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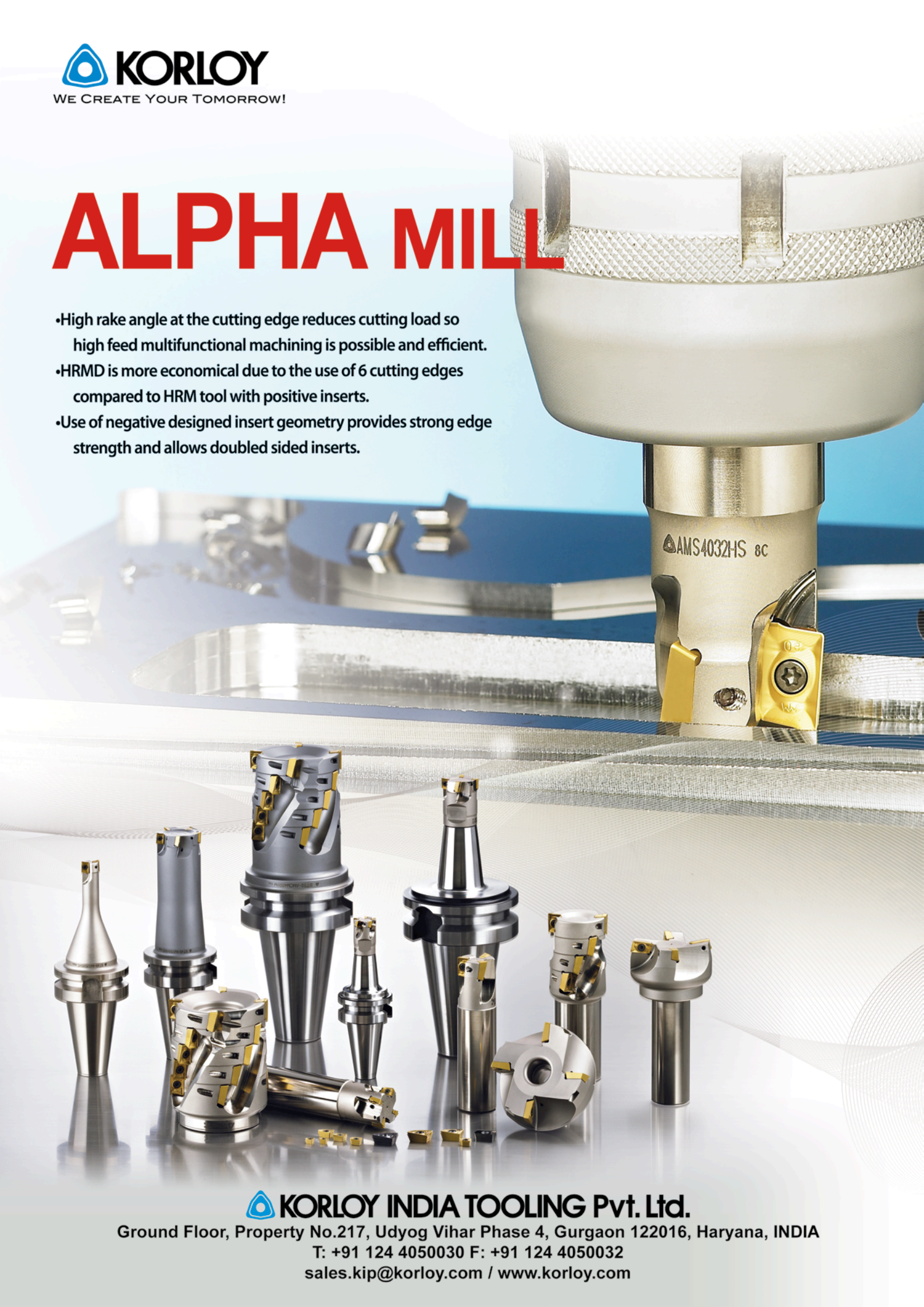

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Volume 1 · No. 4 · July 2013

The official magazine of Indian Machine Tool Manufacturers' Association

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"There should be an increased impetus to industry-institute partnerships in countries such as China, Germany, USA & Korea."

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

Taking a Bigger Look at the Smaller Picture

It is believed that 'solutions to any situation are best found when addressed from the grass-root level', and this saying also holds true for the manufacturing industry. India is a vast country and we have many industry players all over the landscape. Initially, though IMTMA largely focused on national aspects of the manufacturing industry, we soon realized that our activities should also focus on regions which have a large concentration of machine tools manufacturers. Hence, the Regional Councils were initiated. There has been no looking back since. With the focus now shared between national and regional, IMTMA has managed to come closer to its stake holders and at the same time, bring them closer to each other as well. With this innovative approach, the association is also able to address industry matters with better understanding.

IMTMA is also in discussion with the Department of Heavy Industries (DHI) to devise various schemes and programs for the SME's. In the recent 'Development Council Meeting' in New Delhi, various plans for the machine tools industry were discussed and DHI has proposed to set up and fund 'Centers of Excellence' (COE) in different sectors of IIT's. The COE for machine tools is likely to be at IIT, Madras.

Finally, I would like to mention that the confidence level towards newer opportunities and activities of the association has increased in the minds of our industry stake holders.

In this edition of Modern Manufacturing India (MMI) we have tried to spread more awareness about the regional councils of IMTMA and their activities across various clusters. I hope this is going to be very useful information for all the readers and we will see more and more members joining various innovative initiatives of IMTMA for a rewarding future of the Indian manufacturing industry.

I wish you all a very pleasant reading.

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

Reaching the Next Level of Proficiency

In this age of globalization, where our earning capacity is directly proportional to our knowledge, skill and ability to perform, it is important to blend all of that in a manner that provides value to customers. This combination of knowledge and skill fetches true value from potential customers as they willingly pay for expertise. Consequently, this chain of thought also makes employers look out for people that posses information-based, transferable, analytical reasoning and communication skills, along with a creative mind who ultimately can be assets to organizations.

As companies essentially require a trained workforce to meet customers' expectations, training and skill development play an important role. Hence, the more we invest in time to learn and hone new skills, the sooner will we find ourselves at the next level of proficiency. There is no short-cut to learning, and any attempt to skip its stages will limit the scope of achievement resulting in mediocre outcomes. With Indian manufacturing companies transcending beyond boundaries to maintain their position in the global marketplace and expanding their workforce, it becomes imperative to build a competent manpower.

"With Indian manufacturing companies transcending beyond boundaries to maintain their position in the global marketplace and expanding their workforce, it becomes imperative to build a competent manpower."

In this context, we introduce a new section on Skills Development in this issue, reflecting how skilled workforce is essential for successful innovation to generate and implement new ideas. The Big Interview also addresses the same issue and reiterates yet again that the industry – academia gap should be bridged.

The issue is highly technology oriented with views from esteemed industry veterans.

As always your valuable suggestions are welcome.

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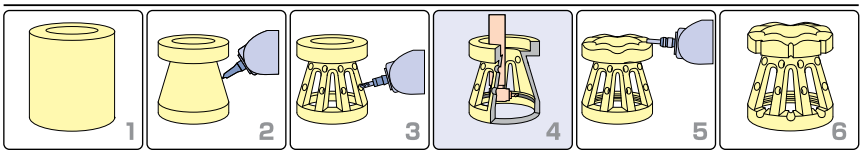
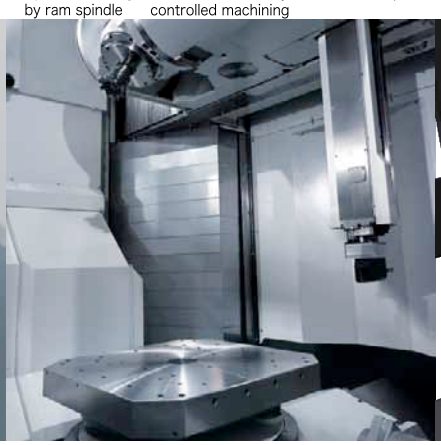
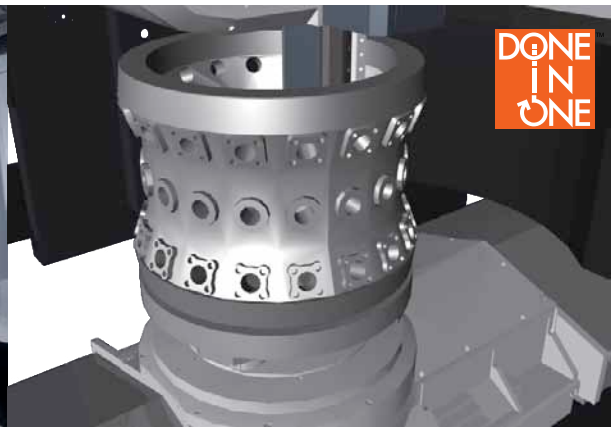


Material | O.D turning | Angle drilling | Deep I.D. machining by ram spindle | 5-axis simultaneously controlled machining | Finished workpiece

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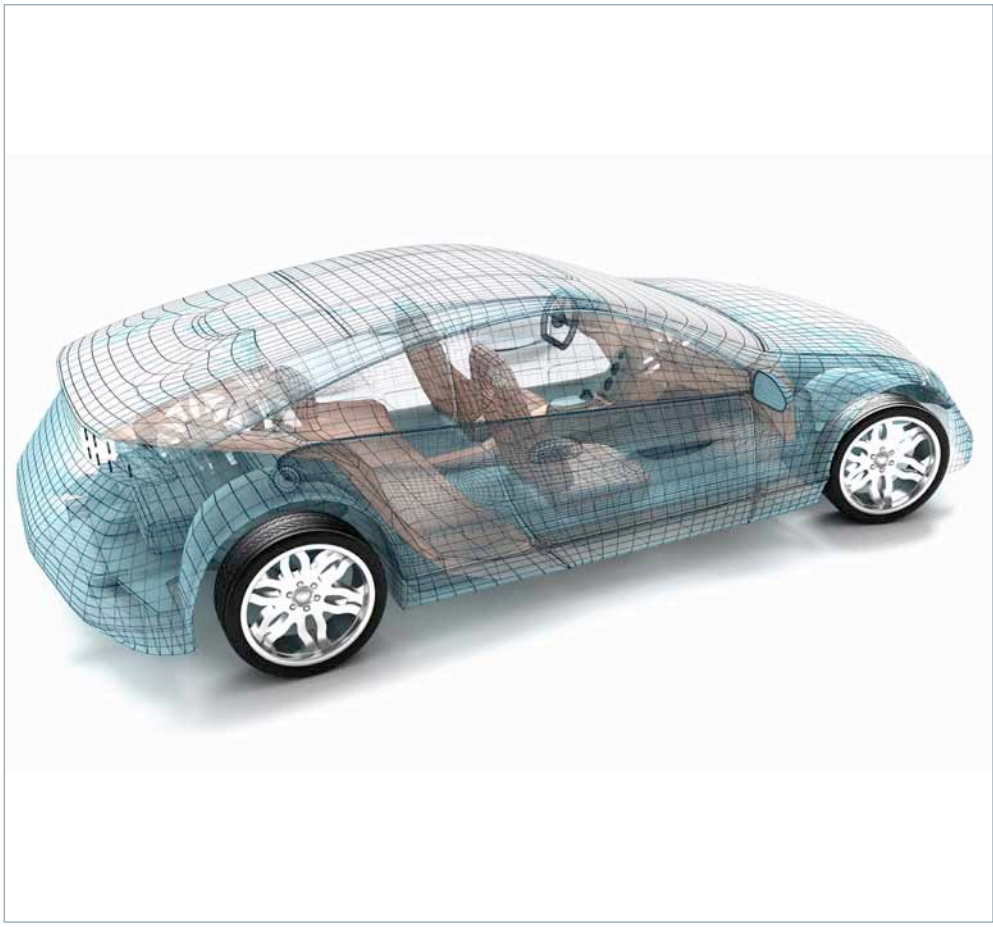

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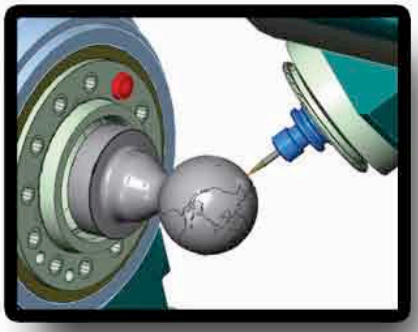

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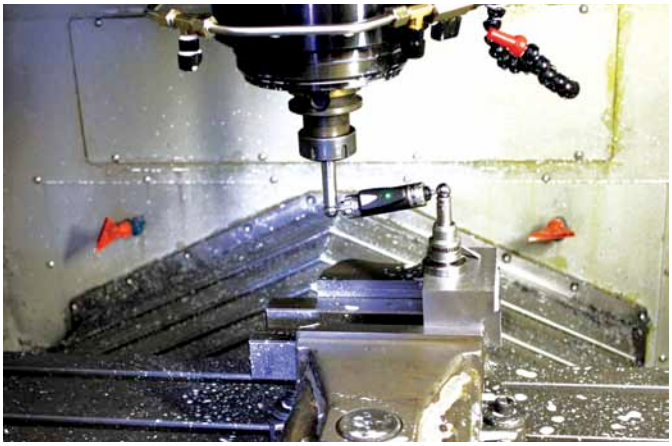

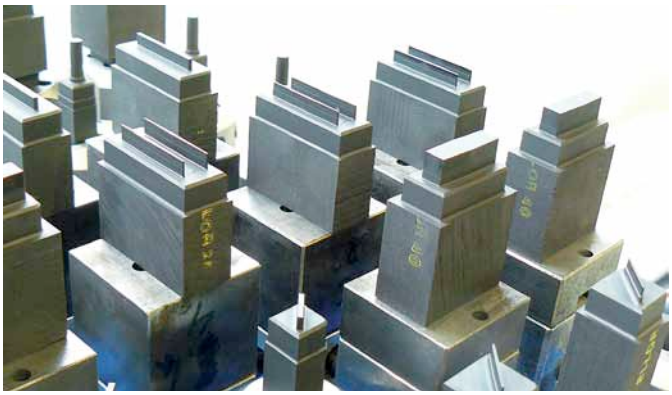

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Empowering the Industry Region by Region

In this age of global competition, Indian manufacturing cannot afford to overlook local challenges. Realizing this need, IMTMA has formed Regional Councils to serve and address the industry at regional levels.

Since its inception in 1946, Indian Machine Tool Manufacturers' Association's (IMTMA) vision has been to make India a leader amongst the significant machine tool manufacturing countries in the world. This was possible only if the Indian companies attain leadership through volumes, productivity and focused co-operative efforts.

It was also observed that there is need for a focus-shift from the national level to the regional level aspects of the manufacturing industry, for better understanding and planning activities of the association. To realize this vision and to address the roadblocks, the Executive Committee of IMTMA proposed formation of three Regional Councils (RC). These councils represent three regions, north, south and west. RCs focus on providing an opportunity to develop competitiveness and leadership capabilities in their respective operational domains. Besides, they also act as a vehicle to achieve specific needs, both of the membership and the association in the region.

The first RC meeting for the south region was conducted on 15 Sept 2003, followed by the maiden meeting of RC North on 20 Sept 2003. While discussing the roles required to be played by the RC members, it was opined that some of the broad objectives of the Council should be aimed at:

- Networking amongst member companies
- Address the needs of the members
- Enthuse non-IMTMA members to join the association
- Broad base the activities of IMTMA

Regions

IMTMA has identified three regions with high concentration of manufacturing industries and selected Bengaluru as headquarter for the RC South, while Gurgaon and Pune were chosen for RC north and west respectively. The RC consists of a Chairman and Dy Chairman to lead projects along with other members from the industry and their coordinators. These coordinators along with the RC members and the IMTMA Secretariat, work to develop proposals and seek wider participation of IMTMA members in their respective regions. The coordinator works under the guidance and supervision of the RC Chairman.

Activities

The RC's have the following broad charter:

- Promote brand image of the Indian machine tool industry, through various regional programs and initiatives
- Focus on enhanced membership services in the region
- Further strengthen membership base in the region and to be the reference point for members in the region

Source: IMTMA

Source: IMTMA

Interactive plant visit to Autoliv (India) Pvt Ltd

Plant visit during regional council meeting

The latest meeting of the IMTMA RC meeting South region was conducted on 30 May 2013, coinciding with a plant visit to Autoliv (India) Pvt Ltd. The learning from this visit was the use of Autonomous Manufacturing Centers to improve productivity from individual processes, which leads to improvement in overall productivity. Furthermore, the visit also helped members understand the efficient use of Japanese management techniques to ensure 'defect-free' production in mass production lines. This coupled with the First In First Out (FIFO) system followed in its stores along with the 'Delivery Milk-Run Systems' implemented for locally available parts; Autoliv India stood as a 'sterling' example on how companies can strive for achieving operational excellence on a day-to-day basis.The visit was highly appreciated by all the members and other attendees of the meeting.

- Evolve and communicate to the Executive Committee of IMTMA, the specific requirements in terms of marketing effort, policies and strategies required to further the interests of the machine tool member companies in the region
- Deliver training programs of IMTMA in the regions and arrange industrial visits for interactions with user sectors
- Identify special needs of manufacturing units, including machine tool industries in the region and advice technology center on the development of training programs to meet these requirements
- In one calendar year, each region conducts four RC meetings (quarterly) and two interactive meetings (half yearly) on specific issues which are of interest to the industry

Achievements

Through the inception of RCs, IMTMA has been able to bring all its member companies closer to each other. New members from areas like Ludhiana and Rajkot were added to the association membership due to the constant efforts through the RC activities. This also helped in the regular supply of information as members willingly shared their production data with the association. With the UNIDO-ICAMT support, IMTMA has till now formed six clusters across the three regions. It is further planning to set up a platform for technology up-gradation in these clusters.

Each region conducts regular RC meetings and plant visits and these meetings and visits have supported manufacturers in the respective regions to voice their issues and find solutions. Regular RC programs and local initiatives have brought IMTMA much closer to the SMEs in the designated regions. Regular reporting of issues and development possibilities are helping the IMTMA executive committee in formulating the growth plans and designing the future roadmap for the industry.

Future plans

Going forward, the vision for the RC's is to strengthen its

Source: IMTMA

Meeting of IMTMA Regional Council (South) at Autoliv (India) Pvt Ltd, Bengaluru

Current RC members on the chair

IMTMA regional councils			
	North	**South**	**West**
Chairman	R D Madan President, Corporate Planning, ISGEC	Umesh N Vice President & Business Head, Industrial Equipment Division, Bosch Ltd	Deepak Srivastava Executive Director, Electronica Machine Tools Ltd
Dy Chairman	Achal Nath Executive Director, Ashok Manufacturing Company Pvt Ltd	Madhavi Chandrashekar ACE Designers Ltd	P P Sastry Accurate Engineering Company Pvt Ltd

Source: IMTMA

presence in all six clusters. Their activities need to be highlighted in all possible manners for the benefit of the industry and get more companies to join the association activities. Thus, IMTMA plans to assist the industry gain more confidence by addressing regional issues. The RC's are moving fast towards the stabilization stage and more stress is given on the regularization of the RC meetings and industry visits, for better interaction and participation from the customers. While the membership is increasing in a positive phase, the regionalization of data is under consideration as it will boost the overall data compilation at a national level. Another major evolution under consideration is the regionalization of the policy advocacies leading to a better focus at regional levels.

Benefits to industry

Participation in the IMTMA regional council has major benefits for the industry as it brings the industry players together under one roof. Manufacturers are able to observe and understand major developments and innovations happening in the region. SMEs also benefit by large scale developments plans by the association. All manufacturers in the machine tools industry are invited to be part of the association and its RCs and avail the benefits. MMI

For membership details please visit website www.imtma.in

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UCAM Builds Large Rotary Table: A First for India

Bengaluru – UCAM Pvt Ltd, manufacturer of CNC rotary indexing tables has recently launched a large size CNC rotary table at the Central Manufacturing Technology Institute (CMTI) campus, Bengaluru. The first of its kind to be manufactured in India, the table measures 2500 mm x 3000 mm with a linear axis stroke of 2500 mm and has a load carrying capacity of 40 tonne. Furthermore, it has a positioning accuracy of ±5 arc seconds and repeatability of ±2 arc seconds with a linear axis positioning accuracy of ±3µ.

The design and development of the table took about two years and has latest technological incorporations. To be noted is the advanced development and incorporation of the hydrostatic bearing technology and dual pinion gear drive with electronic backlash elimination. On this table, a large work piece can be drilled, bored and milled (including rotary milling), making it a universal workholding equipment.

This table has been tested and validated by Advanced Machine Tool Testing Facility (AMTTF) located at CMTI Campus, Bengaluru. The product has already been sold to M/s ABS Machining Inc, Toranto, Canada.

Speaking on the versatility of the product, Managing Director, UCAM Pvt Ltd, Indradev Babu said, "The table is useful for industries wherein a large component needs to be machined. The advantage is that the large component can be machined with high precision in a single set up on varying axes, negating the need of changing set ups. Application areas include heavy engineering industries like power generation, wind turbine machining, aerospace, railways, pump & compressors, large valve manufacturing, capital goods, infrastructure, etc." The company is also investing in a new plant with a state-of-the-art facility on 7 acre of land at Dobbaspet near Bengaluru, which will specially cater to the manufacturing of large size rotary tables.

Source: UCAM Pvt Ltd

Visitors at the launch of large size rotary table at the CMTI campus

Siemens' Productivity Tour a Success

New Delhi – To increase awareness about productivity solutions, Siemens had recently unveiled its productivity bus. The Northern leg of the tour started off in Noida and has already covered over 30 cities The first day itself, the tour bus witnessed a crowd of 50–100 people.

The company has successfully been able to achieve its goal in 'driving productivity to your doorstep' through this nation-wide, multi-city mobile road show indeed. This mobile road show helped them reach each and every nook and corner of the industrial pockets of the country, which were otherwise inaccessible through other traditional marketing media.

Visitor, Factory Head from Chandigarh, Rohit Kapoor said, "The live demos were very informative and helped me understand the benefits of deploying automation solutions in my factory."

In the months of July and August, the 'Productivity Tour' trailer will be covering key industrial belts of Rajasthan, Haryana and Gujarat.

Source: Siemens Ltd

Visitors watching live demos and various presentations in the trailer

Latest from Haas at EMO 2013

Hannover, Germany – EMO 2013 will witness Hass showcasing its latest range of high-productivity vertical mills. The company's booth will feature sixteen of its latest model CNC machine tools, including the high-speed vertical machining centers, 50-taper, high-powered machines designed to take big cuts, high-productivity turning centers with live tooling and dual spindles, powerful, small-footprint drill-tap and toolroom machines, and specialist vertical machining centers for toolmakers.

"Haas Automation has always thrived when trading conditions are difficult," says Managing Director, Haas Europe, Alain Reynvoet, "And 2013 is already turning out to be one such year, with a 24 per cent increase in first-quarter sales, compared to 2012, much of which is due to sales of recently introduced products."

Source: Haas Automation

The CAM-driven HRC210 CNC rotary table that will be showcased at EMO 2013

"Our machines are designed to offer lower cost of ownership, high productivity and outstanding reliability, meaning companies can invest with confidence knowing they can make parts quickly, efficiently and, most importantly, for a profit," he continued.

GreenCo Summit 2013 Honors Going Green

Pune – The GreenCo Summit 2013 is an initiative by Confederation of Indian Industry (CII) in its mission to promote Indian companies to make their daily operations sustainable beyond having sustainable buildings. Against this backdrop, Dr APJ Abdul Kalam, former President of India and brand ambassador of the Indian Green Building Council (IGBC), called on the industry to evolve new energy utilization norms.

Source: CII

Dr APJ Abdul Kalam speaking at the Summit

Dr Kalam said, "21st century companies will have unique challenges of maximizing the output, human resources and machinery with minimum clean water availability and with minimum clean air and maximum fossil fuel driven electricity. That calls for visionary decisions for solar and wind powered company and generation of water bodies inside the company."

Nine companies were awarded the GreenCo rating. These include Bengaluru International Airport Limited (BIAL), ITC Limited PSPD Division, Vasavadatta Cement, ACC Thondebhavi Cement Works, Brakes India Ltd, JK Tyres & Industries Ltd, HIL, Thyssenkrupp Electrical Steel India Pvt Ltd and Hindustan Unilever Ltd.

Blaser Swisslube Organized Technology Summit

Source: Blaser Swisslube

The Blaser Swisslube summit attendees

Hasle-Rüegsau, Switzerland – Blaser Swisslube, a lubricant company, recently organized a summit for manufacturing experts and scientists of the global aircraft industry. The event took place in cooperation with Abamet (distributor of Blaser Swisslube and Haas machine tools in Russia) and VSMPO (the world's largest titanium manufacturer).

The summit provided over 70 participants the opportunity to discuss future titanium developments, display the latest achievements and applications of titanium machining and technologies as well as future challenges. In addition to these, other measurable productivity factors such as choosing the right lubricants were discussed.

Besides well-known helicopter and aircraft engine manufactures like Airbus, Boeing, Embraer, Sukhoi (Superjet 100), Eurocopter and Rolls Royce, suppliers and component suppliers participating, the summit also witnessed participants from universities world-over. The event succeeded in bringing together the experts and scientists of the global aircraft industry to share their knowledge about titanium machining and the latest materials like composites.

CHEP Minimizes Carbon Footprint

United Kingdom – CHEP, the world's leading provider of pallet and container pooling solutions, has achieved significant energy savings through the installation of energy efficient Atlas Copco compressors at its pallet production and repair sites in the UK. The savings from the installation of energy-efficient compressors, backed by a program of planned, preventative maintenance have been measured at over 1,000 tonnes of CO_2 emissions.

Source: Atlas Copco

Pallets manufactured by the company

As a sustainable and environmentally aware organization, CHEP wanted to maintain its commitment to minimize its energy demand and carbon footprint. Subsequently, the company's UK site managers undertook an 18 month review of energy efficiency and CO_2 emissions at the company's process plants.

Plant Manager, CHEP Pontefract Service Centre, Simon Wood averred, "Our relationship with Atlas Copco in the UK is fantastic, and the whole project has been a resounding success."

Lapp Experience Center Launched

Bengaluru – Lapp India recently inaugurated its first Lapp Experience Center. The inauguration ceremony marked the presence of Chairman of the Board, Lapp Holding AG, and Honorary Consul of the Republic of India for Baden-Württemberg and Rhineland-Palatinate, Andreas Lapp, and Director of Lapp Holding AG, Siegbert E Lapp, and Consul General of the Federal Republic of Germany, Dr Ingo Karsten as the Chief Guest.

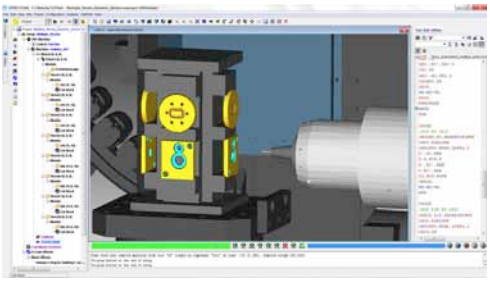
Source: Lapp India

(LtoR) Facility inauguration by Chairman of the Board, Lapp Holding AG and Honorary Consul of the Republic of India for Baden-Württemberg and Rhineland-Palatinate AG, Andreas LAPP, Consul General of the Federal Republic of Germany, Dr Ingo Karsten and Director of Lapp Holding AG, Siegbert E LAPP

Eight key industry verticals will be the main focus of their solutions, viz., machine tools, automation, automotive, public sector, buildings, projects business, renewable energy and process. The facility will also showcase the entire product portfolio offered by the company to its customers; thus enabling them to find a perfect solution for their needs.

CGTech and SGS Carbide sign Partnership Agreement

Source: CGTech India



Software showing CNC simulation

Bengaluru – SGS Carbide Tool signed a technical partnership agreement with CGTech, developer of the CNC simulation and optimization software, VERICUT. Speaking on the alliance, Managing Director, John Reed said, "Like SGS, we provide the opportunity for manufacturing companies to improve their productivity and effectiveness. Both companies share customers that form the leading technical edge in their industry sectors like aerospace, oil and gas, medical, etc. The technical partnership will allow us to work together, for mutual benefits to both partners."

Managing Director, SGS Carbide Tool, Alan Pearce added, "Our technical center has been established to support key customers with the programming of, and cutting tool trials for, existing components as well as providing the opportunity to test SGS cutting tools on new projects. We know our customers trust VERICUT to protect their machine tools and optimize their efficiency, making the decision to become a tooling partner very straightforward."

TRUMPF Holds Multi-city Technology Day

New Delhi – TRUMPF recently organized a 'TRUMPF Technology Day 2013' through which the company aimed to keep its customers updated on the latest solutions and technology in the field of sheet metal fabrication.

Presentations from different business divisions like machine tools and laser technology were made. These were well received by the audience and created a strong connect with their respective applications on the production floors. The event also featured a partner presentation by the Linde Group, which focused on the usage of laser gases and the products they had to offer from their portfolio.

TRUMPF TruServices also provided an insight into the world of service, application and spares. The presentation focused on the current trends for service and the future possibilities for quicker spares delivery and application support.

Four cities were choosen for participation—Bengaluru, Chennai, Ahmedabad and Delhi—on the basis of customer networks. A total of 200 customers were present at all the technology days.

Source: TRUMPF (India)

Customers in full strength at the seminar

Freudenberg's ₹6 Crore Investment in India

Bengaluru – Freudenberg Group, part of EagleBurgmann KE Pvt Ltd, has announced its latest investment in a new manufacturing operation for non-metallic expansion joints in Chennai. The Group underpins its intention to foster engagement in the region. The company has rented a site of 12,000 sq mt—of which 6,000 sq mt is to be used for manufacturing.

Total investment in the new plant amounts to ₹6 crore. The facility will be operational from the fourth quarter of 2013. This is being done in line with the company wanting to expand its competence, product range and services by investing in new technology to manufacture steel frames for non-metallic expansion joints and metal bellows. The company has more than 20 years' experience in fabric, metal and rubber expansion joints for customers in the oil and gas, LNG, foundry, marine and many other industries.

Source: Freudenberg Group

(LtoR): Head Corporate Communications, Freudenberg Group, Cornelia Buchta-Noack; Regional Representative India, Freudenberg Group and Chief Financial Officer, Freudenberg Chemical Specialties, Dr Jörg Matthias Großmann; President & CEO, Klüber Lubrications India Pvt Ltd, Viju Parmeshwar, at the press conference.

Tata Power Solar bags largest project from NTPC

Source: Tata Power Solar

CEO, Tata Power Solar, Ajay Goel

Bengaluru – Tata Power Solar has won a prestigious 50MW solar photovoltaic project from NTPC as part of its mandate to expand its renewable energy portfolio to 1,000MW by 2017.

The new flagship 50MW project, at Rajgarh, Madhya Pradesh, will double NTPC's solar capacity. Once commissioned in March 2014, the project is expected to generate 78.66 million units (kWh) of energy each year for MP Power Trading Company Ltd for a state that runs annual peak deficit of 9.6 per cent (per CEA, June 2013).

"We are proud to be partnering with NTPC on this flagship 50MW solar project to bring much needed peak power to Madhya Pradesh. This project brings together two of our core strengths in solar–market leading solar module manufacturing and, competitive, high-quality engineering, procurement and construction (EPC) capability," said CEO, Tata Power Solar, Ajay Goel. The key criteria for awarding this project were strong technical capabilities and competitive pricing along with the scale and strength to execute this project on time. Tata Power Solar's strong module manufacturing capabilities as well as impeccable track record in executing its projects were instrumental in winning this landmark project for them.

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DMG/Mori Seiki Hosts Technology Open House

Bengaluru – DMG/Mori Seiki recently held an open house at the Bangalore Technology Center. The event garnered the industry's leading suppliers in metrology, tooling, controls and software alongside its own team of specialists. With live machining on 16 high-tech exhibits and industry focused seminars, visitors received a comprehensive overview on the machining challenges in specific industries: automotive, pumps, aerospace, energy as well as die and mold.

Open house was segregated into two sessions; The morning one was reserved for seminars with in-depth technical discussions and the afternoon session offered a space where solutions discussed could be practiced on live machines.

The company also encouraged its visitors to bring drawings and requirement lists, as the event was meant to be a perfect platform for getting a complete solution including all aspects of software, metrology and tooling. The exhibition featured machines for turn/mill technologies that allow a workpiece to be finished with just one clamping bringing significant flexibility and productivity to modern shopfloors.

Source: DMG/Mori Seiki

Comprehensive seminar being conducted on machining techniques

MathWorks India to Host MATLAB EXPO 2013

Bengaluru – MathWorks, the world's leading developer of mathematical computing software for engineers and scientists, is organizing a one day event — MATLAB EXPO 2013 — at NIMHANS Convention Centre on 21 August 2013.

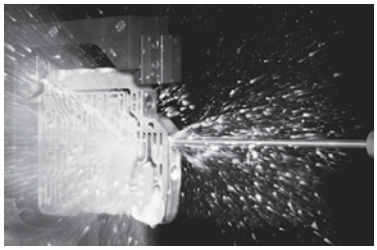
The event will give engineers and scientists from leading organizations, MathWorks experts, and partners a platform to learn about the latest product capabilities in MATLAB and Simulink, exchange ideas, share successful case studies and network with industry peers. Sessions will be presented by MathWorks experts as well as MathWorks customers in India. MathWorks Fellow, Jim Tung will deliver the keynote address entitled 'Embracing Complexity' and discuss how companies and universities are creating and adopting new ways to master the development of complex systems and the analysis of complex phenomena, using MATLAB and Simulink. The conference features three technical tracks technical computing, control design and signal processing and communications.

Source: MathWorks

MathWorks Fellow, Jim Tung will give the keynote address at the event

parts2clean 2013 will Feature De-Burring Methods

Stuttgart, Germany – The 11th session of the leading international trade fair for cleaning of industrial components and surfaces takes place from 22–24 October 2013 in Stuttgart. The list of exhibitors already includes more than 200 companies from 14 countries.



Source: Dürr Ecoclean

Simultaneous de-burring, chip removal and cleaning of workpiece using high pressure water jet with pressure of up to 2,000 bars

The event will focus the spotlight for the first time on de-burring. Burrs and chips occur at almost every stage in the manufacture or processing of components. These unwanted and mostly sharp-edged fragments of material pose an injury hazard, and such production waste can also affect the quality and function of the product.

There is no way to side-step the need for de-burring. The question is which procedure can be used to carry out this task efficiently and without endangering processes. Also does de-burring pose special requirements on cleaning the parts. "If specific cleanliness requirements have to be met with regard to the residual particulate contamination, then de-burring of the components becomes a basic essential. That's why this year's parts2clean will focus on de-burring," said Head, Surface Technology, Deutsche Messe, Olaf Daebler.

Wheelabrator Conducts Seminar for Auto Industry

New Delhi – Wheelabrator recently organized a technical seminar on 'Shot Peening Technology' in Gurgaon. Shot peening is an undervalued process that can enhance the fatigue resistance of highly stressed metallic components. The seminar threw light on how it can improve the performance of safety-critical components.

"Automotive is a very important industry for Wheelabrator. We are honored to host this technical seminar, as this will further enhance the efficiency of the auto industry by educating stakeholders on the latest technology used," commented Vice President – Sales & Marketing, (Wheel & Air), DISA India Ltd, Jagadish Kulkarni. With participation of over 45 delegates from across 27 companies, the seminar was extremely well received by the audience with special commendation given to Wheelabrator for its efforts toward providing details to automotive stakeholders. The major automotive companies that attended the event included HMCL, Hi Tech Gears, Escorts, M&M Auto, Jamna Auto, Techno Springs, AMTEK and Sona Okegawa. The technical seminar followed with informative discussions and a networking dinner.

Source: Wheelabrator

Attendees at the seminar

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Turnarounds with Lean Management

It was with great optimism and expectations that Bridgeport USA and Texmaco, South East Asia came together to set up a joint venture for CNC and conventional machines, but sometimes, even the best laid plans can go awry, as happened in this case. Here's an in depth view at how establishing lean practices throughout the organization led to a complete turnaround in overall performance and achievements.

It seemed like a blueprint for success when some years ago, a joint venture was embarked upon by Bridgeport USA and Texmaco, South East Asia, with a view to build CNC machining centers, CNC and conventional milling machines in Indonesia. This set up was one of Texmaco's business verticals in its engineering business sector and its second one in machine tools.

The ambitious project was headed by seeded experts, including an ex-chairman of one of the world's largest machine tool company and the multicultural team comprised American, British, Chinese, Singaporean and Indian members. The land, building and manpower were supplied by the local partner while engineers and workmen were trained at the collaborator's factory in the US. And to crown it all, the local company had a foundry within the group, and the plan was to supply castings from within.

But five years down the line, with everything in place, teams and machines both working and incurring costs, a single machine was yet to be produced by the company.

Sanjeev Baitmangalkar
Principal Consultant
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Identifying the central problem

In five years, some castings were developed and some machining was done but it was never converted into a complete machine. Internal discussions revealed that the business process was not well-defined and diverse views between the marketing and operational departments were essentially creating a block. There was a value stream with nothing flowing and the thinking was topsy-turvy and discrete. We asked ourselves:

What processes were going wrong? What could be done to change this situation? We then came upon a solution and in this article, out of the various products manufactured, the milling machine has been used as a reference example to explain the case.

The main issues

The factors that were identified as playing a role in the company not being able to produce any machines were:

- No clear authority in place, although people with roles were in place
- Indonesia was and is not a name known for machine tool production in the global market
- Focus on the product market matrix and price point for market entry was missing as was an evaluation of correct market scenes.

Although the company was supported by technical knowhow from the parent company, a proper buy back arrangement was missing, thereby both sides were losing out on potential opportunities.

- Target markets were not clearly identified, although everybody knew that there was a market for such machines
- Core competencies required to build this business were not identified. A good business process, sound philosophy and proper perspective were wanting.
- The pricing factor had probably killed the project. There was total disconnection between expectation and reality. For example: the thinking that prevailed was

Lean thinking helps companies turnaround their current processes

Source: depositphotos / get4net

that we were expected to sell a milling machine at $10,000 per piece, while Taiwan sold them for approximately $2,400-2,600 a piece. While Taiwan sold about 35,000 machines a year, Bridgeport's numbers were at best in triple digits.

▶ The casting factor probably pulled down the project too. The group's own foundry was dictating the price, quality and quantity of casting supplied. The foundry's expectation was a price of $1.40 per kg of casting, which could otherwise be sourced from Taiwan at that time for $0.3 – 0.55 per kg in fully machined condition!

▶ Since all the previous years had gone without testing a single product, the accuracy and reliability of the equipment, tooling and people were not tested and established.

▶ Lead times for various activities were unknown. Operations were not standardized and throughput times were not known.

▶ The first few sample milling heads or initial requirements were to be purchased from the collaborator. The prices of these were not competitive and in fact, were exorbitant, thus making the product unsellable. The brand may have had its name, but knowledgeable customers knew cost effective sources for similar machines and their features. Why was the milling head design put into a delay phase of development? Confidence, lack of knowledge or the capability to process it?

▶ The opportunities in machining centers presented more excitement. Why was this on the next phase? Why was it not concurrent?

▶ What was the strategic intent of the local partner? What was the overriding philosophy? Was there intent to make this company profitable? Was it serious about the joint venture plans?

▶ The plant and equipment supplied by the collaborators were rebuilt machines; they were never put to test here and were never beaten for production. The capacity, capability and reliability of this line was not proven and established.

▶ The percentage market share of the collaborator was less than one half percent of the milling machines market. Where was the argument then about what the customer's wanted?

▶ Did the owners have intent to flourish in this business?

It was clear that we had to think of ways to quickly establish the manufacturing, its supply chain, establish throughput times, lead times, and deal with cash cycles etc., all while contending with detractions from peers and discrete thinking within the group.

Source: Sanjeev Baitmangalkar

Turret milling machine in use

Formulating the strategy

The long-term objective was to develop a supply chain from within Indonesia and that would include our group companies – provided they were competitive. But in the short-term we had to address the market needs too. We had to develop reputation of being a reliable machine tool manufacturer and service provider. Considering the training and development time required within, we needed a strong short to medium-term strategy that could catapult us into the global markets and help understand the customer requirements and establish us as reliable suppliers. These strategies were:

● Buy gears and castings from in-house group companies

We had to test ourselves to produce all components in house. Could we develop them all simultaneously? Were we geared up for it? The head was a critical assembly and had intricate component machining. Among the machinery installed, there was no machine available to finish machine high precision parts. The hardening facilities for the spindle were also not installed. A group company that had a gear shop could have been asked to supply gears, but they did not have proper equipment to produce gears of quality class IT-5 and 6. So in our assessment the factory was not ready to produce the 'heads' in-house. We had to either source the components or the assembly in the short to medium term.

The group foundry was ready to supply castings. They had received the patterns of parts other than the head from the collaborator and made some sample castings. Quality issues on casting prevailed but, these could be resolved and overcome. The foundry was selling the castings at $1.40 per kg and wanted to be the final authority on price and salvaging standards! These factors would render us uncompetitive in the global market and hence was not acceptable.

The advantage of building this assembly in house was obvious, and we wanted to get to this stage and bring in all that value addition. However, in the beginning our priorities included customers, markets, channel partners, supply chain partners, working capital, etc. Thus, in the beginning we were not equipped to produce everything in-house.

● Source from points of cost advantage without sacrificing quality

Although cost-based strategy would have been the right approach, with the outsourcing thought the differentiation strategy may not hold out. We could source the parts or assemblies from India or Taiwan but this singular approach would not help develop internal competence.

● Concurrent strategy

The critical issue was that even after five years since inception the joint venture had failed to produce machines, bag orders,

Source: Sanjeev Baitmangalkar

Milling machine for varied applications

establish markets, and corner a share in the market place. Everybody was eager to begin producing and delivering machines. The concurrent strategy was to set up two supply chains; one that focused on developing internal competence (long term), while the other supplied parts from Taiwan until such time we had developed competence to produce parts of the required quality in the required takt time. This would give us the following advantages and help overcome all the in-between problems:

- To start with, we would commence manufacture of all components other than the 'milling head', and work on perfecting the supply chain, procurement cost and quality, manufacturing processes, cycle times, lead times, throughput times, standardize work, develop the ability to solve problems, documentation etc. All that would ensure rapid flow of components.
- Initially we would not be constrained by the results of in-house processes for component manufacture – considering the used machines handed down by the collaborator, and whose process capability was not established or proven. But, could respond to the market demands and fulfill those using outsourced components.
- One of the dominant challenges was building in the core competencies, lean systems and processes required to succeed. This was our top priority. The outsourcing strategy was to gain time to build these competencies and yet not lose the present market, but to begin building a reputation and an image.

● Bring in the machining centers & CNC milling machines

Our intent was not to lose out on present markets while quickly moving on to future ones. We knew that to gain a share of this market we had to compete with the Taiwanese manufacturers, besides with the exception of Singapore, South East Asian countries are not known to be machine tool producers. To make money in this market one had to produce at low costs and high volumes; however, the sales volumes and contributions could only improve by enriching the product mix. The collaborator had a range of CNC machining centers and CNC milling machines. The bigger opportunities, greater markets, and better contributions lay in these products.

Living the challenge

We knew what to buy and from where to gain that cost advantage. We challenged ourselves to buy components from Taiwan, on 30 days credit, build the machines, ship them, collect payment, and pay the supplier all in less than 30 days. Our negotiating skills brought a huge cost advantage, which looked something like:

Taiwan was the biggest seller of these machines; the challenge for us was to be more competitive than Taiwan even though we were sourcing from Taiwan! To give you a broad idea, the costs worked thus then:

If Taiwan sold a machine at $2,400- 2,600, we couldn't price ourselves over this as it would hinder the share acquisition from a country not known to produce machine tools. We had to be equal or be at a better notch at least at entry level. We challenged ourselves to sell at $2,200 - 2,300 a machine.

We bought complete raw material in fully machined and ready to assemble condition at $ 1,180 per set. With internal fixed costs, painting, packing and warranty at $350 per set, there was a clear surplus generated of $670 (or $770) per set. This meant that at 100 machines per month we would generate a surplus in excess of $800,000 (or $925,000) per year! This was targeting to take away a mere 3.5 per cent share from Taiwan. There was scope to take more market share and further consolidate revenues with the rest of the Bridgeport product range.

Source: Sanjeev Baitmangalkar

The milling head

This was fantastic news for any factory that was struggling to produce its first machine for five years. Naturally as in house production of components took over, the contribution would only increase. The advantage of this strategy was in being able to start up manufacturing and delivering with short lead times, enabling to establish a network of dealers and build an image.

Possibility thinking

Another problem to overcome was the absence of working capital. We challenged ourselves to set this up without initial capital. All the while everything we did was tuned to the lean practices as best known to us. Our core team was motivated to believe that we could do this.

We carefully selected supply partners, agreed on lead times, quality and delivery. We placed annual orders and indicated initial pickoff quantities that would self-convert into demand rates later. One supplier was nodal to the shipment of everyone's parts. We then picked a liner that best maintained schedules. It took seven days for the ship to dock in Jakarta, two days to receive the container at factory and two days to build the machines. So the machines were ready for delivery in fifteen days from parts' shipment. We shipped the machines, encashed the letters of credit and paid our suppliers on the 30th day.

The victory

From all the alternatives discussed above the dual strategy action taken by us was perhaps the best. The ownership of the group and the management at first were divided on this issue. However we went ahead as it was in the best interest of the company and its stake holders. Enacting the dual concurrent strategy we quickly had the assembly and dispatch bay's in the factory buzzing with activity. In about six months we had established channels around the world, booked firm orders, which were covered by order commitments for the next year and a half, received letters of credits for payments.

What made this transformation happen? Lean thinking! The multi culture of the work force was not an issue, even though they exhibited varied levels of resistance. As long as we were focused, thinking and acting lean, everything else fell into place. MMI

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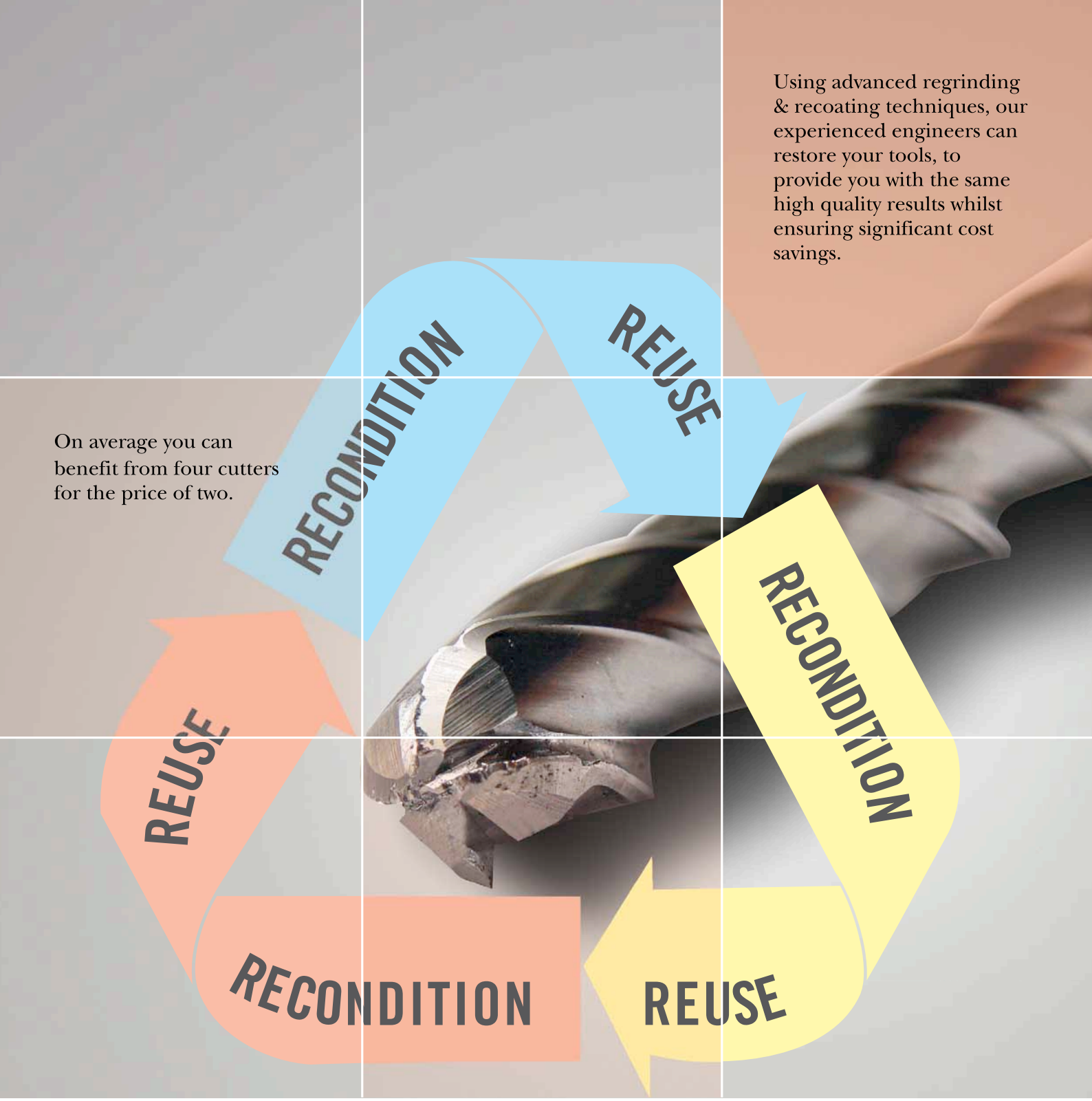

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"Technology Can Only Be Bridged Through R&D"

President, CG Power (Asia), Executive Vice President, Crompton Greaves Ltd and President, Indian Electrical and Electronics Manufacturers' Association (IEEMA), J G Kulkarni, details on the state of the contemporary power sector and draws a blueprint of the industry.

Please share your views on how continuous innovation and investment in R&D can facilitate the Indian power sector to boost cost efficiency, while keeping sync with high standards of quality?

J G Kulkarni: Though Indian energy companies, especially those in the power sector, are deploying state-of-the-art technology, advanced machinery, manufacturing techniques and processes and widespread automation techniques; they do not seem to be focusing much on R&D and innovation, despite it being the need of the hour. With rapid growth in the power sector challenging opportunities for innovation have opened up in areas of technical and operational management. As the power sector is highly technology intensive, R&D plays a major role in developmental plans and technology upgradation. The technology gaps in power sector (generation, transmission and distribution) can be bridged only through R&D.

While a strong focus on improving the design of plant components is vital, there should also be emphasis on evolving cost efficient overall processes. A holistic approach should be followed to leverage the latest developments from IT, electronics and communication to improve the control and instrumentation system, data acquisition system and monitoring of system performance parameters. Moreover companies should focus on developing a skilled manpower base to facilitate the industry to reach higher levels, making the sector globally competitive. It is worth a mention that many organizations have their own employee skill development programme to enhance productivity, quality and competitiveness.

Source: IEEMA

"There should be an increased impetus to industry-institute partnerships in countries such as China, Germany, USA & Korea." - J G Kulkarni

With quality management having huge impact on organizations and direct effect on customer satisfaction and cost control, how can companies today leverage the best out of it especially when it comes to beating competition in the domestic market?

Kulkarni: With domestic electrical equipment manufacturing companies competing with global manufacturers, it is important for the companies to maintain quality and keep costs under control. As the Indian market is very demanding, companies need to utilize the best of available resources to get a kick start for competing in the local market.

While the performance of the domestic electrical industry has been strong over the last decade, it is important to sustain a high rate of growth if it has to meet the demands arising out of the targeted generation capacity addition; meet the growth of other sectors of the economy and also become globally competitive and increase exports.

Hence, it is important to provide a level playing field in the country to domestic electrical equipment manufacturers vis-à-vis foreign manufacturers, who are enjoying support from their respective governments with respect to subsidies on raw material, incentives to export, low cost of funds, better infrastructure, etc. A large number of skilled workers coming out of technical institutes

do not possess the required skills and are not employable. The industry has to spend time and money on their training.

In the wake of increasing demand for more energy efficient machines where do you see the role of copper as a raw material in improving energy efficiency of electrical products in the near future?

Kulkarni: As copper is an excellent conductor of electricity, it is one of the best raw materials when it comes to improving energy efficiency of electrical products. With growing demands for electrically operated machines, consumers worldwide seek more energy efficient devices. There is a need to continuously promote and tap copper's limitless potential for electrical applications. Efficiency in turn translates into lower operating cost, increased reliability, longer lifespan, and lower risk of brownouts, increased safety and more capital for business investments.

Increasing share in copper foils that are required in cables and transformer industries are showing phenomenal growth in India. Increased government spending in the power sector and grant of infrastructure status will surely give this sector a big boost. Foreign investment in the power sector, coming from clean energy sources like hydropower and solar, will definitely result in higher demand for copper.

With the Indian power sector playing a very important role in the manufacturing industry, how do you view the growth of the domestic manufacturing capacity of generation and transmission and distribution equipment?

Kulkarni: The expected investment in the 12th Five Year Plan period in the T&D segment would be ₹1.80 lakh crore in transmission and ₹3.06 lakh crore in distribution, while likely investment in the generation segment is estimated at ₹6.39 lakh crore. Based on investment estimates and capacity addition targets, domestic demand for T&D equipment industry is pegged at around $70–75 billion, while demand for generation equipment industry is seen at $25–30 billion by 2022. Based on the sector's growth projections in the previous plans, India's electrical equipment industry has been investing in capacity enhancements. However, the capacity utilisation of the T&D equipment industry is broadly only 70 per cent, which is a matter of concern for the industry.

Investment in new technology and modernization, like 1,200 kV transmission lines, +/-800 kVDC transmission, planning of smart grid projects and establishment of the national grid by the Power Grid Corporation of India are major steps towards efficient utilization of energy by evacuating electricity from power surplus regions to meet demand in power deficit regions.

PERSONAL

"A large number of skilled workers coming out of technical institutes do not possess the required skills and are not employable. The industry has to spend time and money on their training."

J G Kulkarni

For the generation equipment segment, the total manufacturing capacity of BTG equipment at present in the country is about 25,000 megawatt (MW) per annum and is expected to increase to 40,000 MW per annum by 2014-15, once more joint ventures commence production. Generation equipment such as boilers and turbines are being produced at full capacity utilization to meet the growing demand in the country. Many companies have set up new capacities, while the existing ones are augmenting their capacities.

What are the chief deterrents in the growth of the industry and how can those be addressed?

Kulkarni: Absence of a level playing field for the domestic industry to compete with imported electrical equipment, especially from China, is a clear and present threat. Also, disproportionate reliance on imported power equipment, with uncertain quality and lifecycle, and with no domestic manufacturing facility to provide immediate spares, replacements, etc., especially for heavy equipment, is fraught with long-term risks. The government needs to provide greater encouragement to indigenous manufacturing as done by several countries, including China. To stimulate demand for the domestic electrical equipment industry, the government should expeditiously address the challenges confronting the country's power sector, including the problems in fuel linkages, land acquisition, environmental and other clearances, precarious financial health of utilities, etc.

Although, import duty exists on T&D equipment (generally 7.5 per cent BCD) and generation equipment for non-mega projects (generally 5 per cent BCD, including project imports), there is need to hike it further. BCD should be increased to a uniform 10 per cent on all electrical equipment products. Import duty reduction should not be even considered in light of the capacity underutilisation in the domestic industry and the huge imports already taking place.

How do you perceive the potential for India in the electrical equipment market in terms of exports?

Kulkarni: With the demand for electrical equipment in Europe tapering due to lingering recession, African countries provide us an opportunity to boost exports. As the outlay for power sector infrastructure and development and power reforms in Africa runs to the tune of approximately $90 billion per annum, we aim to tap the African continent for boosting electrical equipment exports through IEEMA's 'Go Global' theme at ELECRAMA 2014. Moreover Africa being India's fourth largest trade partner, bilateral trade between the two is estimated to reach $100 billion by 2015.

How does IEEMA reach out to the electrical equipment manufacturers in terms of creating awareness on the latest trends and technology?

Kulkarni: We undertake several initiatives encouraging manufacturers to work on energy efficient technology and products and make all efforts to recognize the 'Made in India' brand overseas, through international seminars, keeping the industry abreast of the latest technologies. We also organize various technical conferences every year to reach out the industry peers such as SWICON for switchgear, TRAFOTECH (conference, workshop and exhibition) for transformers, TECH-IT for instrument transformers, METERING INDIA for meters, CABLEWIRE for cables and conductors, ELROMA for rotating machines, CAPACIT for capacitors and INSULEC for electrical insulation materials. Besides these, we also hold technical conferences based on topical scenarios like CIGRE conference on heavy electrical equipment and GRIDWEEK ASIA on smart grid. MMI

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

Shifting the Limits of Possibility

Fronius International GmbH attributes its success to shifting the limits of what is possible for its customers. With a stronghold on R&D, the company has created many new technologies for monitoring and controlling energy. Wanting to bring this technology to India and expand its market share, it is now set to open its very first facility in India.

Started in the town of Pettenbach, Austria in 1945, Fronius International has grown tremendously over the decades. It currently has 19 international subsidiaries and deals in over 60 countries. Taking cognizance of the increasing awareness in quality as a rising subject in India, the company sees a brighter market for its product with most buyers wanting to use only the best that is available.

Nedra Pereira
Senior Feature Writer
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It has been providing innovative solutions to the Indian market through local partners for roughly 15 years, and its valuable clientele already boasts of some big players in the industry, such as Reliance, Larsen & Toubro, and Volkswagen, to name a few. Observing an opportunity to explore the Indian market further, it now looks at foraying into India by setting up its own facility in Pune. "The decision to set up base in India is based upon our products gaining momentum and importance in the market. Our intention is to provide high-quality products along with continued support to our customers," says General Manager, Fronius India Pvt Ltd, Gerald Schmitt. The facility will be operational by 1 August 2013.

Innovative technology

With 864 patents to its name, the company currently deals with three main divisions—welding technology, solar electronics and battery charging systems. The firm plans to offer solutions of all the three divisions in India too. "Our welding division is already a strong contender in the Indian market, especially in the automotive sector," asserts Schmitt. An example of the firm's innovation in welding is the Cold Metal Transfer (CMT) system, which made it possible to join steel and aluminum. Before this innovation, the joining of these two metals was said to be impossible. "The main goal is to bring a new feel to welding equipment in India. With the new facility, Fronius India will not only

Source: Fronius International

Fronius facility located at Sattledt, Austria

provide top-quality products but also offer the highest level support," expresses Schmitt.

Quality is another aspect that this company does not compromise on. For example, its solar inverters have a 20-year warranty period. Schmitt says, "Owing to the depth of production, the need for purchased parts is very little, and therefore, we have a much better influence on state of quality than our competitors. This allows us to pass on these benefits to our customers by means of a long warranty period."

Eyeing the solar sector in India, Schmitt adds, "The solar market especially for small and medium projects is almost untouched as most of the project business is focused on the big government driven projects. We see a big potential for growth here." He also opines that he sees India as a prospective market for their other offerings as well and will focus on them accordingly with careful development.

The company, as it does worldwide, will cater to a range of sectors across the three tiers, such as automotive, shipbuilding and offshore, power generation, yellow goods and construction.

Uniqueness of facility

On its strategic move of choosing Pune as its headquarters, Schmitt declares, "Pune is a hub for the automotive industry and many of our existing customers are in automotive related businesses. As a whole, this is the right spot for us. Excellent schools in Pune will also guarantee for well-educated staff."

As the company wants to be able to develop solutions rather than just be a source to buy products, the Indian facility will also feature an R&D hub, ensuring that customers get an all-round solution with technology know-how for their needs. He avers, "We aim to forge a lifetime relationship with all our customers, one that is mutually beneficial to all involved. We recognize that our customers' business is ever evolving and developing. Hence, we want to make sure that the equipment we provide is always able to cope with different changes along with also being available to new requirements of our customers."

Training programs

The facility will also have a workroom to be used as a training ground for customers' employees like welders who need to be educated on the latest techniques or new technology for their solutions. The room will also feature three robot cells for research on automated solutions as well as all equipment required to do the same on manual systems.

Training programs as well as seminars will be held throughout the year at the facility. The Pune headquarters will also be a stage for regular seminars, with specialists from Fronius Austria as guest speakers at these events. Schmitt indicates, "This is mutually beneficial for customers as well as us. We depend on market feedback and demand to be able to stay ahead and keep our position as technology leaders. Only with this input from the welding world can we ensure that R&D at Fronius Austria is developing the right solutions for the market."

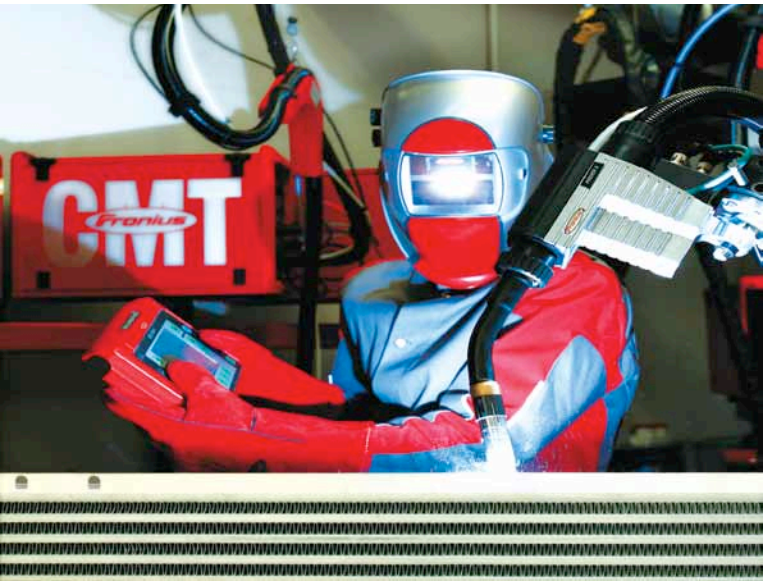
Future plans

There are plans to have three other holdings in India in the first year, viz. Delhi, Chennai and Bangalore, apart from Pune. It aims to further increase to at least four more teams at strategically important areas in India. It also has expectations of not less than 10 per cent growth per annum. Talking about the expectations from India, Schmitt states, "As India provides endless opportunities for the firm, these figures can of course be pushed. We will have to prove ourselves to the customers and the Indian market." MMI

"The main goal is to bring a new feel to welding equipment in India. With the new facility, Fronius India will not only provide top-quality products but also offer the highest level support."

General Manager, Fronius India Pvt Ltd, Gerald Schmitt

Welder supervising automated welding process



Solar inverters that produce green energy using multi-thread technology

Source: Fronius International

POWERED BY Modern Machine Shop
GARDNER BUSINESS MEDIA, USA

Five-Axis CAD/CAM Lends a Hand to Prosthetics Manufacturing

By using a five-axis machine and a complementary five-axis release of Visi 20 CAD/CAM software from Vero, a manufacturer reduced setups and established more cost-effective production runs for complex prosthetic components.

Leading shops are often able to help customers establish a more efficient manufacturing process for their new products. This was the case two years ago when UK-based Delta Tooling (Horsham) was approached by RSLSteeper to machine five complex components for the company's new Bebionic3 prosthetic hand.

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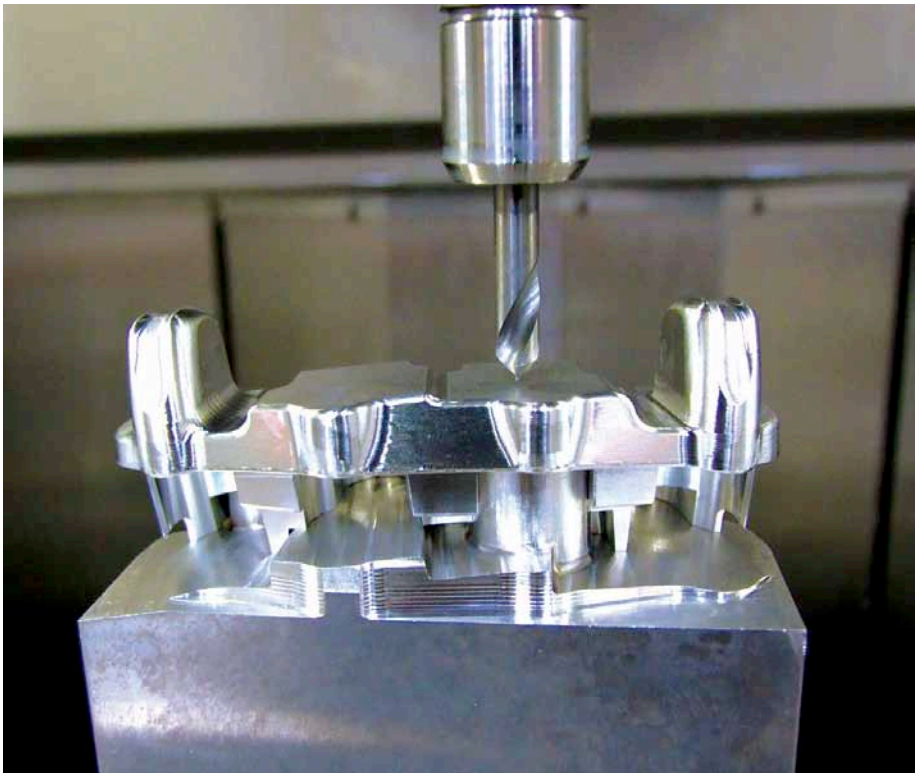
Challenges

The prosthetics specialist asked Directors, Delta Tooling, Gary Childs and Luke Tetlow to assist in the manufacture of its advanced prosthetic hand, which assists amputees by performing 14 different grips that mimic human movement. RSLSteeper's initial concept was to cast or mold the hand's five components, followed by finish-machining operations and then assembly and testing. Instead, Delta Tooling suggested milling the components from billet material, using some of its existing equipment to perform 3+2 machining operations based on programs created using the shop's Visi 15 CAD/CAM package from Vero Software. That way, preliminary molding and casting processes could be eliminated altogether for more streamlined part production.

However, as the complexity of the components grew, it soon became clear that the company required the flexibility of full five-axis machining. Each hand included

Source: MMS Online



When machining the aluminum knuckle component of the prosthetic hand, a dynamic incremental stock (DIS) command automatically trims the tool path to remove unnecessary movements and air cutting

Delta Tooling

Challenges

- Machine five complex components for Bebionic3 prosthetic hand
- Assist in manufacturing of the advanced prosthetic hand

Solutions

- GF AgieCharmilles Mikron UCP 800 Duro
- Visi 20 CAD/CAM package from Vero Software

Results

- Cost-effective and efficient production
- Quality finish
- Reduction in number of setups

"The combination of the new five-axis Mikron machine tool and Visi five-axis programming software is making us even more efficient and competitive for all of our customers"

Director, Delta Tooling, Gary Childs

an aluminum knuckle, a plastic sub-section to which it connects and a complex thumb bracket that enables the opposable thumb to rotate and move backward and forward. In order to machine these tricky parts more effectively, Delta invested in a GF AgieCharmilles' Mikron UCP 800 Duro and updated its programming software to the latest five-axis release of Visi 20.

Role of software

The Visi 20 software enables operators to prepare part geometry for manufacture and create efficient five-axis tool paths. CAD data can be imported into Visi in file formats including STEP, IGES and Parasolid. Various checks are performed on the file to ensure its integrity before laying it out in a way that can produce the component from the machine tool's point of view. Then the shop assesses the part's machinability. Childs explains that running Visi's machining collision control and kinematic simulation is extremely valuable. "Having just made a major investment in a new five-axis machine, the last thing we want is to cause a collision. That's why we always run full kinematic simulation prior to any production run," he further added.

He notes that another important feature in the software is the dynamic incremental stock (DIS) command. This command automatically creates the stock model from the uncut material of previous tool paths to be used as reference data for subsequent milling operations. For example, the command enables rough machining on one side of the product, and after it's turned over, a new machining cycle enables rough machining again, without cutting air. This reduces the machine cycle time and enables the shop to produce components in a timelier manner.

Result

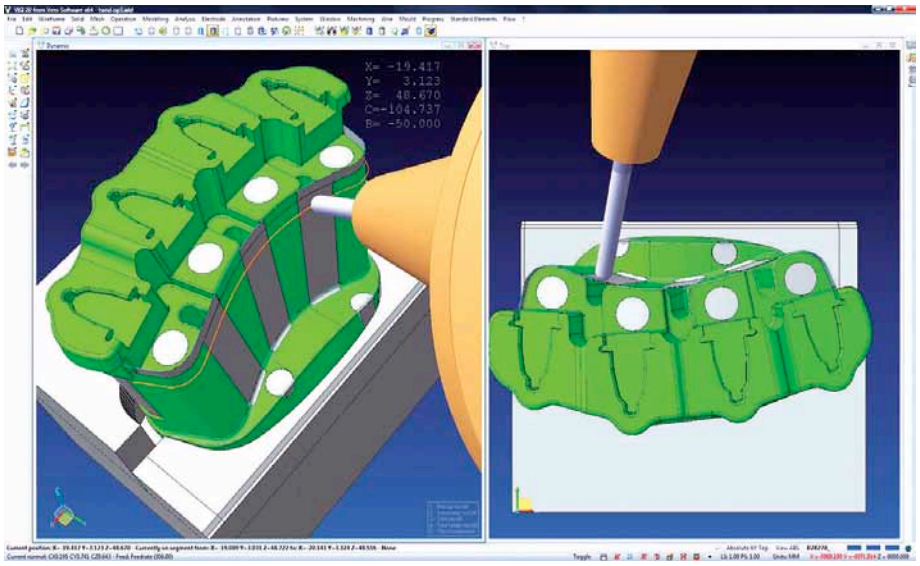
The Mikron runs almost constantly across two shifts, from 8 a.m. to 2 a.m., manufacturing to a call-off order for RSLSteeper on a monthly basis. It is also used for machining components in additional production runs for the company's various motorsport customers.

"The combination of the new five-axis Mikron machine tool and Visi five-axis programming software is making us even more efficient and competitive for all of our customers," Childs stated. "It not only gives a better quality finish on the product, but it means we can manufacture it in a more efficient timescale, thereby reducing the number of setups and producing cost-effective production runs," he concluded. MMI

Source: MMS Online

Delta Tooling uses five-axis machining to produce five parts for the Bebionic3 prosthetic hand, including the aluminum knuckle, the plastic sub-section to which it connects and a complex thumb bracket

Source: MMS Online



Five-axis machining programmed with Visi 20 reduced the number of setups for machining this aluminum knuckle component

INTERNET

Further information on Hand to Prosthetics Manufacturing can be found at: http://www.mmsonline.com/articles/five-axis-cadcam-lends-a-hand-to-prosthetics-manufacturing

www.mmsonline.com

Making Orthopedic Braces Innovative

It is interesting to note that software is playing an important role in patients' recovery. SolidWorks, a software company, helped an orthopedic rehabilitation devices manufacturer to make braces more convenient for patients. More importantly, the company could make the braces fashionable and attractive.

Whether it's an elite athlete or a weekend warrior, the prospect of wearing an orthopedic brace on an injured knee or elbow is often viewed with some degree of trepidation. Orthopedic rehabilitation devices help countless patients recuperate from surgeries and injuries but braces have long carried the stigma of being bulky, uncomfortable and unattractive.

The US orthopedic rehabilitation devices manufacturer, DJO Inc was on a mission to make knee braces and other orthopedic products highly functional to address medical needs, as well as to make them lighter, more comfortable and more fashionable. The company used a combination of AutoCAD 2D and Pro/ENGINEER design tools until 2002, when the San Diego-based company realized that growing its DONJOY line of products into the preeminent brand of orthopedic braces would require a better consolidated approach.

According to R&D Senior Project Manager, DJO, Robert Bejarano, creating more fashionable, comfortable braces demands 3D design and simulation capabilities. "Developing braces that are sleeker, stylish and less medical in appearance requires the use of better materials and advanced surfacing, visualization, and simulation tools," Bejarano explained. "We need industry-leading 3D design technology that is user-friendly to continue to create first-to-market, cutting-edge, orthopedic products," added he. Because of its user-friendly feature, the company transitioned to SolidWorks 3D design software in 2002. Other advantages are that it is fully integrated with the company's simulation analysis software and provides the tools that the company needs to achieve its objectives. The orthopedic manufacturer also values integrated PhotoWorks rendering software, which it uses to create photorealistic images of new design concepts.

Source: SolidWorks Corp

DJO Inc

Challenge

Streamline development, improve style and increase innovation in the design and manufacture of athletic, protective and orthopedic rehabilitation devices

Solution

Implement SolidWorks 3D CAD and simulation analysis software to cut design cycles, enhance style and boost innovation

Results

- Reduced design cycles by more than 25 per cent
- Cut prototyping costs by 5 to 10 per cent of project budget
- Introduced first adjustable off-loading knee brace
- Improved premarketing efforts with photorealistic renderings

Source: SolidWorks Corp

SolidWorks software is helping DJO Inc eliminate the misconception that orthopedic braces are bulky, uncomfortable, and unattractive by making them lighter, more comfortable, and more fashionable

"We use SolidWorks software for all design, surfacing, rendering, and simulation across our product lines, including rigid bracing, surgical implants, electrical stimulation technology, bone growth systems, and countless other products. It is amazing how versatile this software has been during the development stage," Bejarano says.

Designing a breakthrough brace

Since implementing SolidWorks software, DJO has developed a string of first-to-market products. For example, the company made extensive use of the software solutions on the TROM Adjuster Post-Operative Brace, a breakthrough knee brace that promotes faster healing following surgery. This off-loading adjustable brace facilitates a better

healing environment by off-loading weight from injured tissue. It enables quick healing and with less pain to the patient. Also, it reduces the risk of re-injury post-surgically.

The product goes beyond traditional postoperative braces, which simply limit range of motion, by combining off-loading adjustable hinge technology with the company's Tele-Fit telescoping technology to provide a more effective and comfortable fit. "Most postoperative braces stabilize the knee to limit movement and prevent additional injury during recuperation," Bejarano explained. "With adjustability, we lessen the amount of weight-bearing force on the affected tissues and offload it to the unaffected side, providing pain relief and promoting faster healing at the same time," he continued.

Streamlining development

By employing the software and its simulation on the development of the post-operative brace, DJO not only introduced a next-generation product, but also shortened its design cycle and cut prototype development costs. "Using SolidWorks software, we were at least 25 per cent faster designing this device," Bejarano noted.

"We also cut costs related to prototype development by using SolidWorks Simulation. It enabled us to test parts, optimize material usage and create a sleek, attractive and functional design. As a result, we were able to reduce the number of selective laser sintering (SLS) prototypes required for the brace from dozens to just a handful. At an average cost in the thousands for each SLS prototype assembly, the software saved 5 to 10 per cent of the project's overall budget by not developing SLS/SLA iterative prototypes," he stressed.

Dominating the industry

The move to SolidWorks software design solutions has paralleled DJO's rise as a dominant player in the orthopedic rehabilitation industry. Today, more than 90 per cent of Division 1 college football teams use DJO knee braces, including 61 of the 68 teams in the 2010 round of college bowls. Professional athletes who use DJO braces range from football players, Cincinnati Bengals quarterback Carson Palmer and San Diego Chargers defensive end Shawne Merriman to extreme surfing world champion Garrett McNamara and a host of alpine, aerial and mogul skiers.

"SolidWorks software allows us to create sleek, stylish, and innovative products and present them to the market quicker, which has helped support our growth."

R&D Senior Project Manager, DJO, Robert Bejarano

In addition to creating breakthrough products more efficiently, SolidWorks software solutions help the company to market its new products more effectively, even before they are in production. With PhotoWorks rendering software, the company can generate marketing literature earlier by using photorealistic renderings to seed the market. "SolidWorks software allows us to create sleek, stylish, and innovative products and present them to the market quicker, which has helped support our growth," Bejarano concluded. MMI

Tooling Industry Overview for FY 2012–13

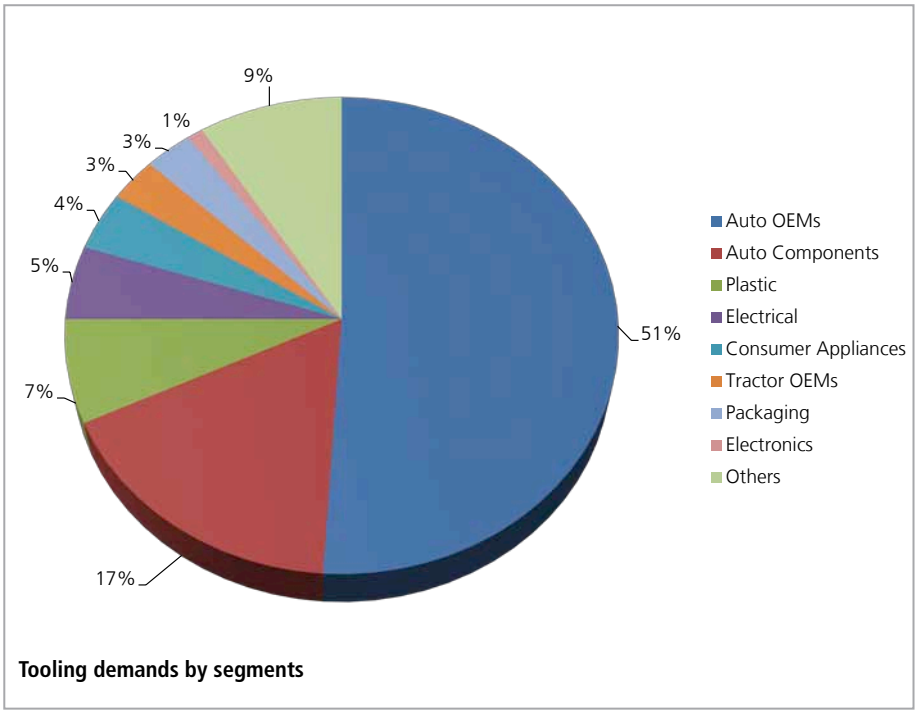
According to the Tools & Gauge Manufacturers' Association (TAGMA) - India, in the last FY 2012–13, the Indian tool room industry reached new heights with a turnover of ₹17,000 crore. Here's a synopsis of which sectors contributed to this growth.

The Tools & Gauge Manufacturers' Association (TAGMA) - India has stated the market size of the Indian tool room industry for the FY 2012–13 to be ₹17,000 crore. Despite the decline in the automotive market growth, it has been observed that the sector has constructively contributed to the total tooling demand in the last fiscal year. This demand can be largely attributed to factors such as changes in the design of existing products, new product development, launches, growth in exports of passenger vehicles and new entrants among end-user industries.

Automakers have made significant investments in tooling during the last fiscal. These will be seen in the current fiscal as new launches. Thirty such launches are expected to hit the road in 2013–14 from leading carmakers including Maruti Suzuki, Tata Motors, Hyundai, Ford, Fiat, Honda, Nissan and General Motors.

Compiled by: Nedra Pereira

Source: TAGMA



Tooling demands by segments

Driving markets

Imports for the past FY has also seen a significant increase in contribution to the sector, amounting to 35 per cent of ₹17,000 crore. This was not the case over the last couple of years. Exports too have contributed to the sector but only by a small margin compared to production and imports.

Apart from the automotive sector, others such as plastic, packing and electrical equipment have reported positive growth during the past FY, which in turn has also helped the tooling industry to fare better in the last fiscal. For instance, according to the data from TAGMA, approximately 51 per cent of the demand in the tooling sector was from OEMs, followed with 17 per cent from auto components and 7 per cent from the plastics sector.

Furthermore, the growth of the consumer electronics industry was also supported by an increase in disposable income, changing taste and preferences and innovation from manufacturers. This sector witnessed its manufacturers venture into localizing their products and introduce compact versions of various products to meet the customer requirements. Owing to these reforms, it was also seen that manufacturers were driving the growth of the industry further through the introduction of innovative products at frequent intervals. MMI

Source: TAGMA India

Enhancing Design with the Right Investment Tool

It was the die and mold industry that dictated a significant part of the elaborate design and manufacturing algorithms for CAD/CAM software. Now, efficiency apart, the kind of jobs that the die and mold does itself calls for elaborate measures to achieve something that is not otherwise possible by traditional methods. Hence, for manufacturers to continually cater to increasing demands, it has now become a 'necessity' rather than a choice to invest in a CAD/CAM tool.

Sridevi Tool Engineers Pvt Ltd, situated in Mumbai, are market leaders and pioneers in mold making in segments like automobiles, white goods and other engineering products. In fact, in 1986 the company was the first commercial tool room in India to adopt CNC machining. Today, the group has a world class advanced in-house tool room facility and is constantly on the quest to upgrade to the latest technology available. Looking to improve their productivity and quality in manufacturing, the company approached Delcam. Elaborating on the same, Managing Director, Sridevi Tool Engineers Pvt Ltd and President, Tool and Gauge Manufacturers Association – India, S C Kalyanpur said, "We approached Delcam to provide us with solutions to reduce our time to market. To this, they suggested using their electrode modeling and PowerMILL CAM." Currently the company has installed Delcam's software in 4-5 of its machines. One of the key areas where they faced difficulties was in electrode machining. "Having worked with two other CAD/CAM vendors in the past, we were unable to derive the maximum benefit of the relation – both technically as well as commercially. Support being one of the key criterion, the features available in PowerMILL and PowerSHAPE electrode played a key role in our decision to invest in Delcam products," added Kalyanpur.

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Proficiency in toolpath editing

Delcam's PowerMILL in particular has an advanced toolpath editing feature which really helps customers to produce right. From exercising precise control on how the tool enters into the material and exits out, numerous leads and links option help the programmer to edit the toolpath to the desired requirement. "Also, when it comes to the removal of selected segments or sketched region from a toolpath, PowerMILL also quickly updates the amended toolpath links automatically, ensuring that the toolpath is gouge free. The programmer also has an option to "Re-order" toolpath based on selected individual line segments in the toolpath," informed Kalyanpur. In addition to this, a single toolpath can be transformed – i.e., translated, rotated or mirrored at the click of a button. "What's more, the toolpath cut direction is maintained in the mirrored toolpath automatically," exclaimed Seth.

Source: Delcam Plc

Large tool milled using PowerMILL 5 Axis

Delivering and customizing right

When it comes to customizing software there are various modules, besides the many features that need to be taken into account. Explaining the same via an example, Managing Director - India & Middle East, Delcam Plc, Vineet Seth asserted, "For example, in the first step, we basically identify the kind of work that our customers do on a regular basis and that is classified as a 'must-have'." This forms the core requirement, while any work that is not done on a regular basis is classified as a 'could-have', for them. All others will fall in the 'good-to-have' category. "Once this classification is done, we then pitch the software modules that cover at least the 'must-have' features – while recommending the customer additional modules (which can also be added at any point in the future) that will help them get

"Support being one of the key criterion, the features available in PowerMILL and PowerSHAPE electrode played a key role in our decision to invest in Delcam products."

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

an extra edge. Following this, there are numerous minor customizations that are very important on an operational basis; BOM in plastic injection mold design, electrode planning sheets, standard library components in CAD which are used on a daily basis, repetitive design & toolpath generation process by Macro automation and finally the customization of the post-processors for various CNC machines," explained Seth.

Likewise, the solution supplied to Sridevi Tools offered them a simple yet powerful wizard based sequence to extract electrodes from the dies and molds much faster than they had ever done and quickly transfer these to the PowerMILL module via an integrated solution. "PowerMILL's ability to quickly recognize hole features from the input model and the in-built high speed machining strategies, together helped the company's designers and programmers to quickly generate electrodes and machine them effectively. This has resulted in substantial savings in time and money for the company," averred Seth.

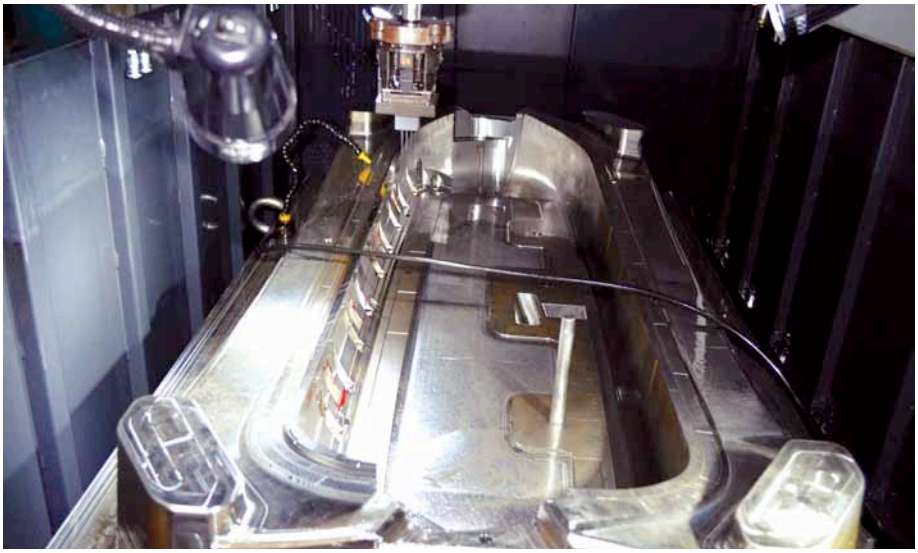
Reverse engineering

Reverse engineering is a key segment in the die and mold industry and is ever changing with the needs of the market. Delcam, are the promoters of the 'Re-engineering' concept in addition to traditional reverse engineering, wherein most of the features of the model are built in during the process of surfacing from the triangle model. "Patented features like 'morphing', helps designers to conform certain regions in the reverse engineered model to the original scan data. Our CAD software, PowerSHAPE reads in a variety of offline point cloud data in order to mesh it for reverse engineering. All this is done keeping the lead times very low," affirmed Seth.

Sridevi uses Delcam's PowerSHAPE with electrode designing solution and are very happy with the tool. According to Kalyanpur, one of the benefits of using the software is that they have seen savings of at least 5-8 per cent in their finishing strategy. "Delcam supports the direct plugin of laser based and point capturing devices to plugin into PowerSHAPE and starts capturing points on the fly. It also quickly triangulates these points and has tools to generate surfaces on the selected triangle data – quickly," informed Kalyanpur.

Enhanced user interface

"The biggest benefit of using Delcam's



Source: Vogel Business Media India

Mold being manufactured at Sridevi, using CAD/CAM integration, which ensures an error-free and highly accurate process

"As CAD/CAM/CAI developers, we expect the customer to utilize the software to its full potential. This will give them the confidence and give us the drive to further enhance the capabilities of the software."

Managing Director - India & Middle East, Delcam Plc, Vineet Seth

software apart from it being cost effective is that it's very user friendly making it easy for our engineers to adapt to the software," quipped Kalyanpur. The company, having always sported a simple and clean interface is continually enhancing their GUI based on feedback from both customers, as well as all of their offices worldwide. "Most of our processes are wizard-based, which means that a particular process is explained briefly with words and pictures, while each block in the process is iterated in a step-by-step procedure. Our testing department checks various graphic cards for their quality and speed, and this is updated on our website, so that our customers can see the benchmarking for themselves and plan their purchases well in advance. We have also arranged the icons in our software sequentially, so that there is a natural 'flow' that is intuitive. The colors used in some of our software modules are also checked for proper visibility - for people who are color blind," said Seth.

Utilizing the software completely

Talking on their expectations from the users, Seth asserted, "As CAD/CAM/CAI developers, we expect the customer to utilize the software to its full potential. This will give them the confidence that the software will deliver and give us the drive to further enhance the capabilities of the software." Quite satisfied with the software, Kalyanpur would definitely recommend it for use to others. "With Delcam's software there are more options compared to any other. We would definitely recommend small tool rooms to use the company's software in order to increase their productivity and efficiency," concludes Kalyanpur. MMI

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Centerless Grinding Achieves Precision Roundness

Centerless grinding is an advantageous process because of numerous reasons. It delivers precision in roundness as well as in surface finish. Read more about its benefits in the article.

Knowing the basics of centerless grinding is an important step to making it a successful operation in the shop. But why would one choose this process over another cylindrical grinding process? Firstly, the operation eliminates the need for workpiece center holes, drivers or workhead fixtures that are required in the other two cylindrical grinding methods (center-type and chucking type). Also, centerless grinding, if set up properly, will achieve roundness, surface finish and dimensional tolerances that are among the best available in metalworking.

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Parts can be ground using a continuous process called throughfeed or the work can be fed to a predetermined point across the work blade to a fixed stop using the infeed process.

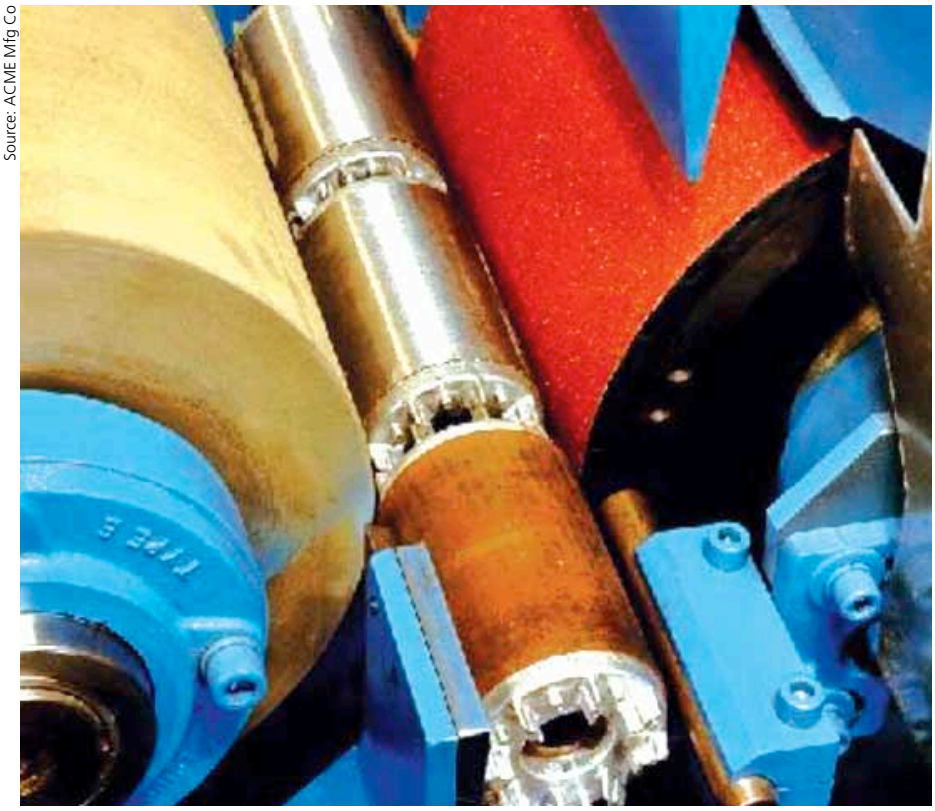
Traditionally, centerless grinding was found in shops involved in high volume production runs. Although this is still a critical segment, the process advantages can also be seen in shops that run shorter job lot sizes.

Centerless grinding is an OD grinding process where the workpiece is supported on its own outer-diameter by a work blade located between a high speed grinding wheel and a slower speed regulating wheel with a smaller diameter. The relationship between the grinding wheel, regulating wheel and work blade is what decides if the process will be successful to an application or if it will instead produce bad parts.

To achieve rounding action, the workblade must be set so that the centerline of the workpiece is above the centerline of the grinding and regulating wheels. The key is to set up an angled work blade so it slopes toward the regulating wheel so it can control the (regulate) workpiece rotation against the higher speed grinding wheel such that metal removal can take place. The angle of the workblade helps keep the workpiece in contact with and under the control of the slower rotating regulating wheel to resist any tendency to 'spin up' to the speed of the grinding wheel.

Centerless grinding, if set up properly, will achieve roundness, surface finish and dimensional tolerances that are among the best available in metalworking. Moreover, the process is able to improve the roundness of out-of-round workpiece blanks. MMI

Source: ACME Mfg Co



Surface finishing done using a centerless grinder

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Customizing Workflows for Better Efficiency

Material handling is usually considered a non-value added activity and according to lean manufacturing, ideally all non-value added activities have to be reduced/ eliminated. But eliminating material handling is not possible as goods need to move. This article shows exactly how handling can be reduced and how by following a solution-based approach; ElectroMech was competently able to supply cranes for Thermax Babcock & Wilcox's super critical boilers plant at Shirwal, Pune.

Thermax Ltd, headquartered in Pune has been providing engineering solutions for decades to the energy and environment sectors. One of its biggest divisions includes supplying boilers for the power sector. The company recently entered into a joint venture with Babcock & Wilcox (USA), a global leader in the power generation industry, to manufacture super critical boilers for the power sector. This plant of Thermax Babcock & Wilcox (TBW) is situated at Shirwal near Pune. For this plant, TBW wanted a material handling system, which is technically proven, corresponded with their applications and was cost efficient. They approached ElectroMech, one of the largest EOT cranes manufacturers in India, situated in Pune, for solutions to match its requirement.

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Delivering across applications

ElectroMech has been supplying cranes to all of Thermax's factories as well as its projects. Thermax's own factory has about seven cranes from ElectroMech and these are used for various applications like loading, unloading, handling, assembly work, etc. For the TBW plant, ElectroMech has supplied around 16 cranes with capacities ranging from 10 to 50 tonnes. Talking about the cranes' applications, Divisional Manager – Manufacturing, Thermax Babcock & Wilcox Energy Solutions Pvt Ltd, Rajeev Sondur said, "The cranes supplied to us at this factory can be used for various applications right from storage yard to fabrication, assembly to the final dispatches. The host of different range of cranes basically aids our entire manufacturing process."

Thermax Babcock & Wilcox

Challenges

Thermax Babcock & Wilcox (TBW) Energy Solutions wanted a material handling system that was technically proven, matched their applications and was cost efficient.

Solution & Results

Wall travelling cranes were suggested by ElectroMech to TBW for carrying out their operations effectively, various zone protection systems were introduced which helped them save their structural cost. Inverter drives were used to save on power consumption.

Source: ElectroMech

Double girdes cranes at ElectroMech's factory

Detailing on the project

What is really interesting about this task is that the company has been involved with TBW right from project conception and the designing stage of the factory building. Cranes play a very important role in designing of the factory building as the entire load lifted by the cranes has to be

"If one would combine the total power consumption of all the cranes used throughout the TBW factory, they would observe that there is definitely a reduction in at least 15–20 per cent over conventional cranes."

Managing Director, ElectroMech, Tushar Mehendale

supported by the building. "Hence, with any project, its best to get involved right from the start as then we are in a better position to come up with optimum wheel loadings, which will come onto the factory structure and that way the structural engineer can optimize the factory building in a much better way. All this leads to reduction in project costs," opined Managing Director, ElectroMech, Tushar Mehendale. The work of the TBW factory building started almost two years ago and following a consultative approach ElectroMech crafted a solution that was economical, had advanced features, matched speed, technical specifications and other parameters of the crane such as the geometries, wheel loads, etc.

Source: ElectroMech

The wall travelling cranes supplied at TBW includes changing the color to suit the company's requirement

Technology upgradation

ElectroMech has advised TBW to go in for a power supply system that is more reliable and has zero maintenance as compared to the previous one, especially for the outdoor duty – gantry cranes. "Traditionally for a gantry crane, one uses cable reeling drums. The cable reeling drum mechanism itself can prove to be problematic in some cases as it increases maintenance. Again, because we were involved with the customer from the beginning, we were able to factor in, at the time of construction itself, a way to put regular shrouded busbar for supplying power to the outdoor gantry cranes. By this we have eliminated a lot of hassles, which might have come in the future had we resorted to the cable reeling drum concept for providing power to the gantry cranes. This approach has also led to further reductions in project cost," averred Mehendale.

Traditionally, Thermax has been using conventional cranes from the older generation of technology, based on so called Russian designs, in their older plants. Cranes from ElectroMech used at the super critical boiler plant are more compact, efficient and lighter in weight. "These cranes are reliable with practically no breakdowns and minimal requirement in regular maintenance. Since the cranes are more efficient compared to the conventional ones it uses less power thereby resulting in better efficiency for us," asserted Sondur. Talking on the total power consumption used, Mehendale adds, "If one would combine the total power consumption of all the cranes used throughout the TBW factory, they would observe that there is definitely a reduction in at least 15–20 per cent over conventional cranes. These cranes are also inverter driven hence there is better control on various parameters like smoothness of operation, precise control on speeds. Energy efficiency is further enhanced as cranes take only as much power as is required." Apart from this the company has also supplied TBW with unique solutions like the wall travelling crane.

Wall travelling cranes

On a shopfloor, with respect to the principles of lean manufacturing, waiting time is one of the prime sources of waste."Wall travelling cranes allow us to service our workstations individually without using cranes on the top. Waiting time for the crane is thus drastically reduced and productivity of the individual workstation is enhanced," clarified Sondur. In the case of semi gantry crane, which is an alternative to the wall travelling crane, one end runs on the factory building while on

"These cranes are reliable with practically no breakdowns and minimal requirement in regular maintenance. Since the cranes are silent compared to the conventional ones it uses less power thereby resulting in better efficiency for us."

Divisional Manager – Manufacturing, Thermax Babcock & Wilcox Energy Solutions Pvt Ltd, Rajeev Sondur

the other side, a leg runs on the floor. "The moment you provide a leg and make the crane travel on a factory floor, it becomes a safety hazard due to the possibilities of collisions with men, machines and material. Rail tracks or supports would also be needed on the ground, increasing the civil cost. Safety is naturally compromised as there is danger of the leg running over someone's foot. The wall travelling cranes have no legs and travel in the air independently on their own supporting structure integrated with the factory building and thus enable efficient and safe layout of the workstation," added Mehendale.

Value addition

Though material handling forms a critical part of any workshop, lean philosophy dictates its reduction. "By taking cognizance of what needs to be done on a shopfloor, rearranging processes accordingly and by optimizing speeds and geometries of cranes, material handling time can be drastically reduced. All this should be taken note of during the early stages of the project itself," asserted Mehendale. Sondur seconds the fact that including ElectroMech from the start provided numerous benefits. He said, "The company was able to fine tune our plant layout to ensure maximum space utilization and save on our asset costs." What also adds value to ElectroMech as a manufacturer is that since they have built their factory as an exhibit of different types of cranes it has helped customers to trust them further as they can in reality see the usefulness of the product. MMI

Roundheads VS Cavaliers

As technology becomes ubiquitous, the design of a product or the lack of it becomes even more apparent. Design has now become a deliberate and vital part of a product development process rather than an afterthought. In this article, we take a look at the continuing evolution of industrial design.

Designers are artists who incorporate various components of technology, economics and psychology to get the perfect amalgamation of characteristics in a product that becomes the design. These designs then become a language to communicate and express the designer's intent to the users.

The beginning

The start of industrial design is generally attributed to the rise of the automobile industry and in particular to Model T from Ford Motors. The car also introduced the concepts of mass production and mass market goods. With this model, the company brought in a paradigm change in the way we travel, and convinced the masses of the need of a new means of transport. However by 1927, with the falling sales of the model, Ford soon realized that he had to not just make a car but make one that is replaceable. Consumers no longer wanted a car just to satisfy the functional need to travel but also started expecting improvements in terms of comfort, style and performance. This shift from mass production to mass customization eventually led to the birth of industrial design as we know it today.

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Initially, designers may have been faced with an unlikely predicament of which priorities to set. Depending on the status of people, the masses wanted different aspects of customization. This can be compared to the state of Roundheads VS Cavaliers. The term borrowed from the civil war era in England, depicts the differences in the attitudes of consumers towards products they use. The products designed at that time were distinct in their application and catered to their own segments of markets. While the designs used by Roundheads were usually mass produced, those used by Cavaliers were hand crafted and labor intensive. Over the years, this distinction continued to be maintained as the applications, the manufacturing processes and the clientele remained distinct.

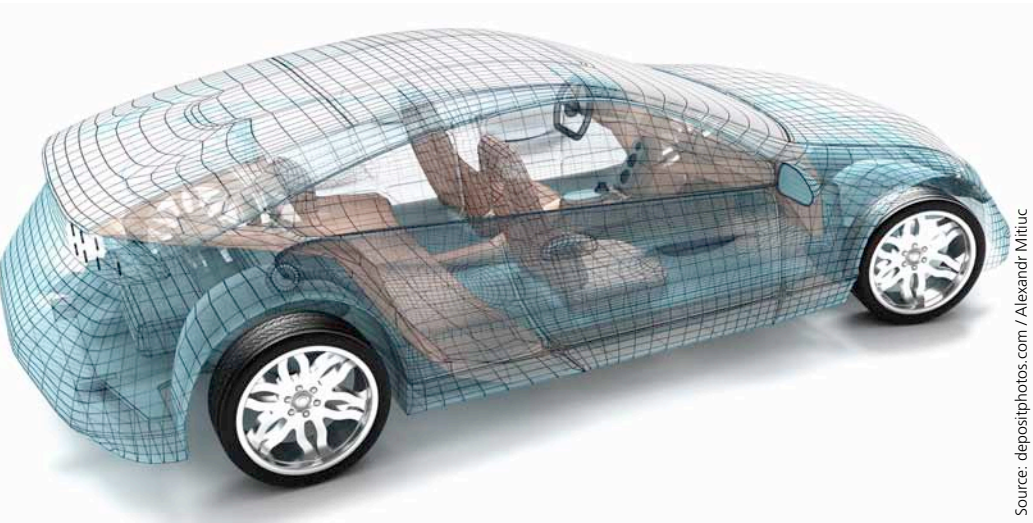
Advancements in design

With the advent of computers and CAD applications, the time taken to design has significantly reduced owing to the shorter times between the various iterations. Designers apply manufacturing heuristics and better knowledge of human ergonomics to build the language of design into their products right from the ideation stage of the development process. With the exponential growth of computing power, designers now have access to a number of different solutions before finalizing on the optima or picking the iteration that is closest to their intent.

These applications are bridging the divide between engineers and designers, further aiding in faster and better iterations. Improved materials and hi-tech manufacturing processes have rapidly changed the discourse of product designs and innovations by seamlessly mating form and function and appealing to connoisseurs of style and substance.

Conscientious planning

Designers have always had to strike a balance between their intents and conventional priorities. Though the design



Source: depositphotos.com / Alexandr Mitiuc

Car wireframe showing aspects of user specified customization

Source: Wikipedia Commons

The first mass produced car—Model T—from Ford that set the foundation for industrial design

intent has broadly remained the same while developing a product, the priorities have considerably changed. In the 21st century, designers now have to grapple with the new norms of green designs and lower carbon footprints. Industrial designers like Dieter Rams brought the ideas of sustainable development and further stressed the need of modernist designs that were both aesthetically pleasing and functionally brilliant.

Current drifts

Rapid erosion in the gap between the design sense of Roundheads and Cavaliers has been observed. The present day smartphone is an apt example of such an innovation. The phones are manufactured by precision hi-tech machines using some of the cutting edge materials and marketed using some of the most innovative business tactics to percolate the benefits of technology to an ever increasing audience. Further, owing to the cost arbitrages and shifting of production centers away from design centers, there is a definite impetus for the designers to include new ways of operational efficiencies and collaboration technologies into their design processes. All these factors contribute to a growing consumer base who are not only looking for a product to satisfy their functional needs and necessities but also are appreciative of the various cues conceived and successfully communicated by the designer to the user via the product.

Conclusion

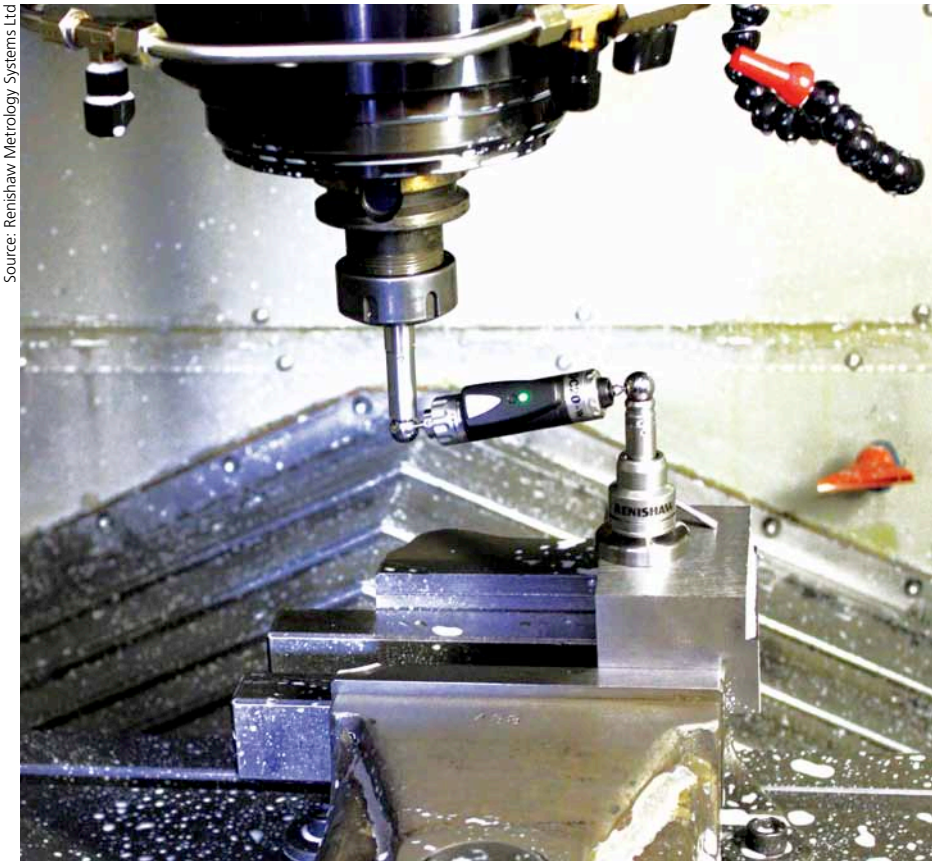
Technology and its adoption are a great leveler and help designers to better their ideas to create the products that appeal to a much larger audience. Designers are using various tools to highlight the functional uses of the product as well as help develop an emotional bond between their products and users; thereby, creating experiences with intangible value. The terminology and the division between Roundheads and Cavaliers may soon become obsolete. We may soon have one audience with an infinite appreciation of true design – Cavaheads who want designs that are minimalistic yet modernist, understandable yet unobtrusive, thorough yet environmentally friendly. MMI

Precautionary Measures Extend Tool Life

With the ever present need to increase efficiency, companies look at various avenues to satiate this requirement. Aquasub Engineering, a pump manufacturing company, chose to equip themselves with maintenance tools that extend the life of their current machines.

Aquasub Engineering (Coimbatore, India), part of the Aqua Group, one of the largest pump manufacturing companies in Asia, wanted a way to reduce maintenance costs, increase capacity and reduce scrappage. With an increasing emphasis on Total Productive Maintenance (TPM), the company started looking for various solutions and selected the QC20-W ballbar system. Manufactured by Renishaw, it is a wireless system that is widely recognized as a preventative maintenance tool for new and installed machines.

Source: Renishaw Metrology Systems Ltd



Source: Renishaw Metrology Systems Ltd

QC20-W wireless ballbar performing a test on an Aquasub machine

Aquasub Engineering

Challenges

To achieve the following without replacing old machinery:

- reduce maintenance costs
- reduce scrappage
- reduce human error
- increase capacity

Solution

Incorporation of preventive maintenance tool—QC20-W ballbar system

Results

Consistent production with

- reduced scrap and faulty product
- reduced machine downtime
- increased accuracy and repeatability
- increased quality

The scope and precision of data given on various machine errors using the QC20-W test gave them a far more reliable diagnosis than their existing practices, with up to 18 separate geometric, plug and dynamic errors.

Multiple benefits

To reduce the necessity of purchasing new machines, Aquasub wants to maintain its 200 existing machines, many of which are 25 years old. General Manager, K Senthil

Source: Renishaw Metrology Systems Ltd

Aquasub senior managers and chief engineers reviewing the QC20-W ballbar system

"We preferred to maintain our old machines and return them to their original condition rather than buying new machines. By incorporating QC20-W into our maintenance program, we have significantly reduced scrap and faulty product."

General Manager, Aquasub Engineering, K Senthil Kumar

Kumar explained, "We would obviously prefer to maintain our old machines and return them to their original condition rather than buying new machines. This a more cost effective option than investing in new machines."

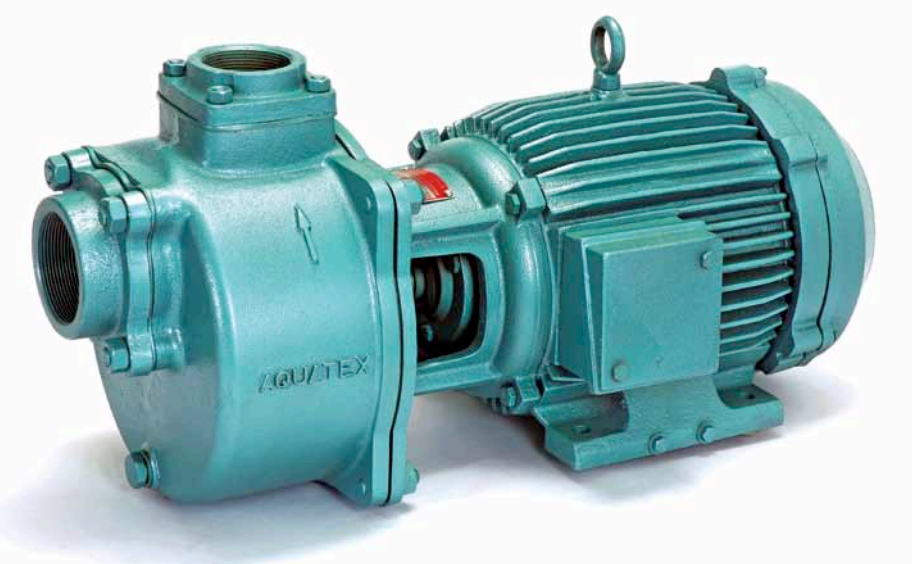
He further added, "If we extend the life of a machine, the improved performance also reduces machine downtime hours. In fact we have seen a 10 per cent reduction in machine downtime. We strive to be more pro-active and have detailed information on each machine so that the operator is aware of the smallest technical issues. In order to extend the life of the machine we are also carrying out regular ongoing tests with QC20-W ballbar. We are now able to carry out three plane testing with a single set-up which has reduced our maintenance inspection time by 20 per cent."

Total productive maintenance

Kumar continues, "Test data from each machine is stored in the Ballbar 20 software history function. This allows us to schedule machine maintenance and take remedial action before part quality becomes an issue. If the machines are in good condition then the component quality will have good repeatability. By incorporating QC20-W into our maintenance program we have significantly reduced scrap and faulty product."

The system is even used to test new machines after it is first installed, since damage during shipment from the machine OEM to the Aquasub factory could result in faulty components even from brand new machines. With a capacity to produce 4000 pumps a day, reliability of their 200 machine tools is of crucial importance to maintain deliveries.

The organization also has a policy to continually improve its manufacturing capabilities through enhancement of knowledge, skills, technology development and continual improvement. By implementing a TPM program they are ensuring that good quality practices are followed and identify scope for further improvement. Kumar explained, "We used to base our machine performance reliability on an engineer's word so the potential for human error was high. Now the QC20-W ballbar provides us with overall machine diagnostics (circularity, squareness and backlash) from a single test. All the machine data is stored in Ballbar 20 software and creates a log of information about each machine's performance that can be reviewed at the time or offline. We are no longer reliant on an engineer's memory. Renishaw's QC20-W ballbar system is the backbone of our quality system." MMI



The 'AQUATEX' centrifugal pump unit manufactured by Aquasub

Source: Renishaw Metrology Systems Ltd

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Modernizing Mold Making Operations with Graphite Electrodes

A German components manufacturer for the electronics industry found that a change-over from copper to graphite electrodes also rearranged the process for mold production.

Due to extremely demanding precision requirements, the mold making operation at electronics components producer, Escha Bauelemente GmbH has been completely rebuilt, outfitted with air conditioning and the plant has been fully modernized. However, for sink erosion and high-speed cutting (HSC) milling, OPS-Ingersoll remained the partner of choice in tool construction. In addition, the original concept of the supplier's 'mold center' was modified as per the requirements. And it has been successful because machine operating times have again drastically increased.

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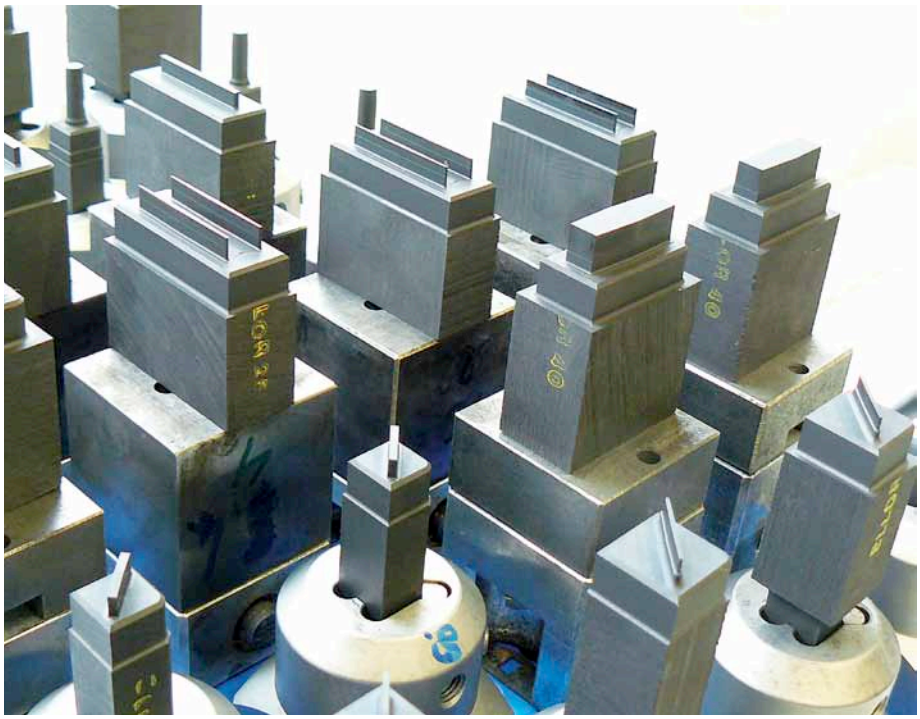
Automation lowers costs

The basic idea was to economically design the electrode and mold production via HSC milling and sink erosion with an automatic process. OPS was said to have achieved this in 2005 with the mold center.

Three years later, Escha invested in this concept and at the same time switched from copper to graphite electrodes. The combination of the Gantry Eagle 400 sink erosion machine and the Speed Hawk 550 HSC milling machine seemed to be the perfect solution for the continually growing volume of orders. Particularly, since the company could get everything from one source, i.e., milling, erosion, automation and job management, the management at the molder selected the multi-change performance with 154 electrode trays and 10 tool positions. Just four weeks after the initial operation, employees reportedly expressed their desire for another extension.

Talking about it, Manager, Materials, Escha Bauelemente, Jürgen Sikora said, "In 2008, when we invested in the plant, we also completely switched from copper to graphite electrodes." He further noted that although the company's expectations were high, it found the low electrode wear and the short time it took to file off the components in the milling and erosion processes surprising.

The Speed Hawk was mainly meant to produce graphite electrodes and also occasionally hard-mill them. Despite these two areas, the machine was too fast. This means that on the Gantry Eagle 400, which was already working with Eagle technology, erosion took place around the clock and the milling machine was still not running at full capacity. "So we had the idea to fire two erosion machines with the Speed Hawk," Sikora explained. The fact that the company often produces small electrodes, which generally equates to very short erosion times, gave rise to the idea.



Source: OPS-Ingersoll

In 2008, the tool production department at Escha switched completely to graphite electrodes

A surge in productivity

This idea became reality in 2012 when a completely new toolmaking section was created at Escha's Halver site, including buildings, air conditioning and machines. The main reason for this was the stipulated tolerances. The company's mold making seeks to keep imprecision as close to zero as possible so that one or two hundredths of a millimeter are used to the maximum when producing the connectors. The problem, until then, was the enormous temperature fluctuations. Differences of a mere two degrees had an intolerable effect on the workpiece. The new AC system is said to have consigned this to the past to ensure precision.

Source: OPS-Ingersoll

The addition of a Gantry Eagle is said to have put an end to erosion bottlenecks and altered the shop's production process

"Initially we were taken aback at the speed at which the milling and erosion machines work. So we had to invest in a second eroding machine to use the milling machines to capacity."

Manager, Materials, Escha Bauelemente, Jürgen Sikora

Productivity increased drastically, as the old mold center became an EDM center. The Speed Hawk was taken out of the operation and fully automated with a large robot. A Gantry Eagle 500 sink erosion machine has been integrated as a replacement for the HSC unit. Even though production has been carried out this way for just six months, this constellation seems sensible, the company said. There are no bottlenecks in erosion or milling. On the contrary, if at all possible, a switch is made to eroding even during finishing. Another benefit of the changes is the measurably higher machine running time. Toolmaking Manager, Escha Bauelemente GmbH, Maik Ullmann, only sees benefits in this set-up. "Some people might mill what there is to be milled. For us this applies to sink erosion. The preferred procedure here always depends on the range of products." He noted that the mold center makes sense if the milling machine can also be used for hard machining, which is not the case here. The EDM center lets the company burden the machines with higher workloads and shortens productions routes.

Production without people

Today at the company, fitting, measuring, shaping and repairing are performed as well as erosion during shifts where employees are absent. This is clearly a situation, which makes management happy. It was particularly important to have just one contact person for such a complex plant.

According to Sikora, "OPS-Ingersoll was the market leader in the processing of graphite. So we never doubted the technology. We wanted everything from one source and, therefore, just one contact person. He continued. "And without wishing to flatter, the all-round carefree packet by OPS-Ingersoll simply works."

Given that in future Escha tool production will also take on external tasks, this is a particularly important aspect, because not just high quality is crucial, always meeting deadlines is too. MMI

Galvanizing Steel without Effluents

To make steel corrosion resistant, various methods are used. One of them is galvanization. However, this process usually requires release of effluents into the environment. Here is an overview of how Nalco Membrane Services helped a major Indian steel mill's production of Galvalume at Vasind Works in reducing effluents, thereby, increasing their energy and water savings.

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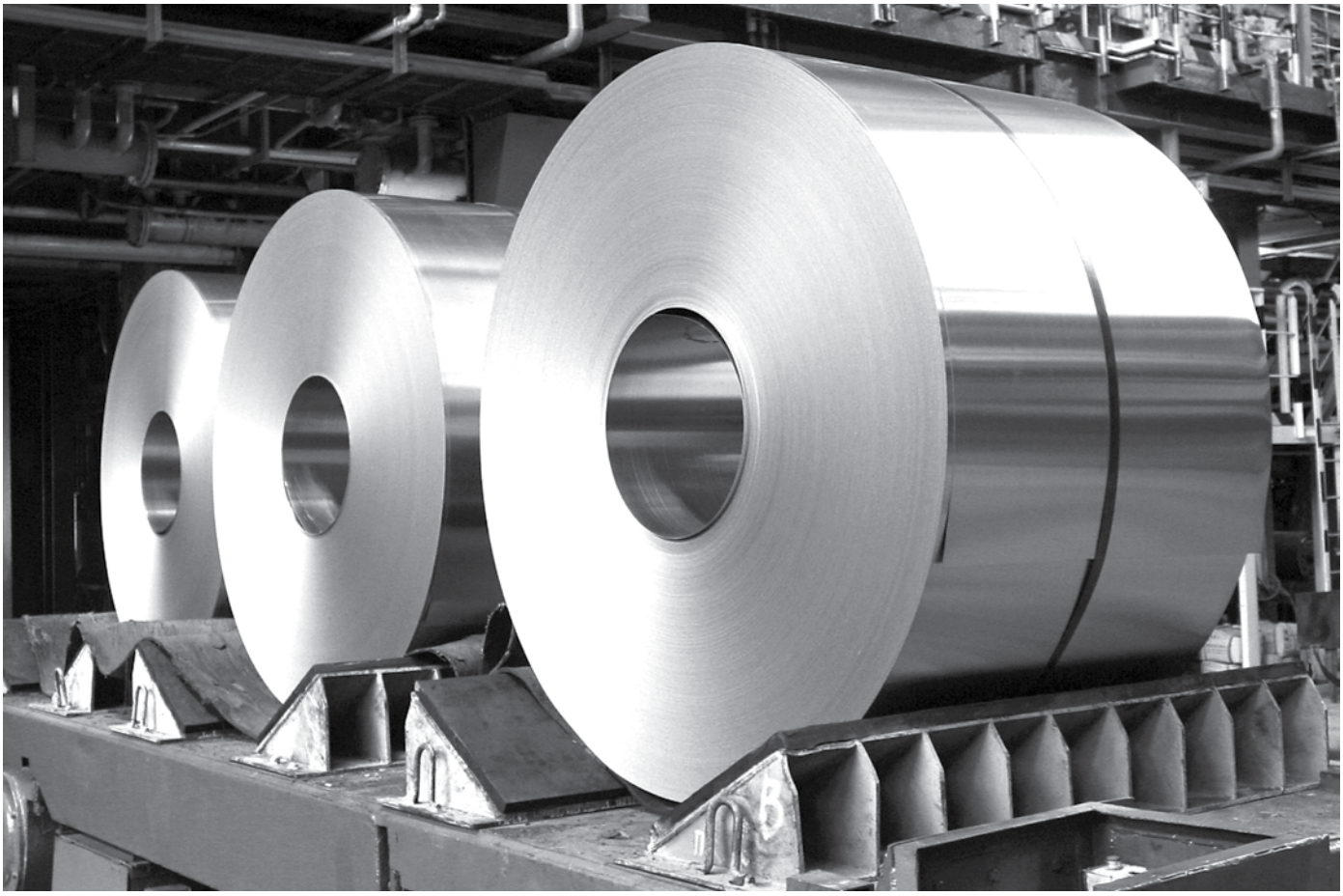
Vasind Works, a steel plant, is strategically located with access to the major ports of Mumbai, markets and raw material sources. The company has a standalone 20-hi cold rolling mill with a galvanizing line that produces galvalume steel. However, being located near a metropolitan city with limited water and energy resources, the local pollution control board has imposed strict regulations with respect to the quality of water discharged and the quantity of the water used.

In order to meet the discharge regulation, this steel mill went a step ahead by installing a Zero Liquid Discharge (ZLD) plant, where the combined effluent from the effluent treatment plant of the acid pickling line and the final discharge from the other sections of the plant is treated.

In the ZLD system, the effluent from the pickling line ETP plant is fed into a two-stage reverse osmosis system through a sand filter, carbon filter and a cartridge filter. While the permeate is recycled back into the system, the reject water is taken to a Multiple Effect Evaporator (MEE) where

Source: Nalco Water India Ltd



Galvanized steel coil roll sheets at the Vasind Works facility

it is further concentrated. The MEE vapors are condensed and returned to the system for reuse. The concentrate is then sent to a crystallizer and finally the solid waste is incinerated.

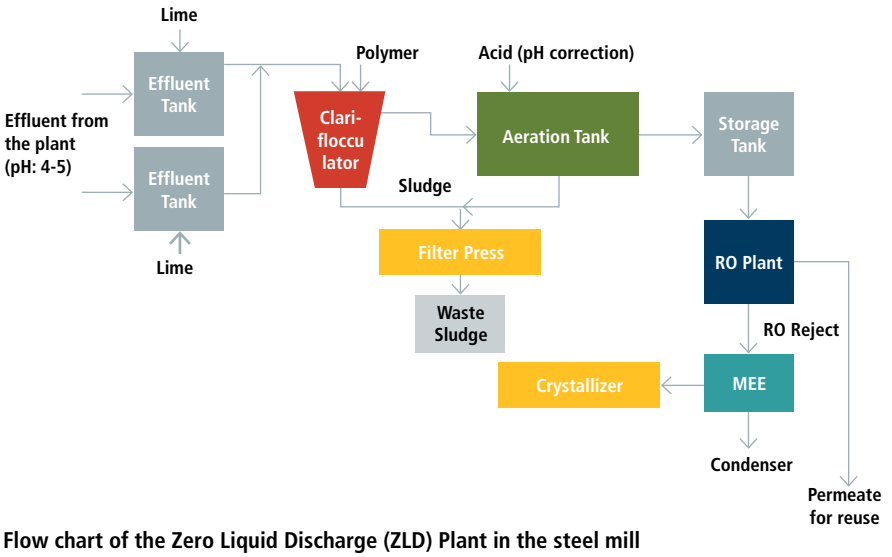
Background

Initially, the plant outsourced its operational and maintenance processes to a local competitor. However, within a very short time, they started facing frequent fouling and scaling issues with the membranes. This resulted in frequent cleaning of the membranes, low recovery rates and high energy consumption. Furthermore, for the plant management, this defeated the original purpose of installing a ZLD system.

Solution

On looking for an alternative, the company chose Nalco Membrane Services, who have a proven track record of success and a clear protocol of the membrane services. The services included a pre-audit of the entire system, which was conducted by an expert, to identify the gaps or issues and institute best practices. Using a proprietary modeling software—RO Optimizer—Membrane Performance Chemicals that include pretreatment, antiscalant, membrane cleaners and biocide, were selected for use in the mill. Further to this, system routine health checks, operational data normalization with the UNO tool, professional service reports, on site troubleshooting, immediate response to all the emergency calls and above all, 24x7 Operation & Maintenance (O&M) of the system by dedicated and well-trained operators and technicians were also offered.

The O&M service also included the cleaning services of the membranes to maximize the recovery of the membrane performance. The company also replaced cartridge filters and membranes as and when required in the mill. Additionally, value added services such as operator training were given.



Source: Nalco Water India Ltd

Flow chart of the Zero Liquid Discharge (ZLD) Plant in the steel mill

Outcomes

After switching over services, plant management observed benefits under various parameters:

Assets protection

- The membrane cleaning frequency was reduced from five cleanings per year to three, increasing membrane life potentially by 50 per cent.
- The chemical and service cost of the membrane cleaning was reduced by $5,000 per year.
- The annual potential saving owing to increase in the membrane life was $4,800

Energy savings

- The differential pressure across the Reverse Osmosis (RO) system has decreased by 0.54 bar, leading to longer running lengths and energy savings.
- The specific energy consumption of the RO system (pumping cost due to reduced differential pressure) reduced from 3.8 KWH/m^3 of permeate to 2.4 KWH/m^3 of permeate, contributing to an annualized saving of 23,134 KWH of energy.
- With the increase in product recovery, the load on the MEE decreased, giving a resultant energy saving of 113,400 KWH (at 50 KWH/ton of water) from the reduced steam generation.
- The reduced pumping cost and steam generation cost for the MEE system contributed to a saving of $6,826 per year.

Water saving

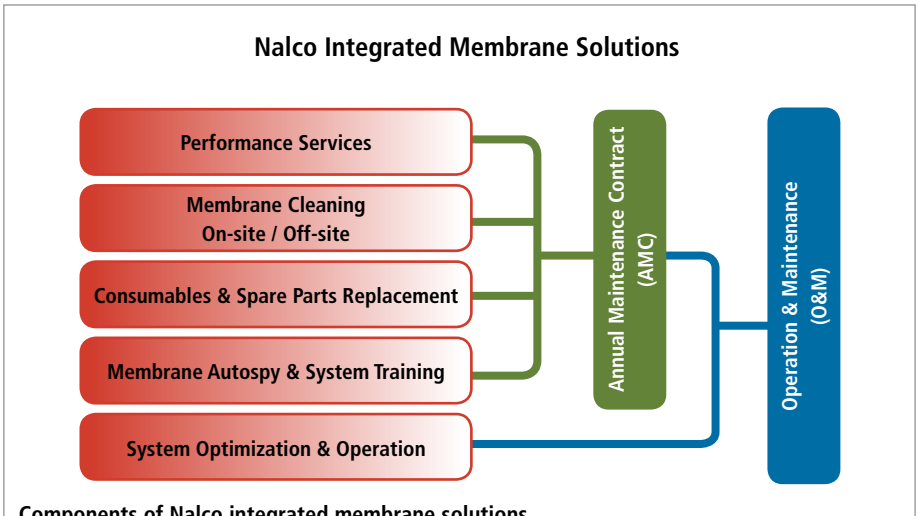
- The permeate recovery rate increased by 9 per cent, equaling to 2,268 m^3 per year. This can be accounted as fresh water savings or the additional quantity of reject water being treated in the MEE.

Air quality improvement

- The reduced energy consumption of the RO system and decreased loading on the MEE system contributed to CO_2 emission reduction of up to 94.2 tonnes of CO_2, equaling to 4,327 trees absorbing CO_2 per year.

Conclusion

By using the right services and strategies, processes can be enhanced resulting in increased efficiency and savings in terms of energy, assets and productivity. MMI



Source: Nalco Water India Ltd

Components of Nalco integrated membrane solutions

Milling and Drilling Tough Materials

The goal of aircraft weight reduction is driving the current increased use of advanced exotic materials such as composites, titanium and Inconel in the aerospace industry. These materials are lighter get stronger, and each present their own set of challenges when it comes to machining. In this article, Seco Tools shares its technologies on milling and drilling these exotics.

For milling and drilling operations, aerospace manufacturers often use solid carbide and/or solid high-speed-steel tools. During machining operations, these manufacturers must achieve the highest levels of quality, often accomplished through carefully monitored and maintained process security. There are ofcourse concerns about cost per part, but in most instances, producing perfect parts is a much higher priority and increasing productivity tends to be secondary.

Aerospace manufacturers strive for process security and consistency through predictable performance of machines and tooling. In the case of tooling, these manufacturers must have milling cutters and drills that deliver exact amounts of tool life from one tool to the next.

Thanks to advancements in machine and cutting tool technologies, aerospace manufacturers can machine materials such as composites, titanium and Inconel with confidence and efficiency. Some tools which give better process control and consistency are the advanced specialized solid rotary mills and drills. These tools have been specifically developed to overcome machining challenges presented by these materials.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Source: Seco Tools

Double helix rougher with chipbreakers

Milling

Composites

The market for machining carbon fibre reinforced plastic (CFRP) material is surging within the aerospace industry. However, the materials are difficult to machine because they are very abrasive and tough on milling tools. Plus, delamination, when individual carbon fibre plies separate, must be prevented from occurring while machining. These challenges can be overcome with hard, sharp solid-carbide milling cutters that employ special surface coatings.

The two types of coating processes commonly used are Physical Vapor Deposition (PVD) and Chemical Vapor Deposition (CVD), along with an advanced cutting material polycrystalline diamond (PCD). PVD coatings involve a physical process and include aluminum nitride, chromium nitride and titanium nitride coatings with hardnesses of approximately 3,000 Vickers. The diamond coatings that are imparted by the chemical process CVD are about three times harder, resulting in a Vickers rating of 10,000. PCD tools incorporate solid PCD-plates that are brazed to solid-carbide cutter shanks.

From a geometrical standpoint, effective cutters for composites incorporate low helix angles to reduce axial forces on the laminate layers of the material, thus preventing

delamination. Additionally, cutters with both a left and right helix are also effective geometries for composite materials. These types of cutters, often known as compression routers, direct and compress cutting forces toward the centers of workpiece thicknesses, in the case of side milling, to keep the laminate layers intact. Plus, these types of cutter geometries make for much freer cutting of composites.

While compression cutting is a common approach, Seco Tools has developed compression cutters with new different geometries, like two double helix routers. One of these is a multi-flute tool with smooth cutting edges. The other has fewer flutes, providing more chip clearance and chip breakers on its cutting edges. The latter is more for roughing operations, while the former multi-flute option without chip breakers offers ideal performance for finishing operations.

As far as machining techniques are concerned, cutting parameters for composites are often dependent on the various materials themselves. Typical speeds for solid-carbide cutters for composites are about 150m/min and feed rates are around .07mm. However, it should be noted that within this group of materials, there are a variety of of binders used, each requiring their own speeds and feeds. The melting points of these binders are often what determine speeds and feeds when cutting composites. Also, fibre content and fibre orientation have a significant influence on the machining process governing cutting speeds and feeds and the optimum tool path.

Titanium alloys

Titanium alloys are often used in three basic application areas, aircraft structural parts, cold section components of jet engines and landing gear systems. One commonly used titanium is 5553, which is a near-beta alloy, typically used for landing gear parts. TiAl6-4 is an alpha-beta alloy that is one of the most common types of titanium used particularly for structural parts.

Source: Seco Tools

Specially designed cutters for machining materials like titanium

Source: Seco Tools

Multi-flute tool with chip breakers for roughing operations

The factors that make titanium alloys a challenge to machine are its thermal conductivity, high adhesion and strain-hardening elements. Its low thermal conductivity means that during machining, the heat generated by the process transfers into the cutter instead of being carried away from the cutting zone within the chips. Titanium's high adhesion means that chips tend to stick to cutters, so very long chips are generated, as opposed to more favorable shorter easily extracted ones. The material's strain hardening element that comes into play during machining causes a small thin layer of the material to harden from the effects of pressure generated during the machining process.

Titanium can be machined with general-purpose solid-carbide cutters. However, cutters designed specifically for the machinability characteristics of titanium will ensure superior results. These special cutters provide extremely high levels of performance, but they can be less versatile when it comes to the number of different materials to which they apply.

For example, Seco has high-speed steel (HSS) cutters in its program designed for both titanium and stainless steels. These are part of the Jabro high performance machining (HPM) series, which has specially been designed for certain material designations like titanium.

There are certain factors that dictate when to use a HSS tool, chief of which is the cutter diameter. Solid-carbide tools should be used when applications require smaller diameter cutters and when workpiece geometries are extremely complex or if taking heavy depths of cut (ap) is the goal.

HSS cutters are recommended for less-complex workpieces in high-volume applications and when both large widths of cut (ae) and heavy ap are the goal. The tool should also be considered when older conventional machine tools with high torque and high horsepower are being used.

Inconel

Parts made from Inconel, which is a nickel-based super alloy, tend to be expensive, not only in the cost of the material itself, but also in the investment of time put into producing them. There are certain similarities between Inconel and titanium. However, in terms of machinability, Inconels are the most difficult materials to machine. They have very low thermal conductivity and very high levels of strain hardening. It also has high adhesion, so cutting speeds can rarely exceed 25 or 30 m/min when applied in a conventional machining method.

Cutter geometries for machining Inconel differ greatly from those used for titanium. Inconel geometries are angular relieved with very steep angles. Such geometry reduces contact between the cutter and material as much as possible. This is critical because Inconel is flexible and has a high memory, meaning it will 'give' somewhat when subjected to the forces of a cutting tool. So, the longer the contact time between the cutter relief and material, the higher the

Source: Seco Tools

3-fluted PCD drills for use with CFRP materials

Source: Seco Tools

Dura coated double helix finisher

abrasive wear on the tool and the shorter its working life. To further reduce the friction between cutter and Inconel, the company incorporates a coating of aluminum titanium nitride, that is polished to an extremely smooth and fine surface finish.

Drilling

Composites

Two common challenges of drilling composites are delamination and uncut fibres, especially on the backside or drill exit side of workpieces. When drilling, tool forces push down on the material and as the drill nears the exit side, excessive force can cause the drill to push through, as opposed to cut through, the last portion of the hole. The result is composite fibres that are ripped and ragged instead of cleanly cut, causing material delamination.

To overcome these challenges, tooling companies strive to decrease drill feed forces against the material through the use of different point angles and helix angles on drills. It should be noted that some drill geometries generate lower feed forces and perform better than others.

For example, a 140^0 point angle, which is the most common for solid carbide drills, will work quite well for several holes when drilling composites. Unfortunately, as soon as the tool dulls at all, it loses its effectiveness. With C1 diamond coated solid carbide drill for composites, the company imparts geometry with two point angles, a 130^0 angle in the centre and 60^0 angle on the chamfer of the drill. In operation, the drill's centre point exits the end of the hole first, cutting away some of the hole's material. So, when the 60^0 portion exits, the feed forces of the drill through the material are drastically reduced. Thus, there is less delamination and fewer, if any, uncut fibres.

Titanium

In the aerospace sector, most hole diameters are small. For diameters less than 1mm and up to 20mm, solid carbide drills are used quite extensively for titanium as well as Inconel. As it occurs when milling titanium, heat from the drilling process also tends to go into the tool instead of being carried away within the chips. To combat this, drill geometries typically involve very sharp cutting edges. Normally, drills for titanium are uncoated because of this requirement of extremely sharp cutting edges. Also, coatings can increase friction somewhat, adding to heat generation. One more important point is the shrinkage of material after machining. Due to this a bigger back taper is needed on the drill body.

Inconel

Because Inconel is very abrasive and hard, effective drill geometries for the material are basically the same as those for titanium. However, coatings are added for increased wear resistance and to reduce friction. Seco, for instance, uses titanium aluminum nitride coatings to protect its Inconel drills and extend their working lives.

When drilling Inconel, lower speeds and feeds are used, mainly because the material is harder and more difficult to cut. The machinability of the material comes into play when drilling, much as it does when milling Inconel. In aerospace applications, hole depths in Inconel components are typically only 3xD.

Coatings have played a key role in boosting aerospace drilling process security and productivity. Through effective variations of coatings, like titanium aluminum nitride and control of cutting edges, the company has developed drills that can allow for doubling drilling speeds and feeds.

Four machining strategies for titanium and Inconel

- **Conventional Machining -** It involves a balance between ae and ap of 1x1. This means that machining is done at full cutter width (1*Dc) and at a certain depth of cut up to one times cutter diameter and running at average feed rates.
- **High performance machining (HPM)-** HPM involves cutters specifically designed for titanium and Inconel, such as Seco's HPM line of cutters. These cutters run at large ap (up to 1.5*Dc) and at full ae. Large volumes of metal are removed in a short amount of time for increased productivity.
- **High-feed machining (HFM) -** HFM uses very small axial ap and full ae, so width of the cut is 1*Dc. The specific geometries of cutters used for this strategy direct cutting forces into the machine tool spindle, so this strategy is especially useful in unstable machining conditions due to large tool overhangs and complex applications like pockets with depths of 5*Dc and more.
- **High-speed machining (HSM) -** HSM uses fairly low ae radial depths of cut and very large ap depths of cut. Because the radial depth of cut is relatively low, there is a small arc of contact that helps reduce heat in cutting zones due to smaller contact time and thus allows for higher cutting speeds to compensate and gain productivity.

Conclusion

To effectively machine today's challenging aerospace materials, the key is to obtain a complete machining solution, not just a product. A complete cutting tool solution includes not only the necessary geometry and design, but application engineering support as well. The knowledge and experience of the human resource combined with the advanced product can form a complete solution and achieve ideal results.

Part quality and process security require the best possible tool designed for the particular application at hand, whether it be composites, titanium or Inconel. But that tooling must be acquired from a supplier able and willing to provide guidance as to the proper way to run it for optimum performance. Education and training is the key to getting the most benefit out of advanced tooling designed for tough materials. MMI

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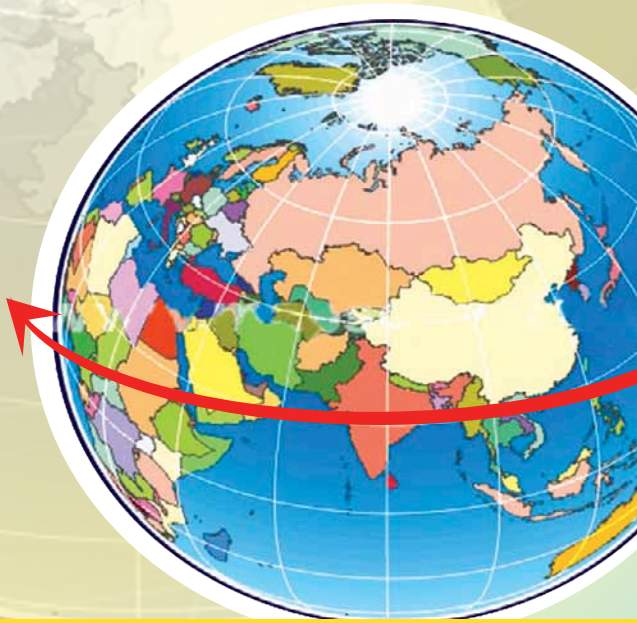

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No Need to 'Tap Out' When It's Time to Thread Holes

Many machinists would prefer not to wrestle with taps due to the problems associated with the cutting tools. The South Korean supplier, YG-1, opines that surrender should not be an option and offers solutions to give users the upper hand in tapping technology.

It has been said that tapping is one of the most difficult machining operations due to the problems of chip removal and lubrication at the cutting edges. The fact that speed and feed cannot be varied independently because the relationship between them is fixed by the lead of the tap, is also a concern.

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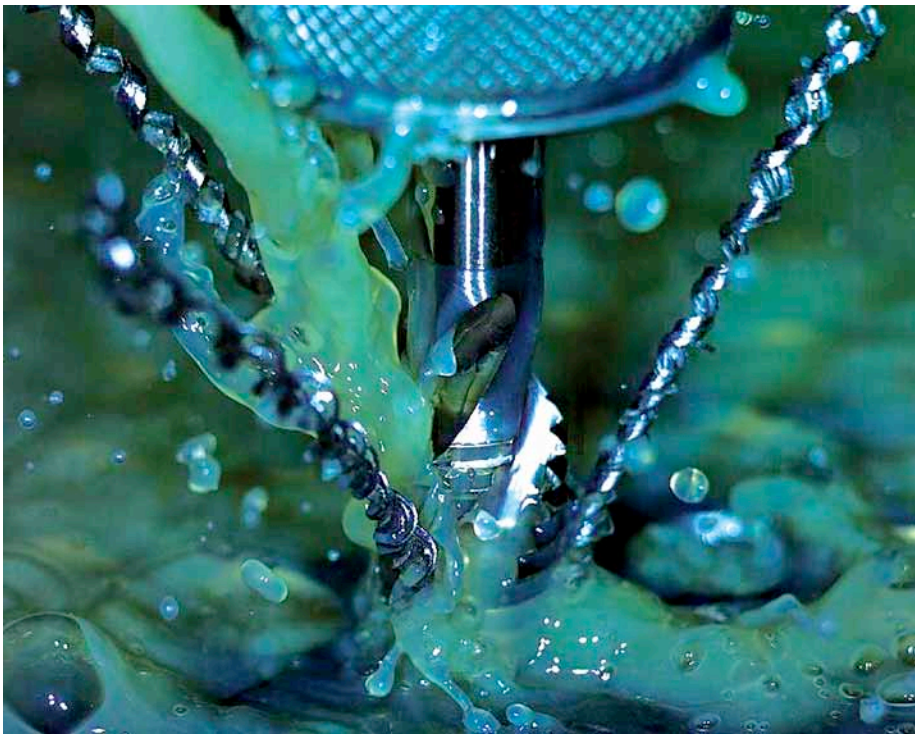
In the production of thread holes, the type of tap used is the most important factor to be considered. Typically, tapping is performed at the final operation of parts machining. A misapplied tap can ruin a part that already has significant amount of added value to it.

The other thread cutting tools, like single point turning tools, often remove material in time-consuming multiple passes to attain the targets, dimensions, surface finish and so on. On the other hand, multiple passes are impossible in tapping. The tapping cycle is completed when a tap fully advances and retracts from hole.

Tapping is performed inside of holes like drilling and reaming. However, the chip space of a tap is extremely limited compared to that of drills and reamers of the same size. This is because the thread part of a tap is hidden in the material to be cut while tapping. Even though the flute space of tap looks wide enough, the effective space for chip evacuation is quite narrow.

Unlike other cutting tools, the user cannot alter the speeds and feeds of taps independently for the purpose of obtaining the desired results because the feed rate of tap is decided by pitch per revolution. In turn, the revolution i.e., cutting speed, depends on the workpiece material, condition and hardness.

Source: YG-1



The process of threading holes can prove problematic due to the various forces at play

Tapping issues

There are several major issues to overcome when tapping. Unlike other cutting operations, users cannot change the amount of stock removal when tapping because the tap should remove materials in a pass, all of the volume of space in accordance with its standard. For instance, a standard size of M12 (x1.75) tap removes more stock than M12 x1.25 tap. When cutting a full thread profile, a tap enters into a prepared hole, which is slightly larger than its end diameter. The tap then lands its first chamfer thread on work material, and goes into material cutting and leaves a specific amount of material for the succeeding

chamfer threads to remove. As taps rotate and feed, the second chamfer thread enters the cut to remove material left by the first chamfer thread. The third chamfer thread enters the cut to remove the material left by the second chamfer thread, preparing the pathway for the first full thread, which will remove only a small pyramid peak of material to finish the final thread profile. All the other threads along the length of thread, linearly and peripherally, play the pilot but do not cut. Basically, this is why tapping is considered as a helical broaching.

Watch the torque

Torque during tapping changes from the time the first chamfer thread touches the work material and rapidly increases until the first full thread starts to cut the work material. Then, it gradually increases until the tap stops and reverses, returning to the starting position. This causes changes in chip formation and flow and leads to unstable cutting. The chamfer threads, which act as the main cutting edges, undergo a heavier torque load and significantly impact the final thread quality.

The work material closely surrounds the tap, some materials shrink and squeeze the tap, which creates friction and therefore increases torque and machine power consumption. Some materials tend to work-harden, which expedites edge wear and increases torque and power consumption.

When tapping with spiral flute taps, contact between the chips, tool and work material creates friction and heat. This might cause size problems in materials that tend to induce the plastic deformation, softening when heated and hardening when cooled. Spiral flute taps tend to break when they reach the full depth of blind hole and stop to reverse. The tap stops while it's still forming chips and those chips lock the tap. To prevent breakage, the tap must push through all impediments. When supplying spiral flute taps to a short-clearance blind hole, the chamfer length must be shorter and limited. This causes the tap to undergo a heavier torque load compared to a spiral point tap, also called a gun point tap, which has longer chamfer length.

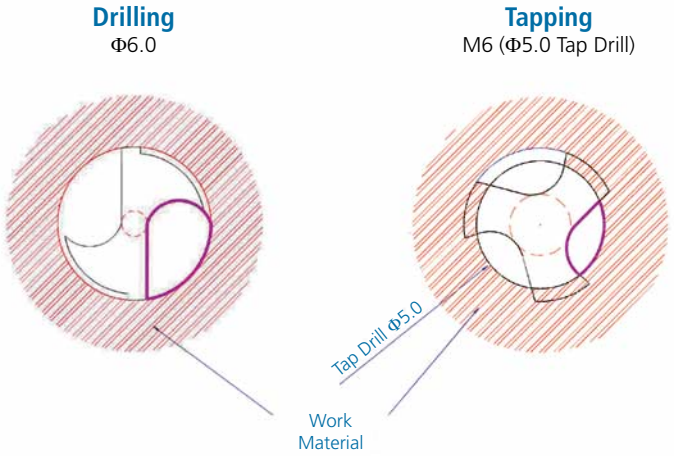
Overfeed / underfeed

In addition to the difficulties previously noted, tapping can create oversize threads that will ruin a part. On some occasions, threads will disappear at the entrance of a hole. When a tap advances inside a hole, it should advance a pitch in a revolution. If not, it will create either overfeed or underfeed. If the pressure of the feed is great enough to allow overfeed due to any elements, it applies to the leading flanks of taps and makes them shave material on the leading side of threads that should not be removed. If the pressure is great enough to allow underfeed, it applies to the trailing flanks of taps and makes them shave material on the other, trailing sides of threads.

Overfeed and underfeed can happen when a tap reverses and exits a hole because of the spindle backlash, the poor condition of the tapping attachment or from other factors. In cases such as these, overfeed shaves the trailing sides and underfeed shaves the leading side of threads.

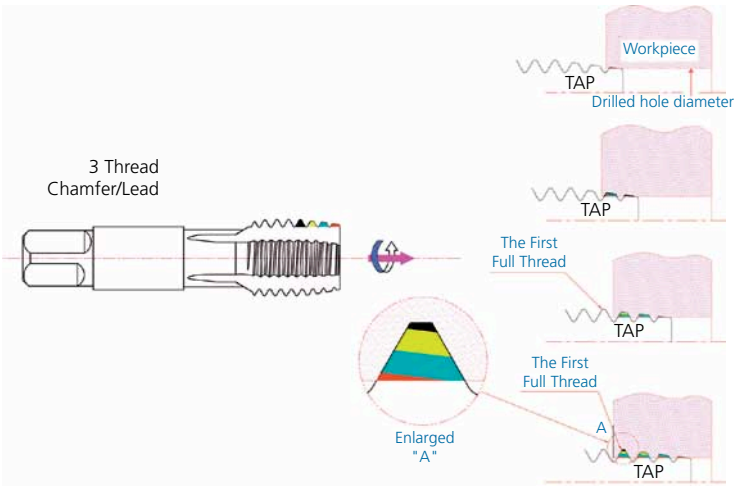
As a result, whether through overfeed or underfeed, the shaved surfaces make the root width too wide but the crest too narrow. The inside diameters, major diameter between the roots and minor diameter between the crests, are not influenced at all. The thread gauge doesn't inspect these. It checks the pitch diameter of threads, in other words, the width of space and thread. The amount of shaving, i.e., the amount of over/underfeed, per length of internal thread determines whether the no-go gauge can pass through the internal threads or if it engages a few threads at the entrance of internal threads (bell mouth). The oversize, or bell mouth problem, is almost always caused by the shaved thread flanks.

In most cases, the oversized conditions come from the tapping equipment or reaction or axial force as a result of flute



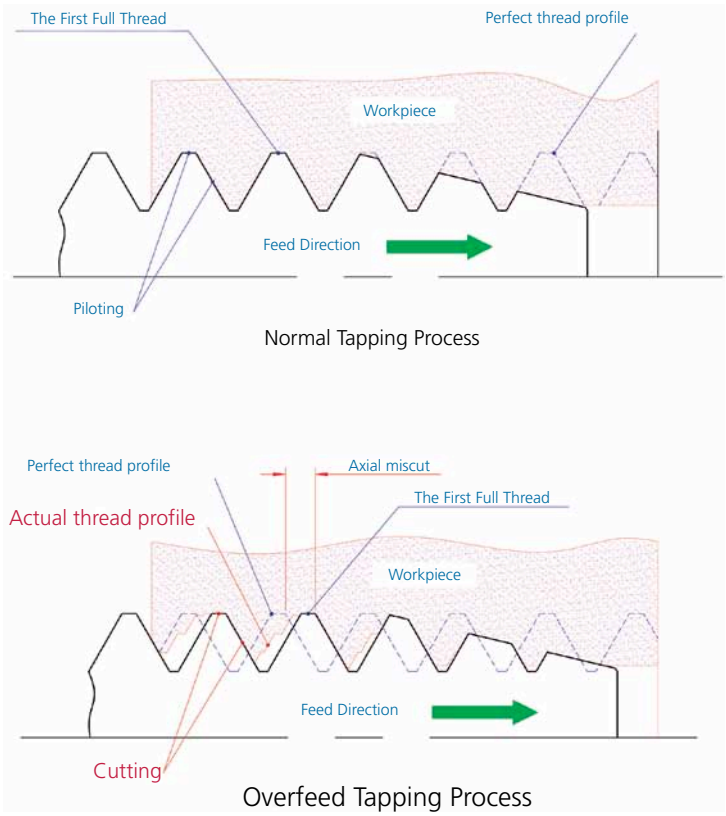
Source: YG-1

Drilling provides much more room for chip evacuation than tapping

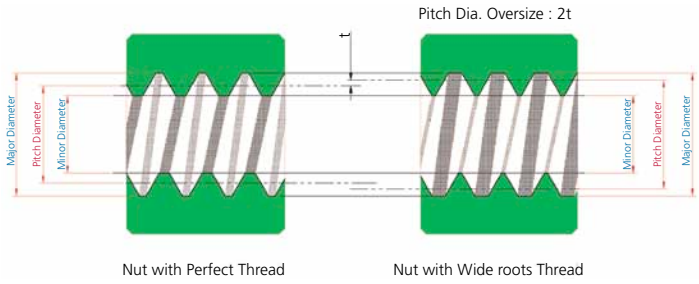


The complete thread forms as the tap progesses down the hole

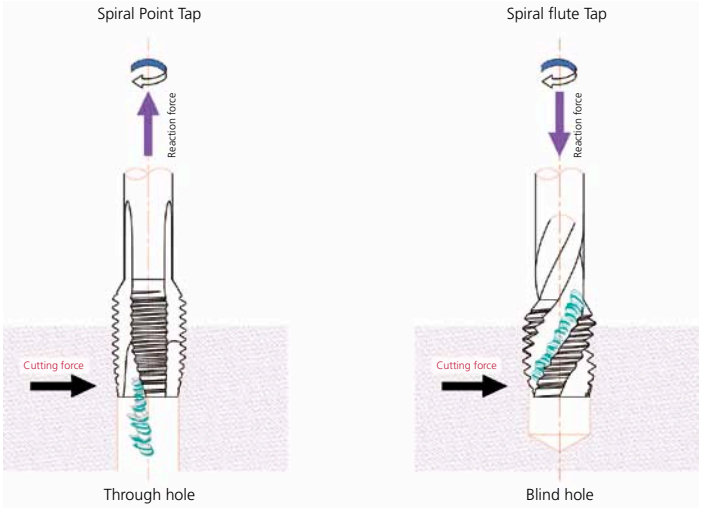
Source: YG-1



Thread miscutting or shaving due to overfeed



Overfeed or underfeed of the shaved surfaces can make the root width too wide but the crest too narrow



Illustrations of axial, or reaction forces, which can result from the geometry of the flutes on a tap

geometry and the difference of wedge angles between the leading and trailing flanks, or both.

Furthermore, the tap is easily broken and the machine needs more power consumption when oversized conditions happen. That happens because the chamfer threads and all full threads cut the material and more chips are produced than with normal tapping.

Troubleshooting

Metal working professionals often consider taps to be the tools of last resort because of these problems. Different work materials and machining conditions lead to an almost unlimited variety of tap geometries, material substrates, surface treatments and coatings. Such an array can cause headaches when choosing the right tap for the job.

Tapping can be the preferred option for thread making. However, it is important to find solutions that prevent a tap from advancing slightly faster than it should, have it accurately correspond to its own lead, prevent the width of space from being shaved too widely and prevent oversized threads. These solutions can be used to help produce an ideal thread form.

YG-1 said one solution is its 'Combo Tap' for blind and through-holes. The tool's special thread form geometry solves tapping problems by acting like a brake to prevent the tap from over or underfeeding. It also avoids axial miss-cutting and stops production of oversized threads. In addition, the geometry is said to compensate for cutting forces, which reduces tap wear and extends tool life.

The supplier noted that the tap also allows for increased thread relief as well as reducing torque, machine power consumption and friction. In addition, it reportedly enables smoother tapping with better chip evacuation. It also reduces tap inventory because the multifunctional tap can thread a large variety of materials, including carbon, alloy, stainless and tool steels, the company explained. **MMI**

INTERNET

Further information on Tapping technology can be found at:
http://www.etmm-online.com/machining_accessories_cutting_tools/articles/405516/

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Designing Equipment for Power Transmission Line

Development of a new 1200 kV power transmission system for bulk power transmission puts forth various challenges. This article gives an overview of how Supreme & Co Pvt Ltd overcame these challenges by designing and customizing components to make this system successful.

In view of the projected growth of capacity addition in power generation and to take care of the future increasing load demand, Power Grid Corporation of India Ltd (PGCIL) decided to adopt a 1200 kV power transmission system for bulk power transmission. It was decided to develop the entire range of equipment for the sub-station and transmission line indigenously and PGCIL therefore created a Project Steering Committee (PSC) and several Working Groups (WG) equipment-wise.

Various studies were conducted by the company to determine the configuration of its 1200 kV transmission lines and switchyard. These studies included various aspects such as corona cage, air gap insulation, voltage distribution on the insulator string, Radio Influence Voltage (RIV) and voltage gradient measurement. Based on the results, the conductor configuration, air gap clearances and string configurations were finalized.

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Corona cage studies

The Corona cage tests were carried out at the Central Power Research Institute's (CPRI) UHV test lab at Hyderabad. An Octagonal Bersimis Aluminium Conductor Steel Reinforced (ACSR) (dia 35.1 mm) bundle conductor was chosen for this test. Three types of bundle arrangements, with different sub conductor spacing of 350 mm, 450 mm and 550 mm respectively were studied. Then Corona Inception Voltage, AN and RIV were measured with two nominal precipitation rates viz. 57mm/hr and 85 mm/hr. Corona loss, energy loss that happens due to corona, was also measured simultaneously with the same precipitation rates.

Eight bundle Bersimis with both 450 mm and 550 mm sub-conductor spacing were considered for the 1200 kV system. Furthermore, as system studies conducted with the eight bundle Moose gave good results, two National Test Stations including Bersimis (D/C line) and Moose (S/C line) conductors were adopted.

Selection of insulation levels

Lightning Impulse Withstand Voltage Level (LIWL) and Switching Impulse Withstand Voltage Level (SIWL) were prime considerations for insulation coordination. With rise in system voltage, the ratio of LIWL and SIWL to the rated voltage decreases. For example, LIWL/rated voltage for 400 kV, 765 kV and 1200 kV respectively is 4.15, 3.22 and 2.45. Alternatively, SIWL/rated voltage for 400 kV, 735 kV and 1200 kV respectively is 3.06, 2.37 and 1.84. By using high performance multi column surge arrestors, lightening impulse and switching impulse insulation levels were kept at similar for 1000 kV line in China.

Clearances

Based on experimental results conducted by PGCIL and CPRI, clearances stipulated by PGCIL are given below:

(a)	Minimum phase to earth clearance	8.30m
(b)	Minimum phase to phase clearance	12.30m
(c)	Sectional clearance	10.5m
(d)	Phase to phase distance (Pie structure)	27.00m

Source: Supreme & Co Pvt Ltd

1200 kV power transmission system with improved insulator and conductor fittings

Technical parameters of 1200 kV equipment

Based on the above studies and test results, all relevant technical considerations for individual equipment and major technical parameters were identified by PGCIL, which are given in Table - I.

TABLE - I

Sl No	Technical Parameters	Value	Remarks
1	**System Parameters**		
(i)	Phase-Phase	1150 kV	
(ii)	Frequency	50 Hz	
(iii)	Number of Phase	3	
(iv)	Fault Current	50 kA	
(v)	Corona extinction voltage	762 kV	
(vi)	Max. Radio Frequency voltage (0.5-2 MHz)	1000 MicroV	
(vii)	Creepage distance	25 mm/kV	(Total 30000 for 1200 kV system)
2	**System Maximum Voltage (Ph-Ph)**	**1200 kV**	
3	**System Insulation Levels**		
	Lightning Impulse Voltage Level (1.2/50 microsec)	2400 kV	Switchyard equipments
		2250 kV	Transformers & Reactors
		2550 kV	Transformers & Reactors Bushings
	Switching Impulse Voltage Level (250/2500 dry and wet)	1800 kV	Switchyard Equipments and Transformer
		1950 kV	Bushings
	One Minute Power Frequency voltage (rms)	1200 kV	
4	**Bus Bars/Equipment Interconnections**		
(i)	Tubular Bus/Connections	Twin Al. 4" IPS tubes with 450 mm spacing	
(ii)	Height	18.0 m	
(iii)	Strung Bus/Equipment Connections conductor bundle	Octa Bundle Bersimis with 457 mm sub conductor spacing	
5	**Clearances**		
(i)	Minimum Phase to Phase Clearance	12.30 m	
(ii)	Minimum Phase to Earth Clearance	8.30 m	
(iii)	Sectional clearance	10.5 m	
(iv)	Phase to Phase distance (Pie Structure)	27.00 m	
6	**System Neutral Grounding**	–	**Effectively Earth**

Source: Supreme & Co Pvt Ltd

Line hardware design

After obtaining the data from PGCIL and also compiling more data from other sources, the design parameters were selected and the aspect was categorized in three broad groups for:

- Aluminum tubes for Corona Control (CC)/ Grading ring
- Steel forging
- Fabricated steel plates

Aluminum tubes for CC/Grading ring

CC rings are deployed in EHV/ UHV levels for the dual purpose of reducing electrical stresses and to ensure extinction of corona below a certain voltage level, thereby reducing corona loss. It also takes care of insulator string and voltage gradient, which varies directly with the system operating voltage and inversely with the square of the distance from the center of the conductor. Moreover, design of the CC ring also ensures that the RIV stays under the acceptable limit.

The system needed special attention on the design aspect of CC rings, as the dimension of the CC ring had to cover the large hardware fitting set. Surface voltage gradient on the surface of the conductor was calculated for transmission lines and sub-stations and was found to be within a safe limit with respect to corona inception. See Table - II. Selection of the CC ring was done by covering a much larger diameter and effective surface area and hence, performance with respect to corona inception and losses were within the limit.

To achieve this, a 100 mm diameter 6063 grade aluminum alloy extruded tube with 5 mm thickness was selected. Bending of such a tube called for new and higher capacity bending machines and also new dies, which were developed in-house. The large dimension CC ring for tension hardware was fabricated (bent) in two halves. Two couplings with inner dia maintained at close clearances to outer dia tube were deployed at the two adjoining points of the two halves of the CC ring. To facilitate smooth fitment, the couplings were tapered inside from the center to the outermost point on either side. Opening up of the CC ring was arrested by two structural steel flats bolted with the bracket of the ring thereby fastening both halves together.

Studies were conducted by Deccan Enterprises to determine voltage distribution along the insulator string. A polymer insulator with an Octagonal bundle conductor was considered with two types of outer CC rings viz., 700 mm and 1100 mm ring diameters.

Voltage distribution pattern on whole string and near the HV end indicated is in Figure 1(a) & Figure1(b):

Steel forging

The most important parameter for design of steel forging components is the Electro-Mechanical (E&M) strength requirement. It is derived from the E&M strength of the insulator as well as total string configuration. Primarily, the ball and socket designation are selected. Typically for a 400 kV system, 20 mm B&S designation is adopted for 120 kN and 160 kN insulators. However, PGCIL has already introduced higher capacity insulators of 320 kN and 420 kN. These call for higher B&S designation, which resulted in use of 24 mm and 28 mm ball and socket size with chrome molybdenum alloy and high strength steel designated as EN19 grade, to withstand the electro-mechanical strength requirement. Obviously, same designation was adopted for ball and socket components for respective hardware fittings for 1200 kV.

This also called for the development of a full range of forging dies, socket cutters, a set of gauges etc. The matter was taken up immediately and fresh design was made for dies. New die blocks were imported and die sinking was done at a pre-approved vendor's work under constant supervision.

In this process, the components were

Figure 1(a)

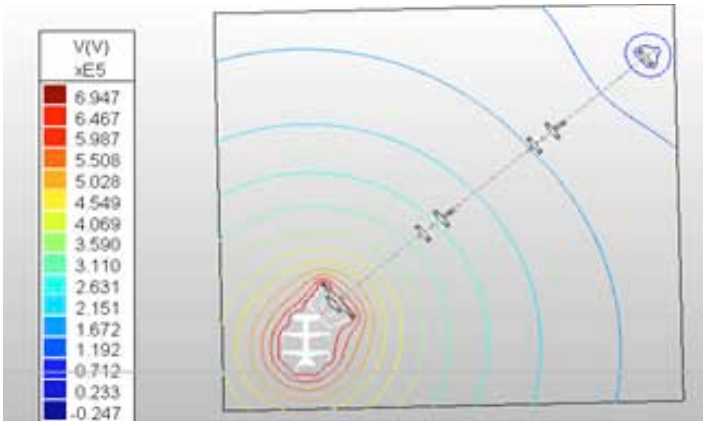
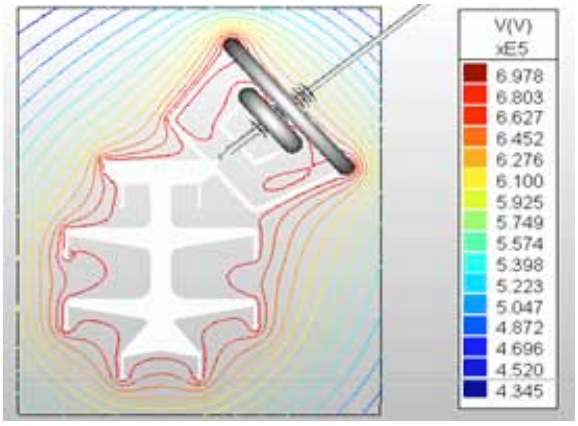


Figure 1(b)



Source: Deccan Enterprises

Voltage distribution pattern on whole string and near HV end

forged in drop hammers of 1T, 1.5T and 2T capacities (depending on the size of product) at red-hot condition with temperatures ranging from 975°C to 1,050°C. Flashes were then removed at trimming presses with the help of newly developed trimming dies. Components were allowed to cool naturally in the open air. All forged components were subjected to heat treatment (normalizing) in a furnace at 850°C with a soaking period determined by the thickness of the product.

Major dimensions were initially selected based on previous experience of design used for EHV segment and extrapolating the higher mechanical strength withstanding ability. Certain aspects arising purely due to levels of mechanical stresses, significantly higher such that mere extrapolation would not have sufficed, were also addressed. All components needed to have the required yield, shear and bearing strength and these were validated by design calculations. Moreover, design was based on mechanical strength values applicable under normalized condition, avoiding use of hardened and tempered steel. Ductility was a key consideration as parts must undergo macro deformation before failure. Use of fasteners with grades higher than 8.8 was avoided since their yield point is very close to breaking load, which is not recommended for cyclic stresses arising out of vibration. Additionally, higher grade fasteners are susceptible to hydrogen embrittlement. Stress concentration may also arise due to various local changes in geometrical shape, sharp bends or abrupt changes in cross-sectional area.

Stress concentration at roots and run outs of the thread were avoided by use of thread rolled bolts. Higher edge distance, counter holes, radiused edges were used to mitigate stress concentration related problems.

After design calculations, forging components were revalidated by testing on tensile testing machine as per PGCIL standard technical specifications i.e. 67 per cent proof load (5 min) and 100 per cent UTS (1 min).

Source: Supreme & Co Pvt Ltd

TABLE – II

Calculation of conductor surface voltage gradient

Method obtained IEE Power Series 17, 'high voltage engineering and testing'

$E=(V/\sqrt{3})*(\beta/(r*\ln((a/Re)*2h/\sqrt{(4h2+a2)})))$

Where,

$\beta=(1+(n-1)r/R)/n$

$Re=Rn*\sqrt{(nr/R)}$

$R=S/(2*\sin(\pi/n))$

E= Conductor Surface Voltage Gradient (kV/cm)

V= Rated Voltage (kV)

β= Factor for Multiple Conductors

r= Radius of Conductor (cm)

R= Outside radius of bundle (cm)

Re=Equivalent Radius of bundle conductor (cm)

S= Distance between Component conductor centers (cm)

a= Phase Spacing (cm)

h= Height of conductor above ground (cm)

(This value is taken as the distance between phase connection/bus bar to the metalwork at earth potential)

n= Number of component conductors in bundle

Fabricated steel plates

Design of plates for the 1200 kV hardware fittings called for innovation, owing to the number of sub-conductors, which was decided as eight per phase. In the case of suspension hardware fittings, the challenge lay in the development of a single piece yoke plate to support all eight sub-conductors at the same vertical plane from eight different points (holes). Simultaneously, sub-conductor spacing i.e. distance between adjacent sub-conductors had to be kept identical, which was 457 mm. Eight armour grip suspension clamps supporting each sub-conductor were attached with the yoke plate at the hole points as mentioned above.

Design parameters viz. thickness, edge clearance etc. of suspension yoke plate was selected based on previous experience of 400 kV strings. Subsequently, validation was done through calculation of tensile, bearing, shearing strength of plate and bearing strength of bolt as per guidelines of IS 800. The concept of design that followed was generally the same as had been done before. As far as material was concerned, low carbon structural steel as per IS 2062 Grade-A was adopted. All hole edges were countersunk to relieve stress and bolt dimension selected to ensure avoidance of contact of load-bearing surface with the threaded part. Similar design philosophy was adopted for all other yoke plates, links, flats deployed for other hardware fittings viz. tension, etc.

Conclusion

Though the development of all fittings has been done to the extent described above, continuous effort has to be taken after obtaining further test results, to see whether further optimization is possible. MMI

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- Mr. Shrinivas Shirgurkar, CEO, Ace Designers. Bangalore

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Building Advanced Capabilities

An organization can apply a simple set of best practices to promote success. It includes assessing the current performance of procurement division, identifying missing skills and using findings to customize the curriculum for an improved training program. This article throws light on how to roll on such a program while tracking performance.

Procurement is becoming a powerful strategic function. Adopting an integrated approach to building and applying capabilities that go beyond traditional cost management can accelerate this transition.

Leading companies start by determining how procurement can contribute strategically. To build the capabilities they need, they focus on the practical application of new skills that their teams acquire by following a rigorous approach in rolling out those capabilities across the organization.

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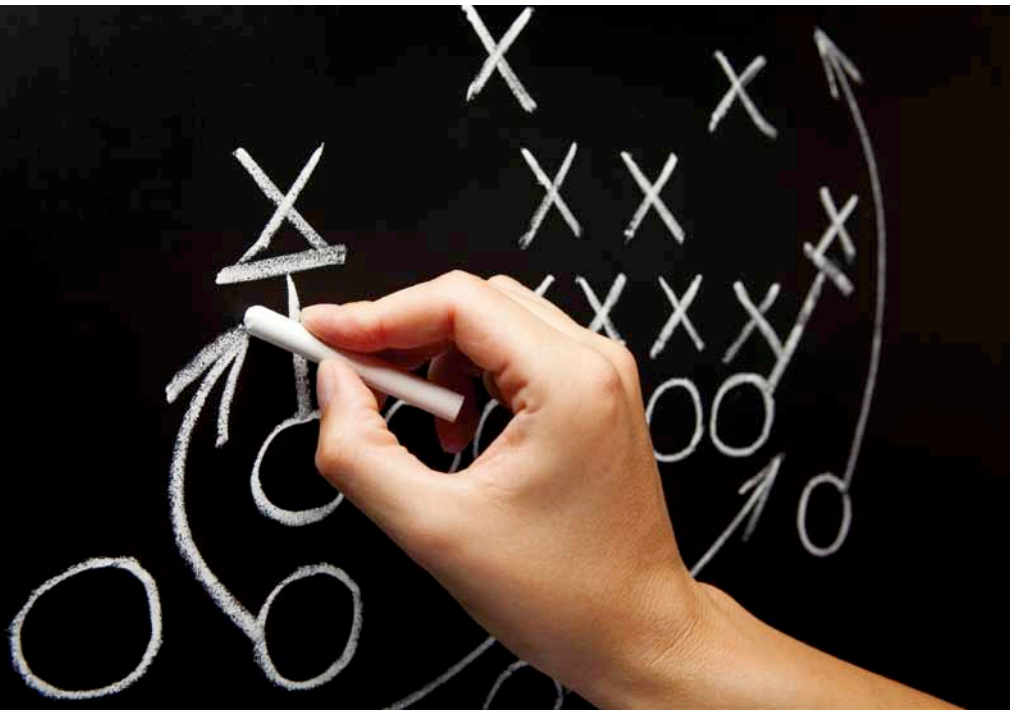
Cross-functional collaboration

To translate their strategic objectives for capability building into bottom-line impact, leading companies ensure that their investments in training are tightly linked to procurement's day-to-day operations. They accomplish this by designing capability-building programs that combine classroom instruction with on-the-job deployment of new skills. When designing a training program, organizations should consider how participants will apply the lessons they have learned to their daily work. To ensure that these lessons become part of the normal course of business, the training curriculum should align with the company's core procurement processes, such as category strategy definition, the source-to-contract process, and supplier development. A roadmap for capability building should identify up front the opportunities for directly applying elements of the training agenda in pilot initiatives.

The company should ask cross-functional teams to identify the scope of the pilots to ensure that the advanced approaches are tested in appropriate settings. Team members from other functions such as engineering, quality management, and logistics should also participate in the program. This enables development of cross-functional collaboration throughout the organization.



Source: depositphotos.com

A solid foundation of core capabilities can have a stronger impact on the bottom line than establishing complex cross-functional approaches

Application of best practices

Following a successful pilot, leading organizations facilitate the rollout of the training program by asking members of the initial team to share best practices with new participants. Approaches that ensure best practices in daily operations include introducing qualification standards for successfully completing the training program and designating someone to be accountable for its results. When rolling out a capability-building program to the full team of procurement professionals, some companies have achieved success by establishing a new organizational entity to lead the effort.

Companies should make sure not to overlook the importance of improving overall compliance with best practices related to core capabilities. A solid foundation of core capabilities can have a stronger impact on the bottom line than establishing complex cross-functional approaches.

Evaluating potential adjustments

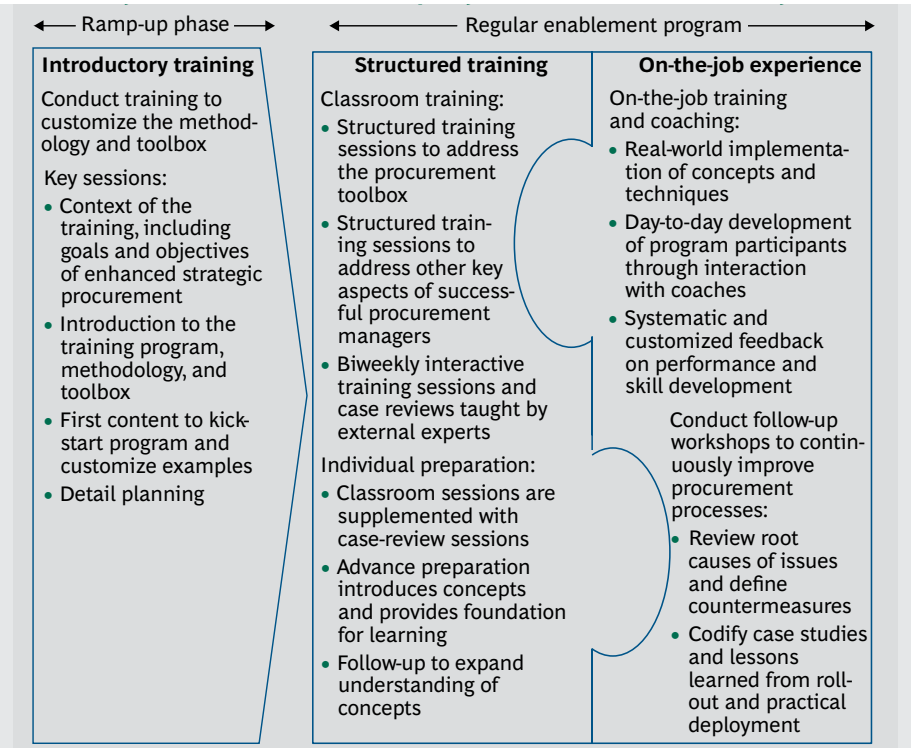
To ensure that advanced capabilities are deployed effectively, leading companies implement critical enablers of improved performance, such as making adjustments to the operating model or elevating the level of talent in the organization. Making adjustments to the operating model, such as establishing cross-functional category boards to monitor decisions and review progress throughout the sourcing process, can improve cross-functional collaboration and decision making. During pilots, companies can evaluate potential adjustments to the operating model for specific spending areas by considering the following:

- Does the organization's current operating model strike the right balance between local execution and the centralized or coordinated definition of category strategies?
- Are decision-making processes and decision rights consistent and clearly understood throughout the organization?
- Are effective platforms, such as cross-functional design-to-cost teams and decision boards, in place to promote collaboration across functions and among global teams?
- Do the existing tools and methods support effective management of spending and strategic sources?
- Are performance metrics aligned with strategic objectives to promote compliance with identified standards?
- Is a robust IT infrastructure in place to support advanced capabilities and cross-functional collaboration?

Elevating the level of talent in an organization also helps to achieve procurement's strategic ambitions. Leading companies develop attractive career paths and offer incentives when hiring, developing and retaining top talent.

For example, a large national oil company sought to enhance its procurement capabilities to better manage volatility in the commodity and supplier markets so that it could maintain profitable growth. The organization also hoped to reduce costs and improve its management of an increasingly complex supply chain, from crude-oil sourcing to supplying fuel at filling stations. The company determined that its current model of allowing business units to conduct all transactional purchasing would impede these goals. So, it opted to transition to a central procurement function reporting directly to the CEO and applied a talent management strategy to enhance the attractiveness of a career in procurement. To emphasize the importance of procurement, the company staffed the department with some of the organization's best performers, a number of whom had only limited procurement experience. The new team formed a nucleus that attracted further talent and made working in procurement a desirable step in the career path for top performers.

The key elements of one company's procurement academy



Source: BCG analysis

Leading companies also seamlessly integrate capability building and performance management. For example, they use a stage gate process to track and validate the category teams' intermediate results, thereby ensuring compliance with the company's category strategy process. At predetermined points, key members of the leadership team coach the category teams responsible for developing the supply strategy and review their progress. The review assesses each category team's ambition and strategic focus and determines how well it is developing and executing the category strategy.

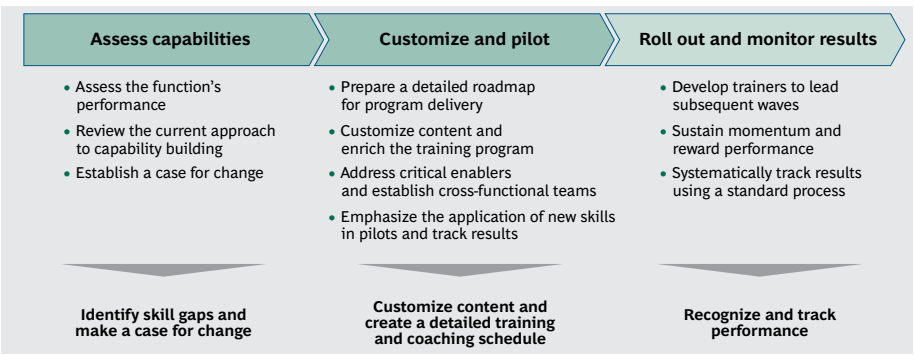
Capability building in practice

Companies can apply a set of best practices throughout their capability-building programs to promote success. These practices are critical across the three phases of a capability-building program assessment, the customization and piloting of initiatives and tools, and rollout.

Assess current capabilities: An organization should design its capability-building program after evaluating its procurement function's performance and skills and identifying the expected benefits of deploying advanced capabilities.

Assess the function's performance: A company should start by establishing a baseline for procurement's current

The success factors for building capabilities



Source: BCG analysis

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Companies should have a solid foundation of core capabilities to ensure overall success

performance. To compare the function's skills with best practices, the organization should gather feedback from the procurement staff (including a self-assessment and a prioritization of potential training modules) and from internal customers. The results can help define the capability-building program's focus and reveal the potential value of enhanced procurement capabilities.

Review the current approach to capability building: The organization should review its current approach to capability building and deployment. This includes analyzing the roadblocks to applying best practices—such as lack of effective cross-functional forums to drive the alignment of category strategies and inadequate performance management.

Establish a case for change: To justify an investment in strategic procurement capabilities, the company can use the assessment's findings to demonstrate the need for change and show how specific capabilities will add value within a spending area. Leading companies establish baselines for spending and performance using three-year targets for procurement savings and then estimate the resource costs of the capability-building program. Individual business cases for particular spending areas can help to establish the near-term benefits of investments in specific skills and resources and to track the program's performance as it is rolled out.

Customize and pilot the approach

In a second phase, the company customizes the elements of the capability-building program and pilots it.

Prepare a detailed roadmap for program delivery: To guide the multiyear program and transformation, companies need to implement an enabling roadmap that capability-building activities should follow. This is particularly critical when organizations, such as successful players from emerging markets, set ambitious targets to achieve their aspirations for best-in-class procurement capabilities. The roadmap identifies important intermediate steps and milestones along the journey, as well as the benefits that are expected to accrue from the effort. It also defines the program's focus and highlights the interdependencies in multiple work streams and spending areas. Common elements for such a roadmap include curriculum based classroom training, detailed plans for teams during pilot projects and their subsequent waves, and ongoing adjustments, if required, to the operating model.

Customizing training program: Demonstrating a training program's success in customizing best practices to a company's specific situation helps gain acceptance for the program. Leading companies emphasize the development of successful initiatives in the pilot phase of the program to gain support for the implementation. The training program should also try to use a variety of instructional formats, including e-learning, and invite internal or external experts from other functions to lead some of the sessions.

Establish cross-functional teams: The procurement team should meet with teams from other functions and business units ideally for the duration of the program. It helps foster an increased understanding of roles, share ideas and challenges and hence improve teamwork. These teams should pilot performance measures, changes to the governance model, and the deployment of new collaboration approaches. For example, members of a cross-functional team could collaborate on reengineering a component or designing a product. The pilot teams provide valuable feedback that the organization can use to more effectively make the proposed changes. This gives the participants an opportunity to immerse themselves in the new way of working and understand the benefits of doing so.

Emphasize the application of new skills: During the program, coaches should support cross-functional teams in implementing major procurement projects that require applying the acquired skills.

Launch the program and monitor results

When the pilot phase is complete, the company can roll out the program to the entire organization, monitoring progress and assessing the results.

Develop trainers: Larger organizations should roll out their training programs in several waves. They should also apply capability levels and standards, similar to those in Six Sigma programs, to qualify a larger group of trainers. Typically, employees who have successfully completed the initial waves become trainers for subsequent waves.

Reward performance: Top management can help highlight a training program's importance by rewarding extraordinary performance and touting successful participants.

Track results: Stage gate reviews should be an integral part of the rollout phase. In addition to ensuring that ideas from outside the core team are applied in developing the category strategy, the review process can be used to support on-the-job training and assure that the new procurement capabilities are being applied.

Charting a new path

As companies chart a new path for procurement and face revised expectations in today's volatile economic environment, assessing ongoing capability-building activities is critical. To evaluate the effectiveness of their current approach to capability building and identify the roadblocks to broader application, executives can consider their responses to a series of pointed questions. MMI

EVENT CALENDAR

Event Name	Contact	Date & Venue
Ferramental	Tel: + 41- 3075-1100 diretriz@diretriz.com.br www.feiraeletron.com.br	14 – 17 August 2013 Expotrade Convention Center Curitiba, Brazil
Modern Machine Shop 2013	Tel: +91-80-66246600 info@imtma.in www.mmsinfo.in	22 – 25 Aug 2013 Pragati Maidan, New Delhi
Pune Machine Tools Show	Tel: +91-79-29701994 info@kmgindia.com www.kmgindia.com	23 – 25 Aug 2013 Autocluster Exhibition Centre, Chinchwad, Pune
EMO Hannover	Tel: +49-69-756081 s.becker@vdw.de www.emo-hannover.de	16 – 21 Sept 2013 Hannover, Germany
Pacific Coast Machine Tool Expo	Tel: +1-800-827-8009 joyce.lortz@cygnusexpos.com www.machinetoolexpos.com	25 – 26 Sept 2013 Santa Clara Convention Centre, CA, USA
Modern Machine Shop 2013	Tel: +91-80-66246600 info@imtma.in www.mmsinfo.in	25 – 28 Sept 2013 Bombay Exhibition Centre, Mumbai
Modern Machine Shop 2013	Tel: +91-80-66246600 info@imtma.in www.mmsinfo.in	25 – 28 Oct 2013 Chennai Trade Centre, Chennai
ENGIMACH	Tel: +91-79-26469725 info@engimach.com www.engimach.com	27 Nov – 01 Dec 2013 Ahmedabad Education Society Ground, Gujarat
Manufacturing Indonesia	Tel: +65-62336777 carolyn@iemallworld.com www.pamerindo.com	5 – 8 Dec 2013 Jakarta International Expo Kemayoran, Indonesia
IMTEX 2014	Tel: +91-80-66246600 imtma@imtma.in www.imtma.in	23 – 28 Jan 2014 BIEC, Bengaluru
ACMEE 2014	Tel: +91-44-26258619 info@acmee.in www.acmee.in	19 – 24 June 2014 Chennai Trade and Convention Centre, Chennai

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

The Power of Connection

Taking inspiration from the old adage, 'A family that eats together, stays together', Siemens PLM Software recently hosted its 'Siemens PLM Connection India 2013'. Of course, a lot more than just eating together was on the menu for the participants of the event! The event is an annual forum for the Indian users of the company's PLM software, wherein connecting and knowledge sharing are orders of the day.

The Siemens PLM Connection India 2013 was held at the Hyatt Regency, Pune on 21 -22 May 2013. By bringing together users of the software and industry professionals, the company aims at providing an overview of the PLM software, its capabilities, recent releases and enhancements in the pipeline. All this has an overall target of assisting users to optimize their PLM processes and derive greater value from their software. The event was opened by Managing Director, Siemens PLM Software India, Suman Bose, who shared challenges faced by manufacturers today and touched on the vital role of the human touch for innovation in industry. The keynote address was given by Vice President, Mahindra Vehicle Research, Nitin Ranade, who shared his knowledge of product development processes as well as keen insights into customer needs.

Compiled by:
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Forum tracks and discussions

The conference attendees had a selection of tracks they could participate in at the forum, based on their expertise and interest. The tracks were focused on product design and design simulation, digital lifecycle management and digital manufacturing. An industry track for specific industry segments was also included. Each of these tracks contained solution updates by technical experts from the company, followed by case study presentations by customers and partners based on real-life PLM implementations. Some of the topics were: HD3D Visual Reporting, Teamcenter on Cloud, TC Visualization, NX Routing, Composites for the aerospace industry, Variational Analysis, Quality Lifecycle Management, etc.

Contests and exhibition

One of the key features of the conference was a solid model contest, wherein several customers submitted their entries prior to the event, all of them quite innovative! Other contests also running over the two days provided participants the opportunity to win exciting prizes. Real-time event updates were published via the Siemens PLM Software India Twitter handle and conference attendees also posted their thoughts and observations on Twitter using an event-specific hashtag. The exhibition area at the conference featured several partners of the company in India, including channel, technology, systems integration, services and training partners showcasing their complementary solutions and services. MMI

Source: Siemens PLM

Managing Director, Siemens PLM Software India, Suman Bose addressing the audience at the event

Source: Siemens PLM

The exhibition area with visitors and participants

Customizing Industrial Cleaning Processes

Parts cleaning technology leader Dürr Ecoclean inaugurated its new Technology Center in Pune recently. The facility is equipped with the latest technology and houses machines for aqueous as well as hydrocarbon industrial parts cleaning. The investment offers customers the opportunity to locally conduct cleaning trials and laboratory tests to choose the most suitable cleaning process for their requirements.

In India, Dürr Ecoclean India operates as a division of Schenck RoTec India Ltd, with its headquarters in Pune. The recently inaugurated a 6000 sq ft Technology Center in Pune, of which 3000 sq ft is constructed, has been built to enable customizable processes for their customers. The centre offers customers the opportunity to run cleaning trials on a variety of Dürr manufactured parts washers using different cleaning technologies. Talking on the additional benefits that the center offers, Managing Director, SCHENCK RoTec India Ltd, Manish Khanna averred, "The center will initially offer customers free trials so that they can learn about the optimum level of quality that is achievable at the facility and compare it with the quality of components achieved at their end." Their laboratory is equipped with the latest technology for cleaning trials and Millipore tests giving customers the advantage of directly experiencing the cleaning process and check results. One of the machines on display and running test trials was the Indian made new Universal 81W.

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Additional benefits

The company also proposes to offer on-the-job training wherein people would be sent to customers' factories to educate their employees on the optimum use of machines and also purposely introduce problems in the machines to help the teams understand the nuances and fix the machines themselves. "As the requirements for each customer vary, we are in the process of designing custom training modules," said General Manager, Dürr Ecoclean, Mangesh Agarwal. Another interesting part about opening a facility in Pune, was that this local presence will now save costs and time for shipping customers' sample parts to similar test centers in Germany and therefore significantly shorten the test process. On a concluding note, Agarwal averred, "Going forward, we wish to add more machines depending on the response of our customers. My ultimate dream is to have a robotic washer, which is our high end technology, to be displayed here and make customers understand the process behind this technological advancement." MMI

Source: Dürr Ecoclean

Dürr Ecoclean's laboratory is equipped with the latest technology for cleaning trials

Source: Dürr Ecoclean

The Technology Center has been built to enable customizable processes for their customers

Driving Industry Forward

In face of the general slowdown of industry and markets, optimism is slowly taking a foothold, as evidenced by the success of the Automotive Engineering Show, recently held in Chennai. Here's a report on the event.

The Automotive Engineering Show is so well known in the automotive industry, that its 7th edition, held at the Chennai Trade Centre from 6-8 June 2013, almost seemed like a family gathering of the industry's eminent organizations. The event was inaugurated by Vice President, Operations, TVS Motor company Ltd, V K Shanmugam, who affirmed that the show was one of its kind and aptly held in Chennai, an important place on the Indian automotive map.

Exhibitors comprised OEM's, third party manufacturers and component manufacturers, while visitors included managers from planning, quality, design, production, projects heads, engineers from the assembly line, technology managers etc.

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The role of Chennai

With 30 per cent of the country's automobile and automobile component industry in its palm, Chennai has long been recognized as an important hub for the Indian automotive industry. In recent years though, it has also been gaining international repute. "Chennai is well recognized globally for its automotive industry and is in fact being called the gateway to South East Asia," averred Managing Director, International Trade Division, Tajima Steel Co Ltd, Mark M Hiruta. The government of Tamil Nadu is also lending its support by investing in infrastructure and focusing on industrial growth.

Seminars and presentations

Alongside the exhibition, the event also hosted a number of seminars and panel discussions on a wide range of topics, wherein, eminent industry professionals shared their knowledge and work processes. Indo-MIM Tech Pvt Ltd shared its new metal injection molding technology, which is an advanced metal working process comprising of compounding, molding, debinding and sintering. Renishaw also presented its advanced probing technology, while Beckhoff Automation discussed their extreme real time control data with Ethercat Fieldbus. Faro Business Technologies India Pvt Ltd, Prism Surface Coating Pvt Ltd, Humiseal, Henkel Adhesive Technologies and ifm electronics India were also amongst the seminar participants.

Grass root innovation

One of the highlights of the event was the special seminar on 'Sustaining Good Performance with Grass Root Innovation', an interactive session in which professionals from leading automotive plants and global technology providers participated.

The panelists of this seminar included: Managing Director, Visteon Automotive Systems India Pvt Ltd, Subu Nagasubramony; Vice President-QHSE, Brakes India Ltd, R Vasu; Deputy Director Department of Industries & Commerce, Dr Ethirajan Bhaskaran; HOD, Engineering Design, Indian Institute of Technology Madras, Professor Nilesh J Vasa and General Manager, Body, Ford India Pvt Ltd, Arthur Dewdason. The moderator for the seminar was Vice President, Automation Industry Association and Country Head, Rockwell Automation India Pvt Ltd, Dilip Sawhney. The lively discussion encompassed ways on how to encourage employees to be more innovative and touched on areas such as participative management cultures, Six Sigma, mentoring, work groups, etc.

Recognizing in-house innovation

Recognizing in-house innovation and creative innovation projects, the Automation Industry Association (AIA) awarded companies, in this years forum. Having started this practice in 2011, the Association continued its trend to recognize and award

Source: Vogel Business Media India

(LtoR): Director, Focussed Events, Sameer Khedkar; Managing Director, International Trade Division, Tajima Steel Co Ltd, Mark M Hiruta; Vice President, Operations, TVS Motor Company Ltd, V K Shanmugam; Managing Director, Mitsubishi Electric, Shinji Yamabe; Managing Director, Sales and Marketing, Schmalz India Pvt Ltd, Philip Mani

Source: Focussed Events

Mahindra Vehicle Manufacturers team was felicitated for its cases during the seminar on 'Sustaining Good Performance with Grass Root Innovation'

Source: Vogel Business Media India

An Automated Guided Vehicle (AGV) from Cybernetik Technologies, on display at the event.

the best. This year over 40 projects from top vehicle and auto component manufacturing companies, were submitted for evaluation. The technical jury, comprising of AIA experts and led by Managing Director, B&R Automation and AIA EC Member, P V Sivaram, evaluated and graded the projects based on six criteria: Degree of innovation; Holistic deployment; Base camp flagging; Competency deployment; Hardware choice; Operational vision and impact.

The trophy for 'Innovative and Impactful Automation Team' was awarded to Mahindra Vehicles Manufacturers Ltd, Chakan Planat, for their project on MES Integration. The runner up team was Tata Motors Ltd, CVBU, Pimpri, for their project on 'Engine Assembly Improvements'. Certificates were also awarded to over 20 other project teams. "These projects are a testimony to the enormous talent of automation engineers within our automotive industry and the passion with which they pursue excellence is heartwarming," Sawhney averred on giving out the awards.

Overview of the event

The event saw a number of new exhibitors along with its host of regular, faithful participants. "We have been participating regularly in this event, and plan to do so in the future as well," informed Director, CDS Cam Driven Systems, Bhavani Shankar. Area Sales Manager, G W Precision Tools India Pvt Ltd, Jeffrey Archard added, "It's been a good show, with positive visitors and enquiries. Marketing Manager, Banner, Shreya Desai, also averred that they had received enquiries from genuine customers and would definitely be participating in the next edition. With the automotive industry also falling prey to the general slowdown of markets, its exhibitions such as these which reflect the optimism of the manufacturers, a point stressed by Shanmugam. "It's a positive sign that such events are taking place, not only in metro cities, but in the smaller cities as well. It has been very heartening to meet a wide variety of automotive industry stakeholders, under one roof." The next edition of the show will be held in Pune in 2014. MMI

Channelizing Growth of the Metalworking Industry

EMO is an important show in the global machine tool industry, because of its dual role as a networking platform and as a business booster. As the machine tool industry is ready to take a leap, EMO is looked upon as enabler for the same.

The metalworking industry is going to get together in Hannover, Germany for a week starting from 16 September 2013. The occasion is EMO Hannover, the world's premier trade fair for the metalworking sector, which will showcase the latest technologies and advancements under the keynote theme of 'Intelligence in Production.'

Compiled by:
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Source: www.emo-hannover.de

With the theme of 'Intelligence in Production', EMO Hannover 2013 is expected to showcase innovative technologies

"EMO Hannover will once again be an event of superlatives for our sector," affirmed General Commissioner, EMO Hannover 2013, Carl Martin Welcker. At the event, exhibitors will be showing international trade visitors how they can best meet and master challenges they face in the production process.

International machine tool market

The machine tool industry has more than enough tasks and challenges to meet and master. This is confirmed by how the market has developed over the past 20 years. Up to 2012, international consumption of machine tools had well-nigh tripled, to around €66 billion. Since the turn of the millennium, it has increased by an annual average of almost five per cent on a euro basis. This growth has been driven primarily by Asia, where in 2012 approximately 60 per cent of the total international machine tool production output was consumed.

This year economic pundits are predicting another 2 per cent rise in machine tool consumption, to a record volume of what will then be around €68 billion. This means that following three strong preceding years, one is seeing an incipient temporary slowdown, resulting primarily from continuing loss of confidence in the prospects of the global economy. Economic pundits anticipate, however, that GDP and industrial production output will gain significantly in momentum during the second half of 2013. Machine tool consumption is accordingly set to grow by one-tenth in 2014.

This will benefit the biggest customer groupings of the world's machine tool manufacturers including the automotive industry and its component suppliers, machinery manufacturers and metal-working companies. Sectors such as electrical engineering, precision engineering and optics, including medical technology and other vehicle producers (aviation industry, rail vehicle manufacture and shipbuilding) are also expected to show positive results. They will be investing over 6 per cent more in the current year, a figure that is set to double in 2014.

"For every machine tool manufacturer who wants to do business on the international scene, participating in the EMO Hannover is an absolute must."

General Commissioner, EMO Hannover 2013, Carl Martin Welcker

The success of the event is significantly underpinned by the globalised nature of the machine tool business. More than half of the global machine tool production output is internationally traded. The volume has risen by 80 per cent since the turn of the millennium. This applies even more cogently for Europe's machine tool industry, which exports almost 85 per cent of its production output.

Gaining impetus from EMO

Against this backdrop, the German Machine Tool Builders' Association (VDW) expects that orders for machine tools will receive further impetus from the event. Order trends in the past show that this has regularly been the case after EMO. "And this can be confidently predicted after this year's event as well," concludes Welcker. MMI

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Cable Carrier

Tsubaki Kabelschlepp has introduced Robotrax, a three-dimensional cable carrier. Its sturdy, torsionally rigid housing is designed for mounting on the robot arm. Its retraction mechanism automatically adjusts the excess length of the cable carrier during shorter movements of the robot. For safe routing in the housing, the end of the 3D motion cable carrier is connected to a short element from the UNIFLEX Advanced series, which travels within the housing. Moreover, it features controlled operating motion, which can achieve up to four times longer service life for the cable carriers.

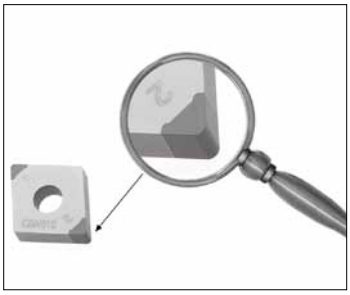
▸ **Kabelschlepp India Pvt Ltd**
Tel: +91 (080) 41158997, E-mail: india@kabelschlepp.in
www.kabelschlepp.de

Rail System

Rollon Bearings offers innovative Linear Slide Rails for machine door enclosures and other sliding applications. The raceways for the slide rail assembly are well integrated for better protection and compactness. Moreover, the system offers advantages such as very smooth movements with low noise level, compactness, simple and easy installation. Sliders are interchangeable by resetting the preload. It also offers high performance at lower costs. These linear slide rails are available in standard lengths of 1040mm and 2080mm.

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

Uncoated Grades



Seco has introduced CBN010, a new, uncoated grade designed to provide excellent performance in continuous to moderately interrupted cuts. Offering an extremely homogenous structure, the new grade provides stable performance and consistent tool life to minimize downtime and machining costs. Optimized for case hardened steels and bearing steels, the new tool can also be successfully applied to tool steel, high-speed steel, high-tensile steel, martensitic stainless steel, ferrous powder materials and hard facing alloys. CBN010 inserts are available in solid, full face, tipped and multi-tipped formats.

▸ **Seco Tools India (P) Ltd**
Tel: +91 (021) 37667300, E-mail: seco.india@secotools.com
www.secotools.com/in

Boring System

Romicron fine-boring system from Kennametal allows users to dial in extremely close tolerances while the tool is mounted in the machine tool, saving time and easing training. It can produce finish bores with tolerances of a few microns in diameter (1 micron = 0.001 mm) and bore-to-bore variations of just a few tenths of a micron. The advantage of the new system is that it can produce high-accuracy holes at high RPMs with no auxiliary setting equipment or previous operator fine boring experience.

▸ **Kennametal Shared Services GmbH**
Tel: +49 (911) 9735 557, E-mail: carsten.gromoll@kennametal.com
www.kennametal.com

New End Mill

Sandvik Coromant's CoroMill 316, an exchangeable-head end mill, features through-coolant capability to deliver superior chip evacuation and higher metal removal rates. The machining of materials as heat resistant super alloys, titanium and stainless steel can demand the deployment of coolant for temperature control and chip evacuation during cutting. By offering internal coolant holes to deliver a precise jet of coolant, the tool can offer better results than others.

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

Traceability Solution

Technifor, Gravotech Group and Oridao have together launched the first universal and secure traceability solution, Augmented Traceability. It is the innovative merger of part marking and secure RFID, allowing for the uncom-promised tracing of parts throughout their life cycle. This new technology is suited for sensitive maintenance processes in sectors such as aeronautics, defense, energy and oilfields. Benefits of this combined solution are redundancy and full consistency, which reduces costs during implementation.

▸ **GRAVOTECH Engineering Pvt Ltd**
Tel: +91 (020) 4103 0000, E-mail: infotechnifor@in.gravotech.com
www.gravotech.com

Bending Machine

Unison has launched a new generation of its all-electric bending machine featuring mechanical architecture and control software improvements. These advancements substantially reduce tubular part fabrication times. It also reduces the time required for all the intermediate handling and movement of the tooling configuration tasks the machine performs before and after a bend, by as much as 40 per cent. The reductions in bending cycle times come from two main aspects. Additionally, the shape and size of all of the machine's auxiliary mechanical axes have been optimized to reduce its mass and inertia.

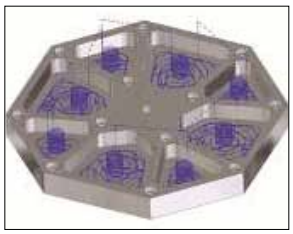
▸ **Unison Ltd**
Tel: +44 (1723) 582868, E-mail: enquiries@unisonltd.com
www.unisonltd.com

Frequency Inverters

Nord Drivesystems has introduced new SK 180E frequency inverter, which is mounted on asynchronous motors, just like its larger counterparts. The new inverter focuses on the core requirements of speed control and efficiency. Featuring two analog inputs and integrated process and PI controller functions, it can autonomously manage simple drive applications. It is suitable for both stand-alone variable frequency drives and for synchronized operation with several units. Additionally, it can save up to 30 per cent energy by automatic magnetization adjustment under partial load.

▸ **Nord Drivesystems Pvt Ltd**
Tel: +91 (0) 9765490890, E-mail: jyoti.mishra@nord.com
www.nord.com

Software Solution



Geometric Ltd has introduced CAMWorks, the embedded CAM solution for the Solid Edge 3D design system from Siemens PLM Software. The new solution offers state-of-the-art machining capabilities to Solid Edge users. Since it is accessible directly in the Solid Edge window, the new software provides a consistent user interface and eliminates time-consuming file transfers. Its feature recognition technology runs in real-time to capture machined features and automatically generates or updates the toolpath. Furthermore, it helps to make manufacturing-driven design changes to any CAD model using synchronous technology.

▸ **Geometric Ltd**
Tel: +91 (022) 67056500, E-mail: inquiries@camworks.com
www.geometricglobal.com

Indexable Drills

TaeguTec has expanded TopDrill, a series of high performance and high productivity indexable drills, to meet the increasing demand of customers across industries. Built for improved tool life with the latest insert grades, the TopDrill diameters have been extended up to 50.0mm. They are now available for 2xD, 3xD, 4xD and 5xD holders. The prominent flute shape of the holders with helix type internal coolant ensures better chip evacuation and machining stability. Ideally configured cutting edges enable optimum chip control, minimizing cutting load. Furthermore, they ensure remarkable machining performance on conventional carbon and alloy steel as well as difficult to machine materials, including low carbon and mild steel.

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

Mini Clamping System

Schunk GmbH & Co KG has designed TRIBOS-Mini, a toolholder that can clamp tool shanks with diameters starting at just 0.3 mm. With this new development, common h6 shank tolerances, such as those found in standard carbide or HSS tools, can easily be clamped. The company offers the TRIBOS-Mini with multiple machine interfaces such as HSK-E 25, HSK-E 32 or HSK-E 40 and also as a universal tool extension. The toolholder is useful where microprecision cutting is essential. Hence, it can be used in watch industry, jewelry fabrication, mold production, medical engineering and countersunk electrode production etc.

▸ **Schunk Intec India Pvt Ltd**
Tel: +91 (080) 40538999, E-mail: info@in.schunk.com
www.in.schunk.com

Distance Measuring Device

Bosch Power Tools has launched DLE 40 professional laser rangefinder, a new distance measuring device. The sleek and compact device is capable of measuring distances up to 40mtr with an accuracy of ±1.5mm. It can also be used for instantaneous calculations of areas and volumes. For this, it is equipped with functions such as continuous measurement, addition and subtraction. These functions prove to be time saving for the users. Moreover, for ease of operations, the device features one button-one function keypad.

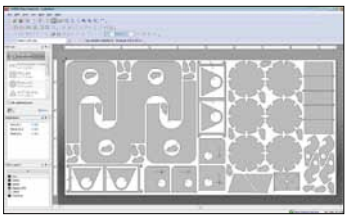
▸ **Bosch Power Tools**
Tel: +91 (0) 7760960188, E-mail: nishant.niraw@in.bosch.com
www.bosch-pt-co.in

Measurement Software

Faro Technologies Inc has unveiled a new CAM2 SmartInspect measurement software. The latest product enables taking measurements without CAD data. The simple software allows even users with minimal background knowledge of 3D measurement technology to achieve measuring results within a short period of time. The software is available in two versions, Basic and Pro. The latter version comes with an extended range of functions, including 3D live view functions as a visual interface to present the recorded dimensions to optimum effect. Other features include measuring length and angle in combination.

▸ **Faro Business Technologies India Pvt Ltd**
Tel: +91 (011) 4646 5664, E-mail: india@faro.com
www.faroasia.com

Software Updates



Hypertherm has announced a number of feature enhancements to its TurboNest and NestMaster CAD/CAM nesting software. The updates will make it easier for companies which fabricate or cut metal to increase the cut quality, productivity and profitability of their operations. The added features include support for CAD fonts, 2D CAD cleanup, Unicode fonts for CAD text and 2D CAD multi-drawing support. The enhanced 2D CAD program in TurboNest can make quick changes to any CAD drawing before it is added to the part list. Alternatively, 2D CAD multi-drawing support allows users to open multiple drawings simultaneously in 2D CAD in NestMaster.

▸ **Hyperthem India Thermal Cutting Pvt Ltd**
Tel: +91 (0) 99 4068 1650, E-mail: HTIndia.info@hypertherm.com
www.hypertherm.com

Versatile Laser Unit

The new TruLaser 1030 fiber, a 2D laser unit from TRUMPF, is a compact and easy to operate device. Apart from cutting various materials such as stainless steel, mild steel and nonferrous metals, it is also capable of undertaking welding jobs. The special feature of this unit is its ability to use the same laser source for welding when it is not actively cutting. As a result, it lets shops make a debut in laser welding at a reasonable expense. This new unit can cut copper up to 3mm thick or brass up to 2mm thick. Mild steel, stainless steel and aluminum can be cut at gauges of 12, 6 and 5mm, respectively.

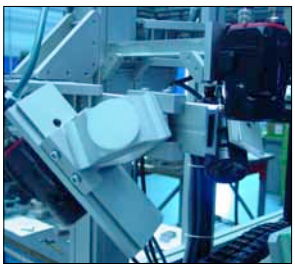
▸ **TRUMPF India Pvt Ltd**
Tel: +91 (020) 6675 9819, E-mail: indrajit.rana@in.trumpf.com
www.in.trumpf.com

Pumps High Pressure Cooling

Machining process in high pressure coolant delivery produces fines as well as chips, small particles of metals that are highly abrasive. If it is not removed from the system by ultra-fine filtration it will destroy any pump where bearings and seals are exposed to the pumped coolant. Hydra-Cell pump is especially designed to operate under such conditions and handle fines up to 500 microns in diameter, eliminating the need for expensive fine filtration. Should a filter become completely blocked, screw and gear pumps will tend to overheat whereas Hydra-Cell pump will continue to operate without damage.

▸ **Machinomatic Engineers**
Tel: +91 (022) 22044766, E-mail: info@symachgroup.com
www.hydra-cell.eu

Sensors



Keyence's IV sensor is a cost-effective option for vision systems. It meets 80 per cent of vision needs with a very high level of accuracy. It is an advantageous alternative to using one or more sensors to detect targets of varying position. The outline recognition technology allows automatic position compensation and the Intelligent Brightness Adjust function (IBA), automatically adjusts the brightness of the built-in lighting. The autofocus function ensures sharp images and is driven by a motor engineered specifically for the IV series. Furthermore, it is equipped with color detection and autofocus capabilities.

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

CNC Machines

Holroyd Precision Ltd has launched a new, WG Series range of CNC machines, which are specifically designed to provide ultra-high levels of accuracy and finish in worm gear shaft manufacture. The new worm gear grinding stations incorporate award-winning 'Smart' probe and self-correction CNC technology. Depending on the model selected, users can grind precision worm shafts to AGMA 14/DIN 2 in sizes ranging from 3 to 500mm diameter and thread lengths up to 1600mm, with a 130mm diameter through bore work head to accommodate long shaft lengths.

▸ **PTG Heavy Industries Ltd**
Tel: +44 (0) 1706 526 590, E-mail: neil.jones@ptgltd.com
www.ptgheavyindustries.com

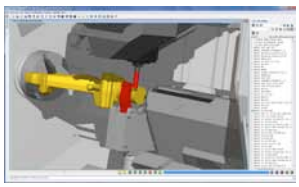
Turn Mill Center

LT-2XL Mc, a turn mill center from Ace Micromatic, is manufactured by keeping in mind the requirements of modern machine shops, with full-fledged C-axis capability. This machine can cater to a wide variety of machining needs like turning, milling, drilling and tapping in a single setup, which improves part accuracy. Also, it increases throughput and reduces component handling. The spindle is designed for heavy duty cutting and features P-series spindle motor for increased torque at lower spindle rpms. Moreover, the machine offers a wide range of variants like big bore, sub spindle, higher spindle power etc., which increase power and capacity while retaining the original footprint.

▸ Micromatic Machine Tools Pvt Ltd

Tel: +91 (080) 4020 0505, E-mail: connect@acemicromatic.com
www.acemicromatic.net

Simulation Software



CGTech offers Vericut, a software to simulate CNC machining, which is essential to detect errors, potential collisions or areas of inefficiency. It enables NC programmers to correct errors before the program is loaded on the CNC machine, thereby eliminating manual prove-outs. Furthermore, it allows the programmer to machine parts on the computer before the actual cutting occurs. The user can eliminate errors that could ruin the part, damage the fixture, break the cutting tool or crash the machine. It also optimizes the cutting process, so in addition to being error-free, the programs are faster and efficient. The software can model and simulate machines like 2-3 axis, multi axis, milling, drilling, turning, mill/turn and EDM.

▸ CGTech India Software Solutions Pvt Ltd

Tel: +91 (080) 2318 6981, E-mail: info.india@cgtech.com
www.cgtech.co.in

Pick-up Turning Machine

Emag plans to display its VL 2 Pick-up turning machine at EMO. This machine opens up new opportunities for the machining of a wide range of small chucked components. Small gear wheels, planetary gears, sliding sleeves, pump components, synchroniser rings, chain gears or flange components with a maximum diameter of 100 mm and a length of up to 150 mm can be machined on this machine. With features such as low component costs, stable processes, high component quality and an optimal price-performance ratio, the machine can be considered as a highly efficient manufacturing solution.

▸ EMAG GRUPPEN-VERTRIEBS- UND SERVICE GMBH

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

Air Sensor

Metrol Japan has brought the Air Microswitch to India for work-piece seating check and gap detection. It can detect gaps of up to 2micronat 1micron repeatability and is one of the most accurate air sensors. With the principle of air micrometers and the tested and proven mechanical design, the accuracy of the product at fast response speed is assured. Applications of the device include in the tables of machine tools to confirm proper seating of the work-piece before machining, ensuring proper adhesion of molds, and other applications where high-accuracy and non-contact gap detection is required.

▸ Metrol Corporation India

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

Horizontal Machining Center

New Mazak HCN 4000 III is specially designed to provide unsurpassed performance, high productivity and reliability. Thanks to the high rigidity bed and column for providing augmented cutting performance. Powerful Spindle with increased specifications delivers efficient machine performance for a wide variety of work piece materials. The machine is ergonomically designed for operator safety and ease of operation. Variety of Mazak Intelligent Functions, provide enhanced operator support for maximum machine efficiency. Extended coolant service life, Reduction of lubrication consumption and lower power consumption, makes this machine environmentally considerate.

▸ Yamazaki Mazak India Pvt Ltd

Tel: +91 (2137) 668 800, E-mail: jainisha_dsilva@mazakindia.com
www.mazakindia.in

Geometry for Grooving

The new UD4 geometry from Walter Tools optimizes grooving and recessing in mass production. Equipped with special chip breakers, the new geometry ensures increased process reliability when grooving and recessing. It offers optimum chip breaking, a prerequisite for a high level of process reliability. For grooving and recessing, this is critically important because chips that refuse to break are particularly undesirable in narrow grooves. The developers of grooving tools had in sight the machining of gearwheels, shafts, hubs and similar components made from forged steel materials and, consequently, components from mass production.

▸ Walter Tools India Pvt Ltd

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