combined solutions, Indian companies, Grind Master Machines Pvt Ltd and Micromatic Grinding Technologies Ltd showcased a new machine named 'Grinding, Microfinishing and Deburring Cell.' This machine combines three separate processes of deburring, thrust face lapping and polishing of diameters of gear pump shaft. Previously, this process involved three separate machines. "These machines are more flexible and the change over time from one job to another is very less. To make this possible, servo axis and CNC systems are replacing hydraulic ones," explained Managing Director, Grind Master Machines Pvt Ltd, Mohini Kelkar. She further added that this machine received a fantastic response from the visitors.

UCAM, another Indian company, is also satisfied with the response for its presentations during this edition of EMO as compared to the previous ones. The company demonstrated several five axis solutions focused towards OEM customers. "The large rotary table and direct drive rotary table invited many serious enquires," stated Managing Director, UCAM Pvt Ltd, Indradev Babu. He was pleased with the detailed discussions, leading towards alliances, which took place during the event with several machine tool building companies. The response received by Nimble Electric, the sister concern of UCAM, for its torque motors was also satisfactory.

Macpower CNC Machines Pvt Ltd also presented its product range of three state-of-the-art machines including the turning center, vertical machining center and Turn O' Mill with Y-axis. Spectra Tools displayed its UNICART Holding System. "Its unique cartridge holding system that can be used for all metal cutting operations like milling, boring, reaming and modular holding. We also received International Patent Approval for this," informed Proprietor, Spectra Tools, Vijay Kumar Mada.

Alternatively, Sphoorti Machine Tools Pvt Ltd exhibited VDI static holders from Ø16 to Ø60 shank, driven tool holders DIN 5482, 5480, 1809 and special customized tool holders. "Our products are well accepted in the global market due to quality and careful pricing," stated Managing Director, Sphoorti Machine Tools Pvt Ltd, R K Purohit. The company was at EMO to expand its exports. Currently 30 per cent of the company's turnover comes from exporting to Europe mainly to Germany.

"We believe EMO is the opportunity to showcase our capabilities. This is a forum where we can meet serious users and distributors. The interest generated converts in exports in due course. Hence, participation in EMO is an investment for the future."

Director, Chennai Metco Pvt Ltd, C Renganathan

"The rise in demand for Indian machines is mainly because Indian machines are at par in terms of technology with international competitors and at the same time are cost efficient."

Proprietor, Spectra Tools, Vijay Kumar Mada

Foreign interest

According to Krishnan, as international trade shows like EMO, gather decision makers and end-users under one roof, it helped Indian exhibitors to close deals, especially international agreements, with great pace. For example Versa Controls, an Indian company in the field of automotive gauging electronics, signed an agreement with Nirschl Präzisionsmechanik Held and Plaschke GmbH, gauge manufacturers based in Germany to sell its products there. The gauging displays supplied to Nirschl are indigenously designed and manufactured by the company in India. The features such as USB data storage and remote firmware update over the Internet have been incorporated in to their products for the first time.

"Efforts such as long term planning have helped gain global acceptance and trust. This is a slow but effective way of achieving an increase in the international market."

Director, Macpower CNC Machines Pvt Ltd, Rupesh Mehta

"We have seen that regular and consistent participation in EMO builds customer and dealers' confidence. We also feel that this has changed the buyers' perspective about Indian machines."

Managing Director, Grind Master Machines Pvt Ltd, Mohini Kelkar

The sales in foreign land further leads to expansions as well. As stated by Purohit, European customers need support locally. "Our company has managed to arrange to stock our products in Germany to enable quick deliveries in case of small requirements. This is an added advantage to boost our sales in Europe," he mentioned.

However, EMO does not only help increase exports but also enables building a brand overseas. "As far as the Indian customers are concerned, it's an additional brand building for us. They see us standing tall amongst exhibitors from the rest of the world, which reassures them about their right decision. It helps us to build a longterm business relationship with them," revealed CEO, Micromatic Machine Tools Pvt Ltd, TK Ramesh.

Talking about the branding efforts, Kelkar noted that participation in EMO itself is a brand building activity. "We have seen that regular and consistent participation in EMO builds customer and dealers' confidence in our company. We also feel that this has changed the buyers' perspective about Indian machines," she stated.

Building brand India

All factors, directly and indirectly, have helped Indian manufacturers make their mark in the global space. "Efforts such as long term planning have helped gain global acceptance and trust. This is a slow but effective way of achieving an increase in the international market," explained Director, Macpower CNC Machines Pvt Ltd, Rupesh Mehta.

Highlighting the efforts taken by the Indian companies, Krishnan pointed out, "In the recent past, Indian machine tool industry has seen a rapid change in technological capabilities through joint ventures and collaborations between Indian and international companies enabling them to develop technologically superior machines."

One can definitely see the result of these cumulative efforts of building 'brand India.' "Indian machine tool players are taken seriously, which further contributes to their growth as exporters," noted Babu. Also, the rise in demand for Indian machines in the global market has been noted. "This is mainly because Indian machines are at par in terms of technology with international competitors and at the same time are cost efficient," revealed Mada. Purohit seconded the same and asserted that India is now emerging as one of the sources for global buyers and Indian products are well-accepted in the global market. The price competitiveness also plays a great role in the global space. "Sincerely this time, we have witnessed the change of perception of global customers for Made in India machines," averred Vice President, IMTMA and Chairman & Managing Director, Jyoti CNC Automation Ltd, Parakramsinh Jadeja.

Along with the Indian machines getting accepted and appreciated in the global market, the country is also a popular destination for foreign companies to make an investment. This fact was further underlined by German Machine Tool Builders' Association (VDW) by organizing a seminar titled 'EMO focus on India.' VDW utilized this platform to spread awareness on the current economic situation, especially focusing on aspects of law, taxes and financing, so that one could take advantage of business opportunities for the machine tool industry in the country. The seminar rounded off with best practice examples from experienced companies in the branch.

Conclusion

With such rightly chosen topics for discussion, EMO 2013 transformed into a platform for various business opportunities. With a background of innovations and novelties, new trade relations were forged. India, too, proved its mettle. However, a significant point to be noted is that visitors marked their presence in abundance giving no indication of the current challenging economic conditions. "In spite of the slowdown in the global economy, I think the response was good. This is an indication of good times to come," said, Dr Thankachan. MMI

"Several innovative tool and workpiece clamping, for a shorter turnaround time and reduced setting times were visible at the show. Newer material matrix and improved finishing systems, for enhancing tool quality were also prominently displayed. In the tools and toolings space, new geometries with multilayer coatings were on display."

Director, Emuge India Pvt Ltd, Sanjay Baljekar

"We have introduced true G-code machine simulation which helps in reducing the setup time on the floor. This allows the customer to have end-to-end capabilities right from the design to manufacturing process planning to verification."

Director – Sales and Marketing, CAMWorks, Geometric, Nishant Saini

Raising the Spirit for Manufacturing Competitiveness

Showcasing how innovative automation technologies should be applied to improve business profitability while optimizing equipment, production lines, plants and enterprise, Automation Industry Association organized a conclave on automation for manufacturing competitiveness in Pune on 18 Oct, 2013.

Considering manufacturing a stable engine for economic growth and that it must be fuelled by innovative and creative leaders, Automation Industry Association (AIA) invited industry thought leaders for its Autom@tion Tech 2013 Conclave at Pune.

Highlights

In his keynote address, President, AIA, Member, CII MSME National Council & CMD, Chemtrols Group of Companies, K Nandakumar presented an appropriate definition for automation. He said, "It is the industrial infrastructure that delivers ultimate customer experience making positive difference in the community."

Indira Rao
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Padmashri & Chairman, Board of Governors, IIT Delhi, Dr Vijay Bhatkar known for his path breaking pursuits in the government, industry, R&D and academia, was the chief guest for the event. Praising Nandakumar's presentation and his acute sense of description of the current status quo of the automation market, Bhatkar averred, "In automotive we have transformed from total backwardness. The ability to add value in manufacturing is important for the industry to thrive. Whenever we have had a challenge or have been denied anything we have responded appropriately. The present time offers an opportunity to create intelligently designed machines to add intelligence on the matter and the energy we process."

Learnings from leaders

Head Operations, Kimberly Clark Lever Ltd, Sanjay Kachre gave his take on how automation strategies impact the entire course of manufacturing, because of the complexity of operations. Elaborating further on how automation leads to faster and smarter decision making, Director & CTO Chitale Dairy, Vishwas Chitale emphasized that holistic use of automation across the entire business process is warranted.

Another industry veteran, Senior General Manager - MES, Controls, Automation, Digital Mfg & General Assembly, Mahindra Vehicle Manufacturers, Nidamaluri Nagesh, also a recipient of the prestigious Boss Kettering Award for 'Innovation on Collaborative Robots', dealt with automation game changers and connected manufacturing and disruptive technology.

Take away

At Autom@tion 2013, global technology giants like Microsoft, Rockwell Automation and Siemens pitched in with their sneak previews of future automation technologies. Apart from witnessing top notch technologies, the delegates also walked away with quite a few ideas that if implemented can change the course of manufacturing and help in attaining skilled labor. Nandakumar during his presentation stressed that the curriculum being taught in most colleges is not apt for the industry. "Companies should adopt the 'Train the trainer' concept, where professors and teachers go to companies and get trained by technical experts. They could then pass it on to their students." This seems like an excellent initiative with companies not making time to go to universities and train the students.

With automation being a game changer for sustainable operation, the Autom@tion Tech conclave put forth how automation is a hidden value amplifier and how manufacturing businesses can unlock profit potential with real-time decision power. MMI

Source: AIA

Director, AIA, A Wadhwa on the dias – LtoR: Past President, AIA, V Paranjpe; Head–Operations, Kimberly Clark Lever Ltd, S Kachare; Chairman, Board of Governors, IIT Delhi & ETH Research Lab, Dr V Bhatkar; President, AIA, K Nandakumar; Senior GM, Mahindra Vehicles Manufacturers, N Nagesh, releasing AIA's Automation India magazine

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ELECRAMA-2014

Power Taking a Quantum Leap on a Global Platform

ELECRAMA 2014 is all set to showcase the global competitiveness of Indian products and the capability of local manufacturers to develop world class engineering products at competitive costs. It will offer a strong interface with the best-of-breed in technology; namely, key decision makers like the government, power utilities, funding agencies, technical specialists, EPC contractors, electrical consultants, academia, and so on.

ELECRAMA, the flagship event of the Indian Electrical & Electronics Manufacturers' Association (IEEMA), is the largest focussed exhibition in the world for the electrical transmission and distribution equipment industry. Held biennially in India since 1990, it has grown to become the world's largest one-stop-shop for electrical equipment and industrial electronics. In its 11th edition, the Karnataka government, is the state partner. The exhibition will be held at the Bangalore International Exhibition Centre (BIEC) from January 8–12, 2014, Bengaluru.

Compiled by:
Nedra Pereira, Senior Feature Writer
Vogel Business Media India
nedra.pereira@vogel.de

International exhibition

With the support of the Karnataka state government, IEEMA will host this event at India's Silicon Valley, to ensure that the exhibitors are able to conduct business smoothly without the least of inconveniences and hindrances.

President, IEEMA, Raj Eswaran said, "We are honored to have Karnataka as the official Partner State. We have been assured of all the support from the government of Karnataka to make the event a global reference. Bengaluru is a pioneer in establishing India's Information and Communication Technology (ICT) prowess globally, signaling the arrival of India's capability in the global arena. It perfectly fits with our theme for this ELECRAMA, which is 'Go Global', where the Indian electrical sector can take a leaf out of the ICT sector. Our aim is to showcase global competitiveness of products manufactured in India. After all, we have got the necessary infrastructure and the capability to develop world class engineering products at competitive costs.' ELECRAMA 2014 expo in Bengaluru is expected to be a generation ahead, in terms of core services, features and amenities—highest quality at par with international standards."

Theme: 'Go Global'

By showcasing the 'Go Global' theme, India will be targeting a five per cent share of global trade in the electrical equipment sector in the next ten years in order to help exports reach a level of $25 billion. Aimed at boosting electrical equipment exports, IEEMA is also encouraging African countries to participate in the forthcoming ELECRAMA 2014.

With Africa being India's fourth largest trade partner, bilateral trade between the two is estimated to reach $100 billion by 2015 after India's investment in Africa exceeded $35 billion in 2011. The growing business traction between the two can be gauged from the fact that India has extended 150 lines of credit worth $5.2 billion to African countries.

Chairman, ELECRAMA 2014, Sanjeev Sardana said, "With the trade between India and African countries gaining momentum over the years, we see a large untapped opportunity for our electrical equipment exports. This is what we want to take forward in the forthcoming ELECRAMA 2014 event.

Source: IEEMA

Director General, IEEMA, Sunil Misra; Vice-chairman, ELECRAMA-2014, Member, Executive Council Mentor, Transformer division, IEEMA & Jt, Managing Director IMP Powers Ltd, Aaditya Dhoot; President, IEEMA & Director Easun Group, Raj H Eswaran; Chairman, ELECRAMA - 2014 & Managing Director, Yamuna Power & Infrastructure Ltd, Sanjeev Sardana and Vice-President, IEEMA & Chairman & Managing Director, Technical Associates Ltd, Vishnu Agarwal addressing the media during the ELECRAMA curtain raiser at New Delhi

"With the trade between India and African countries gaining momentum over the years, we see a large untapped opportunity for our electrical equipment exports. This is what we want to take forward in the forthcoming ELECRAMA 2014 event. This will also helps us to carry the message of going global."

Chairman, ELECRAMA - 2014 & Managing Director, Yamuna Power & Infrastructure Ltd, Sanjeev Sardana

IEEMA Takes Cognizance of Equipment Manufacturers in Smart Grid

Smart grid division established

- IEEMA is in a unique position to address Smart Grid deployment challenges in a holistic manner, as its membership base includes comprehensive eco-system of electrical and allied equipment manufacturers. The Smart Grid Division established will play a complementary role in the development of smart grid market by assisting forums like ISGF, BIS by filling the gap areas in the smart grid eco-system.

First meeting of the division

- The first meeting was held in Delhi under the chairmanship of Energy Efficiency Ambassador & Vice President, Schneider Electric, Dr Satish Kumar. Chief Manager (Marketing) – Solutions, Energy Automation, Siemens, and member of the ISGF Board of Governors, Vikram Gandotra is the Vice Chairman of the Division. The meeting was attended by representatives from Alstom, BHEL, Genus Power, HPL Electric, L&T and Secure Meters amongst others.

Key objectives identified for the division include

- (a) making manufacturing industry understand and learn smart grids
- (b) share knowledge with other product divisions to make the industry ready for smart grid
- (c) educating the utilities and industry and make them understand the nuances of smart grid, essentially required for its implementation

This will also helps us to carry the message of going global."

Conference and events

The five day event has been designed to allow participants to experience its multilateral approach to exhibitions and allied events.

Among the concurrent events lined up, the exhibition will unveil the 9th Trafotech International Conference on Transformers scheduled to be held on January 9-10, 2014.

The TRAFOTECH 2014, held once in four years, will provide a common platform to review the latest advances and futuristic trends, share operational experiences and discuss the requirements of transformers for smart grid systems.

The ChangeXchange 2014 – 2nd Reverse Buyer-Seller Meet (RBSM), supported by the Department of Commerce, Ministry of Commerce & Industry, Government of India, will allow participants from the African nations to meet over 1,000 suppliers from India.

The CEOs summit involving giants from the global electrical equipment industry will feature live panel discussions with eminent experts brainstorming on current challenges and opportunities in Transmission and Distribution (T&D) business.

At the international T&D conclave event, stakeholders from the global power, transmission and distribution sector will be able to participate and present their views. The event will also feature 'Engineer Infinite 2014,' through which ELECRAMA 2014 will continue its search for new talent in the field of electrical and allied engineering.

Vice-chairman, ELECRAMA-2014, Member, Executive Council Mentor, Transformer division, IEEMA & Jt, Managing Director IMP Powers Ltd, Aaditya Dhoot averred, "ELECRAMA-2014 will continue its commitment and vision of scouting new talent in the field of electrical and allied engineering. The continual focus on innovation and recognizing talent pays manifold in directing young energies into seeking new, improved and sustainable solutions of today's and tomorrow's problems and needs. The Student pavilion and the innovation recognition platform of 'Engineer Infinite' will enthuse the youth into exploring careers in the industry and also offer a peerless platform for the much needed industry-student interaction and a readymade technology showcase - both in incubation and global product releases."

This is definitely one event you do not want to miss. See you there! MMI

"ELECRAMA-2014 will continue its commitment and vision of scouting new talent in the field of electrical and allied engineering. The continual focus on innovation and recognizing talent pays manifold in directing young energies into seeking sustainable solutions."

Vice-chairman, ELECRAMA-2014, Member, Executive Council Mentor, Transformer division, IEEMA & Jt, Managing Director IMP Powers Ltd, Aaditya Dhoot

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President, IEEMA & Director Easun Group, Raj H Eswaran

Productivity Buzz Highlights

Indian Machine Tool Manufacturers' Association (IMTMA) encourages the Indian metalworking industry to present its best productivity improvement projects at the Productivity Summit every year. Productivity Buzz is another event that is held concurrently with this summit. Both the events showcase exemplary projects and solutions. At this 7th edition of Productivity Summit and 3rd edition of the Productivity Buzz Siemens partnered with IMTMA to institute the IMTMA-Siemens Productivity Championship Awards which recognizes and rewards outstanding efforts in improving productivity in metalworking industries and creates a spirit of competition. Here are glimpses of the award winners at the recently held IMTMA-Siemens Productivity Championship Awards 2013.

Image Source: IMTMA

1st Prize - Hero Motocorp Ltd
Case Study presented – Zero rejection in crank shift right due to grinding operation

1st Prize - Rane (Madras) Ltd
Case Study presented – Improve productivity by ensuring end to end pull system in M&M Bolero assembly

1st Prize - TVS Motor Co Ltd
Case Study presented – Flexibility in manufacturing of Phoenix engine parts

2nd Prize - Rane TRW Steering Systems Ltd
Case Study presented – Capacity enhancement to meet increase in demand

2nd Prize - Bosch Ltd
Case Study presented – Productivity enhancement through process optimization in fuel injection pump housings

2nd Prize - Godrej & Boyce Mfg Co Ltd
Case Study presented – Productivity and flexibility enhancement of refrigerator plant through flow manufacturing

3rd Prize - Reliable Autotech Pvt Ltd
Case Study presented – Achieved zero defects status for I-match assembly cell

3rd Prize - Mahindra & Mahindra Ltd
Case Study presented – Re-designing of manufacturing process in gear box machining line to enhance productivity

3rd Prize - Laxmi Oil Pumps Pvt Ltd
Case Study presented – Productivity improvement in oil pump & testing assembly

Certificate of Appreciation - Tata Steel Processing & Distribution Ltd
Case Study presented – Enhancement of the capability of CTL lines beyond the design specifications to process 4m long sheet as well as 0.3m small length sheets

New Operating System

CELOS by DMG Mori Seiki simplifies and accelerates the process from the idea to the finished product with various CELOS APPs. At first glance, it provides the user with a standardized user interface with touch functionality. However, it also offers various other benefits with its apps like Status Monitor, Job Manager and Job Assistant. Moreover, as it is compatible with PPS and ERP systems, it can be networked with CAD/CAM applications, as it is ready for future-oriented CELOS APP extensions. In addition, these apps offer integrated and digitised management, documentation and visualization of order, process and machine data. It is available for all new high-tech machines produced by the company.

▸ **DMG Mori India**
Tel: +91 (80) 40896517, E-mail: manoj.kumar@dmgmoriseiki.com
www.dmgmoriseiki.com

Advanced Grade

Sandvik Coromant has recently introduced GC4325; a new-generation coated cemented-carbide grade for steel turning. This latest innovation in tool material provides a new, higher potential for increasing cutting speeds and a longer, more predictable tool life with very high reliability, over an extended broad ISO P25 application area. One of the challenges with this application area is the breadth, which includes several very different materials, from ductile low-carbon steels to high-alloy hard steels, bar material to forgings, castings to pre-machined parts. The advances with the new grade, GC4325, will help users resist holding back on cutting-data levels. Moreover, the grade provides extremely high process security through its ability to retain an intact edge line.

▸ **Sandvik Coromant**
Tel: 1800 233 2444, E-mail: abhijeet.choure@sandvik.com
www.sandvik.coromant.com

CNC Machining Center

SYMG, the Chinese machine tool manufacturer, has introduced new horizontal CNC machining center, VIVA TURN 4. This machine enables work to be carried out at high speed, while ensuring efficient and safe operation. Furthermore, it achieves high accuracy and reproducibility, reliably producing good results. When a revolver with driven tools and optional Y-axis is added to a universal turning machine, complex components can be processed, with milling and boring processes, if required.

▸ **Schiess Tech GmbH**
Tel: +49 (69) 4305328-34, E-mail: m.springstein@schiess.eu
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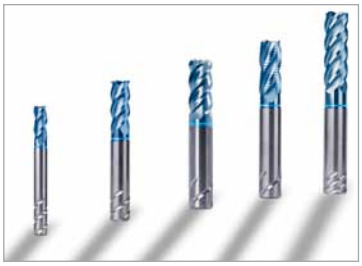
Solid Carbide Endmills



The new Haimer Power Mill Solid Carbide Endmills are made from high end fine grain carbide and are equipped with a 'safe-lock' shank as a standard. These endmill geometries are based on an unequal flute and helix design for chatter free high end machining. The new Power Mill Portfolio, with cutting diameters available from 2 to 20mm, will be available with 3, 4 and 5 cutting edges having multiple lengths of cut. To offer maximum flexibility in order to address the customers application requirements, different cutting edge solutions (sharp, chamfer and radius) will be offered. Also a roughing geometry with a cord profile will be part of the portfolio.

▸ **Haimer India Pvt Ltd**
Tel: +91 (20) 66750551, E-mail: haimer@haimer.in
www.haimer.in

CNC Wire Cut EDM Machine

G series CNC wire cut EDM machine from CHMER has 15" TFT display and water proof PVC film panel for low maintenance. It is also equipped with new LCD remote control, which has X, Y, Z, U, V positioning display, center and edge finding, cut and thread function. C-frame construction was designed by finite element analysis (FEA) along with multi-ribbed structure that features high rigidity, large table load and low mechanical deformation. Its 3-sided stainless steel work table and brushed stainless work tank is designed for endurance and least maintenance. Additionally, it enables real time monitoring of machine operation remotely that means one can see what the operator sees on the CNC controller from anywhere–on home PC or laptop by installing the software.

▸ **Sanki Machine Tools (India) Pvt Ltd**
Tel: +91 (22) 26861326, E-mail: s_m_t@vsnl.com
www.sankimachinetools.com

Grooving System

X4 is a cost-efficient and flexible grooving and parting-off system from Seco Tools. This is a new concept intended for grooving and parting-off with a four-edged insert for optimal cost efficiency. The tangential, robust insert, combined with a rigid stable clamping system provides machining accuracy with high repeatability, high productivity and outstanding surface quality. The multi-edge X4 system covers holders with square shanks as well Seco Capto holders and is offered together with the new Jetstream Tooling Duo system.

▸ **Seco Tools India Pvt Ltd**
Tel: +91 (2137) 667300, E-mail: seco.india@secotools.com
www.secotools.com/in

Laser Welding Machine

With their ELC series of machines, the specialists at EMAG have developed integrated solutions for the application of processes with high output rates. This welding process uses solid-state lasers of outstanding energy efficiency. For starters, the work spindle uses the pick-up principle to load itself. The components involved are then clamped and pressed together in the joining press. The clamping technology ensures the accurate positioning of the components, providing ideal conditions for the welding process. Moreover, the design of the stationary optic offers great operating safety and optimal stability of both machine and welding process.

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Tel: +49 (0) 7162/17-267, E-mail: communications@emag.com
www.emag.com

Microfinishing Machine

Grind Master offers crankshaft and camshaft microfinishing machines in technical collaboration with IMPCO USA. The machines are built with patented GBQ (Generating Bearing Quality) Technology, from IMPCO. Its configuration is determined depending upon the part drawings, cycle time requirement, etc. Moreover, the machine is capable of producing a surface finish of 0.12 µRa from input of 0.4µRa in a single step, consistently. The patented GBQ technology can improve geometry, control size and taper. The company further offers optional features such as auto loading/unloading, interface with gantry etc. Microfinishing of engine parts by GBQ method extends product life, prevents premature bearing failure thus reducing warranty cost.

▸ **Grind Master Machines Pvt Ltd**
Tel: +91 (240) 2376262, E-mail: sales@grindmaster.co.in
www.grindmaster.co.in

Double-Sided Round Inserts

The RNMU insert line of TaeguTec's CHASE2MOLD family has now been expanded to include 10 and 16mm size inserts with cutters. This range was initially available in 12 mm size, has proven to be a cost effective solution due to its double sided design. Now expanded to 10 and 16 mm, the line is capable of providing the same high productivity as the serrated edge 'M' and the 'ML' sharp cutting edge with reduced cutting force. The 10 mm type is suited for die & mold, power generation and aerospace industries while the RNMU 16 type enables very smooth and stable machining for heavy industry segments such as ship building and the steel industry.

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

EDM Machine

GF AgieCharmilles' FORM 20 and FORM 30 die-sinking EDM machines boast productivity-enhancing characteristics that make a market favorite in terms of price/performance ratio. These compact machines' rigid mechanical concept ensures reliable and stable operation, thanks to a cast iron, short C-frame design for static and dynamic rigidity. Linear glass scales on the cross table guarantee positioning accuracy. Featuring easy setup, a high-power generator, the new and intuitive human-machine interface (HMI) and built-in technology to eliminate electrode wear, the FORM 20 and FORM 30 deliver versatility, reliability and ease of use. Moreover, these machines feature the ergonomic AC FORM HMI for a new level of logic, speed and safety.

▸ **GF AgieCharmilles**
Tel: +41 (0) 227833111, E-mail: info@gfac.com
www.gfac.com

Robot Couplings

The compact Schunk robot couplings VERO-S NSR continue to set standards at high-efficiency, robot-supported pallet change on machine tools. With the module VERO-S NSR maxi 220, the system is becoming in the heavyweight class too a superior favorite for pallet handling. It transfers torques up to 4,000 Nm, and can reliably handle up to 1,000 kg (at 800 x 800 mm). Due to the developed locking system with patented strokes (fast and clamping stroke) from the company, such large masses can be handled. Locking is done form-fit, and is self-retaining. All the components of the powerhouse are made of hardened, stainless steel.

▸ **Schunk Intec India Pvt Ltd**
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Milling Solutions for Deep Holes

Vargus Ltd has extended its range of TMSD thread milling solutions for deep holes. New tooling solutions include TMSD vertical for small diameter. The new range of 3-flute thread milling tools ensure faster and more efficient machining of applications with smaller tool cutting diameters and a minimum thread size of M11.5x0.5 (1/2-28UNEF). The insert further features a single point design and reinforced cutting corner for reduced load on the cutting edges and greatly improved rigidity. Inserts are available in three sizes (7V, 9V, 11V) in VBX and VTX grades for the following profile styles- Partial Profile 60°, Partial Profile 55°, Trapez and Stub ACME.

▸ **Vargus Ltd**
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*Example calculation: Product size 800mm 6-pole

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