MMI MODERN MANUFACTURING INDIA

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The official magazine of Indian Machine Tool Manufacturers' Association

Partnered by: Modern Machine Shop, MM MaschinenMarkt

5 BENEFITS OF TOOL SETTERS
PAGE 52

MOTION CONTROL

Drives and Motion Control – Mechatronics

GRINDING

Consistency and Cost Optimization through Abrasion

DRIVES TECHNOLOGY

Energy Efficient Motors and Drive Controls

HARBHAJAN SINGH

Joint Secretary, Department of Heavy Industry, Ministry of Heavy Industries & Public Enterprises, Government of India

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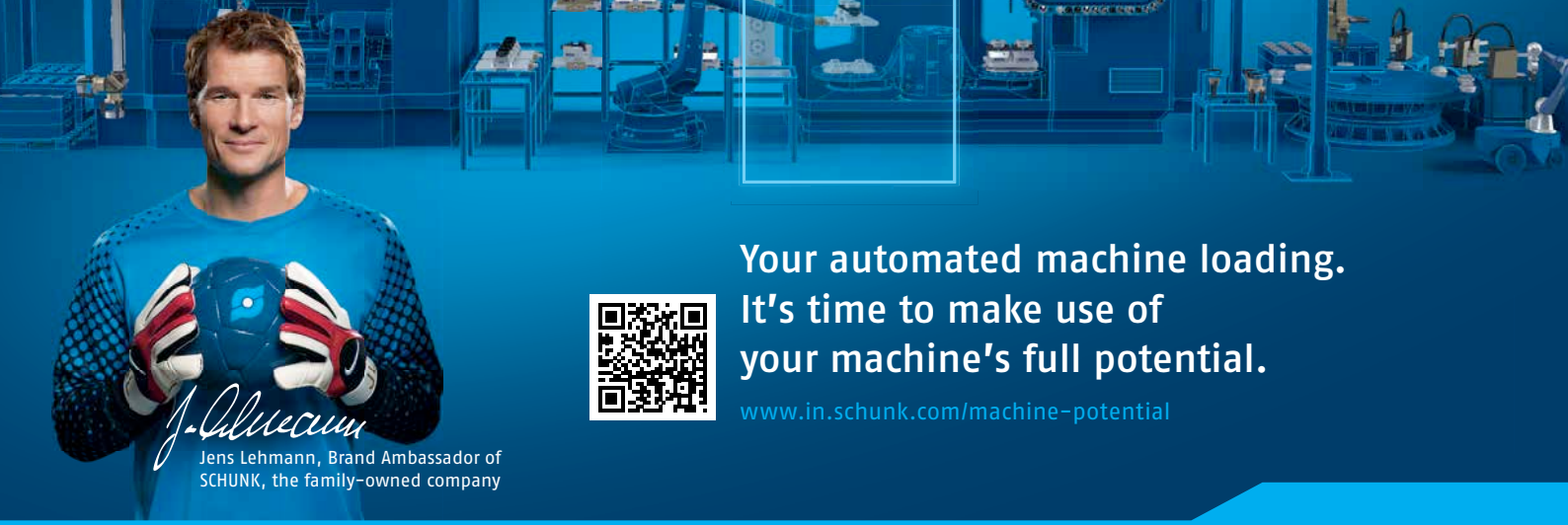

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VMC 1260, VMC 640 APC, VMC 1050 APC

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K2X 20, KX 10, KX 30

NX Series
VMC (3 Axis Double Column)
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NX 3222, NX 4222

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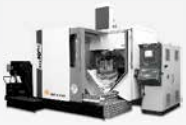

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K3X 8 Five, K2X 10 Five

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HMC 1600, HMC 450 - MP PRO,
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VMC 70L, VMC 70L-5X

KX Large Series
VMC (5 Axis Double Column)
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Company Directory

Companies that are mentioned editorially in this issue

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Route map to IMT Manesar

Vikram Sirur
President, Indian Machine Tool Manufacturers' Association (IMTMA) and
Chariman, Miven Mayfran Conveyors Pvt Ltd

Consistent Efforts to Improve Productivity

"Productivity is a state of mind… an attitude that seeks the continuous improvement of what exists. It is a conviction that one can do better today than yesterday and that tomorrow will be better than today." We all know that productivity is one of the most important elements for a successful business, more so for the manufacturing industry.

The past one year had been most challenging for our industry and the economy as a whole. As per Gardner Research, the Indian economy registered a growth rate of just 5 per cent and the manufacturing industry was only 1 per cent. Owing to the uncertainties in the global and domestic market, machine tool production in India has declined by 10 per cent during 2012-2013. Import in Dollar terms have reduced by 19 per cent and consumption by 4 per cent. Given the unease in the economic conditions at present, pessimism in the market is likely to continue. There is a serious need to focus on productivity enhancement and new product developments.

There are many approaches to improve productivity. Be it through manufacturing system redesign, better asset utilization or optimizing the process or the quality route to productivity. Often companies combine all these approaches. IMTMA's 'Productivity Summit' and 'Productivity Buzz' are a platform for helping manufacturing and production engineers to network, get acknowledged and develop an Indian approach to productivity and quality.

In this edition of MMI, we have tried to spread more awareness about the mega events, 'Productivity Buzz' and 'Productivity Summit' of IMTMA and its benefits to the industry. I am sure this is going to be a very useful piece of information for the entire community of productivity enthusiasts out there!

I wish you all a very pleasant reading.

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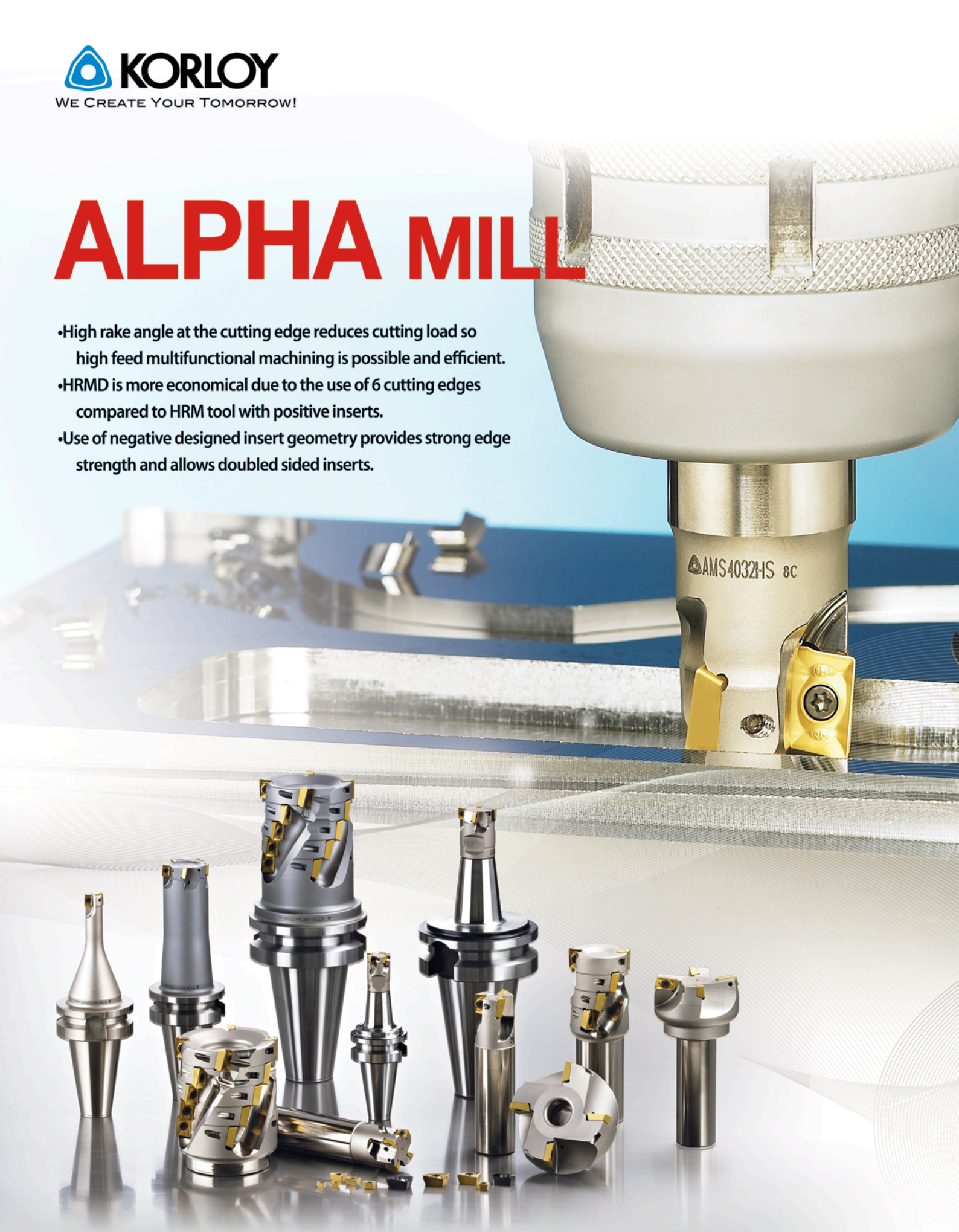

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Soumi Mitra
Editor
Vogel Business Media India
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Taking Home-grown Innovation to the Global Arena

In today's manufacturing space, innovation is not only the key driver for growth but a necessity for survival. To meet the present day challenges, it does not merely suffice to churn out ideas and label those as innovative. It is imperative to make a strong connection between innovation and creativity, as this leads to translating of ideas into workable solutions. After all, no successful innovation comes through gambling! It is an outcome of willingness to take risks and a continuous effort to improvise. In this context, we are glad to introduce to "you" our readers, the Best Manufacturing practices column from this issue onwards.

Best manufacturing practices are a necessity in today's economic scenario what with the rupee slumping and the manufacturing economy dwindling. As the power of small improvements in downturn is huge, the rupee's slumping to a record low provides one with a large scope of opportunities to innovate. Acknowledging this fact, in spite of the gloomy economic environment, the Indian machine tool manufacturers have been continuously strengthening their R&D base to come out with the latest advancements. The September issue of EMO-Special reflects on how home-grown innovation is growing leaps and bounds in the global space. Showcasing these innovations are the Indian exhibitors at EMO-Hannover.

"As the power of small improvements in downturn is huge, the rupee's slumping to a record low provides one with a large scope of opportunities to innovate."

We hope to see you at the show and as always solicit your feedback. Do write-in to us and let us know your opinion of the technologies displayed at the show.

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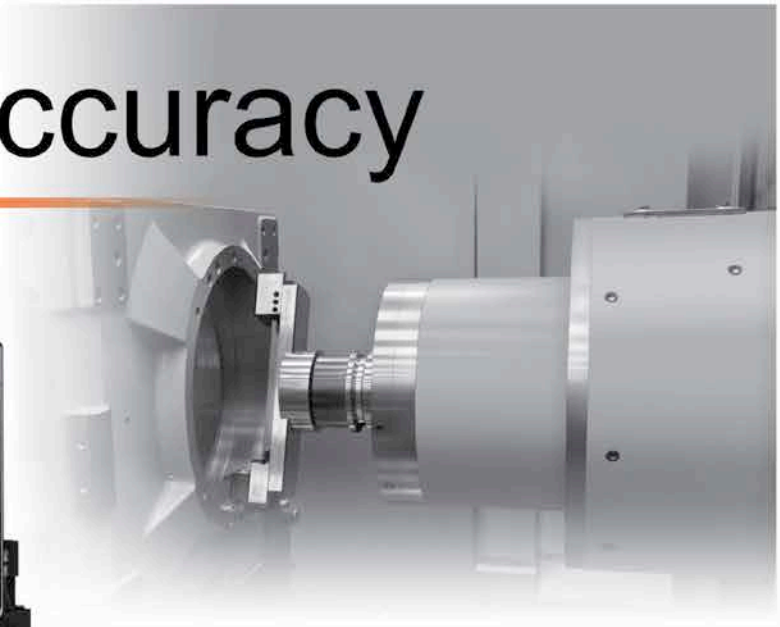

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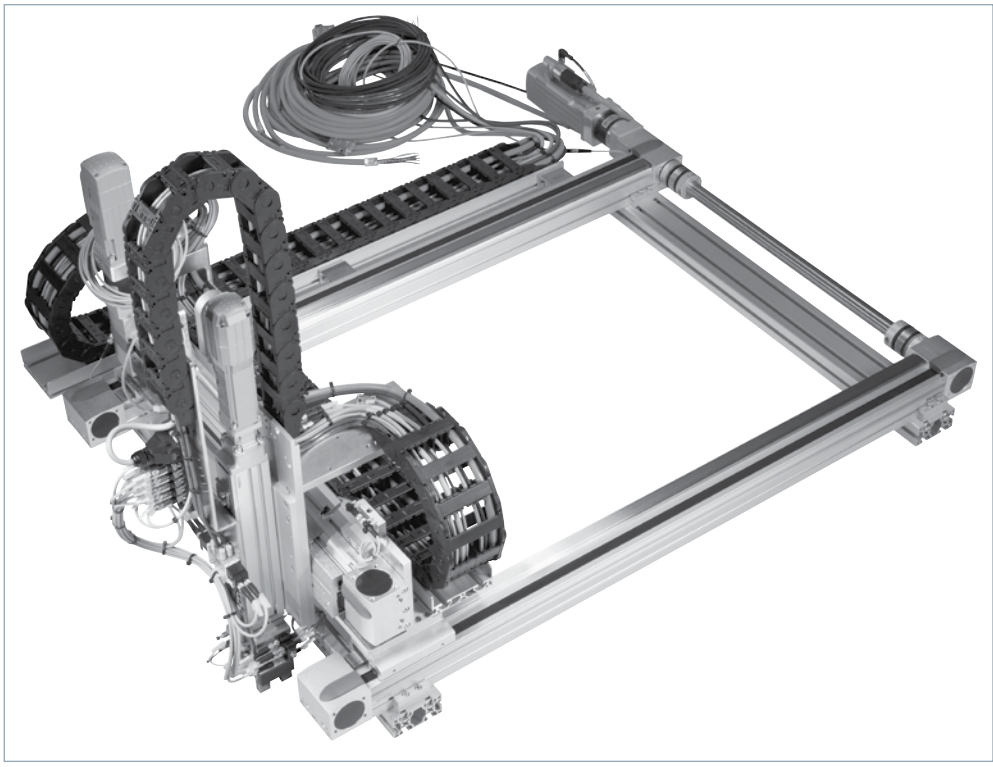

▶ **MOTION CONTROL:** A three-dimensional gantry consisting of horizontal gantry axes and a vertical drive, that can be used universally for light to heavy workpieces **38**

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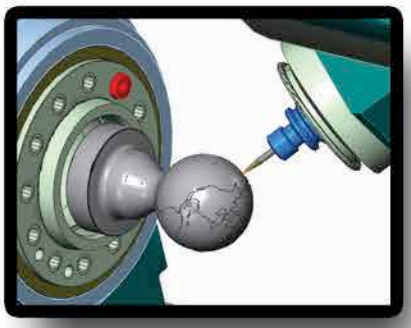

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▶ **HIGH SPEED MACHINING:** The shrink-fit tooling offers the runout and rigidity required for effective high speed machining of mold blocks as hard as 60 HRc 42

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Spearheading Productivity in Metalworking

Productivity is an important aspect for any business. Increased productivity at any level brings about profitability for a company as a whole. Many businesses, through their experience and R&D, build products / technology that enhances efficiency. However, the Indian machine tool industry faces numerous challenges in achieving productivity targets owing to lack of solution providers or not being able to find them at the right time.

Productivity Summit (An initiative of Indian Machine Tool Manufacturers' Association (IMTMA)) was launched in 2006 to recognize and reward productivity champions in the field of metal working. The main objective of the summit is to spearhead the productivity movement in metal working industries. The event brings together metalworking professionals from varied segments of metalworking industries to discuss, deliberate and share experiences on ways and means to enhance productivity in order to achieve manufacturing excellence.

Source: IMTMA

As stated by President, IMTMA, Vikram Sirur, "In today's competitive scenario, companies have to adopt highly productive manufacturing solutions in order to meet international quality standards within the time lines. This can only be done through superior manufacturing processes, highly efficient machines and competent manpower. With Productivity Summit, our aim is to bring 'Gurus', experts and leaders from the industry on a common platform to give aspiring professionals an unparallel forum for networking with industry decision makers, experts, manufacturers, suppliers, customers and researchers in this field".

IMTMA, the voice of Indian machine tool industry and Siemens have instituted the IMTMA-Siemens Productivity Championship Awards to acknowledge and recognize the creativity and innovativeness of Indian manufacturers in attaining highest level of productivity. Shortlisted companies present their case studies, which feature best manufacturing projects implemented to enhance productivity in their respective companies. The selection of winners is done by an independent jury of eminent professionals in the industry who evaluate the entries received from various companies.

Take Away

There are a lot to take away from the summit:

- It is an excellent platform to learn from industry leaders, manufacturing professionals and fellow contestants. Also, one can get recognized for outstanding achievements in productivity.
- Take pride in showcasing productivity improvements before a large gathering of manufacturing professionals
- Peer recognition
- Become a role model—A proud productivity champion!
- Chance to win attractive cash rewards and appreciation
- To broad base the summit into a much larger event beyond just a competition.

'Productivity Buzz' was introduced in the year 2012, a concurrent event with the 'Productivity Summit' to showcase productivity solutions in metalworking. 'Productivity Buzz' brings the solution providers and the solution seekers of the industry on the same platform to exchange thoughts and ideas in the field of metalworking.

Source: IMTMA

IMTMA – Siemens Productivity Championship Awards 2012 winners

Source: IMTMA

'Productivity Summit' 2012 inauguration

"Provision for people to post a problem on the 'Productivity Buzz' web page is a very good idea. A solution seeker posted a problem and when we responded with the solution, the applicant was very happy. Brisk exchange of drawings, quotation, clarification and discussions happened within a day. It is almost ending up in an order. We are impressed with this idea of requesting people to post their problems on the productivity website," affirmed, Managing Director, Trishul Machine Tools Pvt Ltd, CS Shiva Shankaraiah.

A 'Productivity Buzz' website was also introduced as a unique e-platform to facilitate the industry. This website was a first of its kind initiative, where productivity solution providers and solution seekers could come online to exchange ideas. This move helped in an active interaction with a host of problems and solutions posted by solution seekers and solution providers. Some of the online interaction also led to business order confirmation.

An award for the most innovative solution display was also introduced to encourage the industry to not only participate by displaying the best solution but also get rewarded for their efforts.

Productivity Buzz 2013

This year, 'Productivity Buzz' will be organized on 15–16 November 2013 in Pune, India, which is also known as the hub of manufacturing in the western part of the country. The event will feature thematic setup of productivity solutions. Few areas to be covered are IT solutions, quick set-up change, robots, manipulators & manufacturing automation, turning centers, machining centers, die & mold metal forming, welding, energy efficiency and so on.

Several professionals from the manufacturing industries such as automotive & auto components, tool rooms, machine tools, aerospace, consumer durables, general engineering as well as from R&D organizations and academia are expected to participate in this two day mega event.

To witness the latest developments and solutions for various productivity challenges, IMTMA welcomes all to its mega events 'Productivity Buzz' and 'Productivity Summit' 2013. MMI

Thinking Local Acting Global

Commemorating the old and welcoming the new, the 67th Annual Session of Indian Machine Tool Manufacturers' Association (IMTMA) was held on 6 September, 2013. Heralding the new President – Managing Director, TaeguTec India Pvt Ltd, L Krishnan, the session focused on topics that are not only relevant but also prevailing on everyone's mind.

President, IMTMA and Chairman, Miven Mayfran Conveyors Pvt Ltd, Vikram Sirur averred that IMTMA's 67th annual session, was indeed being scheduled in a challenging atmosphere. However, on a positive note he mentioned that this has not posed as a deterrent for those who seek to innovate. Citing IMTEX 2013's example, he affirmed that the event was witness to a unique determination by several of India's manufacturers to develop and showcase their new-found capabilities in large-size and heavy machine segment. Manifestation of this was equally appreciated by a large facet of customers. At the session too, innovating right was the key theme. Addressing the session, he avowed, "When we grope in uncertain times, we look towards guiding mentors for a path forward. We, therefore, feel deeply indebted to Shailesh Sheth and Prof Rishikesha Krishnan for showing us a path to navigate when the going gets rather tough."

Winning in turbulent times

Chairperson, Corporate Strategy & Policy, Indian Institute of Management, Bangalore, Rishikesha T Krishnan, illuminated on "Innovation: A key strategy for organizational renewal & growth. He has also co-authored a book with Vinay Dabholkar titled, '8 Steps to Innovation: Going from Jugaad to Excellence'. "The eight steps are built around three key themes. To enhance innovation output, you need to build an idea pipeline; improve the flow of ideas ('improve idea velocity'); and enhance your conversion ratio from ideas to successful innovations ('increase your batting average'). Among the various interesting concepts, introduced to the audience on innovation, one that created quite a stir was the concept called 'pre-mortem'. Krishnan elucidated, "Pre-mortem, is essentially an exercise when you are working on innovation; you put together a group of people working on that innovation and ask them to imagine that the innovation has failed and get them to think of why the failure happened. So essentially, they will come up with ways on why that innovation will fail."

Corporate strategy Adviser & Past President, IMTMA, Shailesh Sheth spoke on another pertinent topic that is on top of everyone's mind today - 'Winning in turbulent times'. Recognizing the current economic scenario as a time where forces have to come together, Sheth emphasized that this is the ideal time for competitors to cooperate with each other and share the risk. He advised that instead of competing between ourselves (domestic market) manufacturers should compete against imports.

Source: Vogel Business Media

(RtoL): Incoming President, IMTMA & Managing Director, TaeguTec India Pvt Ltd, L Krishnan and Incoming Vice President, IMTMA & Chairman & Managing Director, Jyoti CNC Automation Ltd, Parakramsinh Jadeja

New beginnings

Concluding the event Sirur said, "Today is a rather momentous day for me as also an emotional one. In 2001, I was elected to the apex body of IMTMA as its Executive Committee for the first time. Little did I reckon that in a short span of ten years I would go on to head this momentous association as its President. My deepest gratitude to all former Presidents of the Association, who have guided me from time-to-time in bringing about a paradigm change in the outlook of the association and have been a pillar of tremendous support in these tough and challenging times." MMI

Source: Vogel Business Media

(LtoR): Chairperson, Corporate Strategy & Policy, Indian Institute of Management, Bangalore, Rishikesha T Krishnan; Incoming President, IMTMA & Managing Director, TaeguTec India Pvt Ltd, L Krishnan; Adviser & Past President, IMTMA, Shailesh Sheth; President, IMTMA and Chairman, Miven Mayfran Conveyors Pvt Ltd, Vikram Sirur; Director General, IMTMA, V Anbu

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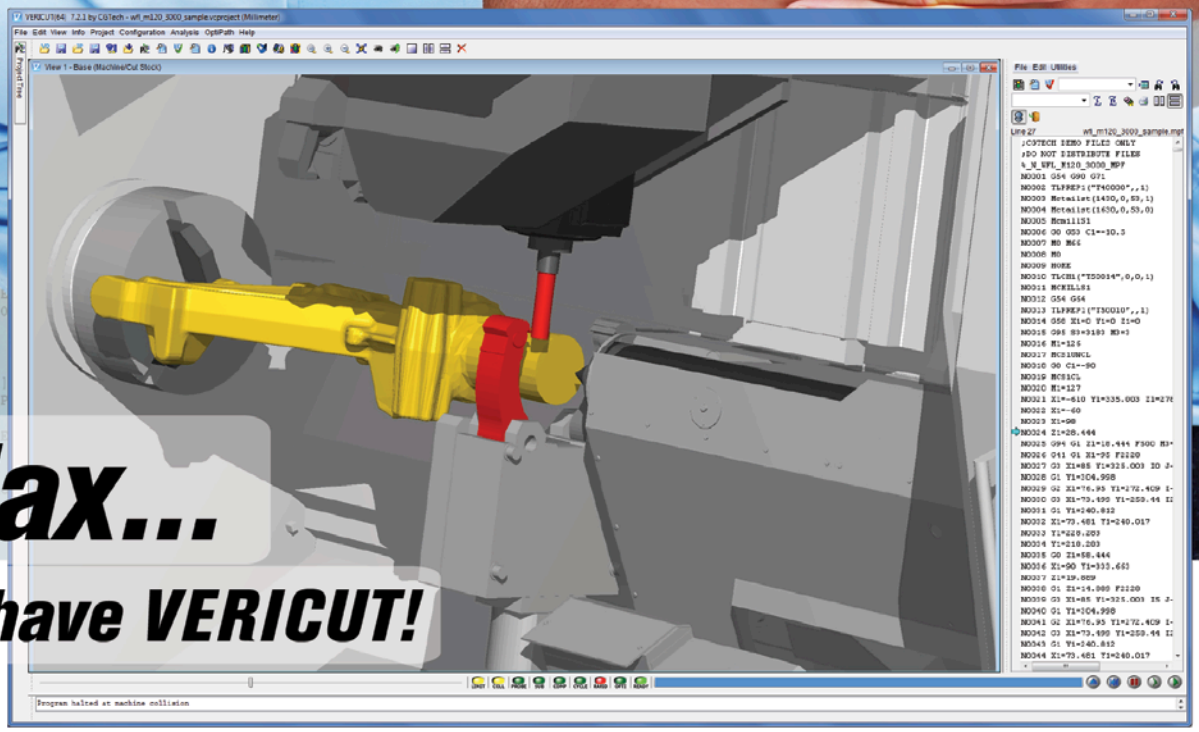

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Third HaasTEC Open House announced by Haas Automation

Source: Haas Automation Inc

Visitors having close look at the machine during previous edition of the HaasTEC

New Delhi – Haas Automation has organized HaasTEC event at Manesar near New Delhi during 16 – 19 October 2013. The company is expecting thousands of visitors to come and witness the latest CNC machine tool technologies in action. After a debut event at Chennai and the 2012 Open House at Ahmedabad, this year HaasTec heads north to Manesar.

"The feedback that we received from the first two HaasTEC events was tremendous and we are anticipating even greater success this time. Around 1700 attended the Ahmedabad HaasTEC, but we are expecting around 4,000 in Manesar," said Marketing Coordinator, Haas India, Melita Furtado.

The company plans to showcase its new age CNC machine tools such as various configurations of Y-axis CNC lathes that include the DS-30Y dual-spindle and ST-20Y single-spindle models. Also, on display will be the EC400 horizontal machining center and the best selling DT1 drill/tap machine, as well as VF-2 and VF-4SS super speed vertical machining centers.

India-China Take a Step Forward Towards Bilateral Trade

Source: CII

Partner (Tax and Business Services), Shanghai Deloitte Ltd, Jeff Xu; Faculty, IIM, Kozikode, Dr G Venkat Raman; Partner - Asia Pacific, Solidance, Heiko Bugs; Legal Consultant, King & Wood Mallesons, David Hong and Vice President & General Manager, Technomic Asia, Steve Crandall at the exclusive session organized by CII

Mumbai – The Union Minister of Commerce and Industry Minister, Anand Sharma had a bilateral exchange of views with the Chinese Minister of Commerce, Gao Hucheng during his visit to Brunei.

To take the agenda forward and better engage with China, Confederation of Indian Industry (CII) had organized an exclusive session on 'Engaging with China for Indian companies' on 29 August 2013 in Mumbai. Indian companies have enormous opportunities waiting to be harnessed in China in across sectors. 'Engage with China,' CII's initiative is expected to help the Indian companies to understand China from a different perspective.

Talking about this, Partner Deloitte Shanghai Ltd, Jeff Xu, said, "China is in the process of transforming its economic growth model from export/ invest driven to consumption driven model under China's new leadership. During the transformation process, China will create a new wave of opportunity in many industries for both foreign and local investors."

Siemens' Productivity Tour Completes 100 Days

Source: Siemens

Visitors being told about the benefits offered by frequency converters from the SINAMICS family

New Delhi – The Siemens 'Productivity Tour' trailer has driven the message of productivity to industrial doorsteps across 51 cities in eight states namely New Delhi, Uttar Pradesh, Uttarakhand, Rajasthan, Punjab, Haryana, Madhya Pradesh and Gujarat. In 100 days of its journey, the trailer has allured 5,288 visitors.

Designed with the aim to create awareness about production efficiency among SMEs based at various locations across India, the trailer has been impeccably demonstrating the value created by Siemens' innovative drive solutions and their contribution towards optimizing industrial processes.

One of such family of drives displayed in the trailer was the SINAMICS family of frequency converters. The range of drives primarily finds applications in efficient pumping, ventilating and compressing, precision in movements, processing and machining. Visitors at the 'Productivity Tour' got a unique chance to clearly understand not just the utility and application scenarios, but also the benefits offered by the SINAMICS family, especially its credentials with respect to 'energy efficiency' and 'integrated safety technology'.

These frequency converters are widely used in various industries such as food and beverage, packaging, metals, buildings and automotive.

In addition to SINAMCIS, the trailer also displayed SINUMERIK range of CNCs, SIMOTION and also Totally Integrated Automation (TIA). In addition to all the products, Siemens Financial Services (SFS), an international provider of business-to-business financial solutions, was also well received by the visitors.

The 'Productivity Tour' has also served to emphasize on the company's innovative design capabilities that help customers achieve better productivity and efficiency in an environment-friendly and cost effective manner.

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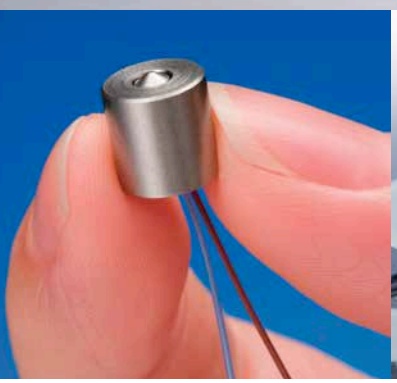

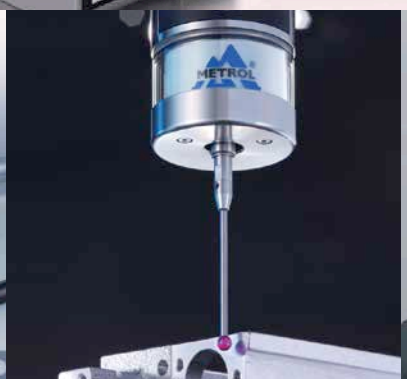

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New Sizing and Selection Tool Brings Ease-in Operation

Source: Thomson Industries

New linear guide components

Wolfschlugen, Germany – Thomson introduces Linear motioneering, linear guide components. Linear guide components enables OEM and factory automation users to optimise machine design and operation by identifying the optimal configuration of round or square rail linear guide components based on application or product attributes. Users can choose a linear guide solution based on their application requirements or configure a solution based on the components they know they need, get a quote and download customized 3D models to simplify and accelerate the design process.

"Thomson's suite of linear motioneering tools make choosing the right product for an application simple by offering two different workflows – one based on application and another based on product attributes," says Product Line Manager, Linear Bearings and Guides, Thomson Industries, Jonathan Wray.

Outputs include a complete orderable bill of materials (BOM), customized 3D models of the entire assembly of components, a printable application / solution data sheet, estimated list prices and an option to request a quick net price.

REC's Subsidiary Handover SPVs to L&T IDPL, Power Grid

Source: RECTPL

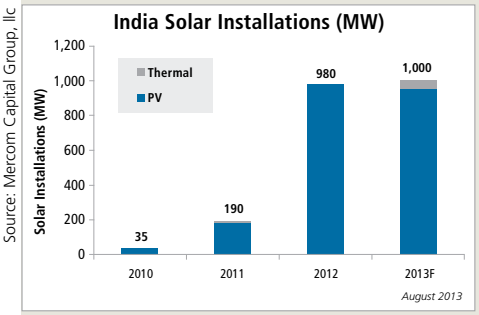
Dignitaries at the handing over of Kudgi Transmission System Ltd

New Delhi – REC Transmission Projects Company Ltd, a wholly owned subsidiary of Rural Electrification Corporation (REC) Ltd, has recently handed over project specific Special Purpose Vehicle (SPV) namely Kudgi Transmission System Ltd to L&T Infrastructure Development Projects Ltd and Vizag Transmission Ltd to Power Grid Corporation of India (PGCI) Ltd who had emerged as the successful bidders.

L&T Infrastructure Development Projects Ltd quoted the lowest levellised tariff of ₹1795.8652 million per annum for transmission system required for evacuation of power from Kudgi TPS of NTPC Ltd. This project involves establishment of Kudgi TPS - Narendra (New) 400 kV 2 x D/C quad lines, Narendra (New) - Madhugiri 765 kV D/C line and Madhugiri - Bidadi 400 kV D/C (quad) line.

PGCI Ltd quoted the lowest levellised tariff of ₹2311.34 million per annum for transmission system for system strengthening in the Southern region for import of power from the Eastern region.

Stable Non-Protectionist Solar Policies will Help Attract Investments in India



Source: Mercom Capital Group, llc

Mumbai – According to Mercom Capital Group , there has been a total of 622 MW of installations in India in the first seven months of 2013, with only 73 MW installed in the last three months. Solar has tremendous promise as one of the most attainable sources of power in India and represents a great future for the economy, industry, jobs, and environment. To achieve this future, India needs to maintain focus on creating a fertile policy environment for private and foreign investments in the power sector.

The decisions made by India to pursue anti-dumping investigations and domestic content requirements (DCR) have all but paralyzed the sector. The Ministry of New and Renewable Energy (MNRE) acknowledged the dilemma and the complexity of applying tariffs and DCR selectively.

MNRE is looking to Viability Gap Funding (VGF) as a way to combat increased costs. VGF has now morphed into a funding/ subsidy mechanism to absorb the high cost of DCR mandated by the government. It was also suggested that developers should petition in a unified way for revised tariffs if they think costs have gone up.

Kennametal Partners with Haimer

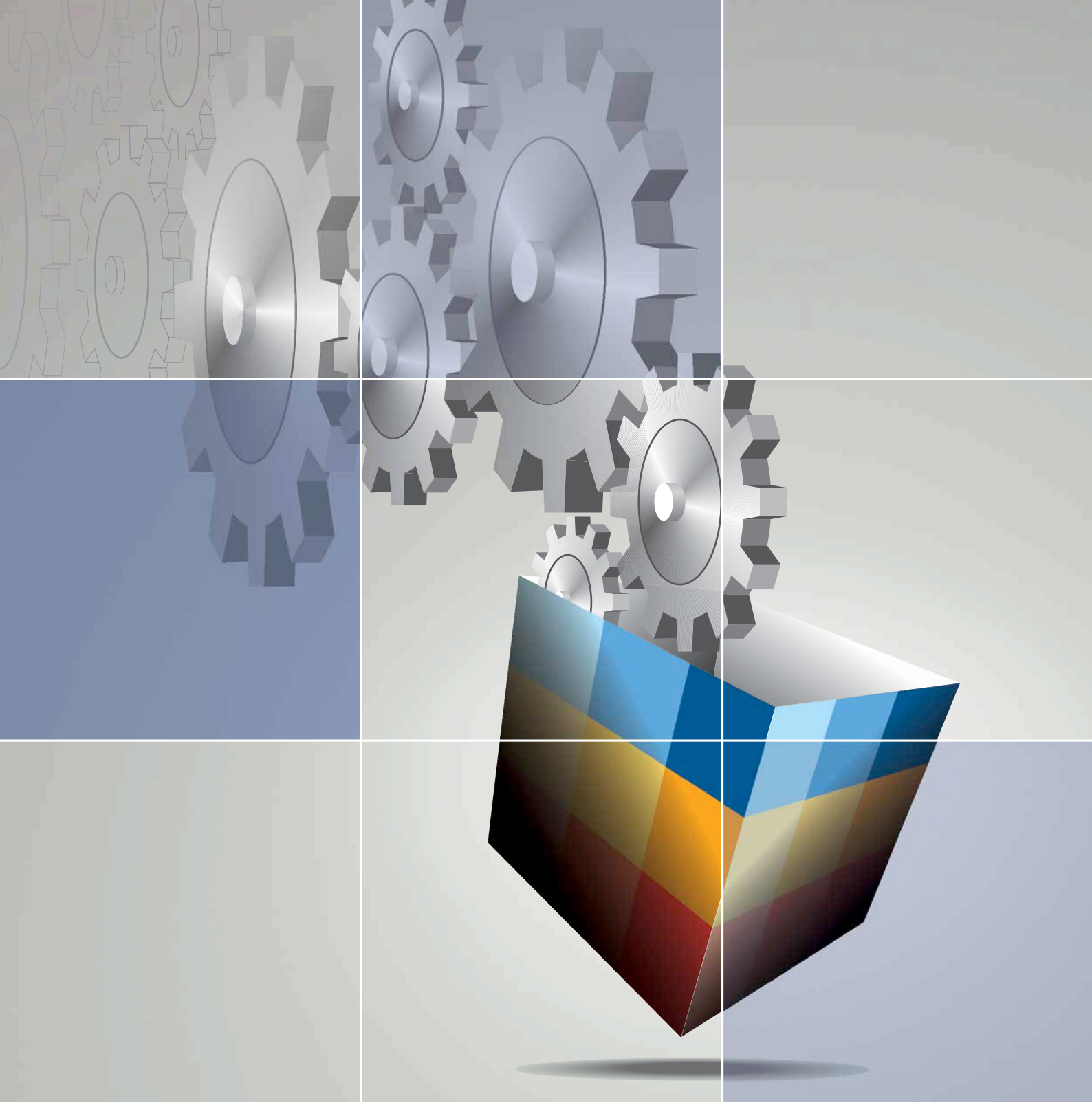
Source: Kennametal India Ltd

Vice President and President, Industrial Business Segment, Kennametal Inc, John Tucker (L) and Director and Member, Executive Board, Haimer GmbH, Andreas Haimer (R) shake hands after signing the agreement

Bangalore – Kennametal has recently granted Haimer GmbH a license to provide the company's new and advanced KM4X spindle connection solution throughout its global markets. Haimer, provider of the innovative SAFE-LOCK pullout-prevention technology together with Kennametal sees significant benefit for manufacturing customers.

The spindle connection, the interface between the machine tool's spindle and toolholder, has to provide the torque and bending load capacity compatible with machine-tool specifications. Cutting forces, particularly in roughing or machining high-strength materials, generate bending moments that will exceed the interface's limits prior to reaching torque limis.

"Having an innovative technology partner like Haimer supply the KM4X connection in addition to toolholders like SAFE-LOCK will create a powerful production advantage for manufacturing companies around the world," said Vice President and President, Industrial Business Segment, Kennametal Inc, John R Tucker.



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Electric Equipment Industry Witnesses Positive Growth

Mumbai – India's ₹1.30 lakh crore electrical equipment industry has, after four consecutive quarters of negative growth, shown a two per cent growth in the first quarter of the current fiscal (April-June, 2013–14), according to production data released by the Indian Electrical and Electronics Manufacturers' Association (IEEMA).

The miniscule growth of two per cent is attributed largely to increase in exports of electrical equipment from India in the first quarter of the current fiscal (Q1 FY'14), despite the growth in domestic orders continuing to be negative as compared to the corresponding period of 2012–13 (Q1 FY'13).

The industry has been staying somewhat afloat on account of the ongoing transmission and sub-station projects, power generating stations especially of renewable energy like wind and R-APDRP projects. Further, the depreciating Rupee has made critical imported raw material and inputs for electric equipment more costly, but given the continued threat from imports of electrical equipment in the Indian market, domestic manufacturers are being forced to absorb this additional cost to remain competitive.

"After intensive consultations with all stakeholders, the Government of India launched the Indian Electrical Equipment Industry Mission Plan 2012–2022 last month, and we now look forward to the implementation of the policy and strategic interventions outlined in the Mission Plan to put back our industry on a high growth trajectory," said President, IEEMA, JG Kulkarni.

Growth Indices for Electrical Equipment Industry
Growth Compared to Corresponding Period of Previous Year

Source: IEEMA

Product	Weightages for 2013-14	April-June 2013-14
LT Motors	4.0	-3.9
HT Motors	2.3	-8.1
Alternators	1.9	-5.9
FHP Motors	1.8	0.0
Rotating Machines	**10.1**	**-4.5**
Power Contactors	2.4	-7.1
LT Circuit Breakers	3.7	-15.4
MCB	3.5	16.0
S/F & F/S Units	0.6	-19.4
LV Switchgear	10.2	-2.9
HV Switchgear	5.7	-13.6
Switchgear	15.9	-6.7
Power Cables: PVC	18.4	4.5
Control Cables & Special Purpose Cables	6.5	5.9
Cables	25.0	4.9
Power Transformers	7.3	-9.5
Distribution Transformers	9.7	-0.8
Transformers	17.0	-4.5
HT Capacitors	0.3	33.9
LT Capacitors	0.4	11.0
Capacitors	0.7	20.8
Energy Meters	4.4	14.6
T.L.T.	14.1	24.2
Conductors	13.0	-8.4
Transmission Lines	27.1	8.6
Total	**100.0**	**2.03**

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Tool Rooms Leading Growth through Customer-centricity

With an increased expectation from the tool room industry to reduce material expenditure, time and cut down on energy consumption, the demand for tooling is driven from this business perspective of higher technology and benefits at the least possible cost. Here's a look at the challenges engulfing the tool room industry and how manufacturers are strategizing to deliver to the Indian psychology, which is governed by 'pay less, get more'.

Source: Renishaw

Machine tool probes being used on Godrej's shopfloor

Indira Rao
Deputy Editor
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The Indian tool room is very fragmented with it consisting of both organized and unorganized tool manufacturers. The current market size according to industry experts is around ₹14,000 crore, out of which 50 per cent is imported. The Indian tool room industry prides itself on low-cost design, manufacturing processes and the ability to learn quickly. "We have been able to successfully provide solutions to the most complex problems encountered by our customers. Also, where else other than India will the world get a workforce ready to work 24x7, 365 days? In India, the commitment towards work and customer-centricity is supreme!" exclaims Executive Vice President & Business Head, Godrej Tooling Division, DK Sharma. According to the Tool & Gauge Manufacturers Association (TAGMA) of India, it is estimated that the tooling demand in India will reach ₹23,620 crore by the end of 2015 and will witness growth of 16 per cent over the next five years. Agreeing Managing Director, Sridevi Tool Engineers Pvt Ltd and President, Tool and Gauge Manufacturers Association – India, SC Kalyanpur opines, "The ability to work closely with clients and maintain a long-term business relationship is definitely a plus point when it comes to the Indian tool room industry. Also the flexibility to cope with changes, manufacturing wide range of tools, catering to the needs of various industries, constant efforts to make technological

"The flexibility to cope up with changes, manufacturing wide range of tools, working closely with clients and maintaining a long term business relationship are definite plus points when it comes to the Indian tool room industry."

Managing Director, Sridevi Tool Engineers Pvt Ltd and President, Tool and Gauge Manufacturers Association – India, S C Kalyanpur

upgradations , presence of training institutes specially dedicated for tool design and development to produce skilled manpower, definitely add to our profile of being a competent industry. And this will lead to further growth of this industry."

Another upside for the Indian tool rooms is the perception that they are better than the international players in terms of quality, die life and pricing. Having said that, according to the TAGMA report, it has been perceived that the Indian tool manufacturers are not competent enough to manufacture critical tooling like progressive, transfer, multi cavity dies, which are the need of the hour considering today's scenario. Also, the availability of die casting commercial tool rooms are very limited compared to the other countries.

Challenges faced by manufacturers

Citing reasons for the same, Managing Director, Vasantha Tool Crafts Pvt Ltd, Dayanand Reddy states, "Die casting commercial tool rooms require huge investments and more space. Therefore, considering the size of the business, investments in this space may not be justified. Also, financial assistance from institutions is not focused and buyers are not yet inclined towards the Indian tool room industry." As the Indian tool room industry necessitates using equipment that is technology intensive, it has to be constantly upgraded. Also, with the equipment being imported from highly developed countries with vast research capabilities and resources, it incurs high cost and obviously requires huge capital investment. Agreeing Kalyanpur says, "Even if the equipment is not high- end, relatively low technology equipment made indigenously also has high import contents, which further results in high costs albeit marginally lower. A tool manufacturer needs various inputs which are mostly imports, from raw material, cutting tools and CAM essential support systems for effective productive use of the equipment resulting in high input costs. Overall, this makes the cash flow as well as manufacturing viability difficult." Against this backdrop of high input costs on operation of the toolroom, the sale value of the tool/die manufactured is up against competition from other Asian countries especially China, which has a local production advantage of very low labor and material costs, along with benefits from bulk procurement of capital equipment made available to the industry at low costs. Therefore, ratio of sale value of output to value of investments in the tooling industry is very low compared to other industries in India.

"In order to make manufacturing an attractive domain for young aspirants, from among the other options available, manufacturers should ensure that the available workforce is multi-skilled."

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

Retaining talent

With the Indian tool room sector being highly skilled and knowledge intensive, another challenge that engulfs the industry is the low technical skill base of the Indian workforce as well as retaining trained talent. Agreeing Sharma avers, "This is a major deterrent for the manufacturing industry – and more so for the tooling segment. Economic growth has created employee demand and job opportunities; while on the other hand, shortage of skills is making people more and more unemployable. Our young workforce today is focused on frequent job changes as they get trained. Retaining this trained talent is a challenge. We need to figure out meaningful ways to ensure knowledge management and retention." With this topic being talked about vehemently in the manufacturing industry, Sharma opines that in order to make manufacturing an attractive domain for young aspirants, from among the other options available to them, manufacturers should ensure that the available workforce is multi-skilled. "That could be an answer for meeting our requirement of skill sets for a comparatively larger period of time and this provides a win-win situation for both – the management and the employees."

Another big hurdle is the lack of a specialist vendor base to feed the OEMs – unlike in the developed countries, where tooling activities are quite advanced. In India, the pace of development of such a network is far slower than the demand, assert

Source: Vasantha Tools

Automated Machining Center at Vasantha Tools

"India is good at developing managers but a lot has to be done by our government in improving the skill set at operator and technician levels. Our ITIs should be much more strengthened."

Director, Karthigeya Group of Companies, Arumugam

industry experts. Also, according to Reddy, getting high quality molds at low cost, availability of the right steel locally and increased complexity of molds are other concerns that the industry faces.

In-house Vs outsourcing

When it comes to large OEMs, a constant dilemma that faces them is deciding between in-house manufacturing and outsourcing development of tools. "Well, historically, it has been observed that when the size of the OEM is small, tool manufacturing is manageable. In a rapidly growing demand for tooling – as a result of multiple launches of products at a fast pace – it is no longer possible to design and manufacture large and complex tools entirely in-house, as it requires special skill sets," explains Sharma. The degree of focused attention required to manage the entire tooling in-house, takes a lot of time and effort from the management's side. "Therefore, we need large specialist commercial tool rooms, which can support the burgeoning demand of the auto manufacturers today. In-house tool design activity comes in handy when we have to incorporate frequent changes in the tools at the R&D stage. However, if such an activity becomes large – especially for production tooling – it requires large scale investments," adds he.

In - house tool design gives a manufacturer the freedom to simulate the mold design on the function of the mold, implement mechanisms for faster cycle time and better quality of parts. Seconding the same, Reddy avers, "Designing in-house builds a lot of confidence in the customer on the technical and IP front. It also helps to control the quality of the machining and mold making. Concurring on similar lines is Director, Karthigeya group of companies, Arumugam, who states, "Even though the world is moving towards outsourcing, being a backwardly integrated company, it gives immense confidence to us in being termed as a complete solution provider in the plastics industry by our customers."

Material and equipment

An efficient manufacturing process requires good selection of machines, proper cutting tools and the right work-holding equipment, which can provide good stability, efficiency and safety to the manufacturing process. "Tool rooms are job-shop operations – hence, work-holding requirements are affected by major factors such as the material to be cut, tolerances required, work piece shape and dimensions," explains Sharma. In most of the shops, work-holding equipment consists of simple vices – some of which are manual and hydraulic, toggle clamps, permanent magnetic chucks, sine table, EROWA holders, quick clamping electrode holder, rotary table, etc.

For machining high quality tools and dies, high level of material removal rates are required during roughing stage, and excellent surface quality must be obtained after finishing. "The manufacturing of tools and dies is a time-consuming task, as it requires superior surface finish. Mold-making not only demands high dimensional accuracy but also requires high feed rates, including for hardened materials, to reduce the machining time. Dimensional accuracy, however, must not be compromised while trying to achieve faster execution," elucidates Sharma. In order to machine right, Arumugam avers that special materials like special alloy steel, pre and high-hardened steel, stainless steel, electrolytic copper, Phosper bronze, Beryllium copper, low

"Designing in-house builds a lot of confidence in the customer on the technical and IP front. It also helps to control the quality of the machining and mold making."

Managing Director, Vasantha Tool Crafts Pvt Ltd, Dayanand Reddy

carbon steel etc. are used. Kalyanpur suggests to chose the material right with respect to the application be it plastic injection molds, die casting, press tool, etc. what is also essential to keep in mind while machining is maintenance. "Maintaining controlled temperature and environment is of utmost importance for all critical CNC machines and CMMs, to ensure their mechanical stability. Also, regular and periodic calibration of all machines is a must to ensure accurate machining."

India vis-à-vis global toolmakers

According to the TAGMA report, it has been perceived that the technical capability of the domestic tool makers is better than that of the Taiwanese and Chinese. Kalyanpur affirms the statement saying that indeed many of the tool rooms in India are technologically at par compared to those abroad. Arumugam while agreeing to the statement points out certain differences between Indian and global tool

Source: Godrej Tooling Division

Tryout machine - IDRA 2500 tonne at Godrej's toolroom

Source: Sridevi Tools

Inspection being conducted on the contoured shape of completed job at Sridevi Tools

makers. "Availability of skilled manpower at operator and technician level is far better in Taiwan and China. Also, mass production capacity and their government support help them recover investments faster, which in turn help them stay very competitive in terms of pricing. India is good at developing managers but a lot has to be done by our government in improving the skill set at operator and technician levels. Our ITIs should be much more strengthened," avows he. Sharma is of the opinion that the backing of the Chinese government in providing technology, scale and subsidies, cannot – and should not – be compared with that in India. "When it comes to China, we in India, should benchmark ourselves with their learning ability and exploitation of available resources. With respect to the quality of Chinese tools, I must share that nearly 20 per cent of good toolmakers in China are as expensive as the costliest tool rooms across Europe. The global players in the areas of special tool steels, heat-treatment and coatings are yet to look at India as a big market, which is not the case in China."

Competing effectively

According to industry experts, adopting modern means and methods, along with age old experience would be the key to profitability when it comes to formulating long - term strategies for the Indian tool room industry to compete efficiently. It has often been observed that many small industries do not invest in technology, and most usually than not, classify this investment as a 'cost'. Investing smartly into the business in newer technologies aids further growth - and in dire and challenging times does not restrict capabilities or options of an organization to be profitable. Quite a few forward thinking toolmakers in the last decade have taken this bold step ahead - and the results speak for themselves. A number of Indian companies are competing successfully in the global arena more by individual or entrepreneurial risk rather than any other support. There are many small tool rooms with individual brilliance in niche areas. Strengthening this spirit with technological advancement will help sustain the current level of commitment. Quality of education and training provided by tool room training centers must be improved by looking at tie-ups between training institutes and governments of countries abroad. The curriculum could also be redesigned to include internships in companies from those countries. This will help know the latest trends going on globally. Lastly, apart from tool making skills, a lot needs to be done on the fronts of quality assurance and reliability, process and document control, sustainability, best manufacturing practices like lean etc. However, in the long run, industry experts opine that more of collaborative approach rather than competition will help the industry really surge ahead and make a serious dent in the world market. MMI

"Transforming Skills and Knowledge Inputs"

Joint Secretary, Department of Heavy Industry, Ministry of Heavy Industries & Public Enterprises, Government of India, Harbhajan Singh talks elaborately on skill enhancement and how the government is launching various schemes to entice the Indian machine tool industry.

In regard to the latest launch of the Capital Goods Skill Council, how will it facilitate the Indian machine tool sector to broaden the indigenous manufacturing base and address major concerns such as low employability due to technical incompetency?

Harbhajan Singh: The basic task of the council is to convert skills needed by the industry into written documents specifying skill standards. These standards will be used by education and training institutions for imbibing skills into youngsters. Thus, for the first time, there will be a direct connect between the skills that the industry needs with the quality of skills acquired by freshers at education and training institutions. The second major change planned in this employers' led initiative is, for the first time, to provide a higher salary package and career path for highly skilled/ educated persons in the capital goods sector, starting from the entry level. This is possible by specifying various levels of skills for a single trade. The net effect will be promoting creation and application of knowledge in the Indian capital goods sector. It may be mentioned that so far the Indian capital goods sector like any other is an importer of knowledge of all types, ranging from what is required for day to-day operations, problem solving to innovations. Overall, the council is seen as an employers' led initiative for transforming skills and knowledge inputs in the Indian capital goods sector, thus positively impacting their global competitiveness.

Source: Vogel Business Media

"Supply and availability of skills needed by the industry are required to be augmented. To address this, the government has brought the IITs and industry together for developing technologies" - Harbhajan Singh

In the wake of increasing competition from international players in the machine tool sector in the domestic market, how does your ministry seek to protect the interests of the domestic manufacturers?

Singh: Internationally, every economy worth its salt imports machine tools which are not made domestically. India is no exception. We have prepared a plan for the Indian capital goods sector including machine tools and as per that we are implementing four parallel strategies to boost the global competitiveness of the domestic industry. Today our machine tools sector is deficit in capacity to generate knowledge i.e. technology and skills. Supply and availability of skills needed by the industry are required to be augmented. There are policy issues. The sector is also impacted by higher conversion costs. To address these issues, the government has brought the IITs and industry together for developing technologies. I am happy to share that project reports for these initiatives have been prepared and are under active consideration of the government to provide major grant support. A major initiative for technology development in machine tools is in the offing with IIT – Chennai. The Indian Machine Tool Manufacturers' Association (IMTMA) is also being supported to create

industrial infrastructure near Tumkur, Bengaluru, where the entire value chain will be located. This will bring down logistics and conversions costs.

Kindly tell us about the measures taken by the government to help the domestic machine tool sector in increasing production and reducing import dependence?

Singh: Since 1991, the Government has taken on the role of a facilitator while private entrepreneurs have been put in charge of the economy including manufacturing, capital goods and machine tools. The government made sure that the entrepreneurs have complete freedom to make decisions for setting up and running the industry. The industrial licensing was dispensed with and the import and export policies were made open. The import taxations, which were as high as 150 per cent were brought down to 10 per cent lower than common bound rate of 30 per cent. India has signed many FTAs, further bringing down import taxations to zero levels. National Manufacturing Policy, DMIC, SEZ and export promotion schemes further provide a congenial atmosphere. Modernization of industrial infrastructure too is being supported through liberal schemes and R&D and skill development are being encouraged through a number of incentives. During the 11th Five Year Plan (FYP) the production in the machine tools sector peaked to ₹4300 crore from ₹2600 crore. In the 12th FYP, we expect the sector to double its production. The 12th plan targets an expenditure of ₹1,00,000 crore in infrastructure sector alone. Local technologies, which are planned to be developed in cooperation with IITs, will further impact growing imports. There is ample scope for domestic manufacturing to grow and imports may continue in high tech niche products, but not in those that are manufactured domestically.

What initiatives are being taken by the government in terms of providing financial support to the small domestic machine tool manufacturers?

Singh: The Government of India has provided policy, services, finance and incentives to the MSME sector through an act. The act is implemented through a separately created ministry called Ministry of MSME. It has programs addressing all needs of the small scale domestic manufacturers including machine tools for financing, etc. The government has created a Small Industries Development Bank of India to provide financial support. National Small Industry Corporation of the Ministry of MSME also provides financial support through leasing and hire purchase schemes. A Credit Guarantee Corporation has been created through the MSME act for addressing credit guarantee needs. Women and ST/SC entrepreneurs are provided additional incentives under RBI regulations for term financing. Scheduled Commercial Banks, Non-Banking Financial Corporations, State Industrial Development Corporations and MSME Exchange provide additional financial assistance.

PERSONAL

"One of the peculiarities of the Indian trade policy is that it is the only country which allows free import of second hand capital goods including machine tools at duty rates ranging from 10 to zero per cent. This makes second hand imports cheaper and easier."

Harbhajan Singh

It is well-known that the manufacturing activity of the machine tools sector is opened up to 100 per cent FDI yet not much FDI has been attracted. Are there any special reasons for this and what steps are being taken to increase the same?

Singh: The issue of the need for and encouraging FDI in machine tools sector was examined in detail by the working group set up for the 12th FYP. It was noticed that even though global companies are present in India, their investment here is limited. The FDI companies plan production in India only for the Indian markets. However, when they plan investments in China and other places, they set up plants to service global markets. Indian markets are only a fraction of the global market. Therefore, we cannot expect similar levels of FDI in machine tools unless our domestic markets grow. Only on the strength of our domestic market will companies plan global capacities. We hope that in the next five to ten years, India will provide the minimum economic size of the market. One of the peculiarities of the Indian trade policy is that it is the only country which allows free import of second hand capital goods including machine tools at duty rates ranging from ten to zero per cent. This makes second hand imports cheaper and easier. Thus, a large amount of the Indian market is taken away by second hand imports. The department is working with the user sectors to bring about a change in the trade and taxation policies. The aim is to provide fair competition and level the playing field in policies for the domestic manufacturers.

The Auto Mission Plan 2006-16 is the cornerstone of the government policy for the auto sector. What special measures are taken by the government for the development of the sector especially in terms of strengthening skill development and R&D?

Singh: Liberal policy regime for domestic manufacturing of the automobile sector has resulted in unprecedented growth. The sector is also insulated from unfair imports from developed markets keeping in view that the Indian auto sector is at least 10 years behind in technology and economy of operations. This barrier has a positive effect on the growth of the Indian auto sector. The policy has been accessorized by providing further incentives and funds for R&D. Skill development is also incentivized through a policy announced last year for the service and manufacturing sector. The government has also set up an automotive sector skill development council for converting industry needs into skill standards and a system of training manpower in education and training institutions. It has invested more than ₹2,500 crore for setting up the auto sector testing and development services under the umbrella of NATRiP in seven locations. The National Manufacturing Policy seeks to provide manufacturing zones along the Delhi-Mumbai industrial corridor for the auto sector among others. MMI

The interview was conducted by:
Soumi Mitra, Editor, Vogel Business Media India
E-mail: soumi.mitra@vogel.de

Devising Ways to Make Surgery User-friendly

It's said that when innovation becomes a core business function, great things happen and indeed it does, especially when it comes to life saving products such as implants and instruments for knee and hip arthroplasty. With innovation at its nucleus, Biorad Medisys Pvt Ltd through its factory based in Pune, brings about novelties not only in manufacturing implants, but also in packaging, and efforts are made to make the entire process of surgery more user-friendly.

Following the motto of 'Designing through empathy', Biorad Medisys Pvt Ltd based in Pune, manufactures the highest quality implants and instruments for knee and hip arthroplasty. The ISO 13485 and ISO 9001:2008 certified facility that has an FDA approved layout plan is spread across 20,500 sq ft. Equipped with state-of-the-art machines, the entire facility features air-locks and is air-cooled for temperature and humidity control. Biorad Medisys features an in-house facility for CNC turning and milling on imported machineries from leading makers like Haas and Mazak.

Indira Rao
Deputy Editor
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Listing the machines at the facility, Managing Director, Biorad Medisys Pvt Ltd, JM Hegde says, "We have a CNC wire-cut EDM from Electronica, Delta Tau Delta, US. A specialized programmable dry polishing machine from OTEC, Germany, ensures the highest level of surface finish equivalent to a mirror. For quality control, a Coordinate Measuring Machine (CMM) from Accurate Spectra, Renishaw, UK, a Carl Zeiss trinocular microscope and a surface roughness measuring machine from Carl Zeiss are available. We also have an in-house microbiology lab, Single Chamber Multi-Operational (SCMO) machine from Siemens, Germany, for cleaning and a laser-marking facility in addition to Millipore plant and automated blister packing machines from Nelipak, Netherlands operated in a class 10K clean room environment."

State-of-the-art machines at the company's shopfloor

Source: Biorad Medisys

Decoding the manufacturing process

All the materials used to make medical devices are biocompatible and have to be periodically tested *In vitro* for biocompatibility and other tests like cytotoxicity and immnune response. These are carried out by accredited laboratories and are governed by the ASTM and ISO standards. "Presently Cobalt Chromium Molybdenum (CoCrMo), Titanium Alloy (Ti6Al4V), Stainless Steel Grade 316 Low Carbon (SS316L) and Ultra-High Molecular Weight PolyEthylene (UHMWPE) are used to manufacture the implants," states Hegde. Following stringent quality checks the company has successfully developed hip implants which are at par with the international players and are affordable. "We follow the ISO standards and Good Manufacturing Practices (GMP) to ensure that every product that comes out of the house, goes through several stringent quality checks at several stages of both the production and hygiene."

The complete development of the implants and instruments goes through a variety of processes depending on the kind of implant. "Cast or forged implants go through processes like turning, form-cutting, machining, buffing, grinding, in-process cleaning using four-stage ultrasonic cleaning, laser marking, sand blasting or three-stage OTEC polishing depending on the application, profile check on CMM and Surface Roughness Measuring Machine (SRMM) for Ra, and are then sent to final cleaning," explains Hegde. He further avers that few implants and instruments go through processes of wire-cut, milling, turning, boring, tapping on CNC, buffing, polishing followed by stringent quality checks for application and fit. Rest of the processes after laser marking remain the

"I have used INDUS knee prosthesis from Biorad Medisys for 10 cases and all the patients had very good range of motion and function after surgery. The implant is not only of very good quality but also is very cost effective and hence the Indian middle class patient can afford it."

Chief Joint Replacement Surgeon, Inamdar Multispecialty Hospital, Pune, Dr. Qaedjohar Dhariwal, MS (Ortho) FCPS Gold Medallist, D Ortho

same. "A separate machine shop for polymer machining checks for contamination of the metal debris into polymer components, which are the crucial bearing components for the implant to function," states he.

When it comes to products, first the raw material is checked for its microstructure and uniformity of grain using radiography techniques and trinocular microscope at the inward inspection. In-process inspection is carried out at the end of each process until it reaches the final stage of cleaning. The implant is then checked for profile correctness under CMM. After quality check the implants go through final cleaning using SCMO under class 10K clean room and the material movement henceforth happens using dynamic passboxes. The packaging is done under Laminar Air Flow (LAF) in clean rooms featuring High Efficiency Particulate Air (HEPA) filters to ensure cleanliness. The implants are then Gamma irradiated for sterilization and then once again checked for sterility or development of microbial colonies in the microbiology lab in-house. Even when it comes to packaging the products, the company follows high standards. The packaging features tamper-evident hologram seals, which ensure passive quality checks right from the factory to the end user. In addition to this, new and innovative designs are being developed and tested. A new modular knee system is currently in the pipeline.

Designing medical equipment

Design and development is an indispensible unit when it comes to manufacturing medical products like implants and instruments. "'Design through empathy' is what our designers have as their motto," avows Hegde. "The biggest challenge when it comes to design is that the designer can only see the surgery, but never use and feel the product in actual scenario. Hence, observation and empathy become very important attributes for designing medical implants and instruments. Design of an implant requires utmost care in terms of application since the product will remain in the human body for almost the entire lifespan of the patient. There is no room for error." A fundamental understanding of the anthropometric data is carried out based on the application.

Prior to brainstorming for solutions, 'regression analysis' is done to understand the product and its various variables. Agreeing, Hegde adds, "For instruments, techniques like Quality Function Deployment (QFD) are used to transform user needs into qualitative components and to pin-point the sub-systems and components for quality and cost optimization. Validation of design and risk management is the second biggest challenge for designing medical equipment. For mitigation and product confidence, finite element analysis is carried out on each design output and the resulting prototypes undergo accelerated test studies like five million cycles fatigue test for verifying and validating the design." Several trials are done on soft bones for final fine tuning before the product is sent for validation and clinical trials. The design team works in close collaboration with surgeons and the sales team where the surgeons, basically the end-users, give inputs and verify designs and the sales team gives a vision of what the market wants. "We have highly qualified designers and interns from prime institutes like IISc and IITs who strive day in day out to come out with innovative solutions," affirms Hegde.

"The biggest challenge when it comes to design is that the designer can only see the surgery, but never use and feel the product in actual scenario. Hence, observation and empathy become very important attributes for designing medical implants and instruments."

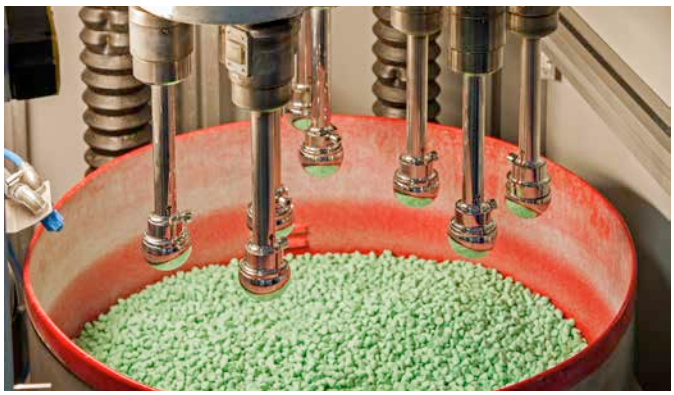
Managing Director, Biorad Medisys Pvt Ltd, JM Hegde

In the months to come

The company currently also has an in-house facility for development of dies and molds. In addition, the jigs and fixtures for various processes are also developed in-house. For the financial year 2013-14, the company plans to increase the development and production capacity and clean room area. "At present we cater to sectors such as Urology, Gastrology (Partial), IVF (Partial), Interventional Radiology (Partial) and Orthoplasty. Going forward we would like to be known as an ageing solution provider company," opines Hegde on a concluding note. MMI

Source: Biorad Medisys

The packaging is done under LAF in clean rooms featuring HEPA filters to ensure hygiene



Source: Biorad Medisys

Cast or forged implants go through processes like three-stage OTEC dry polishing

Bringing Aesthetic Value to Switches

It is essential for manufacturers to keep pace with evolving tastes of their customers', without comprising on quality. In this article, Minda Industries Ltd uses the versatile Autodesk Simulation Moldflow software to bring better visual appeal to it's switches...

Minda Industries Ltd serves the automotive industry with its innovative products, designed and manufactured for efficiency, reliability, quality and safety. The company has the switch division, which specializes in two and three wheeler switches such as handle bar, panel, start, modular and rear brake switches.

Along with a state-of-the-art R&D center the switch division operates through nine plants in India and two overseas plants in Indonesia and Vietnam. "Ours is the first and the only company to receive the Total Productive Maintenance (TPM) award in India, with core competency in manufacturing and developing a wide range of high quality automotive switches serving end markets in various countries including India, US, Spain, Malaysia, Thailand and Indonesia," informed Assistant Manager- Tool Design, Minda Industries Ltd, Shrihari B Rasal.

Demand for aesthetic value

While working for one of the leading two wheeler manufacturers in India, Minda switch division had to deliver a switch that had an aesthetic appearance. In order to remain competitive nowadays, auto manufacturers are trying to differentiate themselves from the competition by enhancing their vehicle's appearance. While doing this, even a small accessory like a switch is among the top priorities to improve the aesthetic value of the vehicle.

While bringing such value, the Minda switch division faced a challenging issue - the occurrence of weld-line at the center of the switch that did not meet the quality and aesthetic requirements specified by the customer. There was limited scope for modification of the Knob Blinker, a switch component, because of its small size and complicated shape. "It was a challenging task to overcome this defect of small and complicated parts of two wheeler switches, due to the limited scope for modification," explained Rasal.

Minda Industries Ltd

Challenges

- Bring aesthetic value to the switch
- Shift weld line

Solution

- Adoption of Autodesk Simulation Moldflow

Results

- Shift of the weld lines to the corner by design modification in the component
- Improved product quality
- Zero rejection due to weld line

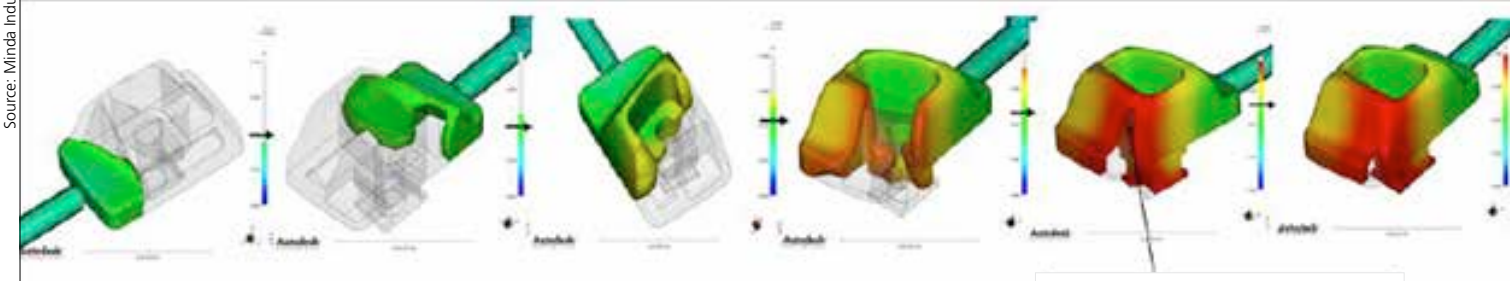
Meeting challenges

In this case of switch component, which is

Source: Autodesk Inc

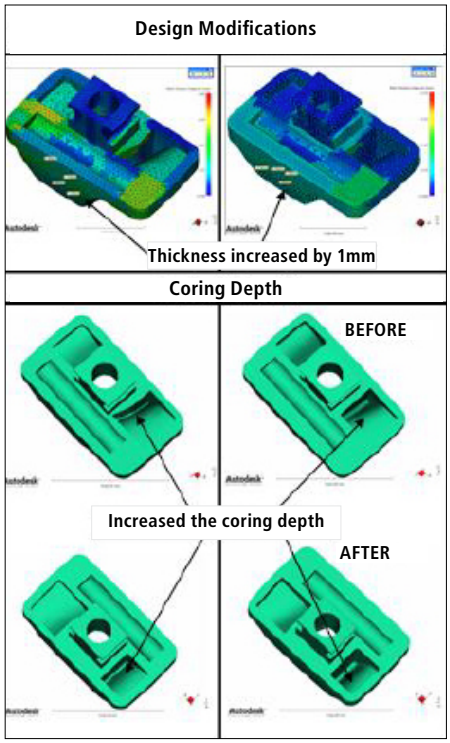
Source: Minda Industries Ltd

Moldflow fill simulation showing elimation of the weldline



Shift of weldline in corner area

Source: Minda Industries Ltd



repeatedly under load, the weld line is the factor that influences the aesthetic value and part strength. So it was a tough task to bring a sophisticated look to the component by shifting the centerweld line to the corner without weakening the product strength.

With assistance of Autodesk Simulation Moldflow, Minda professionals were able to shift the weld lines to the corner by design modification in the component. The company increased the right side wall thickness by 1mm and also coring depth so that the material flow on the right side slowed down and met the left side flow at an edge.

Key benefits

The speed and power of Autodesk Simulation Moldflow gave good results. Agreeing, Rasal said, "By using this software, we got an accurate representation rather than an approximation. It is now easy to verify problems and fix them in the early development stage so that we get the right components in trial one."

Ever since 2008, the company's switch division has successfully used the software to develop more than 200 hundred products. The results have shown that the software helps not only to reduce the design and development cost, but also improves the product quality and saves time. In addition to that, the software has also helped the company identify the main problem areas before the part is manufactured, which is particularly difficult to predict with traditional methods.

"Using Autodesk Simulation Moldflow, we get an accurate representation rather than an approximation. It is easy to verify problems and fix them in the early development stage so that we get the right components in trial one."

Assistant Manager-Tool Design,
Minda Industries Ltd, Shrihari B Rasal

"Autodesk Simulation Moldflow is very versatile and a complete injection molding simulation tool. It has helped us achieve zero rejection due to weld line and thus serve the automotive industry with better products," concluded Rasal. MMI

Performability to Lead towards Sustainability

The performance of systems, products and services has always been a concern of designers, operating and maintenance engineers since the beginning of the past century. This story emphasizes the importance and necessity of devising a performance index so that it could be used as a criteria for developing future products, systems and services.

In designing a product of a system, one must take a holistic view of various activities and processes at various stages. Simultaneously, it is also important to monitor what is being produced and wasted at every stage. One should aim to conserve and economize materials, energy and avoid waste to optimize a product or system's design over its entire life cycle. Typical lifecycle activities of a product or a system can be depicted as shown in Fig 1. At every stage of lifecycle of a product, be it extraction of material, manufacturing, use or disposal, energy and materials are required as inputs. Also, emissions (gaseous, solid effluents or residues) are always associated, which influence the environmental health of the planet. Design of products, systems and services can not be called optimal from an engineering point of view, unless all the above factors are taken into consideration.

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Source: depositphotos.com / Radovan Marcek

Green earth - sustainable development concept

Sustainable production and consumption, dematerialization and waste prevention are the basic strategies that can be used to design sustainable products and systems. Sustainable consumption has been defined by United Nations Environment Programme (UNEP) as 'the use of services and products, which respond to the basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life-cycle, so as not to jeopardize the needs of future generations'.

Sustainable consumption addresses three categories of impacts:

- **Environmental impacts** i.e., resource depletion, pollution, reduction of biodiversity
- **Social impacts:** Resulting from under consumption and overconsumption
- **Economic impacts:** The costs of global warming or of the loss of biodiversity, the high dependence of some regions on the production of a limited number of commodities, where quantities can rapidly deplete

Dematerialization

The dematerialization of a product means to use less material to deliver the same level of functionality. A material can be anything from an unprocessed raw material to a finished product.

Source: Prof Krishna B Misra

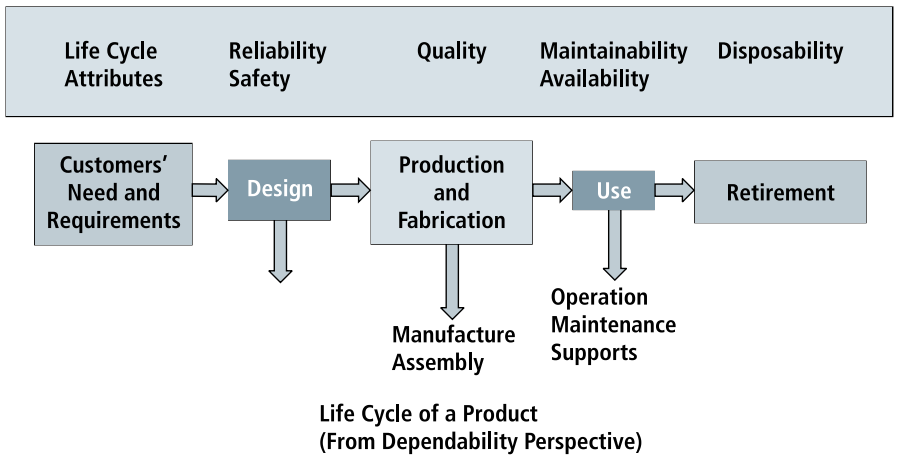


FIG 1: Life cycle activities

The UNEP defines dematerialization as 'the reduction of total material and energy throughput of any product and service and thus, the limitation of its environmental impact. This includes reduction of raw materials at the production stage, energy and material inputs at the use stage and waste at the disposal stage.'

Dematerialization considers, besides waste, natural resources involved in the products' lifecycle. It literally means the use of less materials. It entails actions at every stage of the production and consumption chain such as resource savings in material extraction, improved eco-design of products, technological innovations in the production process, eco-friendly consumption, recycling of waste, etc. Dematerialization strategies basically translate into:

- the conception, design and manufacture of a smaller or lighter product
- the replacement of material goods by non-material substitutes (for instance replacing letter on paper by an electronic mail)
- the reduction in the use of material systems or of systems requiring large infrastructures (for instance using telecommunications instead of using personal contact)

All materials leave a carbon foot print during manufacturing or use. Carbon footprint can help in assessing the efficacy of the dematerialization process. A carbon footprint is defined as 'the total set of GreenHouse Gas (GHG) emissions caused by an organization, event, product or person.' Carbon footprinting represents the total amount of GHG produced to directly and indirectly support human activities, usually expressed in equivalent tonnes of carbon dioxide (CO_2). Several organizations have calculated carbon footprints of products and the US Environmental Protection Agency has even addressed the carbon footprints of paper, plastic (candy wrappers), glass, cans, computers, carpets and tyres.

Minimization of waste

Waste minimization must consider the full life-cycle of a product, starting right from the conception stage to achieve a reduction in total amount of waste produced.

Sometimes scraps can be immediately re-incorporated at the beginning of the manufacturing line so that they do not become a waste product. Some industries routinely do this; for example, paper mills return any damaged rolls to the beginning of the production line and in the manufacture of plastic items, off-cuts and scrap are re-incorporated into new products. Such innovations help reduce waste material or scraps.

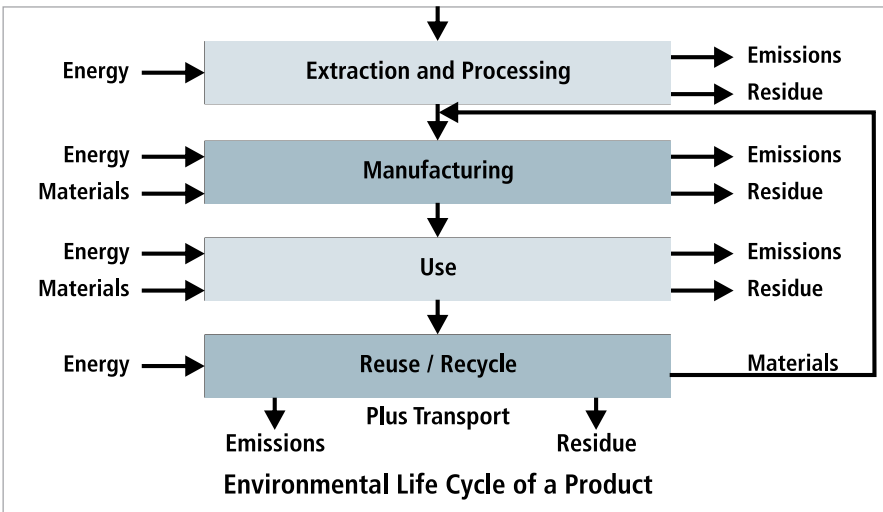
Furthermore, steps can be taken to ensure that the number of reject batches is kept to a minimum. This is achieved by using better quality control procedures. In fact, waste can be reduced by improving quality and durability of a product so that over a given period of time, it results in less wastage. Waste of energy over the use period forms a part of waste consideration.

Sometimes waste product of one process becomes the raw material for a second process. Waste exchanges represent another way of reducing waste disposal volumes for those that cannot be eliminated.

End-of-life treatment

From environmental as well as economical considerations, the end-of-life treatment of products and systems is now becoming the liability of manufacturers and distributors. The Waste Electrical and Electronic Equipment (WEEE) directive of European Union is the first step in that direction, at least in the electrical and electronic sector. The WEEE directive (2002/96/EC) as passed by European Community, is aimed at preventing waste electrical and electronic equipment from ending up in landfills and to promote the level of recycling and reuse in the electrical and electronic sector. This directive requires all manufacturers and importers of electric and electronic equipment to meet the cost of collection, treatment and recovery of their waste electrical and electronic equipment at the end of their useful life.

The alternatives to landfill or incineration include: maintenance, recycling for scrap material, and re-manufacturing. This is shown in Fig 3.



Source: Prof Krishna B Misra

FIG 2: Throughputs at every stage of Life Cycle

Remanufacturing, recycling and reuse: While maintenance extends product life through individual upkeep or repair on specific failures, remanufacturing is a production batch process of disassembly, cleaning, refurbishment and replacement of worn out parts, in defective or obsolete products. However, scrap-material recycling involves separating a product into its constituent materials and reprocessing the material. Remanufacturing involves recycling at parts level as opposed to scrap-material level. It is actually in effect recycling of materials while preserving value-added components.

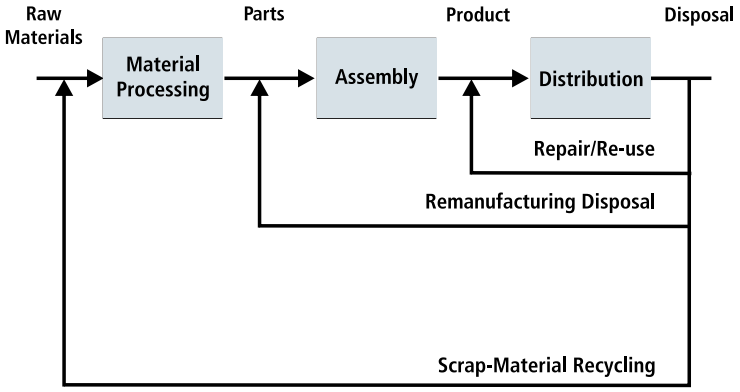
Remanufacturing also postpones the eventual degradation of the raw materials through contamination and molecular break down, which are the characteristics of scrap-material recycling. Since remanufacturing saves 40-60 per cent of the cost of manufacturing a completely new product and requires only 20 per cent energy, several big companies are resorting to remanufacturing. Many well-known companies like IBM, Xerox, UNISYS and Hewlett-Packard have already used this strategy. It must however be stated that remanufacturing is not suitable for all types of products and is appropriate only for those products that are technologically mature and where a large fraction of product can be used after refurbishment.

Costs considerations: It may be mentioned here that a designer must account for various costs associated with recycling and remanufacturing, including the recycling cost and the cost of failure during disassembly and reassembly. The first cost is the cost of manufacturing and first assembly. Recycling cost includes the cost of extracting material or cost of separating parts of different materials. Both maintenance and remanufacturing involve disassembly and reassembly and part reuse, and failures can occur during these phases. Therefore, the consequences of the above failures are weighted by their probabilities of occurrence. For example, rivets and welds usually get destroyed during the disassembly. The other part of the cost includes the cost of damage done to a part when the fastener is extracted. Maintenance costs are the costs associated with disassembly or assembly whereas the remanufacturing cost is the total cost under all the mentioned heads.

Appropriate measure of performance

In simple terms, performability engineering can be defined as the entire engineering effort that goes in improving the performance of a system that not only ensures its high quality, reliability, maintainability and safety but also its sustainability.

Implicit with this definition of performability, is not only the high performance of a system but also its minimum life cycle costs. We cannot separate environmental problems from economics of clean production and clean technologies. Likewise, improved performance should necessarily imply less environmental pollution, less material and energy requirements, waste minimization and finally conservation and efficient utilization of available resources. This in turn would result into minimum life cycle costs. These problems are best tackled at the design stage of a system.



Source: Prof Krishna B Misra

FIG 3: End-of-life options

Towards dependable and sustainable designs

High performability systems, products or services can probably be designed in two stages. In the first stage, base case design can be developed based solely on the dependability criteria of a product or system and then further modified by introducing sustainability criteria. This means the base case design can be improved by exploring the possibilities of minimizing the material and energy requirements of the product or system, along with the waste generated over the entire lifecycle of the product including manufacturing.

One can use penalty / reward models for deviation of these quantities from the base case design. For example, if the production processes generate worse or lesser amount of waste, the deviation can be used to develop a penalty or reward model for the design using a specified technology. Similarly, there can be a penalty/reward model for deviating from the base case design in relation to the material and energy requirements using a certain technology.

Several alternative designs using various technologies can be evaluated and an optimal design would be one which provides minimal impact in terms of environmental impact (which perhaps can be calculated possibly in terms of the carbon footprint the design alternative will have in order to have uniformity and simplicity of comparison) and offers economic benefits.

Sustainability requires that the processes used must be clean and non-polluting. Again a reward/or penalty can be introduced in assessing the cleanliness of the processes. The sustainability criterion also requires that the product process should be waste free or have means of utilizing the waste created by the production processes. Sustainability criteria also require that the energy requirement for the production process as well as during the product maintenance should be minimum and may possibly use clean energy sources. Reward/or penalty models can be developed for implementation with a certain source (renewable sources included) and the amount of energy used over the entire life-cycle. Reuse and recycle possibilities should be rewarded suitably in the design model. The alternative modern technologies, such as nanotechnology and biotechnology, also widen the possibilities of such a realization of a product design.

Conclusion

The concept of performability for design of products and systems (including services) opens up entirely new possibilities of designing, producing, maintaining and disposing off the products, system and services in the 21st century. It is expected to make these designs more environment friendly as well as economic over their entire life-cycle, while excelling in dependability. MMI

GERMAN RELIABILITY and INDIAN INGENUITY

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Drives and Motion Control - Mechatronics

The more things change, the more they stay the same, is a proverb increasingly getting challenged in the current manufacturing milieu. Product design and production engineers are being challenged by increasingly different parameters. Here's an overview of how Festo, a pioneer in automation, is evolving an integrated approach to new challenges of motion control.

There is a large need for creating processes, or machines, which have the ability to cater to multiple product lines. A linear motion, between two fixed and unchanging points, was achieved either by CAM controlled motion or later through pneumatic or hydraulic actuators. However, there is an increasing qualification to this simple motion, in terms of accuracies required, speeds and acceleration control, constant motion profiles, and the ability to follow a designed contour.

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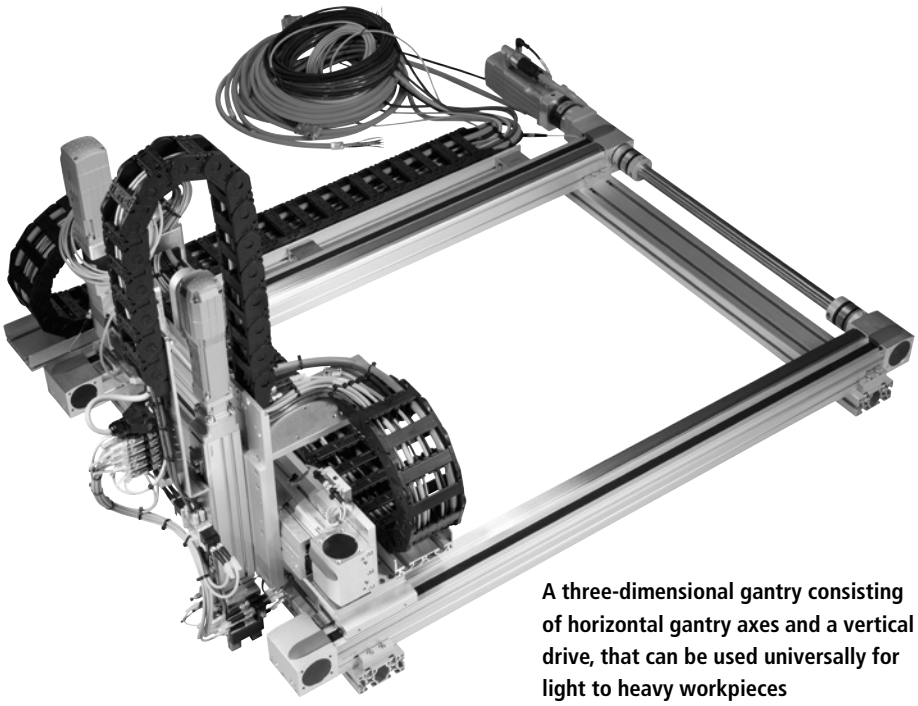
Such demands are brought on by applications, which are replacing the old generation devices. Take the case of a packaging machine, designed to pack medicines. The size of a tablet or capsule determines the length to which the packing material is required to be fed. Cycle time and precision of feed are the most important criteria for such an application, along-with flexibility in choosing the feed length easily.

Multidiscipline to single point solution

Selecting such an actuator demands multi disciplinary skills involving mechanical, electrical and power electronics, and control systems. Skills alone, in this case, are not sufficient to arrive at a conclusion. Arriving at the correct result demands multiple iterations and combinations of different variables, such as ball screw diameter, pitch, length of the ball screw, etc., or in case of toothed belts, the diameter of pulley, belt width, etc. The permutations are so wide, given the choices in the market, that the project is at best an educated choice by the designer, without much possible comparison.

Festo has been working on core areas of motion control, which makes it equally easy for a designer, or maintenance engineer, to optimize this selection. Furthermore, in an attempt to be media agnostic, the motion control system offers a choice of drives, between electromechanical, linear motor or pneumatic, on different platforms. The application decides the type of actuator and drive depending on application requirements.

Source: Festo



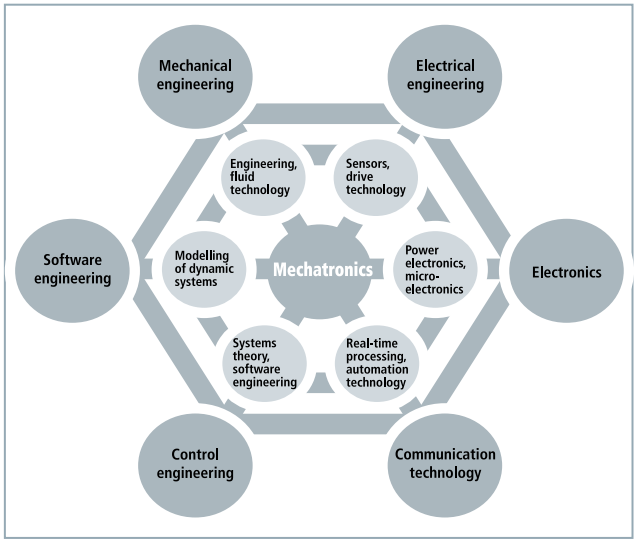
A three-dimensional gantry consisting of horizontal gantry axes and a vertical drive, that can be used universally for light to heavy workpieces

Making it simple

The process of selection to commissioning these drives is simplified through various tools, which are freely available. As any designer of motion control applications will verify, the toughest part is taking a call on the final payload. As calculations are generally time consuming and error prone, considering production pressure, the designer assumes higher loads to safeguard against any future increases in payload, and undersizing of the drive or actuator. This practice, however, ends up with actuators and drives which are more often than not, of larger sizes than required.

If the application area of the motion has been worked out, it is just a matter of two or three steps till the axis can be commissioned on the machine. This allows the user to choose between multiple actuator types with clear advantages for loading of the axes, be it a toothed belt

Source: Festo



Motion control today, encompasses all the latest developments across fields which were distinct and specialized in the past, such as mechanical engineering, power electronics, sensors technology, communication networking, among a host of other disciplines

drive, ball screw (or a pneumatic drive, in case of using the Pro Pneu selection tool), and electromechanical axes. It provides an excellent match of cycle times simulated for one or multiple cycles. Motor selection is another crucial part of motion control. The inertia ratios need to be compared, to achieve an ideal mix of high service life to loading ratios. This is easier said than done, as calculation of inertia parameters of electromechanical axes itself is a detailed process. Comparison and matching with motor inertia is also another vital step, which could be more approximated than perfect if manually calculated for multiple choices.

The positioning drives software throws up drill down details in a matter of few minutes, for hundreds of axes motor and gear box combinations. The ease of comparing complex data such as acceleration achieved , time taken for the actuator , speed in rpm and m/s for motor and actuator to achieve the cycle time, at specific acceleration, and current drawn at crucial points, makes it very simple for the user to exercise a choice between functionality, performance and price.

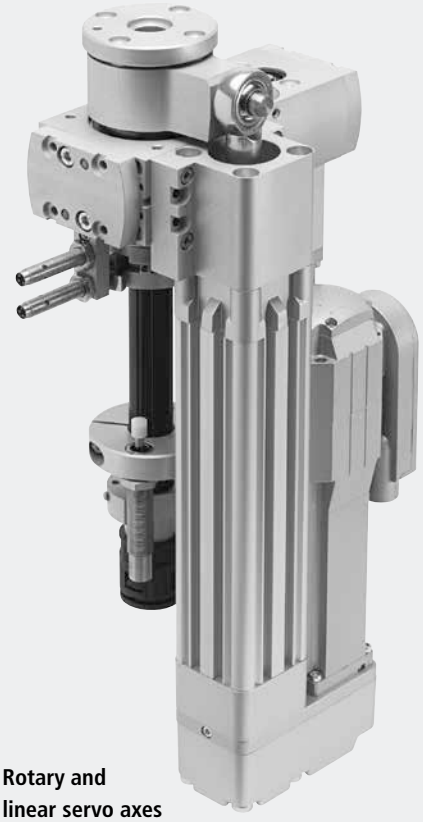
Drives and motion control

The best available solutions need to be medium agnostic. The capability to harness pneumatics or electromechanical devices with electronics, power electronics and motion dynamics, is key to offerings in this field.

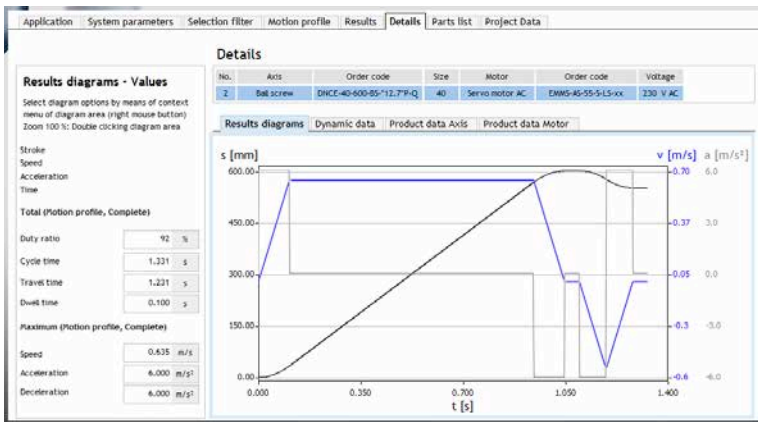
The company has come up with three designs—piston rod, rodless, and semi rotary—that are all enabled with closed loop feedback systems. However, pneumatics is still the most optimum choice for forces generated in a given footprint i.e., forces up to 250 kg or so. Offering reasonably good repetitive accuracies up to 200 microns and speeds up to 1.5 m/s, the pneumatic drive makes for a good fit for areas which need to be isolated from normal operating or high voltage systems.

The user has a choice of using pneumatics, by far the cheapest cost of running, among power actuators in the position control servo mode or to achieve end positions in lesser time, which may be lost in vibration absorption.

Source: Festo



Rotary and linear servo axes



Graphical simulation of Motion control with details at your fingertips

Source: Festo AG & Co KG

Another advantage with this system is its ability to create algorithms and control functions for pneumatic servo systems and drives for a notoriously difficult to predict medium—air.

Pneumatic or electromechanical axes

The reasons to choose between pneumatic or Electromechanical (EM) systems could be primarily as follows:

a. choice of air as a medium

b. requirement of higher speeds with more accuracies

c. higher loads (more than 500 kg).

Pneumatics is generally best utilized with operating air at 6 bar and for forces up to 500 kg with speeds less than 3m/s. Acceleration ideally should be less than 25m/sq seconds, with accuracies up to 200 microns through electronic control.

The above are general guidelines, applicable to majority of discrete automation, handling and motion control applications.

This brings us to the selection of an optimized EM system, or servo system, as it is commonly referred to. Owing to the rapid development of technology breakthrough in materials and assembly techniques, synchronous motors are available at price points far below the price points five years ago.

This still raises the question of optimum mix of technologies. Rather than assuming one shoe (synchronous motors) fits all sizes. DC stepper motors, are still more economical than synchronous motors with servo drives, and can be used for motion control in a number of applications.

Stepper motor or synchronous motor

How does one decide when to use a synchronous motor or stepper motor, and how are they relevant to motion control?

Stepper motors from the company are hybrid motors. They are preferred owing to the high resolution offered during positioning. The company has worked around the problem of step resolution, by using microstepping combined with servo functions.

A servo controller, almost as small in size as a 1 tera byte hard disk drive can now control a stepper motor with 24 VDC in a closed loop and deliver servo positioning with linear accuracies of up to 20 micros.

The new EPCO series of actuators combine the classical form of a pneumatic actuator, with the ease of browser based configuration (no programming) to give simple servo functionality in two steps—plug and play. This is an entry level choice, ideally positioned for applications in loads up to 15–25 kg and speeds of up to 500 mm/s.

High speed drives, with velocities up to 10 m/s, and acceleration up to 50 m/s^2, are used in various design forms. Integration of the mechanical guides (LM guides, roller guides, plain bearing guides, air bearings) into the basic construction of the actuator makes it possible to deliver higher dynamic loads. Variants include protection for the slides, which may be needed in food and pharmaceutical industries, or areas prone to spillage or harsh environments.

A matching set of accessories, including motors, gear box, end position sensors, and mounting accessories, are offered with the actuators as a system with product parts numbers.

Applications requiring lower speeds, but settability are addressed through solutions such as servo motors with integrated controllers and axes. There are systems, which address combined motions i.e. rotary and linear, in a synchronized motion.

Cycle times

To achieve desired cycle times, for combined axes, it is important to be able to understand the mechanics and related motion dynamics of the individual axes. Engineering all parts of such systems would probably take up days together, if started from scratch. Among many other possibilities, permutations for various motions are also possible through the company's systems. For instance, rotary motion can be coupled with linear motions, to make a pick and place from a press to a conveyor, or have a single device to assemble an end of the line package. Motion control with point to point linear interpolation is possible for two axes without any major programming effort.

The Codesys based motion controllers make it possible to use the servo axes in conjunction with conventional pneumatic systems, i.e., multiple valves, sensors and even vision systems through a single control interface. This means less dependence on expert programming skills, and faster set up times, with no worries of integration between multiple vendor platforms. Users can now rest all their efforts with multiple disciplines and technologies and choose to make a simple choice through the integrated environment available for motion control and drives. MMI

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High Speed Leads to Lights-Out

One can become more competitive by establishing a high speed machining process that is predictable enough to confidently run lights-out. Here is how, Quality Tooling based in Corydon, Kentucky runs lights-out high speed machining processes.

By developing a reliable process for unattended, high speed machining of mold cores and cavities, Quality Tooling has boosted its competitiveness to the point where it is starting to win work that previously was outsourced overseas. Although it took the Corydon, Kentucky tooling manufacturer a little while to gain the confidence to run lights-out, its systematic approach has resulted in a high speed machining process that performs effectively, regardless of whether or not an operator is in front of a machine. This is particularly important when one considers that intricate jobs might require as much as 30 to 60 hours of machining time.

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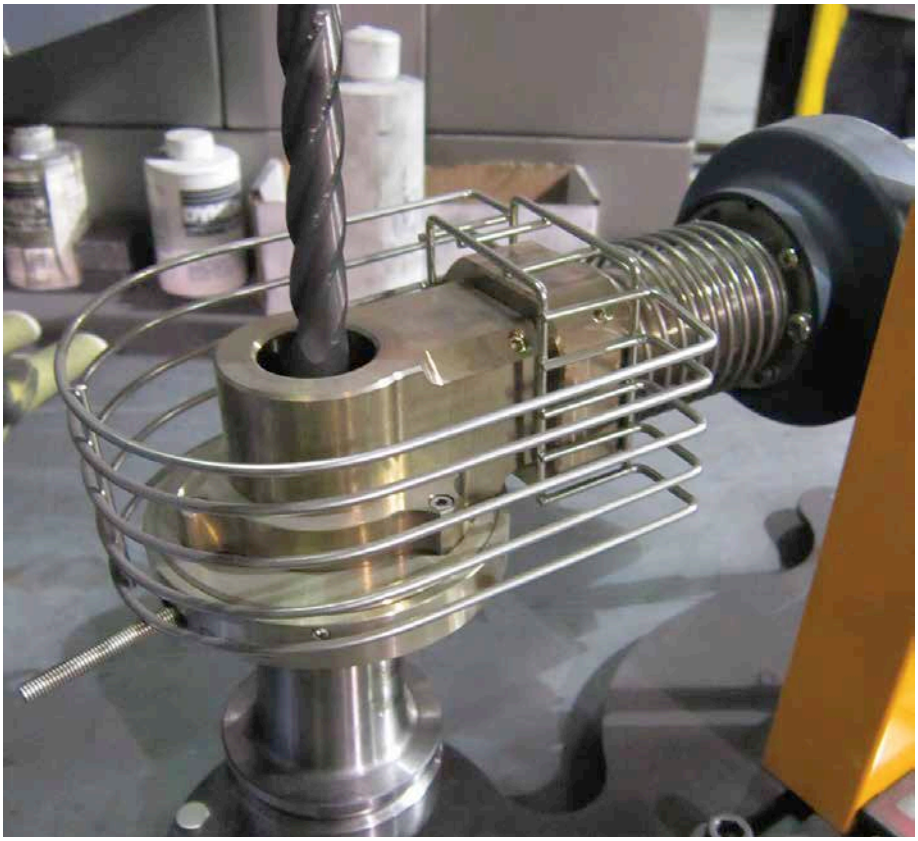


Source: mmsonline.com

The shrink-fit tooling offers the runout and rigidity required for effective high speed machining of mold blocks as hard as 60 HRc

The family-owned business is led by brothers Mike and Brian Alvey. Its lead CAM programmers are Mike's son, Stephen, and long-time employee Jeramy Lamb. Brian admits that the company was a bit late to the game when it comes to high speed machining of tool steel mold blocks. This is partly because it pays for equipment up front and in full to remain debt-free, a policy initiated by his father, Jim, who started the company in his garage in 1968. Over time, however, the company eventually assembled all the complementary elements needed for effective high speed machining, including the appropriate machines, cutting tools and software.

Now, it can produce finished mold surfaces that require little or no hand polishing or spotting, which has greatly reduced manufacturing costs and delivery times. High speed machining of blocks has also decreased the need for sinker EDM operations (and related electrode machining). In addition, job quotes are more accurate because unexpected machining mistakes that might require block welding, reworking or possibly even scrapping have been greatly minimized.

Ultimately, the company's predictable high speed machining process paved the way to added capacity and lights-out production. The latter enables the company to run machines unattended through nights, weekends and holidays to wring the maximum production out of each day.

Building a high speed process

Quality Tooling is a 27-person company

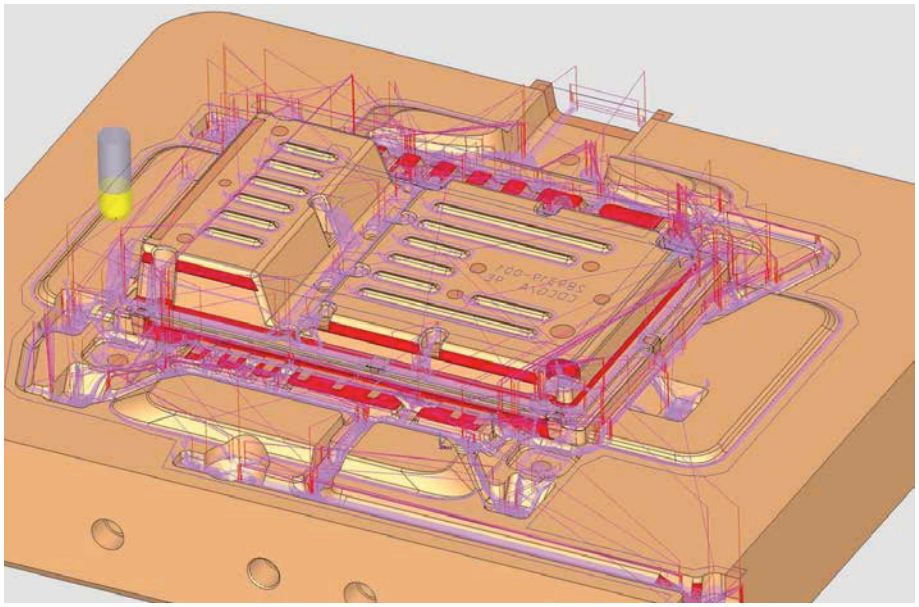
that originally designed and manufactured only plastic injection molds, and has also diversified its capabilities to produce rubber, die-cast and blow molds as well. It also performs a good deal of mold repair work, which represents approximately 20 per cent of its business.

Establishing a lights-out mold machining process was not the goal when the company first considered high speed machining. Instead, it viewed high speed machining as a necessary step to improve efficiency by machining contoured mold surfaces to net shape with minimal bench work. This is accomplished by taking a number of light cuts with close step-overs to minimize the size of the material cusps left behind. Feed rates and spindle speeds must be higher than conventional machining operations so the cutting tool can achieve an effective, consistent chip load. Higher feed rates make it possible to complete a greater number of passes across the workpiece to reduce cycle times.

Although the company's existing CNC machines were well-suited for traditional mold machining work, they were not geared toward high speed machining. Therefore, its first step was identifying a machine that could deliver higher spindle speeds and feed rates along with the requisite accuracy for complex 3D mold surfaces. After performing its own research and considering opinions from others in the industry, it chose a 30-hp, 20,000-rpm V55 from Makino in 2000. This VMC with an HSK-63a spindle interface has a FANUC 16i-m CNC running Makino's Super Geometric Intelligence (SGI) servo-control software. SGI uses part program block look-ahead and fast processing capability to take advantage of the machine's quick acceleration and deceleration rates and fine-position-resolution feedback. It anticipates the servo lag or following error for upcoming toolpath motions and moves the machine to those points prior to receiving the actual feedback from the servo drive. This compensates for servo error to help achieve accurate, smooth tool paths.

Adoption of balanced shrink-fit toolholders

Another piece of the high speed machining puzzle was the adoption of balanced shrink-fit toolholders from OSG. Shrink-fit toolholders offer minimal runout, so there is effectively no off-center rotation of the cutting tool that would cause a higher chip load on one flute and shorter tool life. The shrink-fit tool/toolholder interface is also extremely rigid, enabling cutters to reach deep into pockets and other difficult-to-access areas. This reduces the number of sinker EDM operations that would otherwise be needed to create those surfaces. The company has two Heat Robo inductive shrink-fit heaters from MST Corporation. Heating time for these units is less than two minutes and cooling time is approximately one minute.



Source: mmsonline.com

The CimatronE CAM software precisely calculates the stock remaining after each tool path and uses that information to optimize subsequent cutter moves. This has virtually eliminated gouging, which was common with the company's previous CAM package.

Using shrink-fit toolholders to maximize tool life is important because the company does not skimp on cutters. It primarily uses end mills from OSG and Garr that have proven effective at high speed machining blocks as hard as 60 HRc. The ball end mills used for finishing operations, for example, have extremely accurate radii to ensure even metal removal rates and smooth mold surfaces. Similarly, the company uses Crystallume diamond-coated cutters for machining abrasive graphite electrodes because they combine hardness with a low co-efficient of friction, for excellent electrode surface finishes and long tool life.

With this equipment in place, Quality Tooling began programming high speed machining jobs using its existing CAM package. Although this CAM package worked well for the company's standard CNC machines, it simply did not enable the high speed machine to realize its full potential. The 'speed' was not quite there yet, even though the machine was fully capable of it. Cutters approaching corners would slow down too much and the resulting tool paths were not smooth. In addition, Stephen Alvey says cutters sometimes 'fell into' gaps rather than smoothly maintaining the tool path and traversing them. This could cause material gouging and tool breakage. At best, welding and re-machining could save the block. At worst, the block was scrapped and all the previous machining time and cost was lost.

Software for high speed machining

In 2004, the company began looking for CAM software that was better-suited for high speed machining with its V55. It chose CimatronE, which Brian says was more costly than other CAM packages but offered the features needed to realize the advantages of high speed machining. He also appreciated that Cimatron was not shy about programming test cuts based on actual jobs that the company had run in the past, whereas other software companies presented only their own program demonstrations.

Stephen says the look-ahead algorithms in CimatronE are extremely helpful and have greatly reduced the chance of gouging. Specifically, he appreciates CimatronE's 'Knowledge of Stock Remaining' technology, whereby the software precisely calculates the stock remaining after each tool path and uses this information to optimize subsequent cutter moves. He says better management of remaining stock is important to prevent cutter crashes and minimize air cutting.

High, consistent feed rates are now possible because the software rounds all

tool paths to eliminate sudden changes in direction and minimize jerking movements, Stephen notes. The software automatically adapts the tool path to ensure that rounding does not result in unmachined areas or large scallops, even when cutting sharp corners. Where necessary, it also automatically applies trochoidal machining. Zero-overlap trochoidal machining and tangential approach/retract options help prevent witness marks and scratches on mold surfaces. The software also minimizes scallop size for complex 3D surfaces by varying machining based on vertical or horizontal incline and/or maintaining a fixed 3D distance between passes.

Without the toolpath 'stumbling' that was common to the previous software, the higher-priced cutters hold up longer and deliver better finishes. Plus, the company can rough more areas of its blocks and rely less on sinker EDM. Today, a typical block might require one or two sinker EDM operations, compared with 15 to 20 previously. The company realizes further time and cost savings by reducing the number of electrodes it needs to machine.

Quoting is more accurate, too, because unexpected gouging has been virtually eliminated. In addition, NC code calculation time is much faster. Stephen says the software can be set up to use all of his computer's eight cores. Another big time-saver is the ability to process a job while he programs another. Plus, programs automatically update whenever changes are made.

Adding capacity, running lights-out

Brian says Quality Tooling's predictable and efficient high speed machining process enabled the company to win more work by providing faster deliveries at lower costs than many competitors. This spurred the company to increase capacity by adding another seat of CimatronE and two more Makino high speed machines: an S56 in January 2006 and an F5 in April 2012. The F5 is fitted with a Donaldson Torit dust evacuation system and is used for graphite electrode machining as well as finish-machining of mold blocks.

The company also quickly realized that lights-out manufacturing would be the next logical step in becoming more productive. This also would enable the company to charge customers at a different rate because there are no employee costs associated with that work.

Handling long-running jobs efficiently

EDM and milling jobs with short cycle times typically run during one of the two day shifts in which operators are present. Longer-running jobs are set up to run overnight, during weekends or over holiday breaks. Meetings are held every Thursday or Friday to schedule the work that will run unattended over the upcoming weekend. If no long-cycle-time jobs are in the queue, multiple smaller jobs are set up. In those cases, the goal is to make the most use of each machine's available table real estate while leveraging the benefits of alternate workholding methods.

For example, the company uses electropermanent magnetic workholding chucks from Tecnomagnete on its machining centers and sinker EDMs for quicker setups and fixturing flexibility (it currently has six of them). Previously, it machined ledges on the bottom of blocks so conventional clamps could secure the workpieces. It took as long as 30 minutes to set up and indicate a block using this workholding method. With the magnets, this takes only five minutes. For milling and sinker EDM work, the company can set up a long-running job on one side of the magnet and leave the other half available for short-run work during attended shifts. That way, operators can pause an uncompleted, long-running job in the morning and set up and complete short-run work during the day.

Similarly, the company uses Hirschmann quick-change pallet fixturing systems to speed setups and change-overs on sinker EDMs and machining centers that mill electrodes. Pallets install in receivers in known table locations, making for fast installation and repeatable positioning. Prior to machining electrodes, the company simply saw-cuts graphite blanks and uses a specially designed industrial adhesive to glue the blanks to aluminum plates that mate to the Hirschmann pallets.

Source: mmsonline.com

Electropermanent magnetic chucks on the company's sinker EDMs and machining centers speed setups and enable multiple jobs to be fixtured at once

Conclusion

Although Quality Tooling has built a high degree of reliability and predictability into its lights-out approach, no process is flawless. Cutters can unexpectedly break, as can EDM wire, which could lead to extended lengths of unproductive idle time. Rather than paying someone to perform these checks in person during off hours, the company has installed infrared LED cameras that can pan and zoom to view a machine's control screen or workzone.

Stephen developed a means to assign an IP address to the video feed in order to access the cameras via home computer or smartphone. That makes it easy to remotely check the status of long-running, unattended jobs. If a problem is identified, someone can come to the shop to make the fix and get the equipment running again. MMI

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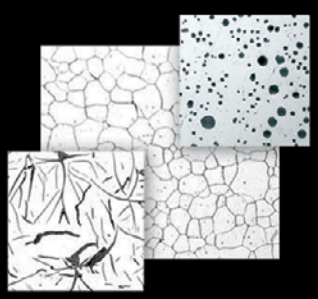

Consistency and Cost Optimization through Abrasion

Finishing processes such as grinding are often underestimated. The right grinding technique can not only guarantee the finest finishing of the product but can also increase efficiency. Here's how Hypratek Fluid Power Pvt Ltd, by incorporating centerless belt grinding machines, was able to achieve consistency at optimal cost.

Established in 2010, Hypratek Fluid Power Pvt Ltd, manufactures a comprehensive range of single acting telescopic hydraulic cylinders for a wide range of truck and trailer body tipping applications. As these cylinders need to slide on to one another, the finish needs to be very good and within the required accuracies for smooth sliding performance. In the initial stages comprising, namely, the first two years after establishment, the Bangalore-based company put a lot of effort into the design, prototype manufacturing, trial and testing processes. "Grinding and finishing operations are absolutely vital for our product range and therefore incorporation of an appropriate grinding and finishing machine was a necessity," said Managing Director, Hypratek Fluid Power Pvt Ltd, Sudhir Prabhu.

The company then approached Grind Master, a company that offers special purpose machines for finishing processes. Prabhu having already worked with Grind Master in previous work assignments was aware of the range of centreless belt grinding machines that Grind Master manufactured, and had previously purchased a 2- and 3-head belt grinding machine from the range.

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Hypratek Fluid Power

Challenges

To achieve finish within required accuracies so as to obtain smooth sliding performance

Solution

Incorporation of the FH series machine – a multihead belt grinding machine from Grind Master

Results

- Finishing within the required accuracies
- Less power consumption
- Optimized process and cost
- Improved cycle time

Source: Hypratek Fluid Power Pvt Ltd

The machine is user-friendly and easy to set up; thereby, requiring only single worker to monitor the grinder process

Providing a comprehensive solution

Both companies came together to bring about a comprehensive solution. The requirement was to incorporate a machine that could finish hydraulic telescopic cylinder tubes with a specific accuracy. The outer diameter of the tubes manufactured ranged from 71 mm to a maximum of 250 mm. The application also involved stock removal in addition to the finishing improvements.

"Given the prerequisite, we knew selection of the grit sequence and its optimization was important. Additionally, as these jobs are produced in medium batch sizes, the set up change from one tube size to another required to be fast. We also had to maintain the tube alignment throughout the machine for all job diameters. We recommended the FH series machines—a multihead belt grinding machine—that are designed to fulfill these prerequisites," advised Managing Director, Grind Master, Mohini Kelkar.

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"The technology and knowledge employed by Grind Master in its machines makes it most suitable for telescopic cylinder manufacturing. The company's machines are definitely import substitutes that are at par with machines from global competitors."

Managing Director,
Hypratek Fluid Power Pvt Ltd,
Sudhir Prabhu

Prabhu opined, "We initially wanted to incorporate the company's 3-head belt grinding machine. However, on its recommendation of using the FH Series machines, we set to test prototype cylinders, with a pilot attachment provided by Grind Master for initial testing." The use of the pilot attachment confirmed to both the companies that use of the FH Series machine was indeed appropriate.

"During this testing period, parameters for the optimum process offering consistent finishing results was proven and confirmed. And our decision to use the FH Series machine from Grind Master was also affirmed as this machine is capable of consistent quality finish and works with a larger batch size. The technology and knowledge employed by Grind Master in its machines makes it most suitable for telescopic cylinder manufacturing. The company's machines are definitely import substitutes that are at par with machines from global competitors," he affirmed.

Enhancing processes

Talking on why it is necessary to choose machines in accordance with applications, Kelkar mentioned, "Many times grinding processes are expected to take care of the variations or inconsistencies from the previous machining processes. It is important to then determine the grinding steps along with a well-defined input tolerance and input finish. The consistency of grinding results depends on consistency of the input."

The FH Series machine has a floating type belt grinding head which operates from top of the tube as opposed to conventional centerless grinding process wherein it operates from the side of the tube. Multiple belt grinding heads are used with different grits of abrasive belts that are carefully selected to fulfill the stock removal and finish requirements. The required finish of 0.2 Ra-µm is achieved from the turned finish. These features assist in achieving the required finish at optimal cost.

Agreeing with the benefits of this machine, Prabhu added, "Compared to other centerless grinding machines, we found that the FH series machine is more user-friendly and easy to set."

Source: Hypratek Fluid Power Pvt Ltd

The job passing to the multihead belt grinding machine at the Hypratek facility

"There is a huge scope for optimizing grinding processes. On the basis of the input condition and required finish, the grinding process sequence should be carefully selected. The grinding and finishing parameters also play an important role so as to achieve the end result at minimum cost."

Managing Director, Grind Master,
Mohini Kelkar

Advantages of belt grinding

The conventional process of centerless grinding uses bonded abrasive wheels. This method is now being replaced by the abrasive belt grinding process owing to the speed of operation. Speaking on the benefits of using this machine, Prabhu conveyed, "Belt grinding processes are faster and consume much lesser power compared to conventional methods. Additionally, the process can have multiple heads in a row, so as to complete the job in one pass."

Further advising on the machines' benefits, Kelkar asserted, "Increased accuracies, smoothness and required finish are possible within microns. Furthermore, using this machine also saves on costs and increases efficiency as it can give consistent results, provided RPM and pressure parameters are inputted correctly."

Optimization conditions

Although grinding and finishing processes are known, there is a huge scope for optimizing these processes. On the basis of the input condition and required finish, the grinding process sequence is carefully selected. The grinding and finishing parameters are also important so as to achieve the end result at minimum cost. The type of abrasive belt used is a very important factor too. The structured and high tech abrasive belts can give the guaranteed results and consistency. Apart from the theoretical calculations, a lot of careful experimentation is needed to arrive at the optimum grinding process. MMI

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Radar-based Collision Protection Moves Closer to the Shop Floor

Machine tool crashes can destroy the tool and damage the machine as well as, in certain circumstances, expensive workpieces. To overcome this issue, German researchers are using radar to recognize imminent collisions. This is an overview of the new concept to detect errors effectively.

Collisions due to operating error are among the prevailing causes of breakdown in standard processing centers. Due to mechanical overload after a collision between an already clamped tool and workpiece or other machine parts, components such as the tool clamping system, the main spindle bearing or even all the handling systems can be damaged. The result is high costs for downtimes, repair and restarts, with possible follow-on costs from reject production and damage claims. The firm Ott-Jakob Spanntechnik, in collaboration with the department for high frequency technology at Munich Technical University, is currently developing a sensor system intended to quickly recognize the risk of collision during machine set-up and avoid it by switching off drives.

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Miniature semiconductor heralds breakthrough

One of the major challenges here results from the energetic dynamics and the high rapid motion speeds such as those encountered in modern processing centers. In this case, a method is used that has for decades guaranteed safety in air and shipping traffic, namely the recognition and locating of target objects with the help of radar technology.

As a result of the breathtaking progress in semiconductor technology, radar systems are no longer only hall-covering sites with huge rotating antennas. With the highly integrated, high-frequency electronics available today, radar sensors can also be created significantly more compactly and cheaply. Subsequently, they have already been standard equipment in cars now for years and occupy many fields of application as miniaturized motion detectors.

Source: GMN Paul Müller

FIG 1: The damaged interior of a machine spindle after a collision of the tool with the workpiece

If it works for cars, why not machine tools?

This sweeping triumph of radar sensors inspired the specialists at Ott-Jakob Spanntechnik with the idea of incorporating into their motor spindles, the same technology that has long been preventing crashes in aircraft and cars. An especially favorable circumstance in the plan was the geographical proximity to Munich Technical University, where, in the department of high frequency technology, there is a research group whose work is constantly concerned with improving the capabilities of radar sensors.

It was there that a sensor concept, which aims to protect in future the tools in processing centers from geometric collisions, was developed. This kind of collision includes all crashes between the tool spindle and other machine parts during positioning.

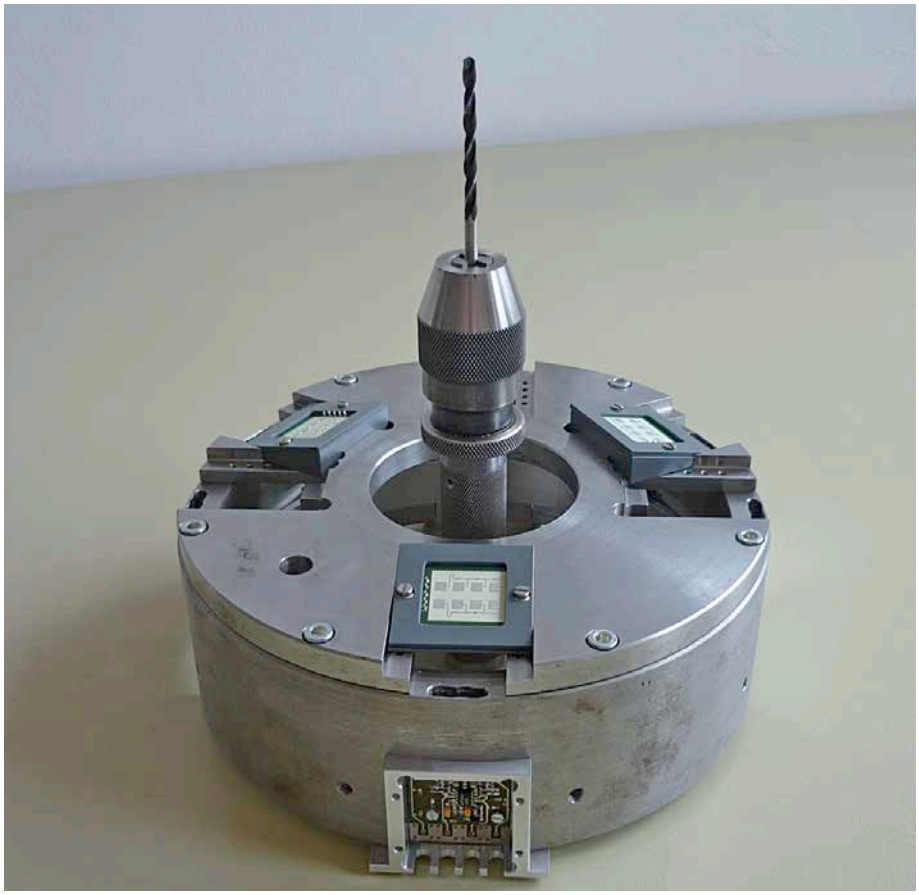
Fencing in the spindle to protect from crashes

The idea is to set up an invisible encircling protective fence of several small radar

modules around the tool. Fig 2 shows a laboratory construction that is used for measurements and series of experiments. It consists of a holder that accommodates the radar modules and the pertinent amplifiers for signal conditioning. The radar module is of a size that will later also be suitable for incorporation into the motor spindles at Ott-Jakob.

The special factor here is that the radar sensors involved are of very simple construction and can thus be purchased at low cost. They require no large transmission power and need not produce short impulses as, for example, in weather radar. As only objects in motion are to be detected, it is quite sufficient if the modules send out a continuous signal. A modulator, which would make the system much more complicated and more expensive, is not required.

The radar principle that applies is very closely related to the measurement principle in radar equipment used for detecting road speed infringements. When the electromagnetic waves sent out from the radar are reflected back to the unit by a moving obstacle, the frequency of the received signal is changed as a result of the relative motion. This is known as the Doppler effect, which also occurs with sound waves. Through this frequency change it is possible to tell whether the object is moving away from or towards the radar. But there is more: if one measures this frequency change with spectral analysis procedures such as Fourier transformations, it is also possible to calculate the relative speed of the object.

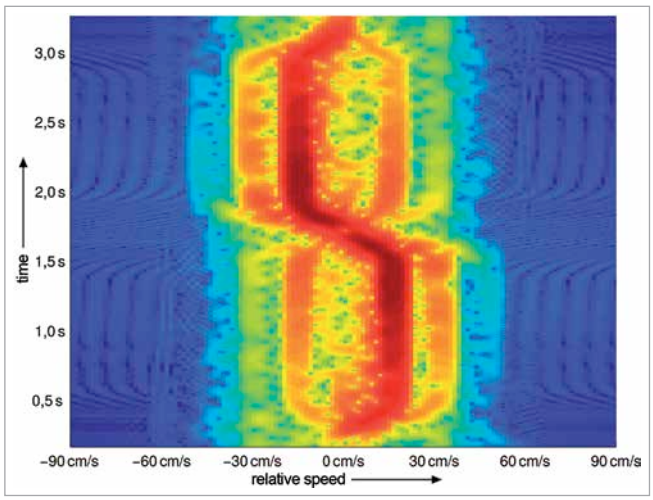


Source: TU Munich

FIG 2: This clamping system with mounted radar sensors recognizes the crash danger and stops the drives before the collision

Color signal provides visualization of collision danger

This relative speed already offers plenty of information about the target object, particularly if the object is observed not only by one sensor, but by a number of sensors around the tool. The chronological pattern of frequency change can be represented in so-called spectrograms. These represent in color code the results of the Fourier analysis of a short excerpt from the signal and the analysis window is permanently updated. One thus receives, thanks to the calculating power of today's field-programmable gate array (FPGA) building blocks, a precise millisecond-by-millisecond picture of the spectral composition of the received signal and thus of all objects in the monitoring field of the radar. The image above shows such a spectrogram, recorded during experiments with a test machine at the PTW Institute in Darmstadt, Germany. Here the motor spindle initially moves towards the obstacle and then draws away from it. These two motion phases are recognizable by the high amplitude (red) at a certain frequency. The moment of motion reversal can also be pinned down very precisely. As individual sensors in the radar ring are not lone warriors but collect and compare centrally information and observations, the observed objects can be followed through the area, even though none of the sensors ever carry out a distance measurement. It is enough to know that target objects cannot move completely arbitrarily, but only according to the laws of physics. The whole is thus more than the sum of its parts, and the sensors together recognize when the tool is too close to an obstacle.



Source: TU Munich

FIG 3: The chronological pattern of frequency change in the received signal is represented by this color-coded spectrogram

The research project will continue to make the signal processing ever more reliable and accurate with experiments on real machines. The chances are therefore rising that such "intelligent" miniature radar systems will in the near future help prevent expensive damage to processing centres, which can occur from lack of attention or a careless error. By eliminating the costs of lost production and follow-on expenditures, even avoiding one collision could allow such a system to pay for itself. MMI

Measuring Tools Accurately

5 BENEFITS

Tools are required to be precisely measured at the time of positioning into the CNC machine. Here, a small investment like a tool setter comes in handy. It can help businesses increase efficiency and the output. Listed below are some of the benefits that the tool setter has to offer.

A tool setter performs various functions such as measuring tool off-set, tool wear updation and tool breakage detection, bringing enormous efficiency in the process of manufacturing. Following are some of the benefits that a tool setter offers.

Source: Metrol Corporation India

A tool setter detecting the position of the cutting edge of a tool in a CNC machine

Source: Metrol Corporation India

1 Minimize Manual Intervention

The conventional method of measuring the tool offset and entering the value into the machine controller could cause errors in reading or updating, leading to unnecessary rejection of component/s. With a tool setter installed on the machining center, the same process is automatically updated. Moreover, it nullifies any manual/operator errors.

2 Reduction in Setting Time

Usually the time taken for manual tool height measure-ment on machine or if done externally on tool pre-setter will take around 1~3 minutes. However, it takes even less than a minute with the tool setter for the same job. Also, an additional advantage is that the value is directly updated into the controller. With this, the tool setter turns out to be a time saving device for the organization.

3 Accuracy of the Component

Due to auto-tool measuring and subsequent updating of the real-time wear and compensated thermal expansion of the machine Axis, the accuracy of the component will always be maintained within the tolerance.

4 Reduction in Rejection

Due to timely tool breakage detection, further damage to other tools or to the component is avoided. This results in reduction in the rejection rate.

5 Value addition to the Machine

Even in an economical machine, the Thermal expansion of the axis can be compensated using Tool setters. Due to all the points mentioned above, even a semi-skilled/un-skilled CNC operator can operate the machine without much effort. This proves to be a cost-efficient feature as it saves a fair amount of money over a period of time.

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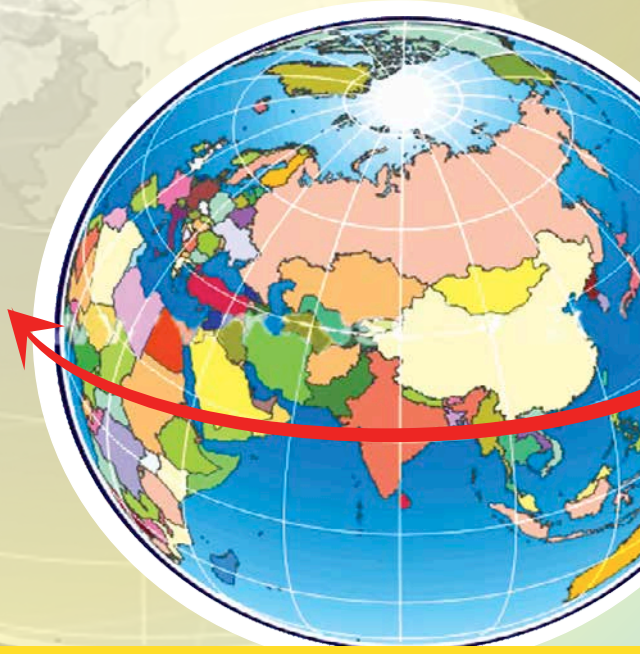

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Energy Efficient Motors and Drive Controls

Today, energy efficiency is need of the hour. The manufacturing sector can achieve this to a great extent just by choosing the right devices. Read more about how one can go eco-friendly with energy efficient drives and motors.

Energy efficiency has become the foremost mandate in boardrooms across all industrial segments. The basic facts are well known – industry accounts for close to 50 per cent of the world's power usage and electric motors account for more than two-thirds of the power consumption. Electric motors are extensively employed not just in the industrial sector, but also across all major sectors such as agriculture and commercial. They are deployed in a wide variety of equipment from pumps, fans, compressors to large kilns, extruders and crushers.

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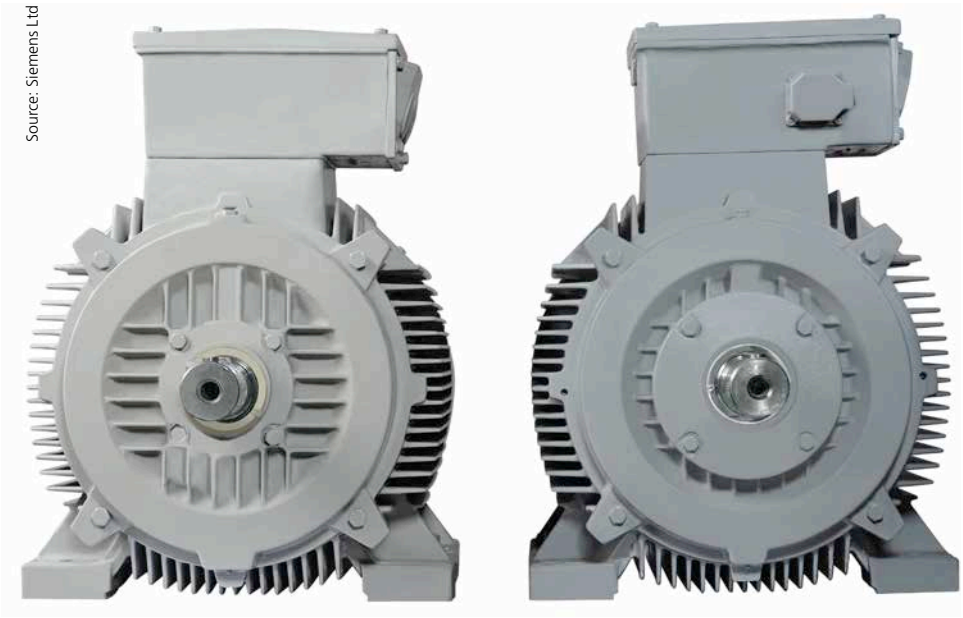
Experts believe that while appropriate measures and standards are being implemented to improve industrial energy efficiency, the next phase of energy conservation should come from the efforts of individual companies. Manufacturers today, are developing energy efficient equipment or technology that optimizes the energy consumption of the driven equipment, in order to generate energy savings. By deploying energy efficient electric motors alone, they can potentially reduce energy consumption up to 70 per cent. This is one of the first steps to initiating a systematic approach towards energy management that can lead to cost savings as well as ensuring sustainable energy efficiency.



Source: Siemens Ltd

Siemens Champion conforming to IE2 & IE 3 energy efficiency classes

New Indian standards for energy efficient induction motors

Though efficiency standards are primarily set and driven mainly by International Electrotechnical Commission (IEC) and NEMA, in India the standards are revised so as to bring it in line with IEC. The IEC has introduced newer efficiency standards superseding the earlier EFF 1 / EFF 2 efficiency classifications. The latest efficiency norms as mentioned in IS 12615:2011 are IE2 & IE3, in which IE2 corresponds to the earlier EFF-1 or high efficiency and IE3 corresponds to Premium efficiency, a new range specifying higher efficiency values. It is important to note here that the IE1 efficiency class is not recommended today as the efficiencies fall below the minimum values that the Indian standard permits. Consequently IE2 is the minimum permissible efficiency norm. The standard also specifies the minimum permissible efficiency norm under the scope shall be IE3 effective Jan 31, 2014.

So, clearly the onus is on the manufacturers to manufacture motors that are compliant to the new standard IS 12615:2011.

The new standard also specifies an accurate measurement of the stray load losses, which was earlier assumed as 0.5 per cent of output power, thereby accounting for the difference in the declared name plate efficiency and the actual operational efficiency. For accurate measurement

Source: Siemens Ltd

IE3 motors for a sustainable future

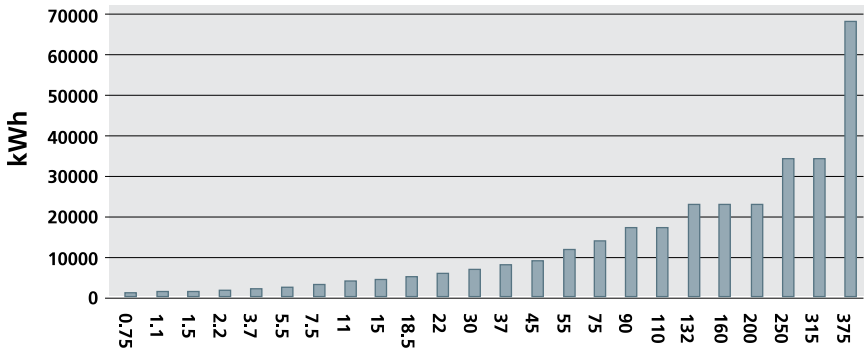


FIG 1

Source: Siemens Ltd

purposes, manufacturers must have the facilities to test their motors as per the latest regulations, prior to certifying their machines as IE compliant.

The government has also shown the way under the Energy Conservation Act 2001; whereby it is mandatory for all energy intensive industries to reduce their Specific Energy Consumption (SEC).

Energy savings by IE motors

IE efficiency class motors, as compared to the non-IE motors, offer substantial savings in energy. When IE3 motors are used in place of standard efficiency (IE1) motors the result is 5 - 10 per cent of savings depending on the frame sizes.

For example if a 75 kW, 4 Pole IE3 motor is used instead of IE1 motor at 85 per cent full load for 8000 hrs, the total savings from a single motor for a period of one year will be about 13,600 kWH. This is further substantiated in fig 1.

As of now IE3 is the highest efficiency class prevalent among the countries adopting IEC standards. In India, if all new motors manufactured were in the IE3 efficiency category, the country could save more than 5 billion kWh of energy in just one year. This is equivalent to energy produced by a 600 MW power plant. The energy saved without actual generation can help reduce 4 million tons of CO_2 emissions per annum and our dependency on fossil fuels. This also leads to energy saving without actual generation thereby reducing investments of about ₹3,500 crore.

More energy saving through drive controls

The electrical drive is key to reducing energy consumption, as it acts as a link in the conversion of electric power to mechanical energy. Traditional drive controls only recognize 'on' or 'off' states, resulting in maximum output power that is controlled by mechanical actuators leading to energy losses wastage. A more energy efficient approach is controlling rotating speeds of the electric motors through variable speed drives (also known as Variable Frequency Drives / VFDs) and thereby controlling the output power. Running the motors at optimized speeds not only reduces energy consumption but also extends the life of the electric motors. In certain applications, the deployment of VFDs to control rotating speeds can result in up to 70 per cent power savings.

Conclusion

India's energy intensive manufacturing sector presents an enormous opportunity for energy saving through upgraded technology and equipment based on the latest relevant standards. Energy-efficient motors can deliver a number of benefits apart from energy savings such as higher reliability & uptime and reduced CO_2 emissions.

Rising energy costs is the main influencing factor for the industry to adopt energy efficient technology. As the industry gradually replaces the inefficient electric motors and equipment manufacturers deploy better solutions based on variable speed drives, the demand for high efficiency motors and drives will definitely see an increase. MMI

A Power Packed Performance

Frequent power fluctuations can lead to various problems and losses. This is specially true in the case of steel mills, which require constant power supply in order to keep it's furnaces running. Madhav Alloy was facing a similar situation at one of its plant. Here is how Eaton offered a perfect UPS to resolve the company's problem.

Madhav Alloy is one of the leading manufacturers in secondary steel market in North India, with a turnover of ₹700 crore. The group's name is synonymous with distinct quality and enhanced customer satisfaction. Established in the year 2002, it has been progressing at a fast pace and has created a unique differentiation in the steel sector. The group also manufactures and supplies various industrial products like mild steel angles and mild steel beams. Madhav Udyog Pvt Ltd and Madhav Alloy Pvt Ltd are companies within the Madhav Group.

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Challenge

One of the plants of the company continuously faced unscheduled and untimely power failures and tripping for variable periods of time. These unannounced power failures negatively impact the engineering industry. Many furnace units have been forced to close down their production activities, which directly hit the price structure of the iron and steel products used as basic raw material in the engineering industry. In such a dire power supply scenario, there are significant losses in the form of downtime, man-hours lost, productivity, process break ups and monetary losses in the manufacturing processes. Apart from power losses there are frequent power incidents. A power incident can be a power failure, power tripping, power sag, power surge to under voltage, over voltage and onwards to switching transients, line noise, frequency variation and harmonic distortion. These power incidents can also lead to material wastage and productivity loss leading to a loss of business and reputation.

Madhav Alloy Pvt Ltd

Challenges

- Unscheduled and untimely power failures
- Significant losses in the form of downtime, man-hours lost, productivity, process break ups due to power failure
- Monetary losses due to power failure

Solution

Eaton's 9395 UPS

Results

- Continuous power supply
- Reduction in energy costs

Source: Madhav Alloy Pvt Ltd

Typical casting of molten iron at a steel plant

Intrinsic challenges

Steel manufacturing units like Madhav Alloy utilize a critical process called 'continuous casting' to manufacture TMT bars etc.

"Madhav Alloy was looking for a smooth process flow through power continuity, with minimum downtime and qualitative power, to minimize losses and improve productivity. To resolve this problem, Eaton offered its Power Xpert 9395 UPS, which delivers among others the highest reliability and availability with hot sync paralleling."

Sales Director, Electrical Sector, South Asia, Eaton, Sushil Virmani

Continuous casting, also called strand casting, is the process whereby molten metal is given shape and solidified into a 'semi finished' billet, bloom or slab for subsequent rolling in the finishing mills. It allows lower-cost production of metal sections with better quality, due to the inherently lower costs of continuous, standardized production of a product, as well as providing increased control over the process through automation. The continuous casting machine (CCM) is installed in the induction furnace project.

It is extremely critical for the company to keep the CCM running during the tripping caused due to intermittent power failures. A continuous and conditioned power backup is required for the CCM, so that there are no process breakages, which result in man-hours loss, productivity loss and material loss; and whereby the entire process has to be restarted.

A CCM machine needs a lot of motors to keep it in a continuous running mode. During power tripping, even if one motor trips, the whole process breaks, entailing huge losses for the company.

Therefore, during steel manufacturing, steel units spend a lot of money to set up overhead water tanks. These are used in induction furnaces for a continuous supply of cooling water, to keep motors running smoothly, for at least 30 minutes despite power supply failures.

Managing Director, Madhav Alloy, Munish Goyal says, "Our plants run on full capacity approx 500 TPD. We needed a power quality solution, which could help us to cope with a largely unpredictable power tripping situation. The downtime translated into enormous productivity and monetary losses due to process breakage in the CCM machine functioning. Continuous and quality power was really vital for the company."

Requirement

Madhav Alloy decided to look for an efficient, cost effective UPS with over 90 per cent availability and which could prevent the massive production losses due to daily power failures and tripping.

"A genset solution coupled with utility power was not viable for the highly frequent power tripping that we face in our city," said Goyal. "We needed a unique solution which could tide over the time lag during power tripping – from utility power supply to UPS; and from UPS to DG set, without stopping any motor from tripping," Goyal added.

When the company started the sourcing process for a UPS suitable to their unique requirements, Eaton was one of the front runners in the process. The customer was looking for a smooth process flow through power continuity, with minimum downtime and qualitative power, to minimize losses and improve productivity.

Solution

To resolve this problem, Eaton offered its Power Xpert 9395 UPS, which delivers the highest reliability and availability with hot sync paralleling, superior battery management, inherent redundancy and a scalable architecture that adapts to increasing power requirements.

The company evaluated these UPS systems on various parameters of price, product, performance, past experience, track record, service support and overall organizational capability. After careful evaluation, Madhav Alloy decided to go for Eaton's 9395 UPS with one 550 kVA unit initially. "We were impressed with the 9395's features like Energy Saver System (ESS), its efficiency and modular solution," averred Goyal.

The 9395's ESS dramatically increases UPS efficiency without sacrificing protection, all the while reducing energy costs. ESS technology enables the UPS efficiency to reach an impressive 99 per cent.

Eaton performed a power audit and load study of the customer's facility before suggesting the appropriate power solution.

The 9395 550 kVA UPS is now powering Madhav Alloy's machines at Patiala. The UPS has also helped Madhav Alloy eliminate the necessity of creating a huge overhead water tank for cooling its components and processes, which has resulted in good savings for the company. As the UPS ensures power supply is always available, the cooling process is therefore continuous.

"We needed a power quality solution, which could help us cope with a largely unpredictable power tripping situation. The UPS from Eaton has completely minimized our downtime, monetary and productivity losses and we feel absolutely vindicated in our decision to choose the UPS for our facility."

Managing Director, Madhav Alloy Pvt Ltd, Munish Goyal

Installation

The installation process was also smooth. Eaton's 9395 not only reduced installation time but also lowered costs with a small footprint and the flexibility to install up against walls, using top or bottom cable entry. Moreover, front-panel access for all services and operation increased serviceability and reduced repair time.

"We were happy with the fast and smooth installation completed in good time and with minimum disruption in our running operations," says Goyal.

Operation

Since installing the Eaton 9395, there have been frequent power tripping incidents. However, the company has managed to overcome them without any productivity or monetary losses. The UPS installed in its facility carries the machinery faultlessly.

"The UPS has completely minimized our downtime, monetary and productivity losses and we feel absolutely vindicated in our decision to choose it for our facility," according to Goyal. MMI

Developing Machines In-house

Total Productivity Management (TPM) leads to higher production, as proven by Munjal Showa Ltd. The company adopted TPM concepts along with lean practices and completely transformed its working environment. Read more on how the company developed new-generation machines adhering to these concepts in-house.

Munjal Showa is predominantly a manufacturer and supplier of shock absorbers for new-generation two-wheelers and four-wheelers, having many well-known customers in the country. A few years back, one of it's customer's, Maruti Suzuki India Ltd (MSIL), made it mandatory to comply with POCDSME parameters so as to retain 'A category' supplier status.

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The company was then advised to embark on a Total Productivity Management (TPM) implementation plan under the guidance of the Japan Institute of Productivity Management and CII under the stewardship of TPM guru, S Yamaguchi and Dr Sarita Nagpal. However, due to the high consultancy cost, a cluster of five companies was formed where this practice was to be learned and implemented. It was further decided that Yamaguchi would conduct monthly learning sessions in one of the companies.

During one of his early visits, Yamaguchi sugggested Munjal Showa change its machines – advice the company took seriously and which led to its transformation. This transformation happened in four phases. The aim was to replace large, high-cost, unreliable machines with lean machines which would result in zero accidents, zero defects, zero breakdowns, zero wastage and lower manufacturing costs.

Source: Munjal Showa

Lean machines yield manpower reductions, lower costs, higher productivity and fatigue reduction

Phase I: Rebuilding large and complicated machines

The company earlier had Japanese machines, one of which was posing quality problems and had also experienced several breakdowns. The company had already negotiated with HMT to re-condition the machine at its re-conditioning branch in Bangalore. However, on request of the TPM team, which was created soon after the training started, it was decided to recondition the machine in-house.

The company re-conditioned the machine in just 44 days and simultaneously converted it by using TPM concepts. Above all, it also proved the CP and CPK values, resulting in time and money savings. The company spent only ₹1.57 lakh instead of ₹19 lakh, which would have costed them otherwise. Also the team performed the job six-and-a-half months ahead of HMT's schedule!

For the re-conditioning job, the team dug up data for breakdowns, rejections, re-work, customer problems, accidents and

consumables for the last six months, analyzed each problem and resolved it. In the process, it did many Poka Yokes and kaizens for the elimination of quality and breakdown problems as well as kaizens for safety, energy and savings of consumables. With this, a large, complicated machine was converted into a small, simple one.

Phase II: Manufacture of new machines by using lean concepts

Apart from re-conditioning the machine, the team also had to manufacture a new machine for the company. It had placed an order with Widia India Ltd for a special purpose machine (SPM), which was needed for making shock absorbers for a new Honda car model. Widia quoted a cost of ₹14 lakh and delivery in five months. Since, the company had to deliver the first sample lot within a month's time, time was of essence. Hence, it decided to build the machine in-house. Japanese collaborators (the company has a Japanese Joint Managing Director and two Japanese technical advisors) argued that it was a challenging task as the company did not have a designing package like ProEngineers or AutoCad.

Nevertheless, the team built a new machine in 14 days by using material from un-used machines and one hydraulic cylinder, which was purchased for ₹7,000. The machine was appreciated by both the Indian management as well as Japanese collaborators.

Phase III: Manufacture of new machines using low cost automation

With customers imposing stringent quality requirements, the company realized that it would have to supply only quality products. The production system would have to be 'fail safe' (PokaYoke) at all stages. That means the machine's intelligence level had to be the same as human intelligence. This terminology is described as the Jido ka System in lean manufacturing. Many sensors and electronic products now available in India can help achieve this. Using those products an easily help carry out mistake-proofing in critical operations and achieve the target of implementing low-cost automation (LCA), where the payback period is less than one year.

The concept of LCA is used for many things but India needs it mainly for quality. However, the concept also yields advantages like manpower reduction, productivity improvement, reduced costs and fatigue reduction.

Phase IV: Manufacture of CNC machines using low cost automation, TPM and lean concepts

Having obtained good results with in-house manufacturing and re-conditioning of machines, the company further manufactured 356 new machines and re-built another 121 machines, making for a total of 477 machines. As a result, there was a one-time saving of 80-85 per cent on capital investment and a recurring saving due to lower manufacturing costs.

This is a good way to beat the competitors especially in the case of a company's expansion plans. MMI

Developing 'Helicopter Skills Centric 360° Training Model'

Training and skills development is an essential part of any organization. It helps employees grow and thus leads towards growth of the organization as well. Here is a look at the 'Helicopter skills centric 360° Training Model' that can turn employees into complete professionals.

Most successful organizations in the world have a strong back-up of training and re-training. A learning ambience is necessary for organizations to remain competitive at all times and nurture and retain talent. The value-vision domain on which businesses expand globally and survive for centuries has a strong bearing on mindset, attitude, training and learning of people working there.

Besides 360° training requirements for individuals to make them complete professionals, corporate sector organizations also have to consider their own requirements of brand image, growth with stability and long term sustenance in the business environment. Hence, training should be used as a prime-mover of their own 360° domain of the above mentioned concerns. Training philosophy of corporate entities should enable them to integrate both the strategic requirements of the organization as well as the individual needs of holistic development, while arriving at the competency development matrix of the organization.

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Corporate training policy

Training has been accepted as an essential part of corporate strategic intervention. It has been well recognized that training is the highest multiplier of productivity of individuals as well as organizations. It has also been understood that training is an investment and not expenditure.

Training should be an integral activity of any business to achieve the goal of transforming the entity into a learning organization of distinction, to be competitive at all times, and nurture and retain talent.

Its focus should be on development of core competencies, commercial acumen and regular reorientation of attitudes involving one and all, in developing a work-culture that fosters individual growth, team spirit and creativity, besides customer centric elegance of 'caring and sharing'.

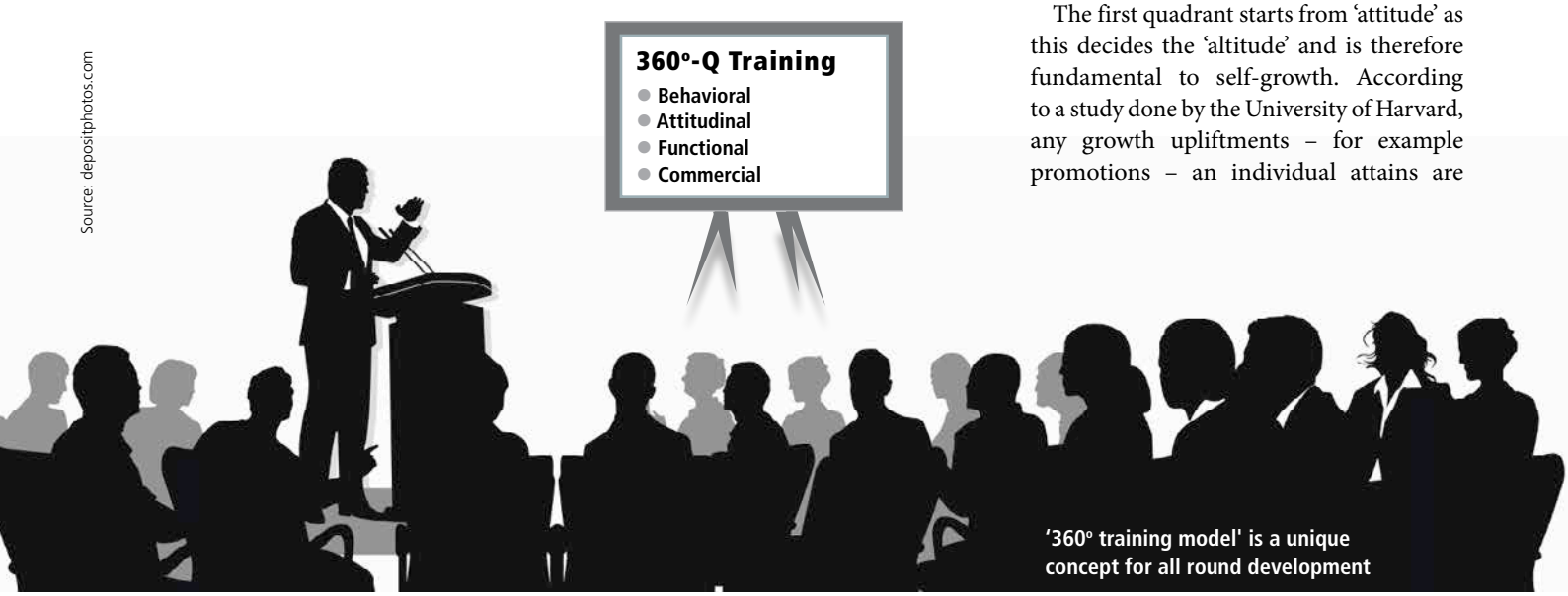
From the viewpoint of development, growth and long term sustenance of organization, training can prove to be a prime-mover of business, organizational culture, performance enhancer and ethics. This would help the organization inculcate business values such as customer orientation, negotiating skills, etc. Also, emphasis on ethics will bring human value in corporate culture and sensitivity towards stakeholders.

Training philosophy-360 degree training

A '360-degree training model' circumscribing attitudinal, behavioral, functional and commercial competencies, is a unique concept for all round development of an individual in to a perfect professional.

The first quadrant starts from 'attitude' as this decides the 'altitude' and is therefore fundamental to self-growth. According to a study done by the University of Harvard, any growth upliftments – for example promotions – an individual attains are

Source: depositphotos.com



'360° training model' is a unique concept for all round development

85 per cent of the time a result of his/her attitude. The remaining 15 per cent is made up of qualifications, other competencies, connections and sometimes, just luck.

While cumulative self-growth is essentially also organizational growth, the vice-versa may not hold true. Therefore, growth of individuals must be emphasized in organizations where their behavioral dimensions are addressed in the second quadrant. As attitude is internal and behavior is external, professionals have to be polished like diamonds for them to be able to standout in the business arena.

The functional discipline chosen by an individual, be it hard core engineering, technology, finance, legal, contracts, marketing, etc. is attended to for reinforcement in the third quadrant, that is, to upgrade a professional with the latest developments in the field. In the globally competitive arena, each and every professional needs to have a commercial orientation and an understanding of the business, of which he/she is a part and therefore these aspects are covered in the forth quadrant.

This can be illustrated by the example of a HT Jointer - we do not forget to tell him how much revenue would be lost by just an hour's delay in his jointing process. Such involving brings awareness on the commercial importance of his job and connects his self-esteem to the organizational pride.

Helicopter skills

According to a MIT executive report on innovation, 80 per cent of all innovations are made by people working outside of the discipline for which they are trained. Therefore, not only is it important to be trained in one's area of expertise, but also to occasionally have a bird's eye view of the other functions prevalent in the organization.

There are two aspects to knowledge - depth and breadth. The deeper one goes and learns, an invention is possible once in a while. Breadth of knowledge on the other hand has the capacity to funnel down ideas from all lateral sides. This could result in spirals of innovations which are more relevant in the business context. The best example of this is the Six Sigma – a concept innovated not by a quality engineer but a communications engineer. Cross-functional teams can bring in more innovative ideas than the specialized teams. Similarly on a lighter note, it is an urban myth that NASA spent millions of dollars trying to develop a pen that worked in space while the Russians simply used a pencil.

Behavioral

- Teamwork
- Networking
- Innovation and creativity
- Employee motivation and morale development
- Customer satisfaction, communication and outreach
- Planning & organizing
- Systems orientation
- Communication skills
- Customer orientation
- Sensitivity / Empathy
- Persuasiveness

Attitudinal

- Resilience
- Goal setting
- Decisiveness
- Result orientation
- Initiative and drive
- Driving change
- Self confidence
- Self management
- Proactive involvement and ownership
- Passion for excellence
- Self managing leadership
- Flexibility and adaptability
- Value centric leadership
- Emotional intelligence
- Developing people

Helicopter Skills

- Power distribution for all
- Electrical for non-electricals
- Technical for non-technical
- Legal for non-legal
- Commercial for non-commercial
- Finance for non-finance
- HR for non-HR
- Customer orientation for back-end executives

Functional

- GIS-supported network planning
- Analysis and asset management
- Advanced engineering and management of power distribution systems
- Performance benchmarking and quality of supply and service
- Best practices in distribution system O&M
- Problem solving and root cause analysis
- Regulation of distribution businesses
- Balanced score card system
- Knowledge management
- Six Sigma programs
- Rational thinking
- Analytical skills

Commercial

- Cost of poor quality
- Best practices in distribution loss reduction
- Advanced courses on financial management for power utilities
- Distribution business management and IT-based solutions
- Distribution, efficiency and demand side management (DSM)
- Financial management of distribution business
- Negotiating skills

Source: Dr B S K Naidu

'Helicopter skills' programs should be preferred once a quarter in the shape of:

- Finance for non-finance
- Technical for non-technical
- Electrical for non-electricals
- Commercial for non-commercial
- HR for non-HR
- Legal for non-legal

The helicopter skills centric 360-degree training philosophy enables organizations to develop complete professionals with a pragmatic outlook and with a unique characteristic of 'Jack of all trades, master of some'. This is what is required in today's context of multi-disciplinary, multi-tasking, fast diversification and high growth scenarios.

Conclusion

Everybody from the grass-root to the apex management level of the organization needs to be trained and retrained to sustain competition at all times. Learning is a continual process, which has no boundaries. This is the guiding philosophy, which drives one to deliver ever improving training programs, leading to development of individuals as well as the organization hand in hand. 'Helicopter skills centric 360-degree training model' has been successfully implemented as an experiment in many corporate businesses to transform the entity into a learning organization of distinction and to be competitive at all times especially in the face of huge expansion plans. MMI

Note: Conepts based on Dr B S K Naidu - 2008

Leaving Footprints on the Global Map

EMO Hannover plays the role of an instrumental platform for manufacturers and users from across the globe to market, form alliances, and purchase the latest offerings in the sector. Here's what some of the Indian exhibitors had to say about showcasing products here, the mutual benefits the event offers and getting India on the map for being at par with global competitors.

EMO Hannover has always been one of the biggest global trade fairs for the metalworking sector; truly 'international' in every sense of the word. Bringing together a plethora of innovation, technology and an ideal platform for forging alliances, it remains to be seen how many more manufacturers and users the show will benefit. Taking advantage of this platform, this year India is all set to change minds on the country's manufacturing capabilities.

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Innovative solutions

A known fact is that 60 per cent of exhibitors at the show are from outside of Germany; it is no wonder that machine manufacturers choose this show to display their innovations and launch new products. India will be no exception this year around. The country is all set to show the world that it is not just a bulk manufacturing destination or a high-skill low-cost labor hub- innovative solutions and high-end customization can also be found here. And it is time for this aspect of the country to be highlighted.

Micromatic Grinding Technologies Ltd has joined hands with Grind Master Machines Pvt Ltd to not only address a need gap but also showcase innovation and cost-effectiveness in manufacturing technology. The innovative solution, the Grinding–Microfinishing Cell, is an integrated turnkey solution for performing critical operations on the gear pump shafts, a very common part in all types of hydraulic pumps.

Chairman and Managing Director, Micromatic Grinding Technologies Ltd, N K Dhand averred, "Traditionally, the process would require five machines—two machines for the grinding operations, one for deburring and two for superfinishing operations. Also, normally component manufacturers would buy machines and automation from different OEMs and

India is all set to change minds on the country's manufacturing capabilities at EMO 2013

automation suppliers. This cell now uses only one grinding machine, one special purpose machine – model: SMP300-3S-GearPump, and a robot, bringing down the total machines used to two."

Speaking about the innovative solution, Director, Grind Master Machines Pvt Ltd, Milind Kelkar added, "As this machine is integrated with the grinding machine, a 'completely automated' feature has been brought about. The part is picked up by a robot and loaded into the grinding machine. After the grinding process, it is unloaded by the robot and loaded into the deburring and superfinishing machine. Furthermore, unloading from the superfinishing machine is also automatic."

Dhand continued, "The advantages of such an integrated solution to the users will be in terms of overall reduction in space, man-power, energy, maintenance, spares and service, life-cycle cost (LCC), inventory, etc."

Even though the solution is built for gear pump shafts, the manufacturers believe that the concept can be deployed across a range of other industrial components that require grinding-finishing, including transmission shafts, main shaft, synchrocones, turbo charger shafts, camshafts, crankshafts, etc.

Another company, Spectra Tools, has developed an innovative Unicart Holding System that has an international patent. They, too, will be displaying this product at EMO. "It is a unique cartridge that can be used for all the metal cutting operations like milling, boring, reaming and modular holding. We are hoping to be able to get feedback and global business opportunities," expressed Proprietor, Spectra Tools, Vijay Kumar Mada.

"The Indian machine tool industry needs to catch up quickly since its share in domestic production is below 40% and exports are negligible. Hence, both from the point of sourcing new technologies & making important new business contacts, EMO Hannover is beneficial."

Chairman and Managing Director, Micromatic Grinding Technologies Ltd & Past President, IMTMA, NK Dhand

"EMO Hannover is not a buy and sell show. Yes, deals are made here, but it is more than that. Indian companies can make their presence known, which will help strengthen the 'Made-in-India' brand."

Corporate Strategy Advisor, Management and Manufacturing Technology, Sheths' & Past President, IMTMA, Shailesh Sheth

Brand equity

The show, host to plethora of innovation and technological solutions, is also a good place to increase awareness for a company's brand, as anybody who is anybody will be present. Even though the event is set in Germany, it attracts exhibitors and visitors from across 39 countries globally. Corporate Strategy Advisor, Management and Manufacturing Technology, Sheths' & Past President, IMTMA, Shailesh Sheth averred, "EMO Hannover is not a buy and sell show. Yes, deals are made here, but it is more than that. The 'Made in India' brand needs to be strengthened. If India wants to be taken seriously, she needs to prove that she is significant to the industry. Being present at the show will be step one in that process. If the European zone perceives India as competent, more bonds will be formed that will increase Indo-Europe trade."

"Even though EMO Hannover is set in Germany, the show gives companies global visibility, and provides a unique platform for developing contacts world over. In our personal experience, it was through this show that we were able to establish relationships in Brazil."

CEO, Micromatic Machine Tools Pvt Ltd, TK Ramesh

"Each country as a market has certain specific expectations in requirements. Associating with international companies allows us to understand the local market and its requirements better."

Managing Director, Ace Manufacturing Systems Ltd, P Ramdas

Speaking along the same lines, Director-Sales and Marketing, CAMWorks, Geometric Ltd, Nishant Saini asserted, "The main aim to attend this show is for brand recognition. Being a global show, this medium is ideal for increasing brand equity. Making the right impression with users and potential customers can go a long way in the success of a business."

Further agreeing with this sentiment, Director, Trucut Precision Tools Pvt Ltd, Zuzer T Lokat also iterated, "EMO is the platform for anyone in the quality machine tools and metal working industry to enter and make their presence felt in the developed market."

Benefits of the show

For any company it is important to have their presence felt at events that give them access to a global market. Trade fairs like EMO Hannover are an ideal platform to achieve this. Establishing alliances with channel partners, knowledge sharing and seeing what's best in the market are some of the other benefits of attending the event. Stressing on the benefits of German trade fairs, Saini expressed, "It is well-known that Germany is the hub for advanced engineering. Being present at German trade fairs, gives exhibitors and visitors a chance to understand the latest technology offerings, provides opportunities to network and knowledge share and identify where the machine tool market is headed."

As far as exhibitors from India are concerned, showcasing machine tools and complementary services at international trade fairs such as EMO serve three major purposes. First, the creation of a positive impression of opportunities available in

"Trade fairs such as EMO Hannover provide Indian machine tool builders with the opportunity to educate vendors and users about the growth prospects and benefits hidden in the alliance."

Senior Vice President – Global Marketing, Bharat Fritz Werner Ltd, Syed Amjed

"Looking at the current sluggish growth in the manufacturing sector, we believe that such partnerships are very important in this climate. As far as our company is concerned, we are looking at markets in East European countries, Middle East and Africa."

Director, Grind Master Machines Pvt Ltd, Milind Kelkar

India. Second, forging alliances with world-class vendors and users. And third, learning—EMO is held on an extremely large scale, displaying in abundance practical demonstration of latest solutions.

Senior Vice President – Global Marketing, Bharat Fritz Werner Ltd, Syed Amjed said, "Owing to comparatively modest volumes and low international awareness about Indian companies, machine tool builders in the subcontinent often end up paying much more than their counterparts elsewhere, rendering Indian products costlier to manufacture. Trade fairs such as these provide Indian machine tool builders with the opportunity to educate vendors and users about the growth prospects and benefits hidden in the alliance. Furthermore, many of the solutions seen at the show are immensely important to Indian machine tool builders for saving time and money and providing greater value to the customer."

Leveraging opportunities

Leveraging on all possible opportunities the show has to offer is important. Managing Director, Pragati Automation, Atul Bhirangi, spoke on the various reasons it chose EMO to showcase its product range. He stated, "EMO is the largest and best machine tool show with participants from all over the world showcasing their latest innovations, products and services. It also has the highest business visitor turnover. Therefore, by exhibiting here our products get good exposure." Pragati makes hi-tech machine tool accessories like tool turrets and automatic tool changers and has been participating in EMO since 1991. Bhirangi further adds, "Participation in EMO has helped us establish a good customer base in Europe with some of the big names in the industry in our customer portfolio." The company exports 50 per cent of its turnover, 60 per cent of which is to European countries with Germany topping the list.

Director, Chennai Metco Pvt Ltd, C Renganathan also expressed similar sentiments with regards to the show. He averred, "We believe participation here is a conduit to the global market. Particularly, we benefit by meeting our dealers from around the world. It is a convenient forum for us to interact. Our presence in such a prestigious fair adds to our credibility. Our participation also takes many of our engineers to EMO and offers a valuable updating opportunity."

Importance of forming partnerships

It is imperative that a positive impression about opportunities in India be created. Apart from countries from the West, the event exhibits a fair amount of products from Japan, Korea, Taiwan and China. Exhibitors from the Indian sub-continent, being few and far between, are easily forgotten. Therefore, forming alliances and partnerships is essential. "Each country as a market has certain specific expectations in requirement. Associating with international companies allows us to understand the local market and its requirements better. The association also strengthens the post-sales support mechanism that can be rendered to customers," affirmed Managing Director, Ace Manufacturing Systems Ltd, P Ramdas.

Further emphasizing the importance of forming alliances, Saini stated, "Time to market is an important aspect for any company to be successful. Establishing partnerships help companies accelerate the process vis-á-vis developing it in-house. EMO is a great place to identify potential partners. The show also provides an opportunity to have a better understanding of gaps in the global market in order to validate one's strategies and recalibrate the growth plans."

However, just forming alliances is not enough. Amjed stated, "Mere possession of an international tag does not make a company good or bad. Several splendid companies exist in India and there must be many companies overseas which are yet to reach the mark. Partnering or not partnering with an international company depends upon the policy, vision, capability and growth plan of individual companies."

Why India is a good market

Alliances and partnerships are necessary

"EMO Hannover being a global show, the medium is ideal to increase brand equity and recognition. Making the right impression with users and potential customers can go a long way in the success of a business."

Director - Sales and Marketing, CAMWorks, Geometric Ltd, Nishant Saini

"EMO is the largest and best machine tool show with participants from all over the world showcasing their latest innovations, products and services. It also has the highest business visitor turnover. Therefore, by exhibiting here our products get good exposure."

Managing Director, Pragati Automation, Atul Bhirangi

"EMO is the perfect platform for anyone in the quality machine tools and metal working industry to enter and make their presence felt in the developed market."

Director, Trucut Precision Tools Pvt Ltd, Zuzer T Lokat

"VDW's initiative of 'EMO focus in India' is being done at the right time. Companies can have partners in India where they can source components and good quality products, and at the same time can have a market for direct sales of their products in India."

Proprietor, Spectra Tools, Vijay Kumar Mada

for global success. The German Machine Tool Builders' Association (VDW), organizer of EMO Hannover, sees the potential of investing in the Indian market and is all set to feature a seminar titled 'Focus on India'. This is an affirmation of the global interest in the country's capability. The half-day seminar on India is designed to inform international visitors to the EMO from the machinery and plant engineering sector, plus exhibitors who want to expand their operations in the country, on the special characteristics of this market. During the seminar, experts will highlight the current economic situation, especially focusing on aspects of law, taxes and financing. The seminar will be rounded off with best practice examples from experienced companies in the branch.

India needs machine tools worth more than €2 billion a year, and imports most of them, offering interesting business opportunities for the tooling industry. In the past five years alone, machine tool consumption has risen by almost 25 per cent. The potential for further growth remains high in the medium term. "There are many good reasons for the VDW to turn the spotlight on the Indian market at the EMO Hannover," says Chairman of the VDW, Martin Kapp.

Even with the current economic state Indian companies are positive that the next two to three years will show growth. Ramdas affirmed, "Investments on capital equipment especially machine tools have been minimal for the past 12 to 14 months. However, some signs of market revival are being observed now. If the trend continues then it is possible to see a growth of 10 to 15 per cent in the demands for machine tools in India."

"Global partnerships have increased demands on specs and performance. This pushes the Indian machine tool manufacturers into frugal engineering. It is useful in new cost sensitive markets around the world."

Director, Chennai Metco Pvt Ltd, C Renganathan

Have you checked all the boxes?

- ☑ Given advance intimation to potential partnerships?
- ☑ Studied the market norms?
- ☑ Pre-marketed your products and attendance at the event?
- ☑ Advertised in local media?
- ☑ Checked what your T&Cs should be with channel partners?

Commending VDW for choosing to focus on India, Mada stated, "VDW's initiative of 'EMO focus in India' is being done at the right time. Companies can have partners in India where they can source components and good quality products, and at the same time can have a market for direct sales of their products in India. It is a two way process and India has a large population and market, and the market is expanding at a much faster rate compared to many other countries. The GDP growth is also up around 6–9 per cent from last few years, which is not possible to be achieved by any country in Europe or the US.

Peculiarities of Indian market

While it is all well to want to invest in India, the market does have its particular mannerisms. Commenting on the same Renganathan averred, "Indian markets are indeed different. There is a clear expectation of 'value for money', and budgets mostly are not liberal. Global partnering has increased demands on specs and performance. This pushes the Indian machine tool manufacturers into frugal engineering - which is useful in the new cost sensitive markets around the world."

Adding to the list, CEO, Micromatic Machine Tools Pvt Ltd, T K Ramesh asserted, "Apart from being a cost-conscious market, there is another peculiarity that is unique to the Indian machine tool sector. In capital equipment, which includes machine tools, the price consciousness lies in between the product and product service. In Europe, when a product is quoted or discussions are happening around the product, there is immense clarity between what comes as a part of the product and what are the add-ons that one needs to plan ahead or make resources available for—it could be cost, people, etc., which is beyond the buying of the product. However, an Indian merchant expects that whoever sells them the equipment, will also cover the training and the training cost and any other service in relation to the product within the cost price of the product. This is very different from how the European market behaves."

Even though the mannerisms may differ, there is no doubt that the Indian machine tool market is growing and global companies that wish to take advantage of this, should do it now as it's the best time to invest, improve and increase their footprint in the Indian market. MMI

Designed for VMCs

Ace Manufacturing Systems (AMS) Ltd is showcasing Super Winner, a machine that has been designed for a variety of applications. The reliability of the machine, spindle speed, accuracy and its compactness makes it suitable for any VMC requirement. This product comes with LM rails on all three axes and based on the component material and cutting process, the motors are chosen to achieve necessary speed and torque. This machine is most suitable for volume production with large batch quantities and can also be customized to offer a turnkey solution. Super Winner has a stroke size of 500x400x500 mm along X, Y and Z axis respectively.

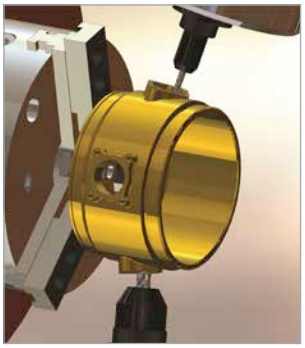
▶ **Ace Manufacturing Systems Ltd**
www.amsl.in ● Hall 17 / Stand F25

Vertical Turning Machine

Emag is showcasing VT 2-4 Vertical Turning Machine, a fast manufacturing system for shaft production at EMO 2013. Even demanding machining processes can be realized on it. When machining shafts of up to 400 mm length and 63 mm diameter, component costs reduce massively, with extremely short chip-to-chip times being the reason. Workpiece grippers transport the raw-parts into the machine and remove them again once they have been machined.

▶ **EMAG Gruppen-Vertriebs- und Service GmbH**
www.emag.com ● Hall 17, Stand C33 or Hall 26, Stand B39

Software System



Geometric Ltd is presenting CAMWorks, a parametric, solids based CNC programming software system at EMO 2013. This system significantly reduces programming time from hours to minutes and removes the drudgery of CNC programming by deploying technology that can interpret the manufacturing intent of the part and recognize machinable features with minimal or no effort. Moreover, it provides an intelligent knowledge base, which allows organizations to standardize and reuse machining best practices at a feature level. It further makes necessary adjustments to machining strategies before re-applying to features on other parts.

▶ **Geometric Ltd**
www.geometricglobal.com ● Hall 25 /Stand J09

Power Skiving Machine

Gleason's new Power Skiving range of 100PS to 600PS machines are part of a breakthrough solution for the skiving process. The company's Power Skiving concept is suitable for the highly productive manufacturing of cylindrical internal and external gears with outstanding gear quality and significant reductions in cost per piece, when compared with the gear shaping process, for example. The tool concept gives the Power Skiving process unprecedented flexibility and simplicity of process management. This makes the process for gear diameters up to 700 mm, swing diameters up to 850 mm and modules up to 8 mm equally suitable for small lot production runs as well as mass production.

▶ **Gleason Corporation**
www.gleason.com ● Hall 26 / Stand A43

Superfinishing Machines

Grind Master Machines Pvt Ltd is presenting the NanoFinish range of superfinishing machines combined with Micromatic Eco-Grind series, forming a high volume automated production system. The flexible system with CNC controlled grinding machine and PC-NC controlled superfinishing machine enables users to make quick changeovers between different component variants. Normally, grinding, deburring and superfinishing processes are done on three separate machines and need three operators. The advantage of NanoFinish range machines is that the cell is operated by one operator, thereby saving manpower cost.

▶ **Grind Master Machines Pvt Ltd**
www.grindmaster.co.in ● Hall 011 / Stand G40

Universal Cylindrical Grinding Machine

The eco 200 is a Universal Cylindrical Grinding Machine, crafted in hand scraped Swiss-precision style. This machine is especially popular amongst tool-room technicians and other precision parts makers in medical, aeronautics, hydraulics, etc., industries. The machine's reliability increases with its ease of operation, desired sub-micron level roundness and size accuracies. Wheel slide of the machine moves on precision linear bearing guideways ensuring repeatability within ±0.001 mm. Morever, this machine is designed and manufactured to meet higher end European EC standards for safety and environment.

▶ **Micromatic Grinding Technologies Ltd**
www.micromaticgrinding.com ● Hall 11 / Stand G46

Grinder Polisher

Chennai Metco plans to launch an upgraded fully automatic grinder polisher at EMO 2013. The new machine is expected to substantially improve the quality of preparation for micro structure and micro hardness testing. All the important parameters can be measured and adjusted with this new model. Furthermore, it also incorporates an automatic doser. This can control the entire process by changing the force, speed and the polishing media in a predetermined dosage. This new system brings in automation and reduces man power for the crucial grinding polishing operation.

▶ **Chennai Metco**
www.chennaimetco.com ● Hall 006 / Stand B72

CNC Machine

Macpower CNC Machines Pvt Ltd is showcasing the MX -class machine, a next-generation premium machine with the flexibility to meet various needs and worth investment. The machine is well designed to assure the best possible rigidity and stability. Furthermore, its design also absorbs cutting force during heavy machining process. The machine is 45 degree slant design offers superior workability and chip-discharging capability while 25 grade stress relieved casting provides dimensional stability. The heavy duty spindle cartridge with grease lubricated precision bearings is rigidly anchored on the ribbed headstock, designed to minimize thermal effect.

▶ **Macpower CNC Machines Pvt Ltd**
www.macpowercnc.com ● Hall NO 26 / Stand E 29

Exchangeable-tip Drill

The CoroDrill 870 from Sandvik Coromant is part of a new generation of exchangeable-tip drills and is designed to save time and reduce hole costs. They can be tailored to optimize applications through diameter range, steps and length possibilities. The drill is available in diameter range: 10.00–26.65 mm (0.394–1.049 inch) and lengths up to 8 × drill diameter as standard. Each drill body has a unique interface size with matching tips to achieve hole tolerances of H9–H10. Also these drills, originally developed for steel and cast iron drilling, are now even available for stainless steel.

▶ **Sandvik Coromant**
www.sandvik.coromant.com ● Hall 5 / Stand B20

Ceramic Grade

Seco's new CS100 sialon ceramic grade provides excellent performance in rough machining applications in nickel-based heat resistant super alloys (HRSA). The grade features high chemical inertness, high abrasion resistance and high toughness, allowing it to achieve long and consistent tool life. This makes it the ideal solution to meet the aerospace industry's ever growing demands for HRSA materials. Moreover, by allowing much higher cutting speeds than can be used with carbide inserts, CS100 minimizes cutting times and maintains cost effectiveness.

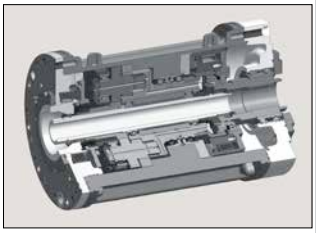
▶ **Seco Tools India (P) Ltd**
www.secotools.com/in ● Hall 4 / Stand A56

Mint Tilting Rotary Table

URH-320i, the Mint Tilting Rotary Table from UCAM, can be used for the machining of larger size components onto a smaller machining center where the standard tilting rotary tables cannot be used due to size constraints. The load carrying capacity of 110 kg in horizontal position, 70 kg in vertical position and clamping torque of 600 Nm and 950 Nm for rotary axis and tilting axis allows the user to use higher cutting parameters during the operation, thus reducing the cycle time. With a tilting range of ±110° the component can be positioned to any compound angle for machining.

▶ **UCAM Pvt Ltd**
www.ucamind.com ● Hall 13 / Stand C 102

Distance Measuring Device



There is a new hollow shaft drive for main spindle drives from ZF that offers many advantages over conventional two-speed manual transmissions. The range will start with the HWG 280 and 380 variants, which are part of the company's Duoplan family. One benefit of the new drive is that rotary masses are reduced when decoupling the planetary gear set in direct drive (1:1) operation at high speeds. This is said to result in short run-up times, minimum temperature developments, and very low vibration values of less than 1 mm/s. Pushrods for release units or coolants can be guided through the hollow shaft. The drives have been specially designed for direct installation on spindle and motor inline and with RAM integration.

▶ **ZF Friedrichshafen AG**
www.zf.com ● Hall 25 / Stand D30

Bimetal Bandsaw Blades

Bipico Industries (Tools) Pvt Ltd is showcasing its Bimetal Bandsaw Blades at EMO 2013. These blades are especially designed to cut metals in various grades, sizes and shapes. Additionally, they offer teeth profile and geometry to suit complex cutting operations. Efficient metal cutting performance along with durability enhances productivity and reduces cost. These blades are available in different grades such as Silver Matrix 2, M42 and M51. Users can also choose suitable size from 13 mm to 80 mm width.

▶ **Bipico Industries (Tools) Pvt Ltd**
www.bipico.com ● Hall 15 / Stand A22

Twin Spindle Twin Turret Turn-Mill Centre

The TMX Series—twin turret turn-mill centre TMX 200—from Jyoti CNC has been designed to equip various production requirements through a plethora of configurations for the spindles and turrets. Both the turrets have a stroke capacity which allows each to individually work in proximity and in combination of either spindle as per application demand thus creating a total flexible working environment, thanks to rotating tools with C & Y axis. Having 840D SL control system, both the main and secondary spindle is equipped with high torque/high power A26 electro-spindle (4000 rpm, 20.9 kW) while both the VDI40 turrets are with 12-station live-tools. Its configuration and modularity makes it a multitasking centre offering many possibilities, from simple turning to complex parts machining with only one workpiece clamping.

▶ **Jyoti CNC Automation Ltd**
www.jyoti.co.in ● Hall 12 / Booth D61/C60

Universal Machining Center

The UMC-750, universal machining center from Haas Automation, offers travels of 762 x 508 x 508 mm and an integrated dual-axis trunnion table. This machine is equipped with an inline direct-drive, low-heat 40-taper spindle (8100 rpm standard or optional 12,000 rpm), and comes with a 40+1 tool side-mount tool changer. The trunnion can position parts to nearly any angle for 5-sided (3+2) machining, or provide simultaneous 5-axis motion for contouring and complex machining. The machine provides +110 and -35 degrees tilt and 360 degrees rotation for excellent tool clearance and large part capacity.

▶ **Haas Automation India Pvt Ltd**
www.haascnc.com ● Hall 27 / Stand C12

Complete Machining Mill-turn

DMG Mori Seiki's DMC 85 FD monoBLOCK complements the successful series of universal monoBLOCK machines. With 5-axis simultaneous machining, pallet changer and mill-turn technology, the DMC 85 FD monoBLOCK is one of the most versatile machining centres. The compact machine has a footprint of only 22m². Workpieces of up to 600 mm in height, a diameter of 800 mm and weighing up to 800 kg can be processed. The DMC 85 FD monoBLOCK features a standard 18,000 rpm spindle. The FD swivel round table offers rpms of up to 800 min-1 for demanding turning operations, as well as a swivel range of +/- 120° for complex milling tasks.

▶ **DMG Mori Seiki**
www.dmgmoriseiki.com ● Hall 2, North Entrance

Powerstir Friction Stir Welding

Powerstir Friction Stir Welders from PTG Heavy Industries is an example of company's commitment to intelligent metalworking. The machine offers opportunities for jointing often difficult to weld alloys, where special attention is paid to structural rigidity. These models produce superior high strength welded joints without the detrimental and visible effects often associated with conventional welding. This feat of design and construction further demonstrates PTG's precision engineering capabilities - particularly in building the machine in question.

▶ **PTG Heavy Industries**
www.holroyd.com ● Hall26 / Stand B51

Standardized Long-stroke Gripper

The CGH long-stroke gripper from SCHUNK is the result of modern simulation methods, intensive test series, and economic manufacturing processes. This lightweight and rigid gripper has a correspondingly torsional stiffness. At a weight of 11.7 kg, the CGH disposes of a gripping force of 2,500 N and a variable stroke per gripper finger of up to 160 mm. The decoupled re-circulating ball carriages ensure that the acting moments will be optimally distributed onto the whole rolling elements.

▶ **Schunk Intec India Pvt Ltd**
www.schunk.com ● Hall 3 / Stand H21

3rd

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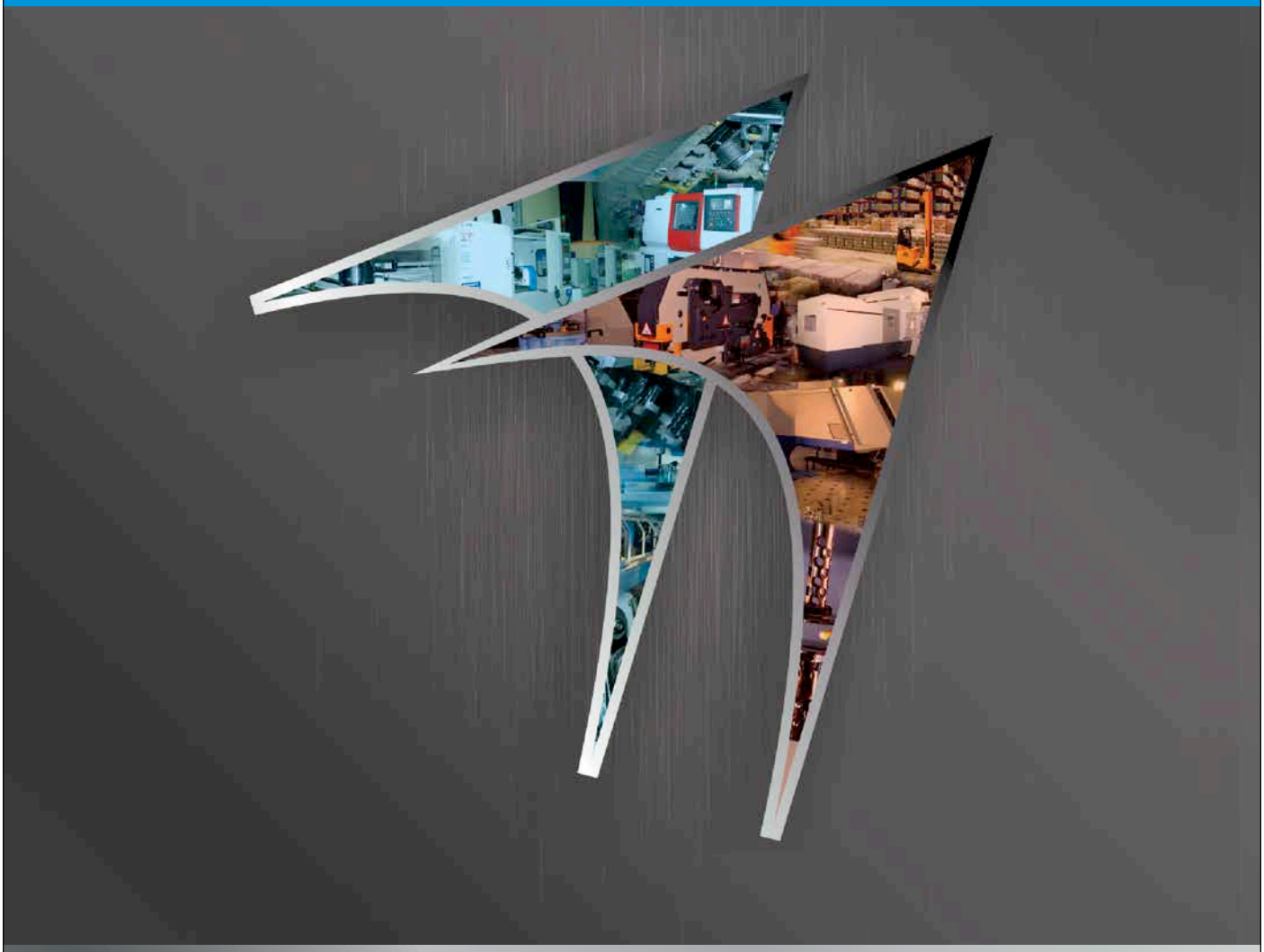

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Supporting Associations

SIMHEM Lifting Industrial Growth

AIA All India Association of Industries

www.mmsinfo.in

Working Hand in Glove with Technology

Held in the glitzy city of Bangkok, this year's Asian Technical Summit by Delcam PLC was as eclectic as the markets of the city. With a mixture of new developments, strategies and releases, this year's conference created an ideal interactive platform to showcase and learn of the company's latest developments in the CAD/CAM sector. A first hand report…

Delcam PLC, the company that helps engineering companies to design, manufacture and inspect complex-shaped products, held its annual Asian Technical Summit (ATS) 2013 at Bangkok, Thailand. Sponsored by Hewlett-Packard along with Renishaw, Sandvik Coromant, ABB, Castrol and Mazak, the event unfolded from 20-22 August 2013. The ATS is held every year in an Asian country to share the latest developments of the company with journalists, industry analysts and customers from across various countries. This event kick started with the CEO, Delcam, Clive Martell, giving the attendees an update on the various activities taking place at the company. Emphasizing on the importance of investing in R&D, Martell affirmed, "We continue to spend around 25 per cent of our turnover on development and this investment increases as our sales figures grow." The company's strongest overall results continued to come from the US, the UK, Germany, Italy and China and it saw good growth from its subsidiaries in Canada, France and India. Martell also mentioned that Delcam employs the largest development staff among CAM software development companies, which includes 210 researchers.

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Event highlights

There were quite a number of technical presentations during the entire course of the event. Marketing Manager, Delcam, Peter Dickin, spoke about Vortex, the high speed roughing machining operation. He stated that the Vortex saves time up to 89 per cent and is soon to be released in FeatureCAM, Delcam for SolidWorks and PartMaker. The Asia Business Development Manager, Delcam PLC, Sandy Moffat spoke on FeatureCAM, the first feature-based CAM system for milling, turning, mill-turn and wire EDM. Highlighting the new feature recognition tools, he said that the areas and elements to be avoided, such as clamps, can be marked. FeatureCAM also now supports the programming and simulation of steady-rests and tailstocks, typically used for large jobs to provide better support.

Head, Delcam Thailand, Buranang Suskamiti gave an overview of the company's activities in the country. He stated that in Thailand, Delcam's main customers are in the sectors of automotive, die & mold, footwear and jewelry industries. The company has a total of 481 customers, 151 of which are users of PowerINSPECT.

One feature that is really unique to the event is the facility visit. Every year, the company takes its attendees to a couple of their customer's facilities and the audience gets to see the shopfloors at work. This time around on the first day, we were taken to Mazak's training center. There were various machines on display and in action including CNCs, VMCs, multi- tasking machining center, laser cutting machine, etc. In another visit we were taken to the Thai Summit Group of companies wherein we visited three of their facilities viz. TSM Mold, TSM AutoPart and TSM R&D. All the attendees were shown around the facility and explained how the company used Delcam's software to design and manufacture its dies.

Source: Vogel Business Media

CEO, Delcam, Clive Martell gives an update on the various activities at the ATS 2013

New developments

During the event, Delcam announced its 45,000th customer – PT Astra Honda Motor from Indonesia. The customer recently ordered seats of the PowerMILL CAM system and PowerSHAPE design software from the Delcam Indonesia subsidiary, plus the Delcam Electrode and FeatureCAM

"Our mission is to help customers make complex 3D parts. We started off with that mission and it's still the same. However, the range of industries has increased."

CEO, Delcam, Clive Martell

"As a CAD/CAM software company, we are unique in having our own advanced manufacturing facility. This factor has helped us innovate much faster than our competition."

MD, India and Middle East and ASEAN Business Development Director, Delcam Plc, Vineet Seth

Wire EDM programs. A plaque marking this landmark sale was presented by British Ambassador to Thailand, HE Mark Kent, to General Manager, Delcam Indonesia. Bambang Nugroho.

This year's meeting also included demonstrations of new versions of all of the company's main software products for design, machining and inspection, together with details on their products for the healthcare industry such as the orthotics and dental industry. There were also a couple of interesting presentations on machining with robots and one of them was presented by ABB. Managing Director, India and Middle East and ASEAN Business Development Director, Delcam Plc, Vineet Seth gave a presentation on The Delcam Edge, 'Resolve your manufacturing problems and delivering a global productive advantage'. "The Delcam professional services (DPS) provide advanced engineering expertise and manufacturing support services. This consists of new process development specialists, experts in process optimization, prototype and short-run production, independent inspection, etc," stated Seth. Among other countries, India too has a regional DPS engineering team.

Among other presentations representatives from the company also spoke about their electrode suit. The company has extended the range of EDM equipment supported by its integrated solution for the design, machining and inspection of electrodes. At the heart of the solution is a new file format – the .Trode file. This contains all the information for each electrode project, including not only the electrode design but also the machining and inspection information, plus the set-up sheets for its manufacture and use. Having all the required information in a single file simplifies data management as well as increases overall efficiency. "With today's customers facing constant pressures to reduce costs and lead times while simultaneously increasing productivity and improving quality, we seek to meet these demands with more powerful, faster, better-integrated CAD/CAM systems and easy to use software," averred Seth.

Fostering innovation

There was also an interesting case study from Harbin Aircraft Industry Group, China. The case study entailed how the company's CAM programming cycle was longer, and the work intensity of programmer higher prior to using Delcam's tools. Post using PowerMILL, the company saw advantages such as shortening of the average programming time by almost 40 per cent and increase in the overall processing efficiency by 15 per cent. Incidentally, Delcam in India too has been growing in the aerospace sector apart from automotive. Some of its customers include the likes of Hindustan Aeronautics Ltd, Indian Space Research Organisation (ISRO), National Aerospace Laboratories, Tata Advanced Materials Ltd, among many others. Having always applied the strategy of innovating across a spectrum of functionality and technology, the company has come a long way in India since its inception in 2000. Sharing his views on the same, Seth avows, "Our strategy has always been in innovating across a spectrum of functionality and technology. We have built an expansive product portfolio that caters to manufacturing across all possible industry verticals. Each of these products cater to diverse domains yet are connected with each other through our core system. For example, innovation in say aerospace machining is suitably adapted to dental machining. Similarly, innovations in mainstream CAD/CAM is adapted to footwear design and manufacturing. Our high investment in R&D, allows us to innovate on any front with the knowledge that we can adapt this to our host of other software products. Most of our competition does not enjoy this luxury of carrying such a large portfolio of products."

Source: Vogel Business Media

Horizontal Center Nexus 4000-II by Mazak at its training center in Bangkok

Staying ahead of the race

Organization culture, entrepreneurial skills, technical leadership, management decisions, cross-functional interaction play a huge role in driving a company's innovation process. The same can be said for Delcam. As a CAD/CAM software company, we also are unique in having our own advanced manufacturing facility where we test our software products, as also use it as a commercial manufacturing facility. This additional factor has helped us innovate much faster than our competition and is one of the key factors that has helped us to continue to stay ahead," adds Seth on a concluding note. MMI

Seizing Opportunities for Success

India is envisioned to become a manufacturing hub by 2020. What facilitates this is a strong platform, which can offer the Indian machine tool sector an opportunity to showcase its innovations and advanced technologies. Indian Machine Tool Manufacturers' Association (IMTMA) presented such an opportunity in the form of Modern Machine Shop 2013, an exhibition event in its third edition, which took place at Pragati Maidan, New Delhi during 22-25 August.

With more than 40 exhibitors of national and international presence, the four days of Modern Machine Shop (MMS) 2013 offered a perfect platform for networking and knowledge sharing. Additionally, it also presented exhibitors and visitors the opportunity to assess competitiveness in the domestic as well as global market.

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Inauguration

MMS 2013 was inaugurated on 22 September 2013, at Pragati Maidan in the presence of Joint Secretary, Department of Heavy Industry, Ministry of Heavy Industries and Public Enterprises, Government of India, Harbahajan Singh.

Speaking on the need for such exhibitions, Singh averred, "This type of medium is very encouraging, especially for the small players, in showcasing their technologies. My message to the industry is that they should come, attend and participate and invest in shows like this."

He further emphasized on the impact events like MMS have on the economy, opining that events such as these encourage small businesses to possibly partner with globally well-known companies and increase their global footprint.

Highlights of MMS 2013

- No. of exhibitors – 40
- Country Participation – 6 (Belgium, China, Germany, Japan, Turkey, and USA)
- No. of machines on display – 30
- Gross exhibition space – 3000 sq mt

Source: IMTMA

Ribbon cutting ceremony (LtoR): Chairman, Goindi Group and Past President, IMTMA, VS Goindi; Joint Secretary, Department of Heavy Industry, Ministry of Heavy Industries and Public Enterprises, Government of India, Harbahajan Singh; then President, IMTMA and Chairman, Miven Mayfran Conveyors Pvt Ltd, Vikram Sirur; Managing Director, ABI Machines, Achal Nath, and Director General, IMTMA, V Anbu

Delegates and dignitaries

The show also observed the presence of a number of delegates, dignitaries and industry experts, including, Chief Mechanical Engineer, COFMOW, Indian Railways, RP Singh; Associate Vice President – Business Excellence, Munjal Showa Ltd, Rakesh Atre; Senior Manager – QA, Caparo Maruti Ltd, Kuldeep Singh and Deputy General Manager, Musashi Auto Parts India Pvt Ltd, D K Deshpande.

Speaking on why a show like MMS is important, Rakesh stated, "In order to be ahead in the game, companies need to constantly upgrade their technology. In terms of bettering technology or upgrading, you need to be aware of what is available in the market. Fairs such as MMS allow for a platform wherein not only visitors but also exhibitors get to see the latest technologies existing in the market. Working in a factory

or in an office, one cannot be completely aware of the newest in the market. Online information, though readily available, may not inform of various aspects of the machine that may apply to a particular challenge faced. Exhibitions like MMS permit face-to-face interaction wherein one can see in reality the capability of technology and be advised by industry experts on what's best for them."

Agreeing on the same, Kuldeep Singh iterated, "MMS 2013 is the perfect platform for information and knowledge sharing. Having attended previous editions of the show, I have seen the benefits. Companies can see where they lack and how they can better their processes through means of advancements in the machines. By incorporating the latest technology, benefits such as efficiency, cost-effectiveness, productivity can be achieved. Additionally, knowledge sharing on such a platform can bring about an awareness of the best practices in the industry."

RP Singh, stressing on the importance of why SMEs or rather everyone in the production pyramid needs to be aware of current offerings in the machine tool sector, expressed, "MMS is essentially a showcase exhibition. Without being aware of what the latest technologies are, you cannot incorporate improvement in your processes. I am really happy seeing the number of exhibitors present here showcasing the best products with the highest quality, so much so that while visiting the booths I felt that I was witnessing an exhibition abroad. MMS is a smaller exhibition compared to the likes of IMTEX; however, the pro of this is that there is more personal interaction and perhaps this allows for better knowledge sharing than compared to the bigger and busier ones."

Source: IMTMA

Latest technology and products being showcased at MMS 2013

Exhibition

The show attracted companies from every section of the machine tool industry such as metal working, automation, material handling and quality control, off the-shelf production aids, accessories, consumables, software and consultancy. In other words, with the latest technologies in various areas, it addressed needs of almost every visitor. Moreover, it offered an opportunity not only for big players in the market to present their innovations but also to small and medium enterprises (SMEs).

SMEs are imperative to the growth of the machine tool industry, and can be said to be the backbone of the industry. They must be encouraged for sustained growth of not only the industry but also the economy. The event offered the perfect stage to these companies to present their innovations. The event also acted as a marketing tool for these companies, through which they could meet their potential clients. Also with the foreign participation, such companies could look for expansion abroad.

All in all, this MMS 2013 strengthened not only a buyer-seller relationship but also offered opportunities to generate more business, ink new partnerships and also assess market conditions.

Emphasizing on the same, then President, Indian Machine Tool Manufacturers' Association and Chairman, Miven Mayfran Conveyors Pvt Ltd, Vikram Sirur said, "MMS has built an ecosystem wherein users and customers are empowered with display of technologies that give an edge to their manufacturing requirements. As the show caters to the industry at a regional level, at their door step, it is an enabler to manufacturing competitiveness and a show window to the emerging technologies of the future.

Knowledge sharing

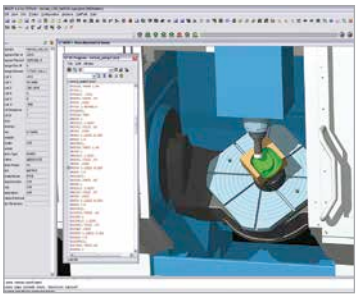
Apart from the business aspects, the event also turned out to be a knowledge platform. Numerous companies conducted seminars to educate visitors about manufacturing flexibility to accommodate shorter product life cycles and enhance overall efficiency.

The interaction between purchase heads, managing directors, technicians, engineers, and industry enthusiasts was very evident from the first day itself. The show provided extensive opportunities for visitors to get acquainted with new technological innovations relating to the industry. The MMS 2013 has and will continue to enable exhibitors to launch new products and services in front of the potential customers and to build business contacts across the region, in its next edition in Chennai. MMI

Source: IMTMA

Live demonstrations being held at the exhibition hall with visitors having the opportunity to network with company representatives

Verification NC Program



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▸ **CGTech India Software Solutions Pvt Ltd**
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Aqueous System

The Universal 81W from Dürr Ecoclean India is an economic, highly efficient and environmental friendly aqueous system, which can be used for a wide range of applications for parts cleaning. The system is especially suitable for removing water based coolants, oils, chips, particles from mass produced parts and for the fine cleaning of assembly parts.

▸ **Dürr Ecoclean India**
Tel: +91 (020) 30585001, E-mail: info.india@ecoclean.durr.com
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Motion Control

Elmo Motion Control offers its cutting-edge, ultra-high current Eagle servo drives. With ratings of 150A, 300A and 600A and operating voltages ranging from 16 to 96 VDC, the newest Gold Eagle family members are specifically designed to meet the unique requirements of unmanned applications such as unmanned vehicles, turrets and other systems that require repeated power bursts for relatively long time periods. To enhance the compact Gold Eagle package with new ultra-high current specifications, Elmo combined its proprietary power conversion technology together with an advanced pulse-width modulation (PWM) 'follower' algorithm. This is the first time such high current has been achieved in such a small military-grade package.

▸ **Rajdeep Automation Pvt Ltd**
Tel: +91-20-24393755, E-mail: sales@rajdeep.in
www.elmomc.com

Compact Touch Probe

Metrol's Wireless Touch Probe for machine tools is equipped with a new radio transmission system that is uninterrupted by noise, coolants or obstacles. It automatically selects the best channel by searching the radio spectrum constantly and is designed for highly-reliable, noise-resistant radio transmission. These probes are ideal for applications where line of sight cannot be maintained between the probe and the receiver in machines like large turn-mill centers and 5-axis machines. Metrol's radio probe with uninterrupted communication, gives reliable and precise measurements.

▸ **Metrol Corporation India**
Tel: +91 (080) 4110 1550, E-mail: shereen@metrolindia.com
www.metrol.co.jp/en

Contact Scanning System

Renishaw has launched Sprint, a high-speed analogue contact scanning system for CNC machine tools. This system incorporates a new generation technology that delivers a step-change in the benefits of process control. It enables fast and accurate form and profile data capture from both prismatic and complex 3D components. For blade manufacture, the new system provides unprecedented capability for blade tip refurbishment and root blending applications. The high-speed measurement of blade sections coupled with high data integrity (even on leading and trailing edges) ensures the indication of true part condition leading to an adaptive machining capability.

▸ **Renishaw Metrology Systems Ltd**
Tel: +91 (020) 66746770, E-mail: samina.khalid@renishaw.com
www.renishaw.com

Cold Weld Metal Repair Compound

Rollon Bearing manufactures Castfil PTFE Putty, a two-part epoxy based cold weld metal repair compound suitable for maximum temperatures of up to 120°C. It is a self-lubricating compound possessing high mechanical strength. It bonds strongly to most metals / plastics and offers long life protection against wear, abrasion and corrosion. It can be used for preventing leakage in gas/liquid pipelines or valves. It also helps repair blowholes, porosities, discontinuities, etc in castings. The solution can further be used to repair damages caused by abrasion or corrosion, rebuilding of critical machined parts and also repairing oversized bearing bores, worn out shafts, scored guideways, etc.

▸ **Rollon Bearings Pvt Ltd**
Tel: +91 (080) 22266928, E-mail: rollon@rollonbearings.com
www.rollonbearings.com

New High Performance Blasocut

Blaser Swisslube has recently launched new Blasocut BC 935 Kombi water miscible cutting fluid for outstanding cutting performance. The product is capable of delivering excellent machining results on steel, cast iron and stainless steel. It features the unique bio-concept of the company. Additionally, it brings higher value to the machining processes through low consumption, clean machines, good Ferro corrosion protection, good rinsing behavior and very good chemical and biological stability.

▸ **Blaser Swisslube India Pvt Ltd**
Tel: +91 (124) 4994000, E-mail: india@blaser.com
www.blaser.com

Measurement Device

The IM-6500 series from Keyence is a new type of measurement device. It is a completely new concept to rival established measuring equipment such as profile projectors, measuring microscopes or automatic CNC measuring machines. The dimensional measurement concept of the IM-6500 series utilizes state-of-the-art imaging technology, thus enabling users to perform reliable measurements in a minimum of time and with an increased accuracy. One can simply place a part on a measurement stage, push the button and up to 99 dimensions are measured in a few seconds with accuracies down to 0.7 micron. There is no tiresome positioning, nor risks of measurement variance or deviation between individual operators.

▸ **Keyence India Pvt Ltd**
Tel: +91 (044) 4963 0900, E-mail: info@keyence.co.in
www.keyence.co.in

Mini Turning Inserts

TaeguTec has recently launched its new Rhinorush series of mini turning inserts. This series is especially developed to meet the manufacturing industry's needs of reduced machining costs and high efficiency. The smaller but optimal sized inserts are invested with superior durability and same thickness as ISO inserts. The 9 and 13 mm new line of inserts is just as strong as the 12, 15 and 16 mm inserts but at a fraction of the cost and size. It is also invested with a unique two directional clamping force. Rhinorush is available in an exhaustive yet constantly evolving range of hi-performance Gold Rush grades and chipbreaker geometries including FG, PC, MT, FM and FT. Repeated tests have proven Rhinorush to offer stable tool life even during high speed machining, interrupted cutting and in old machine set-ups.

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

Laser Processing Machines

Optiplex 3015 Fiber from Yamazaki Mazak uses the industry-leading platform that enables flexible automation for future growth. Automation permits future expansion as per the changing needs. Up to four machines can be added from the company's full range of laser cutting machine models. The fiber laser performs high-speed cutting with lower output thanks to the shorter beam wave length (90%) when compared to a CO_2 laser. Here, CO_2 and fiber laser technologies do not compete with each other. In fact, users can now choose wisely among two technologies as per the application.

▸ **Yamazaki Mazak India Pvt Ltd**
Tel: +91-2137-668800, E-mail: jainisha_dsilva@mazakindia.com
www.mazakindia.in

Hobbing Machine

Premier Ltd has developed a high speed gear hobbing machine. The design includes a direct drive for the hob and work-piece rotation. Moreover, the rigid design of the machine structural parts and the use of back-lash free ball-screws and guide-ways in the drives, guarantee the capability of the machine to match high cutting parameters. As a result, the machine delivers increased productivity and also higher accuracy. The machine also offers a safe operating environment to the operator.

▸ **Premier Ltd**
Tel: +91 9325378745, E-mail: dstotre@premier.co.in
www.premier.co.in

Moveable Power Packages

The modular construction kit from igus allows winding energy chain systems in eighteen different versions. The new igus 'e-spool' heavy duty (HD) and motor flange versions are even more powerful than other variants. The HD variant is equipped with an extra strong spring to retract the energy chain at vertical applications. Moreover, the motor version with motor flange is available for high filling loads and movements in any direction. The e-spool connects two energy supply systems into one system—a standard energy chain being wound and a twisterband for rotational movements. This design allows movements in any direction, hence is suitable for a number of fields of application.

▸ **igus (India) Pvt Ltd**
Tel: +91-80-49127809, E-mail: harish@igus.in
www.igus.in

Twin High Pressure Vice

Fresmak Arnold Precision Engineering's twin high pressure vice allows to clamp the different types of components at much ease and less cost. This comes with a spindle integrated with a hydraulic pressure booster, which boost the pressure up to 40KN just by using hand rotational movement. It has a pressure regulator that controls the clamping force at different intervals. Thus it enables clamping rigid components at high pressure and slender components at accurate and lighter pressures.

▸ **Fresmak Arnold Precision Engineering Pvt Ltd**
Tel: +91 (80) 6765 4250, E-mail: info.india@fresmak.com
www.fresmak.com

Rotary Surface Grinder

Wendt offers WRS, the latest state-of-the-art series of CNC rotary surface grinders horizontal and vertical spindle versions. They feature user friendly operating cycles for rough, semi-finish, finish grinding, spark out and dressing. Additionally, it is also equipped with retraction of wheel head in case of power supply failure. Moreover, it comes with a coolant filtration system with paper band / centrifuge and fume extractor.

▸ **WENDT (INDIA) Ltd**
Tel: +91 4344 405500, E-mail: sajuabraham@wendtindia.com
www.wendtindia.com

Horizontal Machining Center

The YCM's high precision horizontal machining center, NH 450A, is perfect for industries with the application of high production machining. Its BBT-40 spindle with dual surface contacts runs at a maximum speed of 15,000 rpm, powered by 30 HP (22 kW) motor that generates 200 Nm of torque. The three axes are driven by roller guide ways to achieve a rapid feed rate of 2326 ipm (60 m/min) on all axels with acceleration over 1G. The rotary table is driven by a hydraulic system. The machine further features a stepped castings design on the X-axis to increase the cutting rigidity. It accommodates work pieces at sizes of 750 mm x 1000 mm and a maximum loading of 500 kg.

▸ **S&T Engineers (P) Ltd**
Tel: 1800 425 1855, E-mail: info@stengineers.com
www.stengineers.com

Motor-mounted Starter

Nord Drivesystems presents SK 135E, a new motor-mounted starter. The new product comes with an extended performance range for the economic distributed implementation of soft start and reversing functions, for motors from 0.25 to 7.5 kW. It further integrates motor overload protection through PTC thermistor monitoring, mains and motor phase failure monitoring, It monitoring and magnetizing current monitoring. The electronic, wear-free switching technology replaces motor circuit breakers, reversing contactors and brake rectifiers, thus rendering entire control cabinets unnecessary in large facilities.

▸ **Nord Drivesystems Pvt Ltd**
Tel: +91 9765490890, E-mail: jyoti.mishra@nord.com
www.nord.com

Shoulder Milling Cutter

The new generation of Blaxx mills from Walter takes the motif of the noble knight which is hard to resist thanks to their 'powerful, precise, reliable' properties. The Blaxx F5141 shoulder mill has a completely new finish in high-gloss black finish that is not only visually appealing but also substantially reduces the effects of wear and corrosion. Highly precise indexable insert seats also clasp the cutting edges just as knights with their forged gloves clasp their shining swords. The mill is fitted with tangential inserts as an extra feature. The device provides a great deal of carbide volume in terms of cutting force, i.e., an above-average level of process reliability, resulting in an enormously robust tool design, which ensures quiet, low-vibration running.

▸ **Walter Tools India Pvt Ltd**
Tel: +91 (020) 3045 7300, E-mail: service.in@walter-tools.com
www.walter-tools.com

Fiber Laser Cutting System

Future X, a state-of-the-art fiber laser cutting system has uniquely been developed for aerospace and ship-building industry. This machine is capable of profiling aluminum, brass, copper, titanium, coated and textured metal sheets. It can cut a 20 mm of steel with a 3 kW fiber laser with high quality standards. It further offers butter cut, striation free edges at thicker metals, less angular distortion and enhanced cutting through well monitored and controlled pressure of the assist gases. Moreover the machine also features bevel and tube cutting options.

▸ **Sahajanand Laser Technology Ltd**
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