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Nurturing talent 16

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VMC 1260, VMC 640 APC, VMC 1050 APC



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K2X 8i, KX 10i, K2X 8, K2X 10,  
K2X 20, KX 10, KX 30



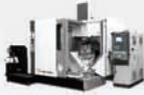
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NX 3222, NX 4222



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# Exciting times ahead!

# S

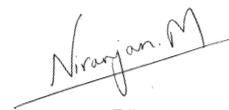
start where you stand and never mind the past. Just couldn't resist the temptation of borrowing the first line of my note from a poem by the 20th century American poet Berton Braley. This line captures the mood and spirit of the entire team at the all new Machinist. We have all taken up the cause of reviving 'The Machinist' brand and building it into a credible and robust platform for the industry. Through rich, relevant and useful content, it will facilitate decision making for the manufacturing professionals from the shopfloor to the boardroom. In its new avatar, The Machinist will add value to all of its stakeholders while adhering to the highest editorial standards.

And we couldn't have started this journey at a better time. The economy has started to experience the green shoots of positivity. The efforts – although delayed – from the Government as well as the Reserve Bank too are encouraging. Add to that a good monsoon in 2013 and the 'go ahead' given to some critical mega projects and you will get a heartening environment. At the same time, exports have improved and imports have moderated narrowing the trade deficit.

Of course, there will certainly be a few hiccups but the positive momentum needs to be maintained diligently. And a lot will depend on the outcome of the general elections slated this April. The industry too must continue its pursuit for excellence.

And importantly, the industry must keep re-inventing itself. That has always been the key. What works now, may not, and most probably, will not work tomorrow. Henry Ford thought nothing could break the monopoly of his Model T car. And he continued producing the same model without any innovation. That's when Alfred Pritchard Sloan, Jr., burst on the scene by introducing a slew of models under the GM umbrella. He not only wrestled away significant market share but also completely changed the game. This forced Ford to stop Model T and work on the Model A. A big lesson that for all of us – *Never mind the past, start where you stand.* And it would only be pertinent if I conclude with Braley's lines from the same poem:

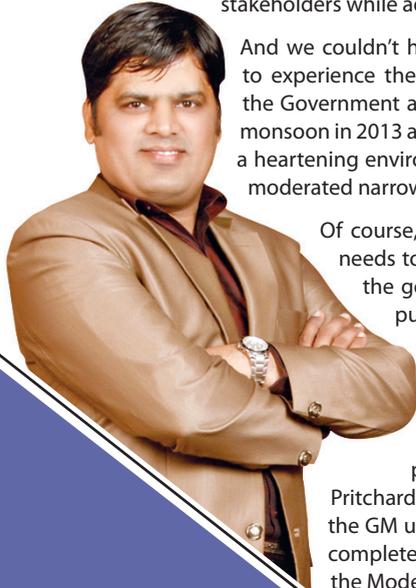
*"This is another chapter in the book,  
This is another race that you have planned,  
Don't give the vanished days a backward look,  
Start where you stand."*



Editor

# EDITORIAL

**KEEP RE-INVENTING.  
THAT HAS ALWAYS  
BEEN THE KEY.  
WHAT WORKS NOW,  
MAY NOT, AND  
MOST PROBABLY,  
WILL NOT WORK  
TOMORROW.**



## THE MACHINIST

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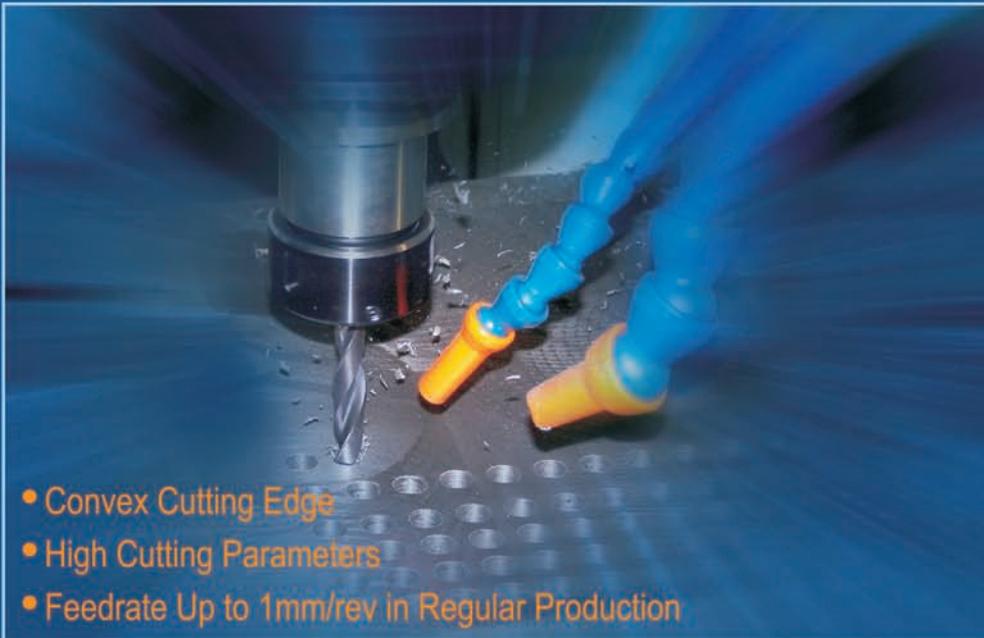
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# NEWS

## Quality will reflect 'Brand India': Minister

The 'Brand India' created by Indian expatriate achievers would be reflected in the quality of goods and services produced by India, according to EMS Natchiappan, Minister of State for Commerce and Industry. "Our stress is on quality of manufactures for which an enabling environment is being created by the Government of India," he assured while speaking at the first 'Global Indian Business Conference', organised by FICCI.



Natchiappan said that huge opportunities are opening up for investors from overseas, including the Indian diaspora, in the National Investment and Manufacturing Zones that are being created. Further, industrial corridors are being created to develop a sound industrial base, served by competitive infrastructure.

## Relief for economy: turnaround index attains highest value in five quarters

In an indication of early signs of revival in business sentiments, CII Business Confidence Index rose sharply. It reached 54.9 in the third quarter (Oct-Dec) from 45.7 for the July-September 2013 quarter. The pick-up in BCI for the current quarter comes as a major relief for the economy which has been braving the onslaught of the slowdown for the last several quarters and awaiting the return of growth. However, the survey also strikes a note of caution as the downside risks to growth have still not abated and supply side bottlenecks continue to pose a problem.

"With some positive signals emanating from the global economy, which finds a



resonance in our improved export performance and is causing our Current Account Deficit to decline, we believe that the slowdown in the domestic economy may have bottomed out in the second quarter and the trend could reverse henceforth," observed Chandrajit Banerjee, Director General, CII. Another positive signal emerging from the survey is that an improvement in capacity utilisation is expected in the current quarter.

**54.9**  
Index of business confidence in the third quarter (Oct-Dec) from 45.7 for July-September 2013

## Snippets ■■■



### Co-operation in iron & steel

A Letter of Intent has been signed between India and Canada to further supplement the dialogue of co-operation in the iron and steel sector. Both countries plan to develop and expand mutual co-operation, inter-alia, through information exchanges in areas of mutual interest including iron-ore, coking coal and other steel making raw materials and encourage bilateral investment opportunities in the sector.

### India's Foreign Trade

Exports during December 2013 were valued at Rs1,63,109.25 crore. This is 17.24 percent higher in Rupee terms than the level of Rs1,39,119.85 crore during December, 2012. Cumulative value of exports for the period April-December was Rs13,86,496.32 crore registering a growth of 17.03 per cent in Rupee terms over the same period last year. Imports during December 2013 were valued at Rs2,25,887.93 crore representing a negative growth of 3.98 percent in Rupee terms over December, 2012. Cumulative value of imports for the period April-December was Rs20,36,568.32 crore registering a negative growth of 2.65 percent in Rupee terms over last year.



### Improvement in hiring

Global hiring conditions are expected to remain stable or improve slightly at the start of 2014, as many employers appear to remain resilient in the face of ongoing economic uncertainty and other disruptions. This is according to the Manpower Employment Outlook Survey. Overall, employers expect to maintain a cautious yet positive hiring pace through the first three months of 2014.



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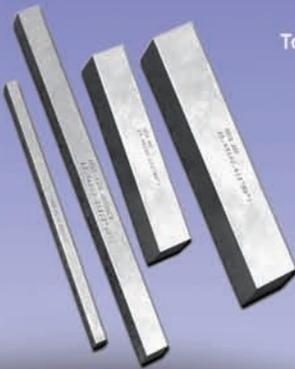
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Engineer's Files



Tool Bits



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## CG to manufacture smart grid devices



**A**vantha Group company CG has launched its smart grid facility at the Global Village, in Bangalore recently. The devices manufactured in this facility will offer numerical solutions to Indian utilities and industries in the T&D segment. CG has invested Rs80 million in this facility which can employ more than 100 people. The facility will manufacture substation automation products, distribution automation devices, protection & control systems, advanced metering infrastructure and telecommunication solutions. The facility will also offer global engineering services such as systems integration, installation, and commissioning.

## KEPL wins Gold trophy for productivity improvement

**P**une-based Kirloskar Ebara Pumps Ltd (KEPL) was awarded with Gold and Silver trophy for two different case studies. The case studies were presented at the 7th Productivity Improvement Case Competition-2013, conducted by the Poona Divisional Productivity Council (PDPC). Organisations are constantly seeking innovative ways to meet the productivity improvement challenges of a globally competent marketplace. Through this competition, PDPC provides a platform for companies to identify and reward the best practices implemented by them towards productivity improvement. KEPL won the Gold trophy In the 'Management-General Category' for its presentation on 'Improvement in Casting Quality through Method Study at Vendor's End (Foundry)' and a Silver trophy for presenting on 'Productivity Improvement through Process Change'.

## MSME Defexpo concludes



**T**he International MSME Sub-contracting & Supply Exhibition for Defence, Aerospace and Homeland Security was successfully held on December 12-14, 2013 at Bangalore. The show is designed to be platform for finding right partners, subcontracting opportunities and forging alliances. At least 25 percent of offset contracts flow to MSMEs. This means a US\$9 billion offset market for them. In this light, the show played a significant role in bringing various stakeholders together.

## Arbitration Act to be amended for faster resolution

**T**he government has proposed to make the Arbitration and Conciliation Act, 1996 more effective in order to make dispute resolution for corporates speedier, cheaper and amicable. It ACT provides for domestic arbitration and also enforcement of foreign arbitral awards. It also contains the new feature on conciliation. It proceeds on the basis of the UN Model Law. The proposed changes in the Act would make the process of dispute resolution smoother and indicate that India is business-friendly.



## IMS 2014 coming soon

**T**he third edition of the India Manufacturing Show 2014 (IMS 2014) will be held from September 11-13, 2014 at the Bangalore International Exhibition Centre. Vikram Kiloskar, Vice Chairman, Toyota Kirloskar Motor & Vice Chairman – advisory committee for IMS 2014 said, "The only way to grow manufacturing is to make sure that policy makers develop an environment that promotes competitiveness. Investors will give priority for regions, which will help excel their products in quality, cost and delivery. I am sure that this show will help policy makers look at the initiatives required for Market India and Factory India."

HVS Krishna, Chairman, IMS Foundation said, "Manufacturing sector is the only and permanent solution to our economic lacuna. India as a nation is on the cusp of something really phenomenal; IMS intends to be the catalyst that triggers this metamorphosis."

## Korean investors shying away from India

**E**xcessive red tapism, poor infrastructure, complex tax policies, protectionist labour laws, high licensing and inspection costs, congested judicial system and land acquisition problems are major bottlenecks forcing investors from Korea to opt for other Asian countries over India, according to a study by apex industry body ASSOCHAM.

"Korean FDI inflows have been growing at a very tardy pace as their companies seem to be keener to explore other emerging markets. Many of them feel that if a company like Posco can face difficulties, despite assurances, it would be even tougher for smaller companies," the report highlighted.

**US\$2.6 billion**  
 India's share of Korea's US\$215 billion total overseas investments till the end of 2012. Koreans pumped US\$39.67 billion in China.

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# Harbinger of change

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**W**hile last year was mostly dominated by recessionary trends, the final quarter showed some signs of improvement. The year 2014 has begun with a promise of revival and things are likely to start improving with the second half. It is expected that manufacturing will once again become the driving force in many economies; India will be looking at increasing the share of this industry from the current 15 percent to 25 percent by 2022.

**Rs 400 crore**  
Value of confirmed orders expected at the show with business enquiries likely to touch **Rs 2,800 crore**

- **Imtex Forming 2014**
- What: **International forming technology exhibition**
- Concurrent show: **Tooltech 2014**
- Dates: **January 23-28, 2014**
- Venue: **Bangalore International Exhibition Centre (BIEC)**
- No. of exhibitors: **419 (334 for Imtex Forming + 85 for Tooltech)**
- Organised by: **Indian Machine Tool Manufacturers' Association (IMTMA)**
- Website: **<http://www.imtex.in/>**

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L Krishnan, President, IMTMA, draws attention to the fact that the machine tool industry has sustained performance during the economic slowdown. “The current market size of the industry stands at US\$ 2,050 million of which the domestic production makes for around 33 percent of the total consumption. The last two quarters have shown signs of improvement in order inflow.” Krishnan rightly believes that the revival in manufacturing will boost the machine tool sector. “Key user industries such as the automobile, auto-components, defence, aerospace and power are set to fuel the growth of Indian machine tool industry.”

It is in this background that Imtex Forming 2014, India’s largest biennial exhibition for forming technologies is happening in Bangalore. With a focus on an exhaustive range for varied engineering applications, the show attracts domain experts from press working, sheet metal forming and processing. Highlight of this year’s edition will be the display of ‘Live Technologies’ in segments such as laser, servo presses, robotics & automation, welding & joining, and wire-forming & drawing.

Concurrent show Tooltech 2014 is the 16th in the series and will feature recent innovations



“  
The last two quarters have shown signs of improvement in order inflow. Key user industries like automobile, defence, aerospace and power are set to fuel the growth of Indian machine tool industry.”  
L Krishnan,  
President, IMTMA

and tooling technologies for precision finish of dies & moulds, forming tools, machine accessories, metrology and CAD/CAM. Together, Imtex Forming and ToolTech will showcase value added innovations across product segments. The displays will focus on optimising productivity, enhancing quality, increasing reliability and global competitiveness. Confident about the success of the show, Shailesh Sheth, Media Chairman, IMTMA, believes it will attract buyers and manufacturing professionals and will enhance technological efficiency across various sectors.

Imtex Forming 2014 will have a comprehensive range of offerings for various industries such as aerospace, automobiles, auto components, defence, capital goods, electrical & electronics, earth moving & construction equipment, food processing and dairy equipment, railways, infrastructure, oil & gas equipment, pharma equipment, space & nuclear and telecom among others. The show has been evolving and expanding as a trade show and the latest edition includes all forming technologies predominantly in metals, plastics, ceramics, composites and exotic materials. This is in line with the objective of the show, which is enabling manufacturing excellence through superior technologies, world-class productivity and cost-competitiveness.

Exhibitors from across 25 countries including India will be participating at the show this year. Key countries participating include Australia, Germany, France, Korea, Switzerland, Turkey, Sweden, Japan, Thailand, UK and USA. The exhibition will also have group participation from four countries - China, Czech Republic, Germany and Taiwan. Importantly, there will be high level of domestic delegations from ISRO, BHEL, DRDO, SIAM, Naval Dockyard, Indian Railways, ACMA, TAGMA and many more organisations as well as industry bodies.

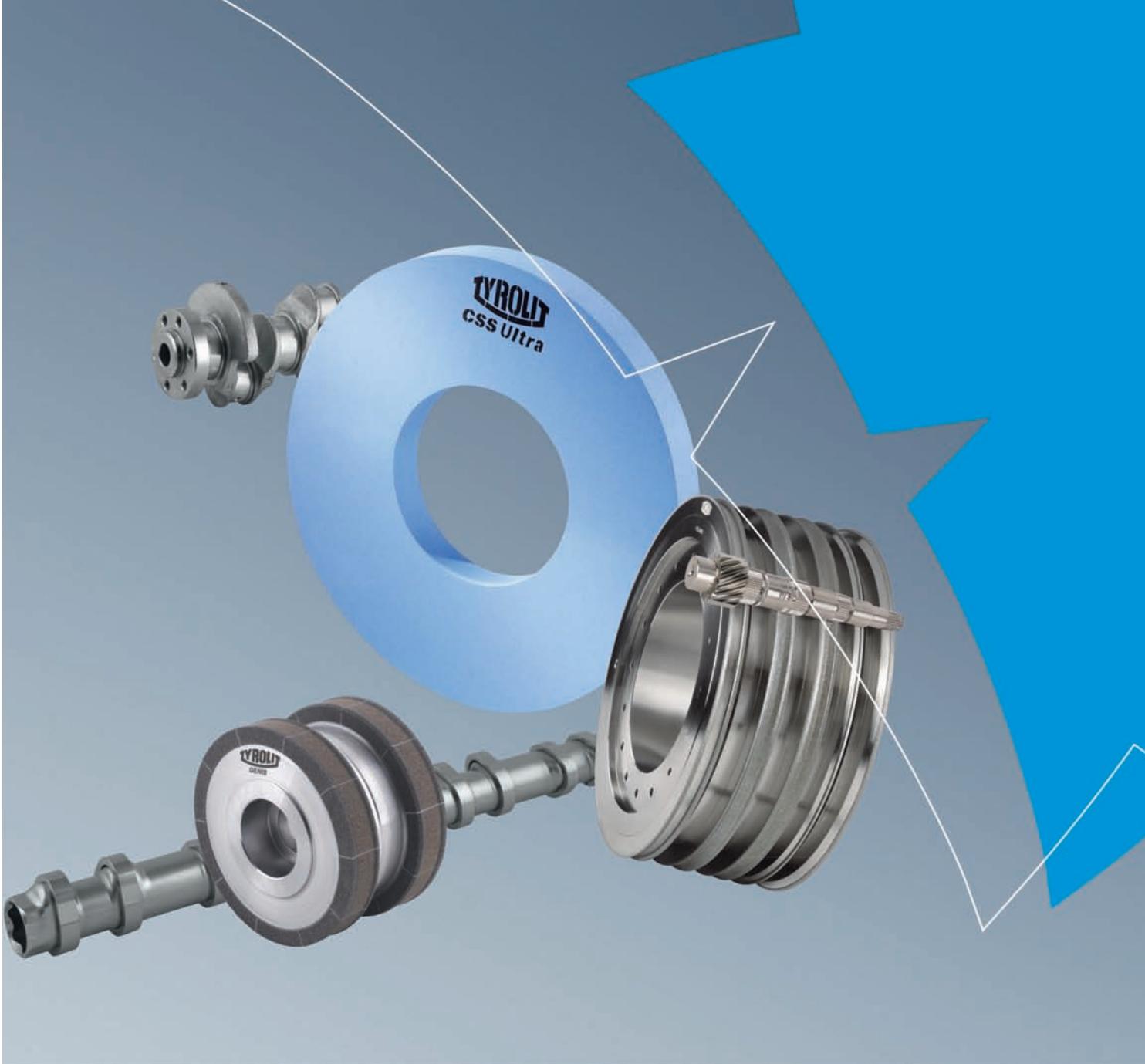
With the aim to provide an opportunity for Indian academic / R&D institutions to show case their R&D capabilities in metal working field, IMTMA has also set up a unique academic pavilion. Prior to the main exhibition, IMTMA is also organising an ‘International Seminar on Forming Technology 2014’ to address the latest trends and developments and research in forming technology on January 22 at BIEC. 

Machine tool consumption trends (in Rs crore)			
Year	Total machine tool consumption	Metal forming machines consumption	Share of metal forming machines
2008-09	8,273	2,376	29%
2009-10	7,205	2,347	33%
2010-11	10,191	2,399	24%
2011-12	11,764	3,093	26%
2012-13	11,268	2,424	22%

Source: IMTMA



Key user sectors like auto and auto-components are expected to boost Indian machine tool industry later this year



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# Nurturing talent



Volkswagen India has started a 3-year Mechatronics apprenticeship programme to offer practical relevance and flexibility of vocational training, says Vijayan KT, Volkswagen India Academy.

By Niranjan Mudholkar

According to the Planning Commission (Government of India), skill building is viewed as an instrument to improve the effectiveness and contribution of labour to the overall production. It is an important ingredient to push the production possibility frontier outward and to take growth rate of the economy to a higher trajectory, the Commission says in its approach to the 12th Five Year plan. The changing demographic profiles in India vis-à-vis China, Western Europe, and North America indicate that India has a unique 20 to 25 years' window of opportunity called 'demographic dividend'.

**“THE PROGRAMME PROVIDES THE APPRENTICES THE KEY COMPETENCIES WHICH ARE NECESSARY TO ADAPT TO THE FAST CHANGING INDUSTRIAL REQUIREMENTS. IT IS BASED ON THE GERMAN DUAL SYSTEM OF VOCATIONAL EDUCATION AND TRAINING.”**



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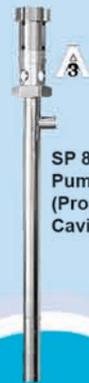
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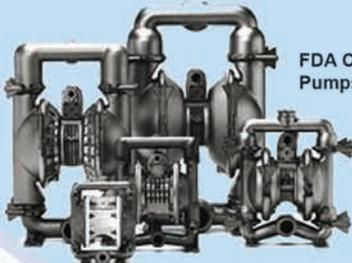


  
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**The Academy is directly connected to the shopfloor**

This 'demographic dividend' accounts for India having world's youngest work force with a median age way below that of China and OECD Countries. And alongside this window of opportunity for India, the global economy is expected to witness a skilled man power shortage to the extent of around 56 million by 2020. Thus, the 'demographic dividend' in India needs to be exploited not only to expand the production possibility frontier but also to meet the skilled manpower requirements of in India and abroad, says the Commission.

While the academia has a natural role in creating industry ready graduates, it is somehow lacking in the same. The need of the hour is for the industry to take initiative and fill in the gaps. Many organisations recognise this and are accordingly playing their role. For example, Volkswagen India is currently running a 3-year specialised Mechatronics apprenticeship programme at its plant in Chakan, Maharashtra.

"Currently in India, our industry needs some key competencies which are necessary to adapt to the fast changing industrial requirements. The motivation behind starting this programme is to offer practical relevance and flexibility of vocational education and training in India. Volkswagen Group, with the launch of this three year programme, introduced its global quality standards from the automobile sector to the education sector," according to Vijayan KT from the Volkswagen India Academy.

Vijayan believes this need of skilled manpower can be fulfilled by these Mechatronics apprentices, as Mechatronics is the combination of

mechanical, electrical, electronics, information technology and control system. He says, Volkswagen is the only automotive manufacturer to offer such programmes. "This programme is unique to India and to the Mechatronics stream with dual training system. Volkswagen also offers this course in several other countries in Europe."

This programme was started in September 2011 and it provides the apprentices the key competencies which are necessary to adapt to the fast changing industrial requirements. The three year programme is based on the German Dual System of vocational education and training. "Till now 45 apprentices have been enrolled out of which six are girls. The first batch will be completing their training by August 2014," informs Vijayan.

The various subjects covered under this programme include metal/tool, electrical, electronics, instrumentation, PLC, robotics, welding, hydraulics, pneumatics, AutoCAD, Catia (all subjects with basic and advanced levels). Furthermore there are few subjects based on employability skills which include: language

(German and English), safety, social and CSR activities, entrepreneur skills etc. "The programme will provide employability in the areas of production, maintenance, planning, quality assurance and research and development to these students," Vijayan adds.

Students with 10+2 qualification and science background (PCM) with 60 percent minimum marks are eligible for this programme. The Academy also has a 3-stage screening

process, which includes 1. written test consisting of aptitude, technical English and free hand sketching; 2. practical test which consists of hand eye coordination and memory test and 3. a personal interview. "The course is designed in a manner where 70 percent weightage is given to practical learning and 30 percent to theoretical learning. From the second year onwards, the apprentices are exposed to extensive on the job training at shop floor."

**SIX**

**Number of girls  
out of the 45  
apprentices  
enrolled for  
the first batch.**

**This batch will  
be completing  
training by August  
2014.**

“

**The programme will provide employability in the areas of production, maintenance, planning, quality assurance and research and development to these students.**

**Vijayan KT,  
Volkswagen India  
Academy**

Apprentices have been provided with monthly stipend (varies from Rs3,000 to Rs.5000 year wise), medical facilities, subsidised food and transportation. However, accommodation is self-owned. On successful completion of this programme, trainees will be awarded with a certificate by IHK Kassel (Germany) for skilled technician. "They will also be certified ITI trainees by NCVT India on successful completion. The apprentices will be absorbed at Volkswagen plant in Chakan." The trainees will be signing a 3-year contract with Volkswagen after the successful completion of the course. One of the best apprentices will be identified for international exposure and for further training at other Volkswagen plants in other countries under 'Wanderjahre program' for 6-18 months. 

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Indian manufacturing has certainly evolved over the years; more so after the entry various international players post liberalisation. One of the remarkable improvements has been on the quality front with more and more domestic players going global and adhering to higher standards than they were used to. The fact that Indian can boast of more than 20 Deming Prize winners across industries is evident enough of the country's enhanced manufacturing practices.

With a growing focus on the quality aspect, today, more and more Indian companies are adopting a wide range of quality improvement programs as well as methods such as Lean, Six Sigma, ISO Standards, Total Quality Management (TQM), World Class Manufacturing (WCM) and so on. Many companies also prefer a combination or a customised version of these methodologies. This enables them to cater to increasingly demanding domestic as well as to the exports market. For example, Shakti Pumps (India) Ltd has its products certified by ISI for quality standards, BEE for energy efficiency and UL for conforming to European and US safety norms. This - believes Dinesh Patidar, Chairman & Managing Director of the company - provides it access to global markets to more than 100 countries across the world.

### Quality: The differentiator for automotive

According to the JD Power Asia Pacific 2013 India Initial Quality Study, the sales volumes of automakers that have quality above-industry-average initial quality have increased by an average of six percent since 2011. In contrast, automakers whose customers report more quality problems than average have experienced an eight percent decline in sales during the same period. Moreover, the shift toward purchasing above-industry-average quality vehicles is more pronounced among experienced/repeat buyers, with 27 percent choosing higher quality vehicles during the same period.

"Manufacturers that are able to consistently deliver a high level of quality may be able to garner much higher growth in sales, even in today's challenging economic environment. On average, sales volume among vehicles that ranked highest in their segment in 2013 has more than doubled since 2011," says Mohit Arora, executive director at JD Power Asia Pacific, Singapore.



Indian manufacturing has evolved over the years with remarkable improvements on the quality front.

By Niranjan Mudholkar



**Steelcast plant: Multiple task forces are created to deal with major areas of improvement**

“Our Quality Assurance department monitors each product and ensures that benchmark quality standards are practiced throughout the process, right from the receipt of raw material to the finished goods,” he adds. Shakti Pumps has adopted a combination of relevant international quality control systems and processes and the company believes in continuous improvement. “The proven standards and practices are definitely making a positive impact on the sales of our products. They are technically competitive and maintain an edge over other products available in the market. Shakti Pumps products are thus known for their consistency in quality, durability and efficiency,” Patidar says.

Steelcast Ltd follows the ISO 9001-2008 Quality Management System to ensure the quality of its product. Chetan Tamboli, Chairman & MD of the firm says that this system has a focus on voice of the customer and customer satisfaction, leadership, involvement of people, continuous improvement and data based decision making. “This is a system oriented process that promotes mutually beneficial supplier relationship,” Tamboli says.

At Steelcast, quality maintenance is done



**We have an effective evolution system in place whereby we can review quality of the training provided. This will help us to identify further training skill to be imparted to the employee.**

**Chetan Tamboli,  
CMD, Steelcast Ltd**

through continuous focus on research & development, technology upgradation and innovative product development solution. “In the last couple of years, we have invested a lot towards quality improvement and product innovation.” According to Joydip Ghosh, Vice President - filters business & HK operations, Disa India Ltd, his company is an ISO QMS certified company and follows the Toyota World Class Manufacturing (WCM) practices to maintain product and service quality. Being in the capital equipment industry, Disa has a big challenge to customise equipment offering to suit customer need and choice. This could result in many variations of same equipment and risk of obsolescence of parts due to wrong configuration control at engineering Bill of Material levels. “Adoption of WCM has helped Disa tremendously in keeping the shop clean and orderly, ordering, procuring and using only what is required for a particular project, eliminating the risk of wrong part fitment, etc. We have benefited in terms of reduction in customer complaints, reduction in free replacement of parts to project sites, reduction in overall project execution time, control of project cost, etc.,” Ghosh explains.



At Disa, quality checks start with vendors being trained to conduct self-inspection of parts.

An important feature of the quality systems is the actual quality checks on the shopfloor. For example, Shakti Pumps conducts inspection with the help of Special Purpose Machines at every major stage of the manufacturing process. “We also do process audit, performance tests according to specifications and final Inspection and packing audit,” says Patidar. Steelcast has three main quality checks on its shop floor.

At Disa, quality checks start with vendors being trained to conduct self-inspection of parts and ensuring no product is offered to Disa, which does not meet specifications. Incoming quality check, during receipt of goods is organized depending upon the level of the supplier and his past quality performance. After the equipment is assembled, the production team and their supervisor run the same to check the dry run performance. “Final certification of equipment is done by experienced QC Engineers,



“ Adoption of WCM has helped us tremendously in keeping the shop clean and orderly, ordering, procuring and using only what is required for a particular project, eliminating the risk of wrong part fitment, etc.

**Joydip Ghosh,**  
VP - filters business & HK operations, Disa India Ltd

“THE FACT THAT INDIAN CAN BOAST OF MORE THAN 20 DEMING PRIZE WINNERS ACROSS INDUSTRIES IS EVIDENT ENOUGH OF THE COUNTRY’S ENHANCED MANUFACTURING PRACTICES.”

who match the customer requirements as per sales records with actual equipment manufactured,” says Ghosh.

Having the right systems is one thing and running them effectively is another. This can be ensured only by involving people. Tamboli says it is important to train and involve employees to align them with the company’s quality goals. “Continuous training and learning are very essential for development of employees which in turn will help company in future. We provide intensive training to our employee by means of on-the-job and class room training to sharpen their knowledge and to upgrade their skill.” Steelcast has divided its training material into six categories. Training under theoretical and on-the-job both have three categories each of basic, advance and detailed advance. “We also have an effective evolution system in place whereby we can review quality of the training provided. This will help us to identify further training skill to be imparted to the employee,” Tamboli adds.

Ghosh says Disa employees at all levels are owners of quality of various activities they are associated with. Every day 5S exercise of 10 minutes duration and a monthly BKW (Brisk Kaizen

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Having the right systems is one thing and running them effectively is another. This can be ensured only by involving people. Representational pic

**Reasons for choosing the ISO 9001-2008 Quality Management System**

Benefits to the organisation	Benefits to the customer
Provides senior management with an efficient management process	Improved quality and service
Sets out areas of responsibility across the organisation	On time delivery
Communicates a positive message to staff and customers	First time right attitude
Identifies and encourages more efficient and time saving processes	Fewer returned products and complaints
Highlights deficiencies	Independent audit demonstrates commitment to quality.
Reduces costs	
Provides continuous assessment and improvement.	
On time delivery	
First time right attitude	
Fewer returned products and complaints	
Independent audit demonstrates commitment to quality.	

*Steelcast Ltd follows this system*

Workshop) involving everyone is conducted. Annual mapping of competency to assess training needs at various levels of employees is used to determine training calendar for the year. "Every new workman joining the shopfloor needs to undergo a fixed period of training and is attached to an experienced workman to get trained. Quality circle involving concerned employees as a team, in place to find out the root cause of defective sub assembly/product."



**“**  
The proven standards and practices are definitely making a positive impact on our sales. Our products are technically competitive and maintain an edge over other products.

**Dinesh Patidar,**  
CMD, Shakti Pumps (India) Ltd

Shakti Pumps too puts emphasis on training. "We believe quality is a continuous process. To make it happen, we need continuous improvement in systems and processes. We have a full time training & development department which conducts various training programs including trainings on quality to develop skills to maintain consistency in quality." Shakti Pumps also has a Kaizen committee that evaluates and approves kaizen proposals and reward employees who bring it on the table. "Through this process, we are able to involve and educate employees in the quality improvement processes. Every month our Kaizen team meets and motivates employees with certificates and awards," Patidar says.

But with rising costs and dwindling margins breathing down the neck, does quality take a backseat during slowdowns? "We believe in exactly the opposite where we try and improve our quality during recession. In the last 50 years, Steelcast has seen about 4-5 business cycles. During growth time, we have increased our capacities and production tonnages by 15 percent to 20 per cent YOY. During this time, our quality

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## Highlights of the Toyota World Class Manufacturing (WCM) practices

- Active engagement of employees of all levels in Quality of every activity.
- Regular Training, with a target of minimum man days training to be imparted to each employee.
- Competency mapping of workmen and Skill upgradation through various focused training on functional areas.
- Everyday practice of 5S and Kanban and other WCM activities on the shop floor. Involvement of every employee of the organisation in WCM.
- Stringent process of Vendor selection and Continuous improvement drive to upgrade the performance of the vendors to bring them up to 'Green Channel' certification status.
- Focus on Ownership of Quality by workmen, rather than Policing by QA department.
- Continuous monitoring of Customer Complaints and review of the same to eliminate root causes.

*Disa India follows this system*

has suffered as the pressure is to produce more tonnages," Tamboli says. In fact, Tamboli believes that it is only during recession where his company gets time to focus and improve quality.

"We have identified major areas for improvement. We have created multiple task forces to deal with each of the problem areas." These task forces meet on daily basis to review progress and decide on further actions to be taken. These task forces involved Quality Assurance team members as well as production team members. "To cite recent example of improvement in quality in last 12 months, we have reduced our hot tear defect rate on the casting by over 90 percent by means of improved foundry practices," Tamboli adds.

Patidar believes quality is not coincidence and not governed by external market dynamics, but a strong focus and commitment on products' marketability which is primarily dictated by its quality. "Our current stature has been earned over the years with meticulous approach and huge investments. We would never want to compromise it due to factors like recession. On the contrary, we believe in the need to be more quality conscious and should learn to work on low margin during recession," he explains.

Ghosh agrees with both Patidar and Tamboli by saying quality remains same for all time and all products. "Recessions are lean periods with ample resources, which offer opportunities to set right our house. Cleaning and other 5S related activities, training, etc. engage everyone to further improve working conditions and quality as a result of the same. Imparting training to employees is the main concentration of Disa during recession period in enhancing knowledge," he says. 

Disa India employees at all levels are owners of quality of various activities





# In the driver's seat

The year 2014 is going to be a growth year in terms of expansion for automotive interior systems major Faurecia, says Vidhyadhar Limaye, its India Director

By Niranjan Mudholkar

Following the successful launch of its first program for its interior systems plant in India, Faurecia is gearing up for the next level of challenges. "This entails successfully meeting the increasing customer demands including localising the LHD (left hand drive) interiors and further improving the overall product quality to make sure that the product is well appreciated in European markets," says Vidhyadhar Limaye, Faurecia's India Director.

## Focus on core areas

Limaye believes the people factor will play a key role in achieving Faurecia's goals. "We have to focus energies in ensuring that we retain all our talent across the organisation and maintain motivation levels to get the desired output." In terms of getting its processes right, the company has already introduced the Faurecia Excellence System at its Chennai plant and now wants to ensure that this plant is recognised as a world class benchmark for India in interior systems. "Several improvement projects and employee trainings aimed at Employee Empowerment are in the pipeline to ensure that this plant is able to deliver not only customer expectations but also delight," Limaye says.

While the interior systems group primarily focuses on the exports market, Limaye does take a note of the rather disappointing 2013 for the automotive industry in India. "The economic downturn, increasing interest rates, significant devaluation of currency and a turbulent and

unpredictable stock market were some of the factors. However, improvements in the local automotive market are expected for the 2nd half of 2014." Of course, he is well aware that the situation will not repair automatically and the administration will have to play its part well.

## Way ahead

From the automotive perspective, Limaye believes the government must provide incentives for export of automotive parts and components as well as tax holiday considerations and extensions. "Basically, the government needs to encourage the industry to start thinking of exporting," he says, adding that focused efforts on manufacturing sector and on younger generations to build a long term strategies to improve Indian manufacturing capabilities is equally critical. "Of course, there needs to be increased focus on infrastructure development leading to improvement of road network across all states."

Of course, Limaye is confident that 2014 is going to be a growth year for Faurecia Interior Systems in terms of expansion. "We have been operating from one plant so far with an investment of Rs30 crore; however this year we will be duplicating our capacities with similar sized investments in plant and equipment to catch up on customer projected volume growth and LHD product localisation in India. Following this, we will also await further program awards from our existing and targeted customers in this area," he says.



We have been operating from one plant so far with an investment of Rs30 crore; however this year we will be duplicating our capacities with similar sized investments.



# In a different class



**20,000 units**

That's the current production capacity at the Chakan facility and this will be doubled by the end of 2014's first quarter.



Despite challenging market conditions, Mercedes-Benz India closed 2013 with a remarkable growth of 32 percent. Eberhard Kern, the company's MD & CEO explains the efforts behind this success.

By Niranjan Mudholkar



All images courtesy: Mercedes-Benz India Ltd



One of the highlights of the Chakan plant is the advanced paint shop

**T**he year 2013 was the 'year of offensive' for Mercedes-Benz India. And how! At a time when the automotive sales numbers have been spiralling southwards, the three-pointed star clocked an impressive 32 percent growth and also regained the number one slot in the luxury car segment.

A key factor in this success was the launch of new products and this could happen because of a renewed focus on manufacturing. Now, Merc has started 2014 with another successful launch and aims to make it the 'year of excellence' to consolidate its leadership position. The Machinist's first cover story (in the magazine's revamped format) brings out interesting details right from the man himself - Eberhard Kern, MD & CEO, Mercedes-Benz India Ltd, who explains the transition from 'offensive' to 'excellence'.

"Yes, we at Mercedes-Benz India have committed ourselves to make 2014 as the 'year of excellence' as we feel that, as the most admired automotive brand in India, we need to set benchmarks in the luxury segment. We are sure that our strategy shall eventually lead to better customer satisfaction and loyalty eventually leading to our profitable growth in India," he says.

Mercedes' production

facility in Chakan is recognised as one of the best CKD assembly facility within the Daimler world. Kern highlights this fact and says that this facility stands key to the car maker's business operations. "We are proud of our facility," he says matter-of-factly. At present, the production facility is undergoing expansion and Mercedes-Benz India has committed an additional investment of Rs250 crore towards this. The current production capacity is 20,000 units and this will be doubled by end of Q1 2014. "The production facility has a world-class paint shop using cutting edge technology and this plays a vital role in our local value addition of our products. The facility will play an important role in our 'year of excellence' strategy. We will be rolling out the S-Class from our manufacturing facility soon," he says.

And while underlining his production facility's capabilities, Kern doesn't forget to mention his supply chain partners. "They play an important role in the production process and we have the best suppliers working with us. Our partners worked in tandem with us and are integral part of our success story. Of course, we expect highest quality from our supply chain as our customers are used to the best product in the world. The 'year of excellence' will entail excellence from our partners as well."

So, what is the percentage



“ The production facility will play an important role in our 'year of excellence' strategy. We will be rolling out the S-Class from our manufacturing facility soon.”



On an average 35 percent to 40 percent local value addition is done to products manufactured at Chakan

of local content in the cars built at Chakan? Does Kern see it growing? How much and in what time-frame? He takes it one question at a time. “We have varying levels of local value addition to our products manufactured in our plant. However, on an average 35 percent to 40 percent local value addition is done to our products manufactured here in Chakan. This number is an average for C, E, S, M-Class and GL-Class. We have localised cable harness for some of our products.”

Kern says that it’s a natural decision to increase local content in Mercedes’ manufacturing going forward as the volumes increase and he does see it growing in foreseeable future. “Our effort has always been to localise based on commercial feasibilities and technological capabilities. Considering low volume multi-product manufacturing set-up, we focus more on doing knock-down assembly thereby leveraging better container utilisation. We also try to get the best by more and more local value addition. As we go along and as product volumes increases, our efforts are always to source more locally. However, we cannot reveal the time-line for that immediately.”

Mercedes-Benz India started its ‘year of excellence’ strategy with the launch of a product that it believes epitomises excellence of a luxury motoring and sets new benchmark – the new S-Class. How many more new models is the company planning to launch in 2014 in India? “We will be launching about 10 new cars in 2014 and most of these will be in the top of the pyramid. We will be launching products across segments thus giving our customers a lot of fascination and options to choose from. We also will be focusing on our performance brand AMG a lot more in 2014.”

**AT PRESENT, THE PRODUCTION FACILITY IS UNDERGOING EXPANSION AND MERCEDES-BENZ INDIA HAS COMMITTED AN ADDITIONAL INVESTMENT OF RS250 CRORE TOWARDS THIS.”**

While Mercedes-Benz has already sold-out the first allocation of the new launch, the delivery will happen only in April. Obviously, reducing the waiting period for cars will be a key focus area for Kern. “We faced the challenge of long waiting period for most of our products launched as these had high customer traction. The M-Class, GL-Class, A-Class were in waiting period and the time for these varied depending on markets. However, we were in talk with our HQ for additional allocations of kits and we are successful in reducing the waiting period for our products. We are also operating full steam our production facility currently.” (And by the way, the HQ is equally busy. For the third year in row, notwithstanding a market slump in Europe and still to gather steam US market, Mercedes-Benz has increased its total production output, according to a press statement).

Coming back to the role of the facility at Chakan in India, Kern reiterates that it is a benchmark facility within the Daimler world and that has been pivotal in the company’s success since



## Mercedes-Benz Research and Development India (MBRDI)

In 2012 alone, MBRDI (headquartered in Bangalore) filed over 50 patents for innovations in automotive development. MBRDI has been involved in many areas of Daimler's R&D engagements including component development of parts and modules for the new generation cars from Mercedes-Benz. The integral seats of the newly launched A-Class and the seats of the new CLA are a few examples of end-to-end projects lead by the MBRDI team. MBRDI has been involved with some of Daimler's cutting-edge projects. A case in point is the company's leadership towards 'Human Body Modeling (HBM) System'. The HBM simulation under development and testing at MBRDI, considers 'almost' every possible combination of accident variables from biomechanics and the physical properties of human tissues to accident statistics and the physics of crash situations. HBM is a key pillar supporting Daimler's vision of accident free driving.

According to Kern, interior and exterior component design is a specialisation of MBRDI Pune which leverages the presence of local suppliers. The Pune office of MBRDI ensures that proximity to the sales

organisation and customer inputs are seamlessly captured and integrated through feed-forward loop into future development of products.

Design teams within MBRDI are actively involved in design, development and modelling of various subsystems such as Chassis, BIW (Body in White), CIW (Cabin in White), Power train, Suspension, Interior and Exterior components, Prototyping, Regionalization and Localization.

The CAE team at MBRDI is one of the largest teams within this Daimler function. Various groups within the CAE team work extensively in the area of evaluating various vehicle functions such as that of crash, stiffness, strength, durability, powertrain, NVH (Noise Vibration Harshness) Body in White & Sheet Metal Forming and computational fluid dynamics simulations.

The Electrical and Electronics departments within MBRDI have competencies focused towards Model-Based-Development (MBD) topics, Embedded Software Design (complete V-cycle) and SW Architecture Knowhow, Embedded Hardware (ECUs) knowhow and Simulation.



Kern says that it's a natural decision to increase local content in Mercedes' manufacturing going forward as the volumes increase



Given the growing demand, MBIL is talking with its HQ for additional allocations of kits

inception. The Rs850 crore facility is also the only luxury car manufacturing facility boasting of an in-house state-of-the-art paint house (operational since October 2012). The importance of the production facility is underlined by the fact that Mercedes-Benz India became the first market to locally produce the M-Class and GL-Class SUVs, outside Daimler's mother plant in USA. "Currently the plant locally produces five models for Indian customers; these are the C-Class, E-Class and S-Class sedans and also the M-Class and GL-Class SUVs. We will decide which will be the sixth model to be locally produced from our plant, soon," Kern says.

Another interesting and important element of Mercedes' success in India is the 'Centre of Excellence' within Chakan facility. According to Kern, this is the next step for differentiated and exclusive luxury experience for the company's discerning customers. "Creation of this Centre is part of MBIL's strategy designed to address increasing needs of our customers for "Individualisation". The facility is part of our strategy to create innovative formats alongside existing ones to cater to specialty cars demand which is increasing continuously. This Centre

shall support in inspiring enthusiasm for the brand by giving consumers a first-hand experience of the brand promise – 'Best or Nothing,'" he says.

In what is probably an industry first in India, customers at this centre can actually customise their AMG/Mercedes-Benz cars using the iConfigurator: selecting the upholstery, have a look and feel of exterior paints, selecting alloy wheels, choose leather, stitch colour and even pedals too. "As part of Centre of Excellence, customers will be given the unique opportunity of a guided plant tour to enable them to see how three pointed stars are made. Customers will also be given adrenaline pumping experience in MB India's off-road track where they can test the prowess of the SUV range." The Centre will have a display of latest range specialty cars from Mercedes-Benz and AMG portfolio. It will have segmented wall panels with integrated elements on the wall panels including brochures, accessories display and TV into wall panels unit. The usage of textile graphic panels and graphic line on the wall create a special atmosphere and adds to the fascination element of the facility. 

“

The 'Centre of Excellence' is part of our strategy to create innovative formats alongside existing ones to cater to specialty cars demand which is increasing continuously.”

# Building a new future

As a valued R&D partner to the Aditya Birla Group, the Aditya Birla Science and Technology Company provides next generation products and technologies for the Group

**T**he Aditya Birla Science and Technology Company (ABSTC) is the corporate research and development centre for the Aditya Birla Group. Located in Talaja, just outside of Mumbai in India, ABSTC supports the broad diversity of the Group's businesses through multi-disciplinary teams of expert scientists and engineers who lead fundamental and applied research projects. The company aims to be a world-class organisation that delivers innovative solutions, continuously improves core competencies and executes effectively. The centre is supported by state-of-the-art equipment set in a one-of-a-kind brand new technology-led environment.

The Aditya Birla Science and Technology Company is ably led by its CEO Roger D'Souza, who is also the CTO of Aditya Birla Group since March 2013. D'Souza has spent the last 27 years in research & development, process development & intensification and new technology and innovation. His experience has been with large multi-national organisations in the US, Europe and Asia.



“ Aditya Birla Science and Technology Centre within India, is redefining the 'R' in R&D. Our People, Process, and Products will drive us to our goal 'to be recognised as the best innovators in India, and be admired globally for such'. Also to see people's attitudes change from being a mere Scientist to becoming Teacher, Mentor and Leader; that excites me and gives me a feeling of accomplishment. ”

**Roger D'Souza**

CEO of Aditya Birla Science & Technology Company Ltd.,  
& CTO of Aditya Birla Group



The ABSTC facility at Talaja



## Areas of focus

ABSTC seeks advances in products, processes and applications in several areas, including:

- Non-ferrous metals (from extraction and smelting to downstream operation).
- Carbon black technology (from feedstock to finished product).
- Cement (mineralogy, clinkerisation and concrete).
- Fibre technology (spinning processes, materials and new applications).
- Chemicals (chlor-alkali product stream development, fluorine derivatives, phosphates, sulphites and specialty thermoset resins).

In his role as the CEO of ABSTC, he is responsible for leading it to be a valued R&D partner to the Aditya Birla Group of businesses, and to set up ABSTC as a premier world class R&D organisation that provides the next generation of products and technologies for the Group. ABSTC will also become the technology mentor to businesses, identifying new business opportunities, new product opportunities and enhanced process modifications, all to differentiate group businesses in their respective market segments while making them the most cost effective alternative.

Some of the innovative and significant products developed at ABSTC are Kara wipes, improved efficiency urea, particulate aluminium matrix nano composites and a value-added fibre technology. There are also remarkable contributions from ABSTC to help the Aditya Birla Group's manufacturing businesses achieve enhanced operational performance, including carbon black reactor design for higher yield, copper slag advisor,

**“BUILT ON A 20-ACRE PLOT, THE 30,000 SQ M FACILITY COMPRISES MODERN LABORATORIES, MULTI-PURPOSE SCALE-UP FACILITIES, AS WELL AS MODELLING AND SIMULATION AREAS.”**

**60 plus**

**Number of patent applications filed by ABSTC covering novel processes, products and applications.**

a dynamic feeding system in aluminium smelting and design of a copper waste heat boiler.

ABSTC has generated extensive intellectual property for the Group, with the filing of more than 60 patent applications that cover novel processes, products and applications. The organisation, that has so far focused more on development rather than research, envisages that ABSTC should become the big “R” and smaller “d” centre.

Built on a 20-acre plot, the 30,000 sq m facility comprises modern laboratories, multi-purpose scale-up facilities as well as modelling and simulation areas. In addition, the

campus also encompasses a 2,500 sq m multipurpose process scale-up and pilot facility, and a Knowledge Centre along with a patent cell. The Knowledge Centre has access to databases on areas of interest and information on patents, periodicals and other publications.

At ABSTC, research and development is based on two strong capabilities. The Process Engineering and Sciences Laboratory focuses on advanced processes & designs, process control & automation, and process engineering platforms & scale-up. The Science and Technology Platforms Laboratory provides expertise in metallurgy, fibre science & textiles, material & surface sciences, and chemistry.

ABSTC is supported by the Analytical Science and Technology Laboratory, with state-of-the-art equipment that will enable advanced measurement and characterisation techniques. The analytical services laboratory will support all the needs of the Group units and, in the future, even those of external customers.

Corporate Technical and Energy Services (CTES), a sister organisation of ABSTC, provides services across the Group for technical problem solving and cost reduction by means of energy conservation, waste heat recovery, optimisation of manpower and material handling systems, improved operational and maintenance practices, water conservation, electrical systems, etc. CTES also provides support services for heat transfer enhancement, thermography and trouble-shooting for plant equipment. 





# Cutting edge choices

Patrick De Vos, Seco Tools' Corporate Technical Education Manager, was in India recently. Here's his take on future trends and what makes some manufacturing companies do better



By Niranjan Mudholkar

Patrick De Vos, Seco Tools' Corporate Technical Education Manager, is an excellent example of 'industry meets academia'. Leading education and training programmes in more than 50 countries worldwide and spearheading the STEP concept (Seco Technical Education Programme), he has the experience of interacting with thousands of metal cutting and other manufacturing professionals globally. This unique position also enables him to understand industry challenges and trends from a closer angle.

The Machinist caught up with him in Pune recently to understand the future trends from the metal cutting point of view. The global slowdown has had a big impact on the metal cutting industry with facilities slowing down or even shutting down production. Of course, things have

started to look a bit positive but it is too early to predict anything. It is in this light that we asked him to speak. At the outset itself he dismissed the possibilities of anything big happening in the near future. "From the technology point of view – whether you talk about tools or tooling techniques or machines, there will not be any big changes. For many years, it hasn't been a revolution but an evolution. And it will continue to be so," he said.

Yes, he did say that there will be new geometries and new cutting strategies but the focus will be more on improvement. He took us a little back in time to explain. "We had high speed steel (HSS) and then we had carbide. Well, that was a revolution. After the carbides, beginning of the 1970s, we saw coated carbides. But since then, it has all been more of an improvement. And I don't think that things will change at least for the next five to ten years. Yes,

“

If you want to be economical then you have to use machine tools which don't cost a lot of money. But that comes at the expense of productivity and quality. End of story.”

there will be new approaches but it will be more on the detail side. Geometry that cuts easier and things like that.”

Of course, he drew our attention to a rapidly emerging technology. “Yes, there is something very new happening from the technology point of view – Additive manufacturing. We have already seen the first production machines popping up on the industrial side outside of the lab. But I am not so sure about it. And I have a reason for saying this. If you look at the kind of workpiece materials that people are using more and more in the aerospace and automotive industries are absolutely different from the workpiece materials handled by additive manufacturing. There is actually a conflict. We have to see how that will evolve. Will additive machining become better to meet the requirements and manufacture nickel based alloys and composites? We have to see.”

Interestingly from the people side, De Vos had another story. “The tools we have today are very powerful and I use the term tools in a very broad sense. These are very powerful means. But we do not always have the people who fully appreciate the power of these tools. People are not aware of the capacity of the tools that they have at their disposal.”

To elaborate on his point, the metal cutting expert pointed out that despite the overall slowdown in the manufacturing world, there are also many manufacturing companies that are

doing quite well. “So why is that happening and how are they immune to the market conditions? They are using the same machine tools and cutting tools as the rest of the manufacturing world and yet they are successful. The reason is the way they are using the tools. That’s the differentiating factor,” he said.

A common denominator – according to De Vos – is that companies who specialise are doing well. “I don’t mean specialisation in terms of using certain workpiece materials or certain industry segments. Let me explain. If you look at the current manufacturing scenario then you will see some buzzwords around. These include productivity, economy, quality and versatility. What you see is that a large number of companies want to be all four. They want to be productive, economical, versatile and also machine quality products. I say that’s impossible. If you want to be fast then that costs you more money. Similarly, productivity costs more money. Speed and productivity need advanced machines and tools that are not cheap. If you want to be economical then you have to use machine tools which don’t cost a lot of money. But that comes at the expense of productivity and quality. End of story. Being all four at the same time is impossible. And I have a feeling that companies trying to be all four of them lose time and spend needless money.”

If you ask him from the supplier point of view then he

confidently says that his company has the whole of range of solutions. “But the offerings are different for different requirements. Same goes for machine tools. Well, we have the full range of tools and we also have what we call as the selection range. The selection range is not necessarily the most productive or the most economical but they offer versatility,” he says. He emphasised that a manufacturing company in today’s era to be successful needs to understand and decide which area it wants to specialise in. “That’s important. People who want to be everything, you will lose everything. If you are trying to be everything and if you face a competitor who is specialising then you will lose,” he added. 



**A manufacturing company must choose its specialisation: productivity, quality, speed or versatility.**



# The missing link!

With a huge resource pile – both natural and human, why are we not able to make a cut in manufacturing?

By Mohit Gupta

It is an established fact that manufacturing is the key driver of economic growth in any successful economy. Industrialisation catapulted the United States and many European countries to the status of developed nations in 1900s. Soon after independence, India also made a fine attempt to accelerate the process of industrialisation.

While the country developed core industries such as iron and steel, heavy engineering and electricals from the second plan, it had pursued an inward-looking import substitution strategy and not an export-driven one, thereby unable to gain foothold in manufacturing at a global playing field. The mid-1980s and more specifically from the 1990s drove the importance of liberalisation, which led to the opening up of the economy. This brought back focus on manufacturing. But there was a substantial time-lag of three decades in terms of any meaningful industrialisation.

## Contribution to GDP

With a population second to China, and substantial human capital with a robust technically-trained workforce and the labour cost advantage, India was ideally slated to emerge as a dominant player in labour-intensive sectors. This would have generated the much-needed employment. In reality, we are far behind most of our neighbours put aside some sectors like textiles, gems and jewellery. Our growth has been largely propelled by agriculture and the services sector. The contribution of manufacturing to

our GDP is now less than 16 percent and our contribution to the global manufacturing value added is just 1.8 percent. This is much less compared to other Asian countries. In China, manufacturing sector boasts of contributing 30 percent of the GDP. China accounted for around 23.3 percent of the global manufacturing value added in 2011. Even smaller economies in the region like Thailand, Malaysia and Indonesia fare much better. Manufacturing accounts for 36 percent, 25 percent and 25 percent respectively in these countries. So, with a huge resource pile - both natural and human, why are we not able to make a cut in manufacturing?



India always had the 'low cost' advantage but now it needs to enhance the same by building up its capacities and capabilities for value engineering to compete globally.

Our conservative approach to Foreign Direct Investment (FDI) has been one of the biggest impediments in gaining momentum in manufacturing. Today, China is one of the biggest receivers of FDI. Around 50 percent of China's total exports and 90 percent of their high technology exports come from the factories set up by the MNCs. While in India it is less than 20 percent. Apart from capital flow, the biggest value these MNCs have brought is the extent of employment opportunities.

The unemployment ratio in China in 2012 was 4.1 percent, whereas in India it was 9.8 percent during the same period. The stress on labour intensive manufacturing in China has not only helped it to contain unemployment but has had a positive impact on the economy as well. We must learn from our neighbours.

Of course, India cannot change things immediately and become FDI friendly overnight.

And yes, to give credit where it is due, the process of change has started. However, it needs to be pursued with the right intention and mechanism. FDI limits have been increased in several sectors and the processes too have been eased; the need is to create confidence both amongst investors and the business fraternity.

**Right policies & good infrastructure**

One of the primary impetuses to the growth of Chinese manufacturing came from the affirmative policy of providing substantial incentives to industries to set up units there in the form of cheap land, power, labour and other facilities. It obviously led to significant cost-advantage to the industries making China highly competitive than similar economies. China invested smartly into infrastructure like roads, ports, airports, etc. early on leading up to scores of MNCs setting up shop in China. India always had the 'low cost' advantage but now it needs to enhance the same by building up its capacities and capabilities for value engineering to compete globally. More R&D activities should be encouraged and innovation should be rewarded well.

India's biggest drawback has been our poor infrastructure and acute shortage of power. Adding to this is the lack of enabling factors like incentives in the form of cheap land and tax benefits. Further, regulatory hurdles like environmental clearance, which lead to delays in approvals. India needs to push its massive and ambitious plan for US\$ one trillion infrastructure investment to develop power, roads, ports and civil aviation during the Twelfth Plan. The government must have more faith in the private sector if it needs the huge infrastructure projects to be completed in time and with quality. It needs to provide support in terms of easy processes, land availability and better finance options.

**Labour reforms**

Rigid labour laws also constitute as a major bottleneck in making India a globally attractive and competitive manufacturing hub. Compounding this is the attitude of some labour unions which are politicised and whose aggressive stance works inimically to the interests of not only the organisation but even the labour itself which they represent. The answer lies in bringing major labour reforms based on collaboration and engagement rather than conflict.

Although, instituted to ensure labour welfare, the one-sided laws make employment contracts perpetual -- the corporate equivalent of marriage without divorce, forcing industries to move towards capital intensive manufacturing. It curtails the employer's right to realign and re-structure their human resources as per the market conditions. The result is greater reliance on less productive

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The stress on labour intensive manufacturing in China has not only helped it to contain unemployment but has had a positive impact on the economy as well.

employment avenues and pressure on the farming sector. This will change if the fundamental issue is addressed comprehensively.

Also, the SMEs, which are a major source of employment and earnings from exports, are the worst affected by the archaic labour regime. It hampers their ability to attain the economies of scale and be competitive. And it hampers their ability to create more jobs for the economy.

**Filling the skill gap**

Yet another issue of concern to industrial growth is the yawning gaps between the skills of the workforce and the requirements of industry and resultant shortage of skilled manpower. Removing this lacuna is a major challenge faced by the government and the industry. In fact, the government has lately embarked on an ambitious scheme of skill development in conjunction with industrial bodies. A revamped educational curriculum with emphasis on vocational training attuned to the growing needs of industry is the need of the hour. Further, we need continuous interaction between industry and educational institutions to ensure practical industrial experience even as students progress with formal education. This has the potential to

**1.8 percent**  
India's contribution to the global manufacturing value added. China's share is around **23.3 percent.**



**Institutes must generate employable youth attuned to industry requirements.**

throw open opportunities for immediate employment of educated youth turned out by polytechnics and technical institutions, as well as saving costs for training incurred by employers after recruitment.

The need of the hour is a paradigm shift in the industrial policy along with rapid development of infrastructure and wiping out of the power deficit. Of course, this needs to happen simultaneously with skill development on a large scale that also keeps employers' needs at heart. This will be the way forward to meet the challenges and make India a manufacturing power house. 

*The author is Director and Co-Founder, TeamLease Services*

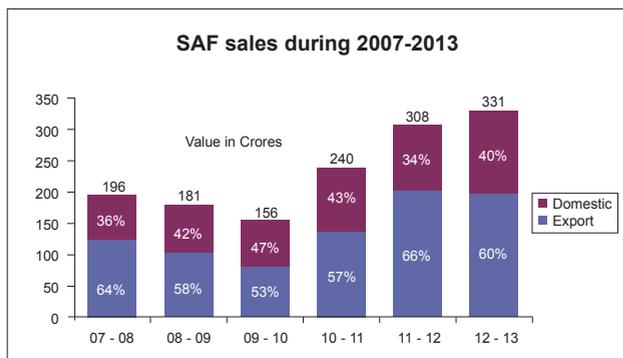


# Transformation!

A tier-1 component manufacturer implemented an online OEE monitoring solution to study and improve its processes with excellent results

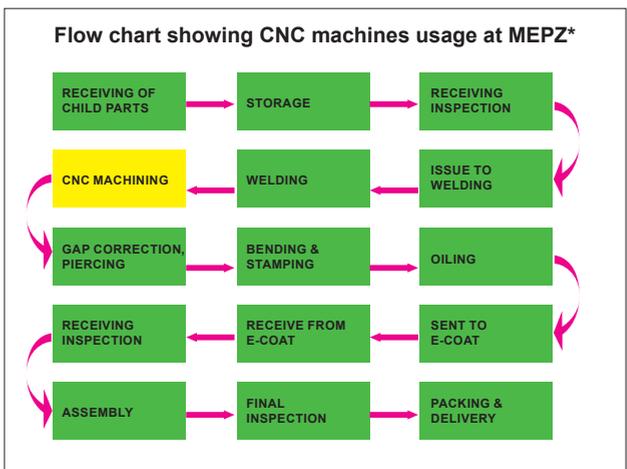
**A** robust manufacturing sector adds substantially to a nation's growth and strengthens its foreign exchange. Healthy and highly productive manufacturing companies not only boost the domestic industry but also enhance a country's capabilities to compete in the global market. Today, many Indian companies – large and small – are continuously working towards raising their standards by adopting innovative solutions and technologies. Super Auto Forge Ltd (SAF) is one such organisation that has been achieving focused productivity improvements at its Chennai plant.

Established in 1974, SAF is a pioneer and the largest manufacturer and exporter of cold forged/cold extruded steel



Import and exports have been increasing from the year 2009 to 2013. The value has grown from Rs196 crore in 2007-08 to Rs331 crore in 2012-13.

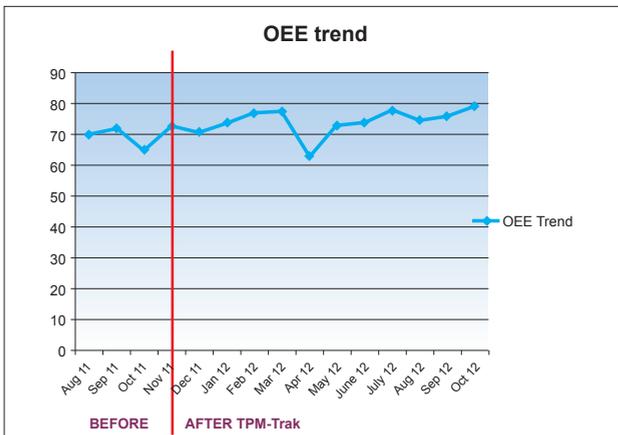
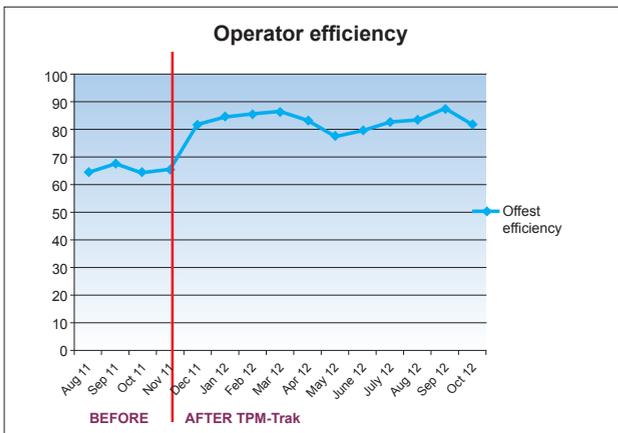
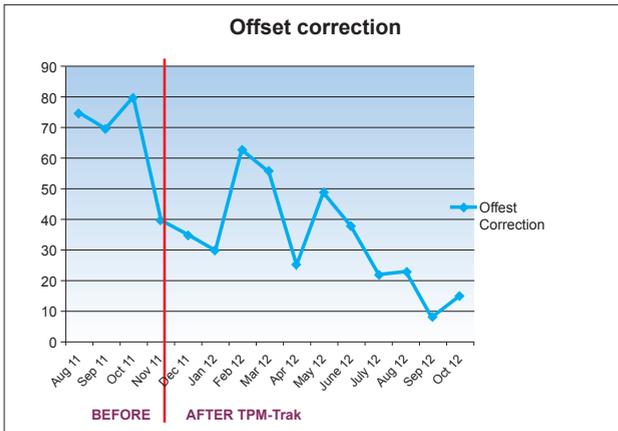
and aluminium components in India. With a state-of-the-art in-house tool room, SAF manufactures auto electric parts, drive line parts, suspension and steering parts, brake parts, and power transmission parts. The company has indigenously developed its forging technology and exports to tier-1 customers in North America and Europe since 1998, where it has offices and warehouses. Using debt-free funds from internal accruals for new projects, SAF has also enhanced its design, assembly as well as testing capabilities and capacities. Today, the company



The above chart shows the role of CNC machines. The child parts are collected in the beginning followed by the welding process. After welding, the entire work is done by CNC machines.

\*SAF has a unit at Madras Export Processing Zone (MEPZ), Chennai

### Changes after implementation

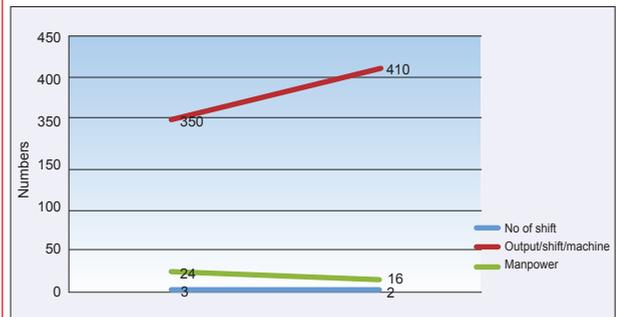


Above graphs show how the offset-corrections were brought down, production output was increased and wastage was reduced.

has scaled up to become a tier-1 player and has a captive SPM design and manufacturing division. SAF has also successfully diversified into the non-auto sector.

For more than three decades, Ace Micromatic has been a trusted partner for SAF. Hundreds of Ace Micromatic machines are in operation at facilities of SAF as well as its vendors. SAF understands that in order to sustain in the competitive

### Tangible benefits



	Before TPM-Trak	After TPM-Trak
No. of shifts	3	2
Output/shift/machine	350	410
Manpower	24	16

Output increased from **350 no.** to **410 no.** per shift and hence one shift was reduced.

Cost savings due to man-power reduction  
is **Rs 6,72,000.00/annum.**

Cost savings due to energy saving (reduction of one shift)  
is **Rs 6,48,000.00/annum.**

global market, on-time delivery, excellent quality and cost-competitiveness are essential. This quest for excellence led SAF to focus on improvements in its internal processes.

Existing processes and systems were studied and analysed to determine the scope for improvements. It was observed that the output from the CNC machines was low and more shifts were required for these machines compared to the other processes like piercing, welding and assembly in the line. It was suspected that productivity was being lost because of offset correction, turret play, down time, idle operator and so on. SAF decided to implement a real time monitoring system – TPM-Trak (by Pioneer CT, Ace Micromatic Group) – on these machines for getting detailed production and downtime information, based on which they would be able to pin-point issues and take up corrective action.

Initially, TPM-Trak was implemented in nine machines and the output was made available to the operating personnel and decision-makers on their computers and laptops over the LAN. Being an online OEE monitoring solution, which monitors cycles and events on the machine, TPM-Trak enabled real-time data collection. Key Performance Indicators (KPIs) such as shift-wise / day-wise production quantity, downtimes, OEE were emailed to the top management automatically. It also helped to increase awareness amongst operators and supervisors. With the use of the available real-time data, SAF was able to address the concerns. Accordingly, the offset-corrections were brought down, production output was increased and wastage was reduced. 



MARKET

UNDER BODY LINE								
STATION	#10	#20	#30	#40	#50	#60	#70	#80
WORK COMP								
PHONE								
FAULT								
SVAMT CALL								
TARGET	120		ACTU					



While the auto sector is the major consumer of robotics today, non-auto industries are expected to see increased application of robotics.

# Engineering business with Germany

The German market remains an important element of any comprehensive export strategy to Europe, says Rajesh Nath, MD, German Engineering Federation (VDMA) India

By Niranjan Mudholkar

The VDMA India office has been acting as a bridge-head between the German and Indian industries. How can Indian manufacturers benefit through you?

**EUR 7.2 billion**  
Value of exports from India to Germany in 2012.

VDMA India is the only association of its kind focusing on mechanical engineering industry and is active in various specialised sectors. The varied activities of this Federation since many years, has led to closer co-operation between the members of the specialised associations within VDMA and the Indian companies they work with. VDMA helps Indian manufacturers in furnishing information about the complete product program of the German industry to assist them to identify right partners and providing information on market trends, prospects, future development, new projects and tenders. Also, we help the Indian companies looking for German tie-ups and collaborations.

Which industry sectors covered by VDMA present the maximum growth opportunities for Indian manufacturers?

Industry sectors like agriculture, food processing, construction, fluid power, power transmission, mining, material handling, machine tools, plastics and rubber machinery present the maximum growth opportunities for Indian manufacturers.

According to the VDMA statistics for incoming orders over the last three statistically recorded months (August - October 2013), 12 of the selected sub-sectors showed growth rates compared with the previous year. Four sub-sectors reached growth rates of 10 percent and more; these include melting plants and rolling mills, compressors, compressed air and vacuum technology, lifts and escalators and fluid power equipment.

The growth in the automotive industry was expected to trigger further demand for the automation and robotics sector. However, that has taken a back seat. Do you see the application of industrial automation and robots expanding beyond automotive?



The last two quarters have shown signs of improvement in order inflow. Key user industries like automobile, defence, aerospace and power are set to fuel the growth of Indian machine tool industry.



By 2015, the global robotics industry is estimated to be worth US\$17.6 billion with the Indian robotics industry worth approximately US\$750 million. In 2011, robot sales in India doubled to 1,547 units. In 2012, robot sales decreased by three percent to 1,508 units. It is again expected to rise to about 4,000 units a year until 2015.

The main applications of robots in India are welding, handling and dispensing. Hence, it is likely that more than 70 percent of the robot sales ended up in the automotive industry. Welding had a considerable increase between 2009 and 2012. It increased from 170 units in 2009 to 840 units in 2012.

Although penetration of robots in the Indian industry is still quite low, it is expected that the non-automotive sector would see increased application in the future. The key sectors would be in metallurgy, glass, ceramic, pharma and food processing industry.

**According to the data from the Ministry of Commerce and Trade, Germany is India's largest trading partner in European Union and 6th largest trading partner globally. However, India ranks 28th amongst trading partners for Germany worldwide and 5th among Asian exporters. Do you see India's contribution to Germany increasing?**

Germany is amongst India's most important partners for trade, investment and technology. In 2012, the trade between India and Germany reached EUR17.6 billion. In 2012 Germany exported approximately EUR10.38 billion of goods to India. The exports from India to Germany attained a value of EUR7.2 billion in 2012. The exports of German machinery to India touched EUR3.2 billion in 2012. Despite the geographical challenges that India is nine times bigger than Germany, the exports of German machinery to India have increased by around seven times in the last 12 years. Although there is a slight dip in the export figures, there is a lot of potential in the long term

**1,508 units**  
**2012 sales of**  
**robotics in India.**  
**It is expected to**  
**rise to about 4,000**  
**units a year until**  
**2015**



Rubber machinery presents huge growth opportunities besides other sectors like material handling, machine tools and plastics.

“  
 Germany and India have agreed for a new jointly funded programme called 'Indo-German Strategic Partnerships in Higher Education', which aims to intensify existing partnerships.

perspective. So we look forward to a buoyant Indo-German trade in the engineering sectors with increased investment of the German companies in India.

**What does Indian manufacturing industry need to do increase its contribution on this front?**

For Indian companies, the German market – the largest in the EU – continues to be attractive in numerous sectors and remains an important element of any comprehensive export strategy to Europe. While Indian investors must reckon with a relatively

higher cost of doing business in Germany, they can count on high levels of productivity, a highly skilled labour force, quality engineering, a first-class infrastructure, and a location in the heart of Europe. For the Indian manufacturers doing business with German customers should take good care of the specifications as the Germans are very specific with the quality of the product and the packaging part.

**Germany is also the 2nd largest partner for technology collaborations globally and has been an important development cooperation partner for India. Do you see India taking advantage of this, particularly at the grassroots level?**

Germany and India are determined to further expand their cooperation in higher education, research and technology – dynamic core areas of the Indo-German Partnership – and to open up new and innovative areas of cooperation. To this end, Germany and India have agreed for a new jointly funded programme called 'Indo-German Strategic Partnerships in Higher Education' (IGSP), which aims to intensify existing partnerships between German and Indian institutions of higher education. The programme will focus on establishing joint research projects that will include joint supervision as well as student and academic exchanges.

Expressing their continued commitment to intensify and further enhance the level of science and technology collaboration, the two countries have agreed to jointly fund the Indo-German Centre for Sustainability (IGCS) established at IIT Madras. The activities of the Centre are directed towards building resilient systems in the face of climate change as well as enhance strategic knowledge in key areas of climate change. It will conduct research, technology development, training and knowledge dissemination including social and institutional barriers that can also help towards developing policy guidelines in a set of priority areas relevant to the changing climate system. The IGCS at IIT-Madras will host visiting scientists and researchers from German universities for four years under support by the Federal Ministry of Education and Research.



EVENT



# Going Global

The recently concluded Elecrama 2014 showcased the global competitiveness of Indian products and the capabilities of Indian power equipment manufacturers

**T**he Indian electrical equipment manufacturing industry has certainly evolved and matured over the years. In fact, India is now becoming a major sourcing destination for global players. That is exactly the reason why Elecrama 2014, the world's largest transmission and distribution confluence, had the theme of 'Go Global'. "The focus has been to showcase the global competitiveness of Indian products and the capability of Indian manufacturers to develop world class engineering products at competitive costs," said Sanjeev Sardana, Chairman, Elecrama 2014. The Mission plan 2012-2022 for the electrical equipment industry was launched in July 2013 and its vision is



Beks Dagogo Jack FNSE, Chairman, Presidential Task Force on Power, Nigeria, inaugurating the T&D Conclave



Karnataka Chief Minister Siddaramaiah (in white) alongside other officials at the inauguration. According to the CM, Karnataka will be a power surplus state by 2017.

to make India the country of choice for production of electrical equipment and reach an output of \$ 100 billion by balancing exports and imports.

The 11th edition of Elecrama was held at the Bangalore International Exhibition Centre (BIEC) from January 8-12, 2014. Covering a gross area of 70,000 sq m with over 1,200 exhibitors from 30 countries displaying their latest products and technologies, it was the largest Elecrama yet. "Elecrama has grown to be the world's largest show for electrical equipments from 220 V to 1200 KV and industrial electronics. The exhibition not only provides a platform for showcasing the global best technology but also provides opportunity for building strong relationship between the buyers and sellers," said Raj Eswaran, President, the Indian Electrical and Electronics Manufacturers' Association (IEEMA). IEEMA, the 66 year old industry body, representing the Indian Electrical & Professional Electronics equipment manufacturers' is the apex industry association in the power sector. IEEMA organises Elecrama every two years.

Karnataka, the partner state of Elecrama, invited the electrical equipment industry to set up manufacturing units in the state. According to the state's Chief Minister Siddaramaiah, Karnataka had initiated several reforms in the transmission and distribution sector that would help reduce inefficiencies in the system and also provide enormous opportunity to electrical equipment manufacturers to supply high quality equipment at reasonable costs.

The five day event was designed to allow participants to experience a multilateral approach and derive maximum benefits while attending the show. Among the concurrent events lined

up, Elecrama 2014 also unveiled the 9th Trafotech International Conference on transformers. The Trafotech 2014, held once in four years, provided transformer designers, manufacturers, users and consultants a common platform to review the latest advances and futuristic trends, share operational experiences and discuss the requirements of transformers for smart grid systems.

#### Importance of transformers

In his Presidential address at the Trafotech 2014, G Kumar Naik, MD, KPTCL said, "The importance of transformers can be understood from the fact that the Government of Karnataka has given topmost priority to transformers by proposing to set up transformer repair centres in every taluka in the state and transformer banks in every district head quarter of the state."

Eswaran of IEEMA said that the industry body had identified five areas for strategic and policy interventions by both the government and industry. Aditya Dhoot, Vice-Chairman Elecrama 2014, said that India's Rs12,000 crore transformer industry is facing a few challenges as it is currently operating at about 60 percent capacity due to a slump in demand projected by the Government companies.

IEEMA also released 'Power Transformers – Standardisation Manual' with the objective of making the industry follow uniform standards on all aspects of manufacturing, maintenance and repair of power transformers in the country. A Lifetime Contribution Award was conferred to ML Mittal the former technical director at BHEL for his contribution in the field of Transformers and smart grid.

The Indian government will soon launch a national smart grid mission and monitor the

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I would urge our friends here to work towards a global model where free exchange of ideas, concepts and technology notes can be seeded to start a revolution in optimised product engineering.

Raj Eswaran,  
President, IEEMA



**Sanjeev Sardana, Chairman, Elecrama 2014 addressing the T&D Conclave. The biggest challenge in the T&D space is incorporation of new technology.**

implementation of policies and programmes envisioned in the smart grid road map for the power sector, said BN Sharma, joint secretary, Ministry of Power at Trafotech 2014. "This will help in finding solutions for some of the daunting challenges the Indian power sector is faced with, such as enabling better access to electricity, providing lifeline supply to all households, reducing T&D losses, etc. This will also guide planning and investments for future power projects and T&D activities," Sharma said.

He added that the government had recently unveiled the Smart Grid Vision and Road Map for the future for both modernising the aging grids as well as for transition towards low carbon power economy by integrating renewable generation with the grid.

The ChangeXchange 2014 – 2nd Reverse Buyer-Seller Meet (RBSM), supported by the Department of Commerce,

Ministry of Commerce & Industry, Government of India, allowed participants from the African nations to meet over 1,000 suppliers from India. The CEOs summit involving giants of the global electrical equipment Industry featured live panel discussion with eminent experts brainstorming on current challenges and opportunities in T&D business.

The event also featured Engineer Infinite 2014, through which Elecrama 2014 continued its search for new talent in the field of electrical and allied engineering.

**T&D opportunities**

Indian transmission and distribution industry should look for opportunities globally to enhance exports from \$5 billion to \$25 billion in next five years in the fields of power generation, transmission and distribution, a top executive of the World Bank said at the first T&D conclave at Elecrama 2014.

"This growth potential should be seen in the perspective of the huge untapped demand for power. Globally 1.2 billion people still do not get power, and India occupies a prime place as around 200 to 300 million people not getting any power. So, one can understand the need for the resources and efforts

**"THE MISSION PLAN 2012-2022 FOR THE ELECTRICAL EQUIPMENT INDUSTRY WAS LAUNCHED IN JULY 2013 AND ITS VISION IS TO MAKE INDIA THE COUNTRY OF CHOICE FOR PRODUCTION OF ELECTRICAL EQUIPMENT AND REACH AN OUTPUT OF US\$ 100 BILLION BY BALANCING EXPORTS AND IMPORTS."**



**The CIGRE sessions focussed on utility engineers, solution designers and professionals in HV equipment manufacturing.**



Seminar on new generation high performance conductors (HPCs) focussed on how HPCs could reduce the Right of Way (ROW) and capital cost, amongst other issues

to reach out to the deprived lot,” said Subramaniam V Iyer, Director, Department of Sustainable Energy, The World Bank.

He said poverty reduction and elimination was central to the World Bank’s global strategy and to this goal making power available plays a crucial role and the World bank is lending \$ 8 billion globally, including India, to power producing and transmission companies.

According to the International Energy Agency (IRA) the demand for energy is going to grow exponentially but the transmission and distribution losses will also grow in a big way unless the T&D equipment makers improve their efficiency.

Iyer said there was a concern about the climate change and reduction the carbon footprint should be a major focus area for the generation and transmission equipment makers. According to Eswaran frugal engineering and innovation are the two main factors that help tide over business cycles in the global electricity sector and manufacturers should embrace upcoming technologies to usher in an exciting phase of transmission and distribution equipment manufacturing.

“I would urge our friends here to work towards a global model where free exchange of ideas, concepts and technology notes can be seeded to start a revolution in optimised product engineering,” he said.

In his address, Ajay Mehta, MD, Maharashtra State Electricity Distribution Co Ltd, said that the biggest challenge in the T&D space is incorporation of new technology, especially in the reading and billing for electricity.

#### Focus on innovation

Considering that innovation is the need of the hour to make T&D sector cost effective, IEEMA organised ‘Innovation Day’ at Elecrama 2014. The aim was to promote the process of ‘idea into product’. “Innovation is defined as the process

of converting an idea into a product or service that creates value for which people are ready to pay. So the real innovation, or an innovation to become a reality in a country like India, it must be aimed at people at the grass root level and it must also embrace the future,” Eswaran in his opening remarks at the Innovation Day.

In his address Mustafa Wajid, CEO, Meher Energy Ventures said that any innovation in the power sector will have to keep in mind the need of the future which can be broadly highlighted as energy security, empowerment and engagement. “Innovation should be intelligent, optimised for economic scale and should have universal appeal,” Wajid said.

G Testi, the Chief Technology Officer of ABB, in his address pointed out that ABB spends a huge amount of money on all aspects of R&D for the power sector. “One of our major focus areas is tackling society’s challenges on path to low-carbon area by helping customers to do more using less.” He pointed out that ABB’s core R&D activities include control innovation for world class solutions, all aspects of electromagnetic, insulation systems, power electronics, sensors, software, switching etc.

To emphasise the urgent need for innovation in the power sector, D Patil, CTO of Crompton Greaves, pointed out that two billion people will be added in the next two decades in the world, electricity demand will double to 39,000 TWH, transport related energy requirement will be up by at least 60 per cent. On top of this, India has additional challenges like non availability of electric power to 400 million people, the average AT&C loss is above 30 per cent, 63 per cent of electricity comes from non-renewable coal and oil and lastly, power-hungry and mega cities are far outstripping the capacity creation. So innovation in power sector must try to address all these issues, he said. 

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India’s Rs12,000  
crore transformer  
industry is facing  
a few challenges  
as it is currently  
operating at about  
60 percent capacity  
due to a slump in  
demand projected  
by the Government  
companies.

Aditya Dhoot,  
Vice-Chairman Elecrama  
2014



# Future *of mobility*

As automakers consider ways to grow organically, technology leadership could be critical to the survival of a company, according to a new report from KPMG. Excerpts...



Ford's Fusion Energi hero: Continuing consumer concern with fuel efficiency is urging automakers to focus on plug-in hybrid.

mobility solutions and technology as critical to OEM survival in the automotive value chain, and the increasing power of Brazil, Russia, India and China (BRIC). These issues are explored in-depth in KPMG's 15th annual auto survey, *Strategies for a Fast-Evolving Market*.

"Continuing consumer concern with fuel efficiency and pollution is urging automakers to focus on plug-in hybrid and fuel cell technologies for the near future," said Mathieu Meyer, Global Head of Automotive and a partner with KPMG in Germany. "Since the development of e-vehicle technology takes time, in parallel, automakers are also maintaining a strong grasp on downsizing the internal combustion engine to meet the needs of the current market place."

### Strategy shift

Organic growth has overtaken joint ventures and partnerships as the most favoured business strategy. In 2013, respondents

Plug-in hybrids will lead the pack among e-vehicles in the race to produce cleaner, more efficient vehicles, according to KPMG International's 2014 Global Automotive Executive Survey. The rise of alternative powertrain technologies is one of several significant influences shaping the global automotive sector. Automakers are undergoing changes on many other fronts: a shift from partnerships and alliances to organic growth strategies, the continued emphasis of



“There is a strong correlation between technological leadership and the ability to remain independent and we can see this from the importance that automakers are placing on technological advances to enhance their mobile solutions.”

**Mathieu Meyer,**  
Global Head of Automotive and a partner with KPMG in Germany

placed joint ventures and alliances as the main approach, while organic growth now tops the list. This view is felt most strongly amongst OEMs from the TRIAD countries (the US, the EU and Japan), with 84 percent listing organic growth as their main business strategy. This significant response may be a result of challenges that are being experienced in current partnerships such as effective integration and finding synergies.

Plug-in vehicles are expected to attract the greatest demand of any e-vehicle, for both the TRIAD and the BRIC markets. Fuel cell vehicles are also experiencing a rise in popularity with 69 percent of respondents considering this

**66 percent**  
**Respondents who predict**  
**that Russian automaker**  
**Avtovaz will be among the**  
**top three OEMs to gain**  
**market share, moving up**  
**from 21st place in the 2013**  
**KPMG auto survey**

technology as critical to future growth.

Despite this confidence, the majority of investment from automakers will continue to be in downsizing the ICE, which could slow advances in e-vehicles, according to the survey. Seventy-six percent of respondents say that ICE downsizing and optimisation is a key issue, compared to just 59 percent for battery-powered technologies.

TRIAD OEM's are twice as likely to invest in ICE downsizing, whereas BRIC countries are more focused on the various forms of e-mobility, like plug-in hybrids and pure battery electrified vehicles.

### Key findings

Organic growth overtakes joint ventures and partnerships as the favoured business strategy.

Plug-in hybrids to attract greatest demand by 2019.

Technology leadership viewed as critical to automakers remaining independent.

Growing trend toward 'autonomous' driving leads automakers to become mobility solutions providers.

Online model for retail automotive sales takes root.

Emerging markets an engine for growth - China expected to account for one third of new worldwide vehicle sales by 2020.

### Technology driving change

As automakers consider ways to grow organically, technology leadership could be critical to the survival of a company. "The demand for autonomous driving is leading automakers to become mobility solutions providers," said Meyer. "There is a strong correlation between technological leadership and the ability to remain independent and we can see this from the importance that automakers are placing on technological advances to enhance their mobile solutions."

With more software technology intrinsic to today's vehicles, the self-driving car becomes a real possibility for the marketplace. However, only 14 percent of respondents feel that self-driving cars represent one of the key industry trends, although these figures differ widely by country. In the BRIC countries, the expectations for self-driving cars are higher (23 percent) than in the TRIADs (11 percent).

### Urban impact

As the world's population grows, patterns of vehicle use and ownership are changing and mobility solutions like car



India is likely to export one million cars within two years.



sharing are becoming increasingly popular. Many of the major automotive brands are moving into this space, even though it doesn't always necessarily involve a physical automobile, but a range of transportation options. Almost half of survey respondents feel that mobility solutions can deliver a profit within the next five years.

Respondents from the TRIAD countries are the most optimistic of the potential for mobility solutions, with almost half forecasting that up to a quarter of city inhabitants will use these services by 2029—a huge increase on the survey results from 2013.

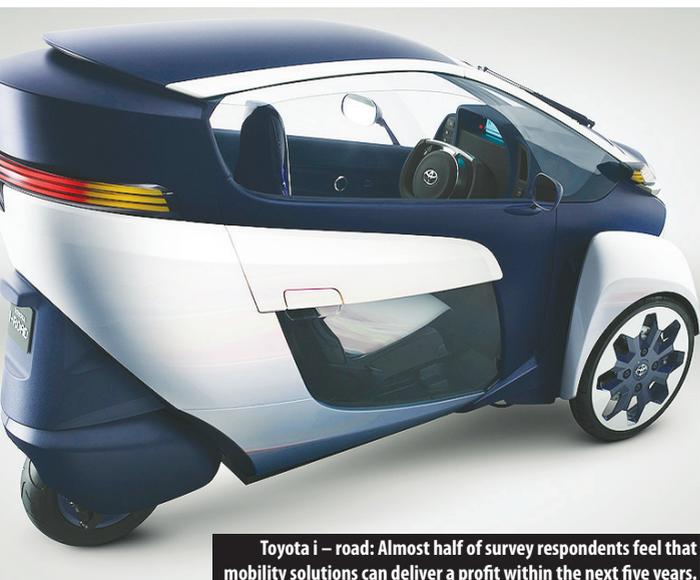
“The growing trend of autonomous driving [the self-driving car] can have a further positive impact on the development of mobility solutions,” noted Meyer. “The ability to ‘order’ a car to ‘arrive’ when you want it, and go where you want to go may make it unnecessary to actually own the car. This could greatly contribute to the rise of mobility solutions models, perhaps eliminating the need to own a second family car.”

**Emerging markets**

A significant majority of respondents see emerging markets as a major growth engine for the auto industry: 85 percent say that growth in the BRICs and other potentially high-growth markets is the biggest single industry trend until 2025.

“As the BRIC countries take up a greater share of the global

**“SALES ARE EXPECTED TO SURGE IN BRIC COUNTRIES, AS SEVEN OUT OF THE 10 TOP OEMS EXPECTED TO GROW IN THE NEXT FIVE YEARS WILL COME FROM BRICS COUNTRIES.”**



**Toyota i – road: Almost half of survey respondents feel that mobility solutions can deliver a profit within the next five years.**

**Core demand**

The top priority for today's car buyers is a longer-lasting vehicle with low gasoline consumption—92 percent of global executives surveyed say that this is a top priority for buyers. Fuel efficiency remains by some way the number one purchase criteria, as consumers vote with their wallets in the face of fast-increasing prices at the gas pump. Enhanced vehicle lifespan has risen in importance for the third consecutive year, with 70 percent of respondents citing this factor as influential. The latest safety innovations also remain a critical factor for consumers when choosing a vehicle, say 79 percent. Consumer preferences for alternative fuel technologies have taken a lower priority in the quest to economise. Less than half of respondents feel that this factor is critical to buyers. However, having a vehicle with the latest in-car technologies is another important consideration to consumers.

market, auto executives face tough choices on how to expand and who to partner with, and how to respond to growing competition,” said Meyer. “However, with these challenges comes massive opportunity for both manufacturers and dealers to tap into incredible long-term potential.”

In this year's survey, respondents are increasingly optimistic about BRIC manufacturer increasing export volumes, with 44 percent confident that China will exceed two million vehicles within two years. Those that predict India will export one million cars within two years have also increased to 38 percent.

The greatest growth potential for BRIC OEMs is considered to be the biggest in South East Asia according to the survey, whereas Western Europe and North America continue to be largely off-limits for BRIC manufacturers. A greater proportion of respondents feel that BRIC auto companies have good growth opportunities in Africa and Middle East.

Nevertheless, that outlook may not materialise as quickly as some respondents predict. “While the survey respondents are optimistic, this scenario may not play out in some BRIC countries where the quality levels of domestic cars are not on par with the standards of Western counterparts. To export into more mature markets, the brand perceptions and distribution networks would have to improve significantly,” noted Meyer.

Sales are expected to surge in BRIC countries, as seven out of the 10 top OEMs expected to grow in the next five years will come from BRICS countries. For example, 66 percent of respondents predict that Russian automaker Avtovaz, will be among the top three OEMs to gain market share, moving up from 21st place in the 2013 KPMG auto survey. 



ABB robots work the ultralight and high strength CFRP module of the new BMW i3 in the Leipzig plant. Courtesy: BMW

# In auto mode!

A trade show scheduled to be held in June 2014 promises to show how the use of modern robotics technology can reduce costs while increasing quality at the same time

**G**lobal competition and the continuing high degree of cost pressure are making automated solutions increasingly important. Robotics and automation continue to grow in Germany despite on-going overall economic uncertainty. The demand for industrial robots remains very strong internationally. According to the International Federation of Robotics (IFR), growth of robot installations increased by an average of nine percent annually between 2008 and 2012. According to the productronic division of the German Engineering Federation, industry sales in 2012 achieved a record value of EUR10.5 billion in 2012 with a growing export share. The demand from the areas of packaging, plastic industries as well as from intralogistics is becoming increasingly significant.

In this background, Automatica, Trade Fair for Automation and Mechatronics, will take place in Munich from June 3 to 6, 2014, overlapping with Intersolar Europe, leading international trade fair for the solar energy industry, and Maintain, Trade Fair for Industrial Maintenance.

On a gross area of 55,000 sq m, Automatica shows how the use of modern robotics, assembly and handling technology as well as industrial machine vision can reduce unit costs while increasing quality at the same time.

Under the new motto 'Optimise Your Production',

**"PLASTICS, CFRP, MAGNESIUM, ALUMINIUM – THE USE OF MULTIPLE MATERIALS IN LIGHT AUTOMOBILE CONSTRUCTION NOT ONLY REQUIRES NEW TECHNOLOGIES FOR MACHINING THEM, BUT ALSO FOR PROCESSING THEM."**

Automatica 2014 is putting the benefits in the foreground. "Automatica has become an indispensable and established factor in automation in Europe. It is and remains the only real robotics trade fair for Fanuc. As a result, Automatica represents for us as manufacturer the most important platform for automation in Germany and Europe," Olaf Kramm, GM, Fanuc Robotics Deutschland GmbH, added.

#### Professional service robotics

Automatica 2014 is going to show saleable service robotics and components, which are used directly as capital goods, in its new exhibition area professional service robotics. As a result, it is positioning itself as the leading trade fair for industrial robotics and professional service robotics under one roof.

#### Focus on automobile production

Lightweight construction is on the agenda in automobile production, but the struggle to reduce every kilogram of weight possible presents challenges to production strategies. New production processes and technologies are required if light construction concepts are to be viable with respect to costs. Automatica, in Munich from 3 until 6 June 2014, presents innovations to the international automation industry that are based on changes of production



technologies in the automobile industry. Starting from 2020, European automobile manufacturers will be faced with stricter limiting values for CO<sup>2</sup> emissions. “German automobile manufacturers are working full steam to reduce CO<sup>2</sup> emissions. The development of highly efficient drive concepts, engine downsizing, new transmission generations and weight optimisation have already resulted in significant improvements over the past years. In spite of all progress, additional efforts are required to comply with the restrictive EU guidelines,” according to Dr Ulrich Eichhorn, MD, German Association of the Automotive Industry (VDA).

**Technological change in full swing**

A look into the BMW Leipzig Plant – the pioneering electric vehicle i3 is being developed there – reveals the radical production differences compared to conventional automobile manufacturing. The vehicle architecture is based on a completely new concept. The i3 is separated horizontally. The passenger compartment, the life module, is on the drive module, which contains the complete drive including batteries. The chassis is made of an aluminium frame, while the high-strength and ultralight passenger compartment is made of carbon fibre reinforced plastic. Both modules are glued together after their complete assembly. This bonding technology



The development of highly efficient drive concepts, engine downsizing, new transmission generations and weight optimisation have already resulted in significant improvements over the past years. But additional efforts are required.”

Dr Ulrich Eichhorn,  
MD, German Association of  
the Automotive Industry

has decisive advantages and is perfectly suited for binding different materials. Certainly, the prestige project BMW i3 has a long way to go from a production point of view before the vehicles can be manufactured in mass production. Light automobile construction is on the agenda for all models and goes hand in hand with material combinations and new materials as well as machining and joining processes. Now, system integrators as well as robot and component manufacturers are all challenged to create the technical production requirements with bundled innovation energy.

**Innovative bonding solutions in demand**

Plastics, CFRP, magnesium, aluminium – the use of multiple materials in light automobile construction not only requires new technologies for machining them, but also for processing them. Bonding technology is



Future of mobile robotics. Photo courtesy: www.kuka.com

emerging as the big winner here. According to the estimates of experts, the quantity of adhesives – which is already around 20 kilograms per vehicle – is to increase by up to one-third in the medium-term. While only glass panes were glued at one time, the bonding applications in automobile manufacturing are used in all areas of bodywork today from assembly to functional and design elements. As a result, the industry has been working on innovative procedures in the area of bonding and sealing applications for years. The robot manufacturers are of course able to realise reliable process solutions for standard applications.

**Automated composite production**

Automation in the production of lightweight components is a pivotal topic at Automatica 2014, above all in the area of composites. The special exhibition ‘Automated Composite Production’ and the ‘Industrial Composites Production Conference’ in the East Press Center from June 5-6, 2014, will examine state-of-the-art technology for increasing process speed and reducing production costs. 

**Automatica Forum 2014**

**VDMA Sustainability Initiative ‘Blue Competence’:** Economic success with increased sustainability

**Flexible production:** Robotics, assembly and vision in times of greater model variety  
**Professional service robotics:** Service robots - automated helpers in logistics and production  
**Future factory:** How the factory of the future looks for future-oriented projects

**Professional service robotics:** Man and machine hand in hand

**Industry 4.0: IT revolution of factories:** The added-value that software and networking contribute to production.

# Optimising aero-engine fuel efficiency

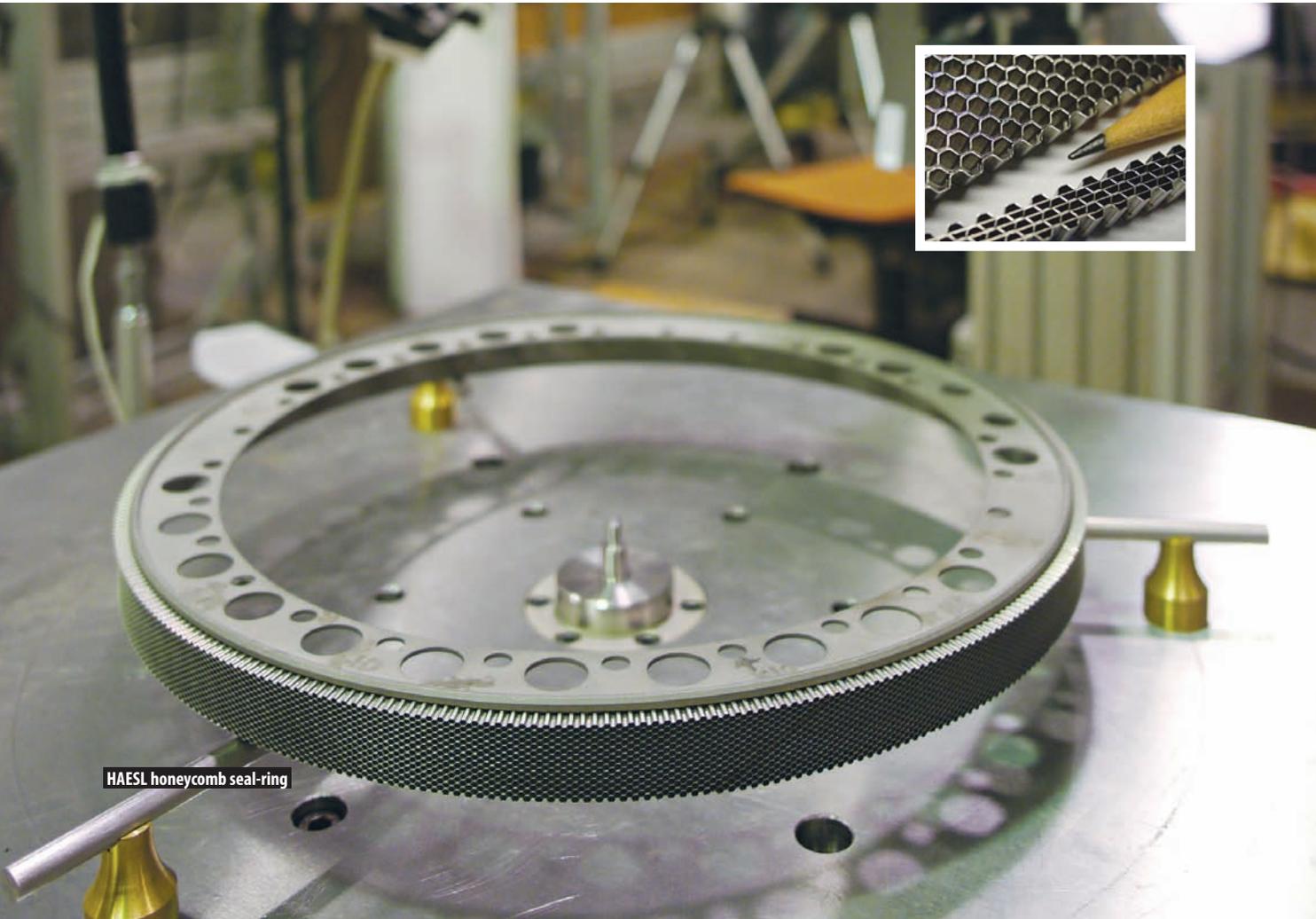
A Hong Kong based company has successfully solved the challenge of measuring the honeycomb seal-ring by incorporating incremental encoders

**H**ow fuel efficient is a commercial airliner? A Boeing 747 burns approximately five gallons of fuel per mile or a total of 30,000 gallons (98 tonnes) on a flight between London and Hong Kong. This is a significant cost for an airline. The honeycomb seal-ring is an extensively used component, which has been proven to optimise the fuel efficiency of aero-engines, but the measurement of these seals presents difficult engineering challenges. Now, HAESL (Hong Kong Aero Engine Services Ltd) believes that it has successfully solved this challenge by incorporating Renishaw's TONiC incremental linear and rotary (angle) encoders within its new optical Seal Ring Measurement System (SRMS).

Eric Lau, Senior Engineer, who has been working at HAESL for almost 20 years, and Engineer Raymond Siu explain: "SRMS is a joint development system by HAESL and The Hong Kong Polytechnic University (PolyU), which has transformed the way we inspect honeycomb. Before SRMS, we used vernier callipers to measure the rings manually which is time consuming and relies heavily on the skill and experience of the operator. This new system has changed all of that. SRMS is not only faster, which increases work efficiency by 50 percent, but also maintains the consistency of the results by eliminating human error."

## Honeycomb seal-rings

Honeycomb seals are fitted into mounting rings that are



HAESL honeycomb seal-ring



HAESL employee using SRMS (Seal Ring Measurement System)

juxtaposed to the blades of the turbine. They are used to seal the radial gap between the rotating blades and the turbine wall to optimise both the fuel consumption and service life of the aero-engine. Rotor blades expand, however, as the operating temperature increases. The honeycomb seal-ring, therefore, provides a sacrificial surface that allows the rotating blades to cut into the seal and preserve the integrity of both the blades and the turbine wall. Hexagonal cell size on the ring depends on the rotor blade dimensions; cell diameter typically varies from 0.8 mm to 3 mm, while depth is up to 13 mm.

**Reliable performance**

Patrick Ng is the chief designer of SRMS. He says: “The combination of an integrated optical measurement head, ball screw axes, servo-motors and encoded rotary table create an accurate, reliable and maintenance-free system. Unlike conventional probe systems, SRMS employs non-contact and optical inspection technologies to tackle the most typical seal-ring measuring problems faced by the industry. The choice of Renishaw was straightforward. We had experience of Renishaw’s encoders from other successful projects in the past, so we knew their quality and how reliable

they are. Renishaw’s TONiC series encoders offer excellent immunity to dirt and its compact size and ease of installation provided us with a great deal of flexibility in system design. Two TONiC encoders are fitted onto the linear axes of the X-Y stage on SRMS and their excellent performance is surpassed only by their exceptional support.”

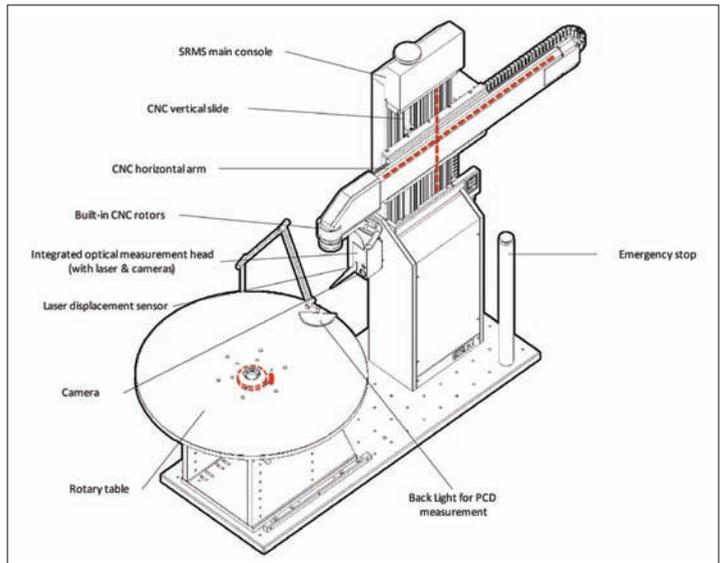
Ng continues: “Loading the ring in the correct position on the rotary table is critical, with a direct effect on the measurement result. We compared different brands but Renishaw’s has the best cost-performance ratio. To ensure a smooth and stable rotation, it is important that the cyclic error is low and TONiC can achieve this.”

Renishaw’s TONiC RESM angle encoder system offers ultra-low cyclic errors of typically  $\pm 30$  nm and a resolution up to 86.4M CPR (counts per rev) which satisfies many of the most demanding requirements. The high accuracy ring scale is designed with low mass and low inertia, allowing better dynamic performance while the readhead employs low noise (jitter) filtering optics to further improve positional stability and repeatability.

“  
The combination of an integrated optical measurement head, ball screw axes, servo-motors and encoded rotary table create an accurate, reliable and maintenance-free system.  
Patrick Ng,  
Chief Designer, SRMS

**Ease of installation**

All of Renishaw’s ring scales feature a patented taper mount which minimises the installation errors and simplifies the integration. “The taper mount is one of the attractive features of Renishaw’s encoders. It saves our time and reduces the workload



Annotated diagram of HAESL SRMS showing direction of axis-travel

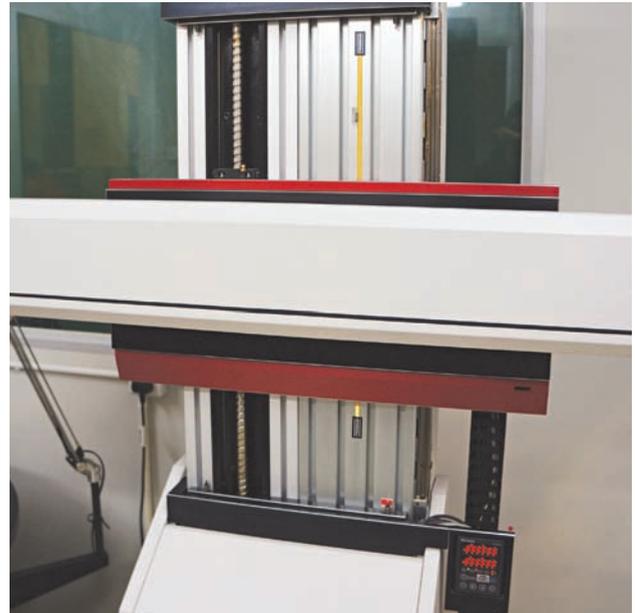
in correcting rotor eccentricity,” says Ng. In addition, every readhead features an innovative integral set-up LED which speeds up installation and removes the need for complex external set-up equipment, or oscilloscopes.

### Avant-garde machine design

SRMS is a high precision optical measurement system which is designed for measuring the roundness, flatness and PCD (Pitch Circle Diameter) of the holes on the seal rings by switching modes on its remote control pad. This system comprises three main modules: the rotary table, the integrated optical measurement head on main console and the software console.

Ng explains: “Our SRMS’ measurement head features a built-in high-accuracy class 3R Laser Displacement Sensor (LDS) and an industrial camera, which moves horizontally (X) and vertically (Y) on the main console. The laser takes measurements for both internal and external roundness, while the camera takes images of the holes around the PCD and provides remote monitoring of the LDS laser spot position. This results in the improvement of measurement precision which the probe system could not provide.”

The seal ring for inspection is placed by the operator on the rotary table, providing a placement tolerance of  $\pm 2$  mm through the built-in auto-centering function. The operator then selects the corresponding ring type from the library and starts the measurement. The measurement head remains static to capture and send the data to the software console for processing. Every individual measurement reading from the head is coupled with corresponding rotary table positional data from the encoder,



HAESL SRMS (Seal Ring Measurement System) and TONIC

**“THE HONEYCOMB SEAL-RING IS AN EXTENSIVELY USED COMPONENT PROVEN TO OPTIMISE THE FUEL EFFICIENCY OF AERO-ENGINES. BUT THE MEASUREMENT OF THESE SEALS PRESENTS DIFFICULT ENGINEERING CHALLENGES.”**

## About HAESL

HAESL, based in Hong Kong, is a joint venture between Hong Kong Aircraft Engineering Company Ltd (HAECO), Rolls Royce plc and SIA Engineering Company (SIAEC). The organisation provides aero-engine repair, overhaul and component repair services for many of the world’s most respected airlines that have chosen Rolls-Royce to power their fleet of Airbus and Boeing aircraft.

With over 35 years of experience in the field, HAESL has become one of the world’s most respected engineering names for offering the highest quality and most comprehensive engine repair and overhaul services to customers worldwide. Since 2002, HAESL has been collaborating closely with The Hong Kong Polytechnic University (PolyU) on many of the joint venture projects and customized training programs for technology updates in the aero-industry.

and then post-processed to compute a holistic geometric measurement of the sample.

### Enhancement of machine tool reliability

Other than SRMS, which uses Renishaw’s encoders, HAESL also uses Renishaw’s QC10 ballbar to assess their machine tool performance: “The ballbar allows us to track and identify problems earlier to enable preventative maintenance. This helps to minimise production downtime and ensure the accuracy of parts produced. We are currently considering upgrading this to Renishaw’s latest QC20-W wireless ballbar system which offers more advanced features such as Bluetooth wireless connection, ‘partial-arc’ testing and single setup for three-planes testing,” says Eric Lau.

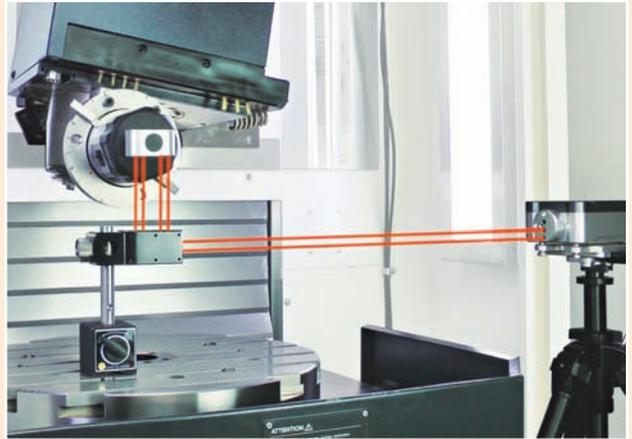
HAESL also uses Renishaw’s TP200 high accuracy touch trigger probe with the PH10 motorised probe head system on their co-ordinate measuring system (CMM) for part inspection. Raymond Siu explains: “Inspection is a highly important and vital process in the aero-industry. Renishaw is the undisputed market leader in CMM probing technology and is undoubtedly our first choice.” 



### XR20-W for use 'off axis'

Renishaw has further extended its solutions for checking the alignment and positioning performance of machine tool rotary axes with the launch of new off axis rotary software for its XR20-W rotary axis calibrator. The new software for the highly successful XR20-W now allows it to be used to measure the rotary positioning accuracy of an axis on many configurations of five axis machine tools, where the XR20-W often cannot be mounted on the centre of rotation. The XR20-W rotary axis calibrator combines with Renishaw's XL-80 laser interferometer to allow rotary axis positioning performance to be measured with  $\pm 1$  arc sec accuracy. With the new 'off axis' test capability, users can now test more types of machine tools than was previously possible with XR20-W.

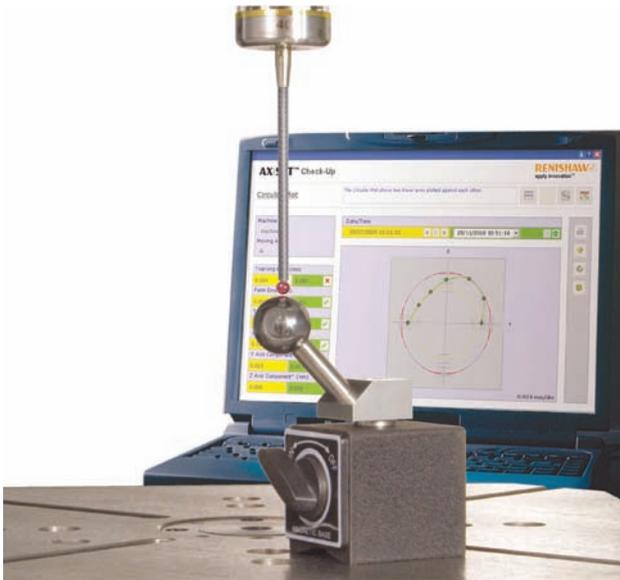
The method for off axis measurement works by synchronising movement of rotary and linear axes so that the XL-80's laser beam is kept aligned throughout the test. Because the linear axis is moving, the measurements made by the XR20-W may include additional angular errors (e.g. pitch) from the linear axis. These contributory angular errors are then measured separately (using the XL-80 laser and angular optics) and removed from the initial rotary axis results. The end result is a set of data reflecting only the errors from the rotary axis itself.



The Off axis rotary software is provided as an extra cost option for XR20-W and includes a suite of software utilities, part program generators and an electronic format manual. The manual details all the requirements for the mounting set-up and associated custom hardware manufacture.

*More information at [www.renishaw.com/calibration](http://www.renishaw.com/calibration)*

### AxiSet Check-up



Renishaw's AxiSet Check-up provides accurate and repeatable results using automated probing routines to gather performance data from a reference artefact, and includes simple yet powerful analysis. Alignment and positioning performance checks are carried out rapidly to benchmark and monitor complex machines over time. All tests utilise existing spindle-mounted Renishaw touch probes, which are standard option on most multi-axis machines, with probing routines generated using machine-specific macro software supplied with

Check-up. To ensure the highest accuracy, the use of OMP400 or RMP600 touch probes with patented Rengage strain gauge technology is recommended.

Set-up is fast and simple. To perform the test a user quickly locates a supplied calibration sphere within the machine tool's working envelope using a magnetic mount. Using the supplied custom macro software, a touch probe is then programmed to automatically take reference measurements around the sphere. Measurement results from the test are output to a PC and presented in a Microsoft Excel spreadsheet, enabling easy to understand analysis of data in different formats. These include a graphical representation of performance that highlights tracking and centring errors, a function that compares two sets of data from the same machine, a simple 'pass' or 'fail' test against the user's pre-defined tolerances, and a history screen that allows comparisons of the performance of rotary axes over time.

To ensure the optimum analysis of rotary axis performance using Check-Up, it is important that machine's standard three linear axes are also performing within specification. This should be determined and corrected if necessary using Renishaw's XL-80 laser calibration system, and then regularly checked using a Renishaw QC20-W ballbar. Together with the XR20-W rotary axis calibrator and AxiSet Check-up these powerful performance testing products combine to ensure the highest quality parts can be consistently produced by five axis machining centres and multi-tasking machines.

*More information at [www.renishaw.com/AxiSet](http://www.renishaw.com/AxiSet)*



### Rotational Viscometer series

The Cole-Parmer Rotational Viscometer series offers greater chemical resistance, enabling the instruments to handle chemically corrosive materials. Each is designed with 316 stainless steel spindles, a sealed keypad, and over/under range alarms.

You can determine the dynamic viscosity of samples in applications such as food (sauces, juices, and syrups), adhesives, petroleum products, biofuels, paints, pharmaceuticals, chemicals, and more! Over/under range alarm sounds when your sample is too high/low for the spindle selected. All models feature 10 language options, push-button control with easy-to-use menu system, motor self-test, user enabled calibration to a known standard, and universal power supply.

#### Select from basic, intermediate, and advanced models:

Basic Viscometers are an economical choice for fast, accurate viscosity readings. Feature a 4-line display that shows selected speed, selected spindle, viscosity, and percentage of full scale.

Basic Viscometers with USB output include software to download data through the USB output to your PC for analysis. Store up to 10 user programs for repeated tests. Display selected



speed, selected spindle, viscosity, percentage torque, shear rate, and shear stress on the 5-line display. Enter the sample density, and the unit calculates and displays kinematic viscosity (cSt) as well.

Advanced Viscometers with Temperature Probe have three times the speed selections and double the speed range of the basic models. Monitor and display temperature with the included RTD temperature probe. Program features include time to torque, time to stop, ramp, and multistep.

Programmable Viscometers feature 2,600 speed selections and the highest speed range, up to 250 rpm. Monitor and display temperature with the included RTD temperature probe. Control

the viscometer through a PC using the included software; also includes curves, graphs, and database references.

*For more information, contact [response@coleparmer.in](mailto:response@coleparmer.in) or visit [www.coleparmer.in](http://www.coleparmer.in)*

### 'Sensing & control' technology



Omron India displayed a wide spectrum of its advanced technology based portfolio at Elecrama 2014. It comprised of key offerings based on advanced 'sensing & control' technology from all of Omron business verticals in India namely, Industrial Automation, Electronic & Mechanical Components, Automotive Electronic Components and Healthcare.

Commenting on the participation, Sameer Gandhi, MD, Omron Automation, said, "The manufacturing sector in India is on its way to witness a boost in investments in automation,

with a growing focus on quality, productivity and to meet the shortage of skilled workforce. We are well poised to assist the Indian manufacturing sector for all kinds of needs." Vinod Rapheal, Country Manager - India - Omron Electronic Components said, "We strive to be a key player in the segment by offering a contemporary, technologically sound and reliable range of relays, switches, connectors and sensors which are capable of catering to the requirements of the industry."

The industrial innovation zone at the booth showcased industrial solutions through cutting-edge technology and components along with applications helping industries to achieve high operating efficiencies by answering their needs of performance, productivity, quality with adequate safety through - Lean, Stream and X-Tream automation platforms.

The Omron automation platform was demonstrated on machines like Delta Robot, SCARA Robot and Bottling machine to experience its utility for bringing flexibility, accuracy, reliability, speed and efficiency in all kinds of industrial applications primarily packaging and material handling.

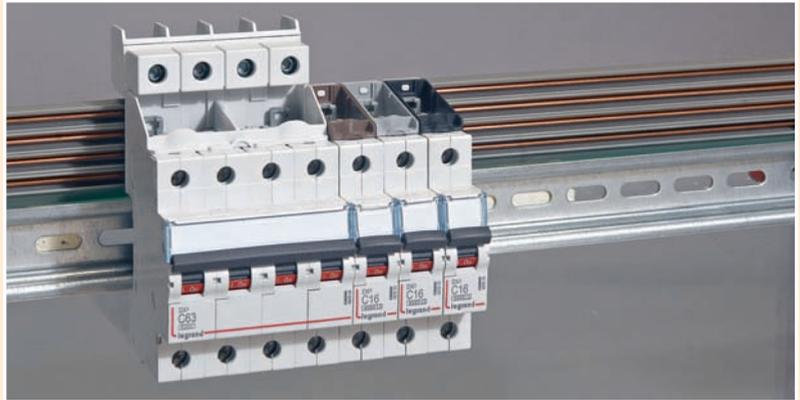
The zone also showcases the utility of Omron Industrial Automation portfolio for all major industries such as packaging, automotive, material handling, food & beverage and textile to name just a few.



### Range of safety and protection devices

Legrand India has recently launched DX3. According to Legrand, this is a comprehensive range of MCB, Isolators, RCBO, RCCB, accessories, measure, time-switch and contactor that meets requirements across the board. This offering positioned at the premium end of the market and comes with 12 patented features. All these are safety and protection devices that ensure that the home and commercial establishments are more secure places. Many of the new patented features ensure that the level of compliance is in excess of what is demanded by Indian regulators. The DX3 features a complete range of MCBs, from

10 KA to 50 KA and observes homogeneity with the power range and effective energy distribution. The innovative bottom clamp enables easy fixation and removal from the bank with fork busbar connection. The uniquely positioned integrated label holder enhances protection from dust, improved opening and closing system while label remains in place for a long time, thus proving to be a useful feature for the end user. The colour-coded on/off indication on dolly allows easy identification of the status of the product and faulty circuit. The DX3 range comes with ISI marking, superior top clamp with longer shelf life, improved air channels, electromagnetic arc puller, clip on accessories, sliding plastic shutters etc.



The improved terminal design maintains high contact at pressure resulting in less heating at terminals and increased contact pressure on cable while cable termination facilitates better connections and less terminal problems. The exclusive innovation of Residual Current Device (RCD) module with metering sets new standards of energy efficiency, easy installation, inbuilt protection and compactness. For the first time in a modular device there is a seamless amalgamation of thermal magnetic protection, residual current protection, energy measuring and local and remote data analysis. The unique Plug In solution is reliable, saves time, leaves space on the rail and has energized intervention with busbar.

### Gensets with stringent emission norms



Cooper Corporation, an engine major has launched Gensets under the stringent emission norms by CPCB II. The new emission norms will come into effect from

April 1, 2014. Cooper Corporation says that its Ecopack gensets ranging from 10 KVA to 200 KVA comply with the latest CPCB II Emission Limits applied by the Central Pollution Control Board for new diesel engines up to 800KVA. The Ecopack Genset is lighter in weight, smaller in size and meets with US as well as European emission norms.

With the lowest cost of ownership, over 2,000 units of Cooper Corporations CPCB range of gensets between 10KVA – 200 KVA are now present in the market. Cooper Corporation strongly believes that the latest CPCB II Emission Rules is a breakthrough legislation which will drastically reduce the pollution of the environment and will take India's Generators ahead of those in Europe and America. Commenting on the new Environment Protection Rules, Farrokh N Cooper, Chairman and Managing Director, says, "This was a long overdue notification and we welcome the implementation of these norms." Cooper Corp's Ecopack series is India's first Euro IV, US EPA Tier IV Interim and CPCB II compliant set of generators. So according to Cooper Corporation, this feature makes it the automatic choice for environment-conscious power consumers. Cooper Corp's Eco Pack could be used for a wide range of ranging applications.

# SENSING SOLUTIONS FOR THE MACHINE TOOL INDUSTRY



Rotary Encoders



Position Measuring Systems



Inductive Sensors



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