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ULTIMATE GUIDE TO PROFITABLE MANUFACTURING

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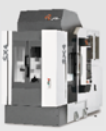

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NX 3222, NX 4222

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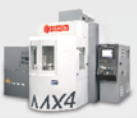


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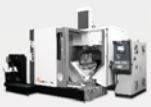

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VMC (5 Axis Bridge Type)
K3X 8 Five, K2X 10 Five

**HMC Series**
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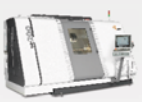

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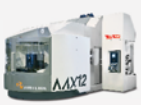


**MX Series**
VMC (5 Axis Universal Milling
Machine )
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**VMC Linear Series**
VMC (3 & 5 Axis Gantry Type Linear)
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**KX Large Series**
VMC (5 Axis Double Column)
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**KXG Series**
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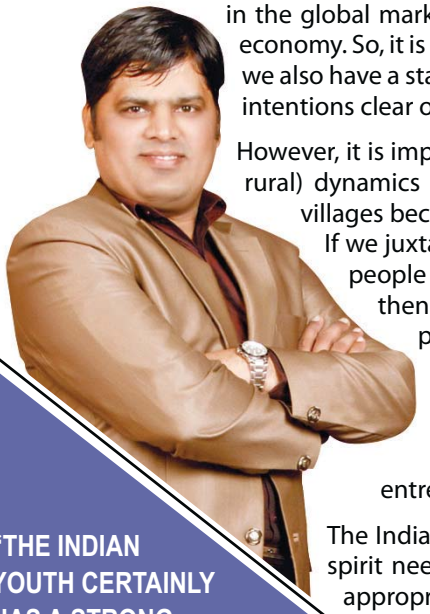
# The Power of Entrepreneurship

EDITORIAL

A key reason for the economic progress in India in the last twenty five years, particularly after the opening up of the economy, has been the emergence and evolution of various entrepreneurial set ups in the country. And this has happened across sectors. The economy now stands on the verge of a decisive transformation.



In the period described above, India has been firmly establishing its position in the global market and also has been building a robust base for its own economy. So, it is safe to assume that things are only likely to get better. Plus we also have a stable government at the centre, which has already made its intentions clear of driving the country ahead positively.

However, it is important to note that at the same time, the 'urbural' (urban-rural) dynamics in the country are also changing with more and more villages becoming towns and towns becoming small cities and so on. If we juxtapose the complete picture against the millions of young people who would be needing employment in the next few years, then it would seem that the current system may not be able to provide jobs for most of them. This could lead to a huge unrest causing further problems in an already difficult society going through enormous change pangs. This is avoidable by taking advantage of the very situation that the country finds itself in. This is avoidable by encouraging entrepreneurship across every level.

**"THE INDIAN YOUTH CERTAINLY HAS A STRONG ENTREPRENEURIAL SPIRIT. THIS SPIRIT NEEDS TO BE ENCOURAGED BY PROVIDING THE RIGHT FRAMEWORK, APPROPRIATE TRAINING & MENTORING, AS WELL AS ROBUST SOURCES OF FUNDING."**

The Indian youth certainly has a strong entrepreneurial spirit. This spirit needs to be encouraged by providing the right framework, appropriate training & mentoring, as well as robust sources of funding. While the government definitely will have to play a big role in this, the industry too will have to chip in every possible way. In the long-term, this will actually be a win-win situation for everyone involved. Creating and building an entrepreneurial culture in the country will ensure both a vigorous economy as well as a healthy society.

Editor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# CONTENTS










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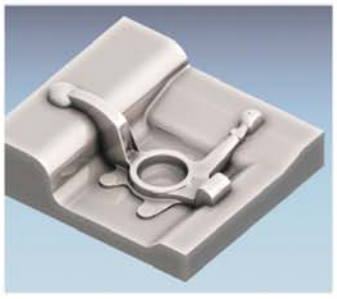







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THE MACHINIST
ULTIMATE GUIDE TO PROFITABLE MANUFACTURING

# LETTERS to the EDITOR

Dear Readers, you are holding the eight issue of the re-launched Machinist. And we are glad to share that the 'all new Machinist' is getting excellent response from all of you. This encouraging feedback also reflects the reach of the publication as well as the profile of our readers.

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Website: **www.themachinist.in**

## Letter of the month

I must say that *The Machinist magazine* is a wonderful gift for the people, particularly the youngsters, working in manufacturing.
I think your article 'The Crusader' (July issue) on the way Mahindra Group is working and its vision shared by Dr Pawan Goenka is just awesome. It gives great insight about the Group's working and its great leadership. Then the article 'Costing your way to profits' under shopfloor is worth learning and implementing. And then 'The Specialist', where Mr. Ravi Sarin (CEO EHES) has shared their success story gives us the learning that how the speed and getting things right first time helped them bringing a 'Big' change.
I am highly impressed and able to learn lot. I must say thanks to you for bringing such a nice informative magazine for us.

**Ashish Rikhie, Plant Head at,**
***Blue Star Ltd,*** *Chandigarh*

Read the July 2014 issue. It is very well laid out, with excellent informative articles and industry news
Please accept my compliments.
We would be pleased to contribute some technical articles on Lean Manufacturing, Performance Management, 5S, etc. in future.

**Viren Joshi, CEO & President,**
***Sigma Electric Manufacturing Corporation,*** *Pune.*

The all new Machinist is a good start and has potential for a lot more. Thousands of smaller companies engaged in manufacturing and machining would benefit from the knowledge shared via the articles. It can also develop into a very powerful platform for larger companies to find vendors and other smaller companies and dealers to reach out to the target readers of Machinist.
Good effort. Make it great and sustainable.

**Lalit Kumar Pahwa, CEO - Auto Products at**
***Escorts Ltd,*** *Faridabad, Haryana*

I find 'The Machinist' very useful to stay updated with the developments happening in the industry. Also, it helps in staying updated on technological advancements.

**Hemant Nadkarni, DGM, Engine Assembly & Testing,** ***Mahindra & Mahindra Ltd,*** *Automotive plant, Igatpuri, Nasik*

As the name 'The Machinist' suggests, most of the contents of the magazine are pertaining to the machining area and helps the machining professionals to connect to outside world with regards to upcoming technology.
Apart from contents I would also like to appreciate the quality of print. It is excellent.

**Vipin Sonje, Senior Manager, Supply Chain Planning & Control Farm Equipment Sector,**
***Mahindra & Mahindra Ltd,*** *Kandivli, Mumbai*

'The Machinist' is an excellent magazine with great information about latest happenings in India and worldwide in the field of manufacturing. My best compliments for the future success.

**Lokesh Kachole,** ***Senior Consultant, CNH Construction Equipment Pvt. Ltd.,*** *Madhya Pradesh*


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# NEWS



## CG inaugurates its first Global Design Centre for motors

Avantha Group Company CG opened its very first Global Design Centre, or GDC, in Bhopal recently. The GDC's key markets would include South East Asia, the Middle East, Africa and Europe. CG's Global Design Centre is unique insofar as being the nerve centre of the design and development of advanced technological solutions for CG's projects globally. "The GDC enables synergies of expertise by closely integrating CG's centres of excellence around the globe, for the purpose of fuelling innovation and accelerating development," said CG's CEO and MD Laurent Demortier.

## CSA Group opens its 1st testing and certification lab in Bangalore

CSA Group has inaugurated its first highly specialised testing and certification laboratory in Bangalore, India. The new lab will offer testing and certification for a wide range of industries. "This launch is a part of our overall global business growth strategy in Asia," said Ash Sahi, President and CEO, CSA Group. "Today, India is increasingly moving towards efficient and sustainable manufacturing to meet global standards and product safety is becoming paramount to consumers and businesses. Our new lab has been designed to provide sophisticated testing and certification services to Indian manufacturers and help them attain access, acceptability and competitiveness in the global marketplace." The new new 2,500 sq m lab is situated in the Beary's Global Research Triangle.

## Dassault Systèmes to acquire Quintiq

Dassault Systèmes, the 3D design software major, has signed a definitive share purchase agreement to acquire Quintiq. Quintiq is a leading provider of on-premise and on-cloud supply chain, and operations planning & optimisation software, for approximately €250 million.

This acquisition further extends Dassault Systèmes' 3DExperience platform to business operations planning and further enables its longtime goal of harmonising product, nature and life.

**Quintiq Applications**

## FICCI welcomes govt's go ahead for second line of aircraft manufacturing

Industry FICCI has welcomed Defence Acquisition Counci's (DAC) decision to clear an IAF proposal for issuance of a tender for construction of 56 transport aircraft by private industry players to replace the ageing AVRO fleet of Transport Aircraft of the IAF. This initiative to create second line of aircraft building in the national interest of both from user (Indian Air Force) and from Military and Civilian Aerospace industry's perspective.

According to Dr. A Didar Singh, Secretary General, FICCI "This opportunity to Indian private sector would create a second line of aircraft production and will strength the indigenous capability of Indian industry in aircraft manufacturing."

## Siemens sets up TAC for machine tool industry

Siemens has started operations at its Technology & Application Centre (TAC) at Peenya in Bangalore, Karnataka. This facility, the first in India by Siemens, will enable machine tool manufacturers and end users to improve productivity through testing machining techniques in real-world conditions. Spread across 6,500 sq ft, TAC will allow Indian machine tool manufacturers and users to get a hands-on experience of the latest CNC technologies and solutions from Siemens and its partners. TAC will also organise knowledge sharing programmes, provide application support and training.

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## KBL Dewas plant certified as 'Green Company' by CII

Kirloskar Brothers Ltd's Dewas plant has been recognised as a 'Green Company' by the Green Business Centre (GBC) of Confederation of Indian Industry (CII) in compliance with its Green Company Rating System. The GreenCo rating systems is a pioneering initiative by CII to assess and analysis the green footprint of a company. KBL's Dewas unit secured the 'Silver Rating' in its first attempt on GreenCo for its leadership towards ecological sustainability. KBL has now also attained the distinction of becoming the first Indian pump manufacturing company to achieve the 'GreenCo' rating.


"We have developed many innovative and sustainable solutions in our plants which follow principles of reuse, recycle and reduce. By ensuring these practices, our focus is to contribute to the society as a responsible corporate citizen," said Sanjay Kirloskar, KBL's CMD.

## Lapp Group's Swiss plant celebrates 25th anniversary

The Lapp Group's injection moulding plant based in Diessenhofen, Switzerland, celebrated its 25th anniversary recently. "This plant is inextricably linked with the global success of the Lapp Group. As a supplier of integrated solutions and branded products in the cable and connection technology sector, injection moulding technology is absolutely essential to our portfolio," said Andreas Lapp, Chairman of the Board of Lapp Holding AG. Board Member Siegbert E. Lapp added: "Our employees' expertise and passion for this technology are the engine that drives our innovations in this area."

**Andreas and Siegbert Lapp emphasised the production site's importance for the global success.**

## Haas Automation partners with Scuderia Ferrari

Haas Automation has partnered with Scuderia Ferrari, the most successful team in the history of Formula One. Beginning with the 65th British Grand Prix at Silverstone, Haas Automation is featured on the lower side-pods of the Ferrari F14 T. Haas Automation branding will be seen on the cars for the remainder of the 2014 Formula One season and throughout the 2015 season.

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

## SKF India registers sales of Rs5,926 million in Q2 2014

SKF India registered sales of Rs5,926 million in Q2 2014 registering a growth of six percent over the corresponding quarter of the previous year and four percent as compared to the immediately preceding quarter. The Profit before tax for the second quarter ended June 30 amounted to Rs819 million registering a growth of 19 percent over the corresponding quarter of the previous year and 9 percent over the immediately preceding quarter. "Demand side of economy continues to face challenges of high inflation, delayed monsoon and global uncertainty amidst a changing sentiment of better future. Our focused efforts at improving operational efficiencies and forging deeper ties with our customers enabled us to deliver a steady performance, in a challenging business environment," said Shishir Joshipura, Managing Director, SKF India.

## NCR to move to a new manufacturing facility

In keeping with the company's plans to execute its future growth strategy in the country, NCR Corporation will be moving to a new manufacturing facility at Mahindra World City, in Chengalpet, close to Chennai, by the end of 2014. The new facility, which is more than double the size of the company's existing facility in Puducherry, is built over an 117,000 sq ft area, and is under a new single roof design structure that will allow NCR to improve operational efficiency. NCR will continue to manufacture financial solutions such as ATMs, while also expanding to manufacture innovative consumer transaction technologies for the retail and hospitality industries. "It is an exciting time for NCR in India," said Jaivinder Gill, regional vice president, India and South East Asia, for NCR financial business.

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# Two Haas Demo Days scheduled for India in September

Haas Factory Outlet (HFO) - Phillipscorp, CNCSSIPL division, has announced two Haas Demo Days' in September 2014.

The first of the two events is scheduled for September 8 and 9 and will take place in Ludhiana at the Research & Development Centre for Bicycle & Sewing Machines. Between 10am and 6pm on both days, visitors to the event will be able to witness cutting demonstrations on various Haas CNC machine tools including a VF-2 vertical machining centre and an ST-10Y, latest generation Haas CNC lathe with Y-axis. The Haas ST-10Y is one of the latest-generation, high productivity machines from the Haas ST range of completely redesigned CNC turning centres.

Haas experts from the local HFO will guide visitors through the demonstrations and will also answer questions regarding the machines. Demo tours are scheduled for 11.30am-12.30pm 1.30pm-2.30pm, 3.00pm-4.00pm, and 4.30pm-5.30pm.

The second event will take place in Kolhapur at Shri Mahalaxmi Auto Components, on September 24-25.


**Haas ST-10Y: One of the machines to be demonstrated at the event**

Opening times are also 10 am to 6 pm and the Haas machines being demonstrated will include the hugely successful Haas DT-1 Drill Tap machine. The Kolhapur Demo Day will have the same format as the Ludhiana event, with demo tours held by Haas experts at 11.30am-12.30pm, 1.30pm-2.30pm, 3.00pm-4.00pm, and 4.30pm-5.30pm.

# Moselle Development invites India to participate in EITS 2014

Moselle Development, the economic development agency of the General Council of Moselle has invited Indian companies to participate in EITS 2014. "Euro India Technology Sourcing (EITS) is a business meeting aiming to establish new contacts between companies from India and Europe interested to develop and boost strong trade relations in the field of materials, processes and energies. EITS is a part of the public strategy for the development of a European Materials and Energy Valley in Eastern France, said Thierry Petry, Director for India, Moselle Development during an interactive meeting on "Doing Business with Europe" jointly organised by MVIRDC World Trade Centre and All India Association of Industries. EITS 2014 is scheduled from December 9-10 and it expects participation from 300 companies from India and Europe.

# AMTEX 2014 organised successfully

The 9th edition of Amtex was organised successfully in New Delhi recently. It was inaugurated by Kalraj Mishra, Minister for Micro, Small and Medium Enterprises, Government of India. Mishra described it as a hub of advancement in industrial management activity in the continent with machine tools as focus. "Our Government is committed to overcome all types of challenges by promoting Industrial technologies and improving productivity both qualitatively and quantitatively," he further said. Since its inception in 2001, Amtex has grown phenomenally to become one of the largest shows in Machine Tools, Machineries and Manufacturing Technologies in India. The 2014 edition


witnessed over 500 exhibitors providing a superlative stage for lively interaction between manufacturers, suppliers and users.

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# Pragmatic and growth oriented

From a macroeconomic perspective, the Budget emphasises the need for fiscal prudence which clearly is the need of the hour.

**By Dr. Baba Kalyani**

We had moderate expectations from this Budget and I am happy that these have largely been met. Given the constraints of time and the severe economic challenges before the country on both the internal and external fronts, the Finance Minister, Arun Jaitley must be commended for his pragmatic proposals which are aimed at reigniting growth and reviving the economy. Clearly the Budget carries a distinct imprint of the priorities spelt out by the Prime Minister in the past 6 to 8 months.

From a macroeconomic perspective, the Budget emphasises the need for fiscal prudence which clearly is the need of the hour. What is particularly noteworthy is the emphasis on the manufacturing and infrastructure sectors as the key levers to revive economic growth. This is perhaps one of the few times that the manufacturing sector has received special attention. The government's commitment for early introduction of GST and a new DTC are positive signals. The proposed overhaul of the subsidy regime to make food and fuel subsidies better targeted is also encouraging.

From a policy perspective, the decision to raise FDI in the Defence sector from 26 per cent to 49 per cent through the FIPB route with management control in Indian hands will provide a boost to domestic manufacturing industry. The FM's statement of wanting to reduce reliance on imports coupled with his intent to streamline defence procurement systems is very positive. We are confident that Indian manufacturing industry would now be able to play a more effective role in indigenisation in this critical sector of the economy.

The emphasis on infrastructure through increased allocations for roads, national highways and expressways, ports, airports, power, new & renewable energy, industrial corridors, smart cities etc are measures that will spur the economy,

We also welcome the government's commitment to take effective steps to operationalise SEZs as a means to revive investor interest and use unutilised lands for productive purposes. Industry is keen to understand what these measures are. Expectations were that Minimum Alternate Tax and Dividend Distribution Tax introduced in 2011 on SEZ developers and units would be entirely withdrawn. We hope suitable instructions in this regard will follow.

> "This being the first Budget of the new government, we believe it is a good beginning. The key lies in efficient implementation of the various proposals through quick decision making across bureaucratic levels."

As regards the automotive industry, government announced a month before its decision to extend the excise duty concessions provided in the Interim Budget till December 31, 2014. We hope that this together with initiatives contained in this Budget for the infrastructure and manufacturing sectors will help revive demand for all categories of vehicles in the country. This would in turn benefit the domestic automotive component manufacturing industry.

Another notable announcement made by the FM was with regard to measures proposed to be taken for faster clearance of imported cargo at our ports.

The Economic Survey released recently has projected GDP growth to range between 5.4 percent to 5.9 percent in this fiscal. Measures announced in the Budget should facilitate the economy to achieve the higher end of this target. As the FM observed, green shoots of growth are increasingly evident in the global economy and should these take firm root in the next few months, our economy could do even better.

This being the first Budget of the new government, we believe it is a good beginning. The key lies in efficient implementation of the various proposals through quick decision making across bureaucratic levels. We are confident that the government will place considerable emphasis in bringing back the growth momentum in the economy which is clearly possible if the directions contained in the Budget proposals are well implemented.


*The author is Chairman & MD, Bharat Forge Ltd*

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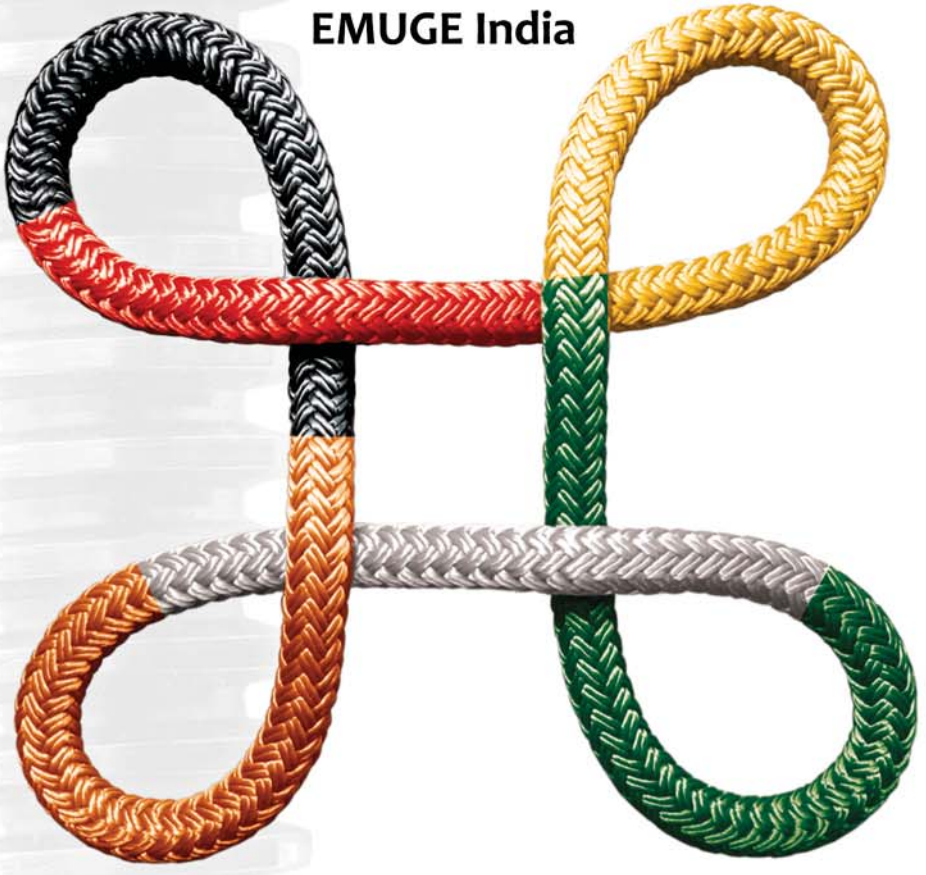

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# Impact on manufacturing

In case of the manufacturing sector, the budget came across more as a statement of intentions than concrete actions. Overall, it appears that the government is still making up its mind on major policy decisions, and to that extent this budget looks like an interim measure. Having said that, there are many decisions related to issues of mining and environmental clearances, which are not necessarily related to the budget, that can be addressed later, thereby resolving a few issues impacting the industry over a period of time. The increased infrastructure thrust should help propel demand, and benefit the closely related manufacturing sectors like metals and cement. FDI in the defence sector will be a positive step as this can help India to move up a notch or two in terms of high-tech manufacturing.

**KPMG (in India)**

There was focus on bringing growth back, reduce inflation and maintain fiscal deficit targeted. The right things have been said and we need to see a consistent approach over the next few years to achieve the targets. The increase in FDI limits, defence expenditure and allocation of funds for smart cities is commendable. What came as a surprise is the Rs400 crore allocation for 1 lakh solar pumping systems. This I hope is the beginning of this great initiative in demand side management.

**Ranganath NK,** ***Managing Director, Grundfos Pumps India Pvt Ltd***

"The thrust on setting up newer industrial clusters is a step in the right direction. The government has also promised to review all the retrospective tax imposition cases. This coupled with overall increase in investments in highways and tax holidays for power plants will definitely contribute in kick starting the capex cycle in various industries."

**Tushar Mehendale,** ***Managing Director, ElectroMech Material Handling Systems.***

"Smart city lies at the heart of the Union Budget of the new government. The allocations and the measures announced now gives shape to the Mr Narendra Modi's initial idea of 100 smart cities. The Government has made an allocation of Rs 7060 crore - an enabling factor that will boost the planning and development of the smart cities. And to complement it, the Government has incisively identified 7 corridors. Overall, these are very promising preamble to the realisation of the smart city concept. It now needs to be seen how the details are worked out by the Government."

**Anil Chaudhry,** ***Country President and Managing Director, Schneider Electric India***

"The current economic situation required a lot of focus on fiscal discipline and the budget points in the right direction by retaining the fiscal deficit target for 2014-15 at 4.1 per cent of GDP and aiming to reduce it further to three per cent by 2016-17. However specifics in terms of how these will be achieved have not been spelt out. The budget has stayed away from any new populist schemes that could further endanger the fiscal situation. This is the just first step in this government's five year program. What will really make a difference are the steps that follow the budget.

**Mathew Job,** ***Managing Director, Racold Thermo***

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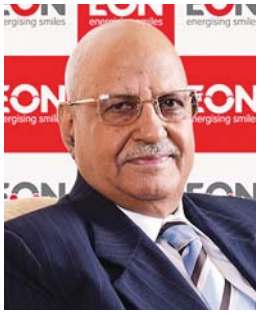
"The FM has emphasised on need to revive growth in the manufacturing sector and has announced various initiatives to encourage investment and employment. This time special effort is put on training, skill creation to ensure employability for the manufacturing sector. FM's proposal of investment allowance of 15 percent for 3 years to a company that invests more than Rs25 crore in any year in new plant and machinery will encourage new investment and help generate new employment opportunities."

**Achal Bakeri,** ***Chairman and Managing Director, Symphony Ltd***

Union Budget 2014-15 underlined its focus on providing good infrastructure and smart cities. We see this emphasis on the urban renewal of cities and towns as great opportunity to further develop our nation. To accommodate this massive urban migration the need of the hour in India is to plan and develop sustainable Smart Cities. While this rapid urban growth creates tremendous opportunities, it also puts extreme pressure on our resources. Collectively, cities need more space in order to accommodate the influx of people.

**Dr. Chandan Chowdhury,** ***Managing Director-India, Dassault Systemes***



"The Union Budget has introduced fiscal prudence and balanced it with growth triggers, revealing a strong intent on part of the Government to lead the country on a sustained growth path. Reducing fiscal deficit and controlling inflation were two measures which called for immediate attention to redress. This is exactly what the Government, which has only just come into power, has attempted to do in this Budget. For us, the modernization of the cities and the measures laid out for shaping the concept of smart cities is very good news.

**Ved Prakash Mahendru,** ***Chairman and MD, Eon Electric Limited***

For addressing low growth, the budget has focused on road, ports, housing projects and development of smart cities. To shield common man from high inflation, FM has ensured that disposable income in their hand increases, which will lead to spurt in overall demand and savings in the economy. Overall focus on infrastructure development and measures taken to restart stalled projects would ensure that demand is likely to be revived soon, which is positive news for cement sector as well.

**Alok Sanghi,** ***Director, Sanghi Industries***

Given the constraints of resources and time, the Budget presented by the Finance Minister is one of the most pragmatic in recent years. The commitment of the Finance Minister in introducing GST and DTC and other fiscal reforms is evident from his taking the ambitious benchmarks of Fiscal Deficit and Current Account Deficit for 2014-15 set by the UPA-II as challenges. The much needed emphasis on 'Ease of Doing Business' has been reflected in the Budget Speech.

Reforms promised in Advance Ruling, retrospective taxation rates and assurance of fiscal prudence, fiscal discipline as well as commitment for a stable and predictable tax regime will boost the confidence of foreign investors.

The emphasis on development of infrastructure – roads, railways, ports and power as well as increase in FDI limits from 26 per cent to 49 per cent in Defence and Insurance sectors will considerably catalyze economic growth.

**Sajjan Bhajanka,** ***President, Bharat Chamber of Commerce, Kolkata***

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Flexibility is important to address changing market conditions

# Achieving flexibility in manufacturing

Today 'differentiated planning' is a compelling approach that organisations are adopting, to maintain efficiencies as well as address changing market conditions.

**By Antony Prashant**

In manufacturing, supply chain planning has primarily been based on forecasts, commitments made by the sales team or growth targets. However, there may be significant difference in the demand pattern of each product category while the manufacturing processes / stages may be similar. For example, rainfall patterns, water table levels, soil conditions etc. determine the type of agro-chemical or pump to be produced. An extension of the summer season changes the demand pattern for certain consumer products such as air conditioners and fans. A sudden outbreak or increase in a certain disease in a particular geography impacts the demand pattern for pharmaceutical products. Competitor move or strategies also impact the demand or sales pattern. Given these situations, planning in the supply chain becomes a trigger based process reacting to market changes and organisations often tend to adopt a 'One size fits all' approach.

"The challenge is in identifying the point of differentiation based on the demand patterns within each stage of the supply chain.

This approach may impact organisations in terms of 1) not being able to meet customer schedules and therefore revenue / margin targets, 2) higher inventory levels (as the right products are not being produced) and 3) lower levels of plant utilisation. To put it plainly, while manufacturing capacity is available and inventory levels are high, organisations are still unable to deliver the right product to the customer on time.

In the drive to enhance efficiencies, organisations tend to reduce focus on flexibility. This has often led factories to schedule large batch runs (leading to blocked capacities) and hence delays in reacting to customer / demand changes. In other words, efficiency means longer batch runs in the shop-floor, lower number of product varieties and less disruption to production plans.

While efficiency is key, flexibility is


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**Supply chain should be configured at two levels: network and plant**

important to address changing market conditions which drive profitable growth. In view of this, organisations are looking at differentiated planning models across product categories rather than adopting the 'One size fits all' approach and move from a homogenous system to a heterogeneous system.

Today 'Differentiated planning' is a compelling approach that organisations are adopting, to maintain efficiencies as well as address changing market conditions. It is the ability to use multiple planning models given the behaviour of each product category in the supply chain. However, the challenge is in identifying the point of change / differentiation based on the demand patterns within each stage of the supply chain. To explain further, demand patterns at the market / customer level would show high levels of fluctuation, whereas when the numbers are consolidated at a regional level, the peaks and valleys reduce but still remain. Further consolidation at a zonal / national level would present a stable demand pattern that is controllable. In this scenario, products that have a low variability in demand and high volumes would follow a batch process in manufacturing with standard quantities planned for a period of time. But the same product may have a highly variable demand pattern in the market and, a replenishment based model (in warehouses closer to the point of sale) would be adopted with defined inventory levels to accommodate for fluctuations including the supply lead time.

Differentiated planning can also be configured within the four walls of a plant. For example, in pharmaceutical manufacturing, the same product would be packed in multiple pack sizes (10 units or 12 units in a strip) given the market requirements; therefore the plan for packing would be based on the customer demand as it is more susceptible to demand fluctuations. However, in the preceding processes the product (tablets) can be produced in defined batches / quantities which are a consolidation of many pack size variants, and this reduces the variability in demand for those processes. The same is applicable to automotive; the engine assembly would have a different planning approach (given similarities in the engine configuration across car models) whereas, the body shop would have another approach given the external design of the car.

Therefore, efficiency is the ability to protect the low variable high volume products and not allow the high variable low volume product to disrupt the flow. This can be addressed by having separate lines for the low variable high volume products and switch to a process layout for the high variable low volume products. This also addresses utilisation in multiple levels.

**Some standard approaches for differentiated planning**

| Variability in demand | Volumes | Strategy to be deployed |
|---|---|---|
| Low | High | Produce standard quantities for a defined period |
| High | Medium | Stock parts and assemble based on order |
| High | Low | Produce based on order |

Given the context discussed in the previous paragraphs, it is also evident that differentiated planning models would work better if the supply chain is configured at two levels: network and plant level

Network level includes: 1) Defining appropriate stock points for aggregation of demand, 2) ensuring appropriate plant to product allocations, and 3) exploring options for producing low variable high volume products in multiple plants to address market opportunity as well as lower the risk

Plant / shop-floor level includes: 1) Defining frozen schedules to avoid frequent changes in plan, 2) identifying stock points for consolidation, 3) lean operations to support the planning model, and 4) aligning procurement to the planning models rather than being forecast based to optimise inventory levels

While this differentiated method of planning has been adopted by various organisations in different forms right from automotive to consumer products; the focus has often been on efficiency rather than flexibility. Differentiated planning is the ability to arrive at patterns of demand in the various stages of the supply chain and aligning the planning process to these patterns which is key to achieve desired results. There is no pre-condition to this approach and is irrespective of the size of the organisation. It also does not require any significant level of investments in term of people as well as an IT enablement.

> "Efficiency is the ability to protect the low variable high volume products and not allow the high variable low volume product to disrupt the flow.

*The author is Senior Manager, Deloitte Touche Tohmatsu India Pvt. Ltd.*

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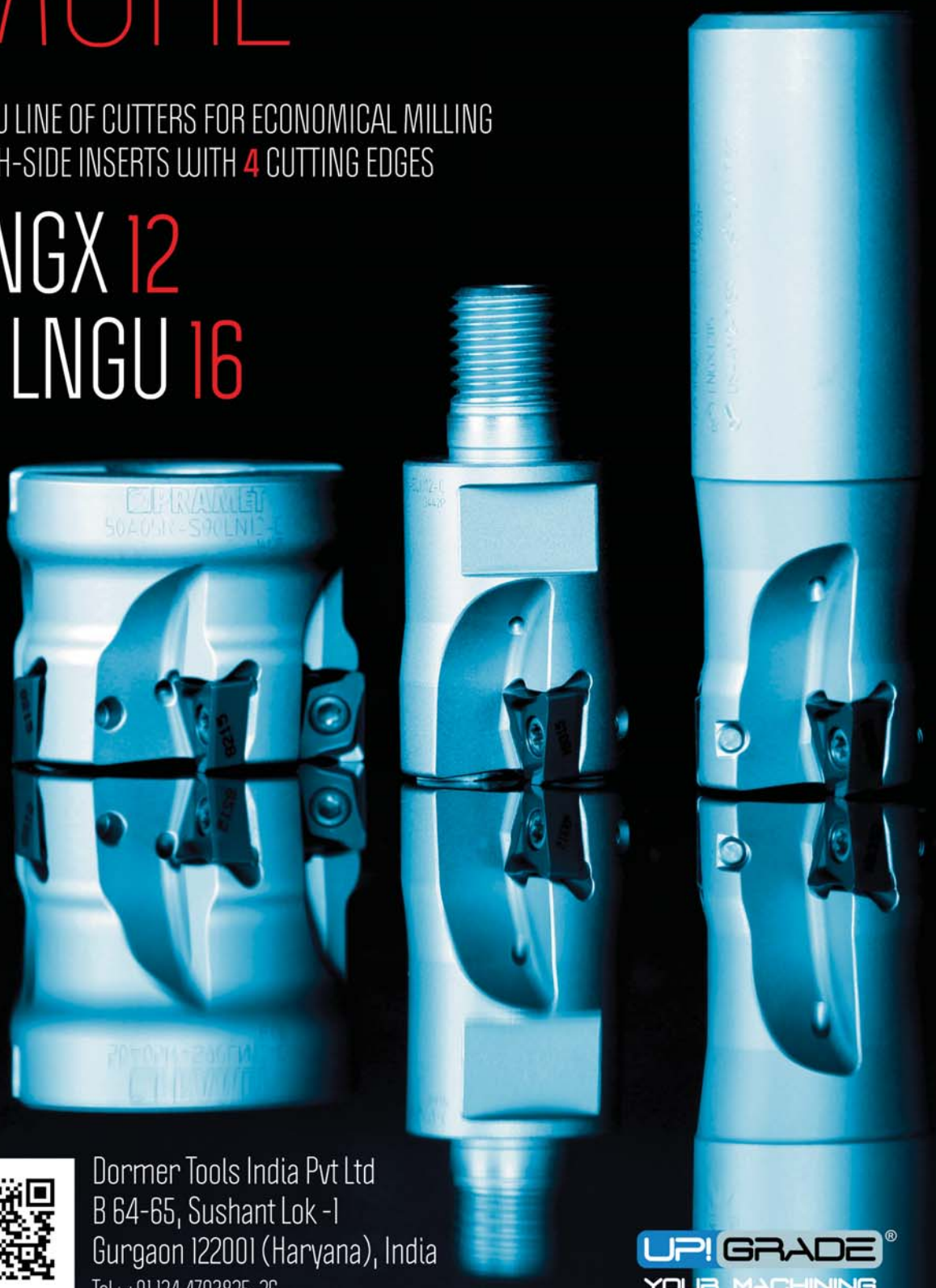

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# Harnessing the Power of the Sun

Within just a year of the Aditya Birla Group's Solar Power Business being set up, the team has executed two complex, large-scale solar projects in India. What gives the team such energy? The Sun, of course, says **Ravi Khanna**, CEO, Solar Business, Aditya Birla Group

The sun beams 35,000 times more energy towards our planet than what we currently produce and consume. Some part of this energy — better known as solar radiation — is reflected back into space, but a lot of it is absorbed by the atmosphere and other elements surrounding the inner atmosphere. This energy can be easily harnessed to produce electricity power. It is a resource that will not be depleted even after thousands of years.

In contrast, fossil fuel depletion is a global challenge, as these are non-renewable sources of energy. Worse, carbon dioxide emissions by the extensive use of fossil fuel lead to global warming, which can have a disastrous impact on our planet. India – an emerging economy – faces power shortage, but interestingly, the country has an abundance of renewable natural resources such as wind and the sun.

> "The Aditya Birla Group is moving towards energy sustainability in a focused manner; all our actions are guided by whether we are depleting our resources or using them responsibly and how we can find new ways to reduce emissions."
>
> **Ravi Khanna,**
> CEO, Solar Business, Aditya Birla Group

The Aditya Birla Group is moving towards energy sustainability in a focused manner; all our actions are guided by whether we are depleting our resources or using them responsibly and how we can find new ways to reduce emissions. The Group, for instance, is a world leader in the recycling of aluminium cans. Sustainability makes sound business sense. Moreover, it is about doing the right thing for the future.

## Rise and shine

Setting up the Solar Power Business was the first step by the Group in addressing energy sustainability. Renewable energy, especially solar energy was identified as a sunrise business opportunity by the Aditya Birla Group in early 2011, when the Solar Power Business team was formed. The team first evaluated the complete value chain of solar projects in the country, short-listing areas that matched the Group's interests.

The team's first project was the installation of a 5MWp solar power plant at Vituza village in Rajasthan, India. This project came with an exceedingly tight timeline due to tariff applicability restrictions. Analysing the opportunity and its associated risks, and knowing that this kind of tariff opportunity wouldn't repeat

Vituza solar power plant in Rajasthan, India

itself, the team took the project on, undaunted by the tight deadlines or even the fact that this was their first project.

When the team began work at the site in the third week of May, it was not the best time to be in Rajasthan. The harsh summer months made it nearly impossible to work long hours during the day, but the team had no options. The nights offered scant respite as the sunburnt, sleep-deprived team worked under floodlights to complete the project in time.

## Levelling up

The first challenge was the uneven terrain, spread over 26 acres, with sand dunes as high as 50 feet. Flattening it meant moving 3.5 lakh cubic metres of sand. Forty tractors worked simultaneously all day on-site, with a brief reprieve between 11am and 4pm, to lay the foundation for the module mounting structures. Multiple teams worked to average a run-rate of 150 foundations a day. It took them almost a month to complete 3,000 foundations.

## Raring to go

The team realised quite early that it could not depend solely on the engineering, procurement and construction (EPC) contractor. Team members monitored all aspects of the project and were present at the site to supervise quality. Come August, and the team was raring to install the modules, but there was no respite from the unusually heavy rains. The road from Jodhpur to Vituza was cut off by floods; the detour doubled the travel time from Jodhpur, just when the bulk of the supplies had to reach the site.

The next step was the mechanical assembly of the modules and the electrical connection. When the EPC contractor was not able to ramp up mechanical installation, the team arranged for sub-contractors to avoid any work delay. This move paid rich dividends as they began clocking 2,500-2,800 modules per day instead of the average daily run-rate of 150-200.

In the meantime, the switchyard work and the 11km, 33kV grid from the switchyard to the nearest 132 kV substation work was completed. As per plan, one transformer was synchronised with the grid on October 14. Starting from zero date on May 23, the project was grid-connected on October 14, thus meeting connectivity and capacity installation deadlines, and achieving savings against the budgeted capex.

Initial estimates revealed that the team had exceeded expected projected returns. The remaining transformers were synchronised over the next fortnight. The plant, running successfully ever since commissioning, has performed beyond expectations. Estimated to generate 21,235kWh daily, the plant has been delivering a higher performance of 23,500kWh/day consistently ever since stabilisation.

## No time to rest

With this experience under its belt, the team lost no time in executing a 15MWp project – three times bigger than the debut project, and to be completed in half the time – in Gujarat. The project was in the Solar Park at Charnka, Patan district, approximately 230km from Ahmedabad. The land was waterlogged and muddy until early October because of the heavy rains.

Fortunately, it was relatively flat and did not need much levelling or grading. However, soil characteristics varied from location to location, sometimes within a few metres. Besides, 15,864 pile foundations had to be made for module structure mounting, along with the construction of 14 inverter rooms, a control room and a 66kV switchyard.

The first foundation was dug on 14 November, 2011, and

"Improving energy efficiency should be a national priority. Generating power responsibly is critical for the future of generations to come. We at Aditya Birla are taking a balanced approach where we are not only looking at increasing the share of non fossil fuel power but are also looking to deliver decentralised form of power to the areas of country where it is needed the most. We are helping fight climate change by bringing in efficient renewable resources while reducing the overall energy consumption. This is one opportunity that we simply cannot afford to waste."

**Dev Bhattacharya,**

Group Executive President - Corporate Strategy and Business Development, Business Head - Solar Power Business, Aditya Birla Group

- Vituza has roughly 5.50 peak sun hours per day. Though sunlight is available for more than 11-12 hours, intensity varies through the day.
- The integrated intensity during the day on a base of 1,000W/m2 is termed 'peak sun hours'.
- The solar plant loses energy due to temperature, electrical resistance, inverters, transformers, dust and manufacturing variability. On an average, 25 percent of energy is lost. Only 75 percent eventually makes its way to the tariff meter.
- A 5MWp plant in Rajasthan gives an output of approximately 7.75 million units (kWh) of green electricity per annum. It mitigates 6,355 tonnes of carbon dioxide in a year and 158,875 tonnes in its lifetime.
- The life of a solar plant is 25 years, with 'life' defined as the time by which the output of the plant drops to 80 percent.

the plant needed to be commissioned by January 28, 2012. Multiple contractors were engaged for each job and separate areas earmarked for them. Part of the work was not contracted out, but given to the contractor who finished his work first.

Training and retraining labour on a continual basis was a major task. Moreover, the government had allotted three pieces of land: two adjoining pieces, with a passage for villagers, and a bigger piece across the road. All three land parcels had different characteristics, and multiple foundation designs had to be employed.

Work in the first parcel went off smoothly; on an average, piling work could be ramped up to 400 foundations per day. But bores collapsed soon after drilling in the second and third parcels, affecting the pace of civil work. However, all the foundations were completed by January 2.

On-time delivery of materials at site was the next biggest challenge. Many of the imported components had to be airlifted. Work proceeded smoothly and team members, vendors, EPC contractors and Spanish engineers worked tirelessly through Christmas and New Year holidays to meet the deadline.

## Excellence in execution

Execution of a 15MWp plant in less than three months exemplifies the combined designing, planning, and execution expertise of the team. The numbers are astounding: it required 15,864 pile foundations for the installation of 63,456 235Wp modules. The mounting structure has provision for a seasonal tilt to capture maximum radiation and maximise generation.

Twenty-eight central inverters of 500kW each are housed in 14 inverter rooms feeding power to a 1,250kVA transformer. There are 14 1,250kVA transformers connected in a ring, stepping up voltage from 400V to 11kV.

Finally, the combined output of all the transformers is stepped up by the main transformer to 66kV level for feeding to the grid through a 66kV switchyard. In order to track procurement and contracting progress, a model mapped the entire procurement process from floating inquiry to delivery at site with weightages as per importance.

All items and contracts were available on a single sheet, and a single scorecard provided daily progress. Visits to vendors' facility for inspection, advance arrangements for unloading the trucks at site, and distributing materials as they were unloaded, helped to cut down time. The Solar Power Business core team and the EPC contractor had daily conference calls to raise red flags and prioritise actions. Ninety per cent of the work was completed by January 24. Because of the January 28, 2012 deadline, everyone, including government officials, worked on 26 January, a Republic Day. All the statutory inspections were carried out in the last two days, and after receiving the clearances, the plant was synchronised on January 27, 2012 a day before the deadline.

## More power to solar power

The plant location has a Global Horizontal Irradiance of 5.305kWh/m2/day, and is expected to generate 23.25 million kWh of electricity annually. This will mitigate 18,600 tonnes of carbon dioxide emission every year. At 600kWh per capita power consumption in India, it can supply power to 38,750 persons or about 9,500 families. In fact, both the solar projects in Rajasthan and Gujarat, are top ranking in terms of output. The team is sanguine about carrying this momentum forward and is developing a reasonably sized portfolio of solar power plants in the years to come. Since the commissioning of above mentioned two projects team has commissioned three more new plants of 40 MW capacity in FY 13-14 in the States of Rajasthan and Telangana. This includes a 22 MW Bhadla, Rajasthan project which by far is the Aditya Birla Group's Solar Business' biggest solar project.

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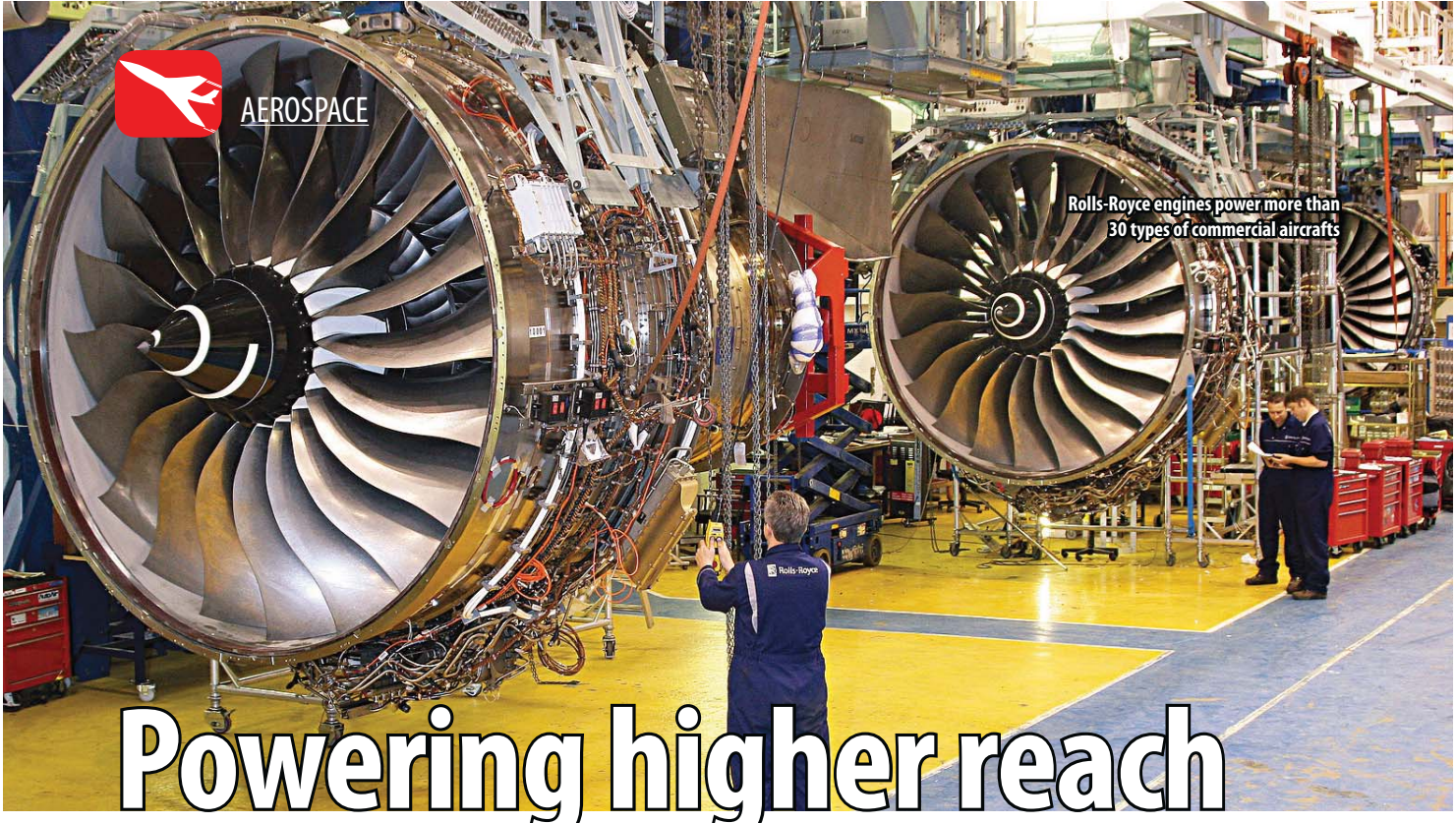


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# Powering higher reach

We continuously pursue innovation that will improve the performance of our power systems and benefit our customers, says **Kishore Jayaraman**, President, Rolls-Royce India and South Asia

FDI is just one piece, we will continue to invest in India and contribute to realising the country's efforts to indigenise defence production and reach strategic self-reliance.

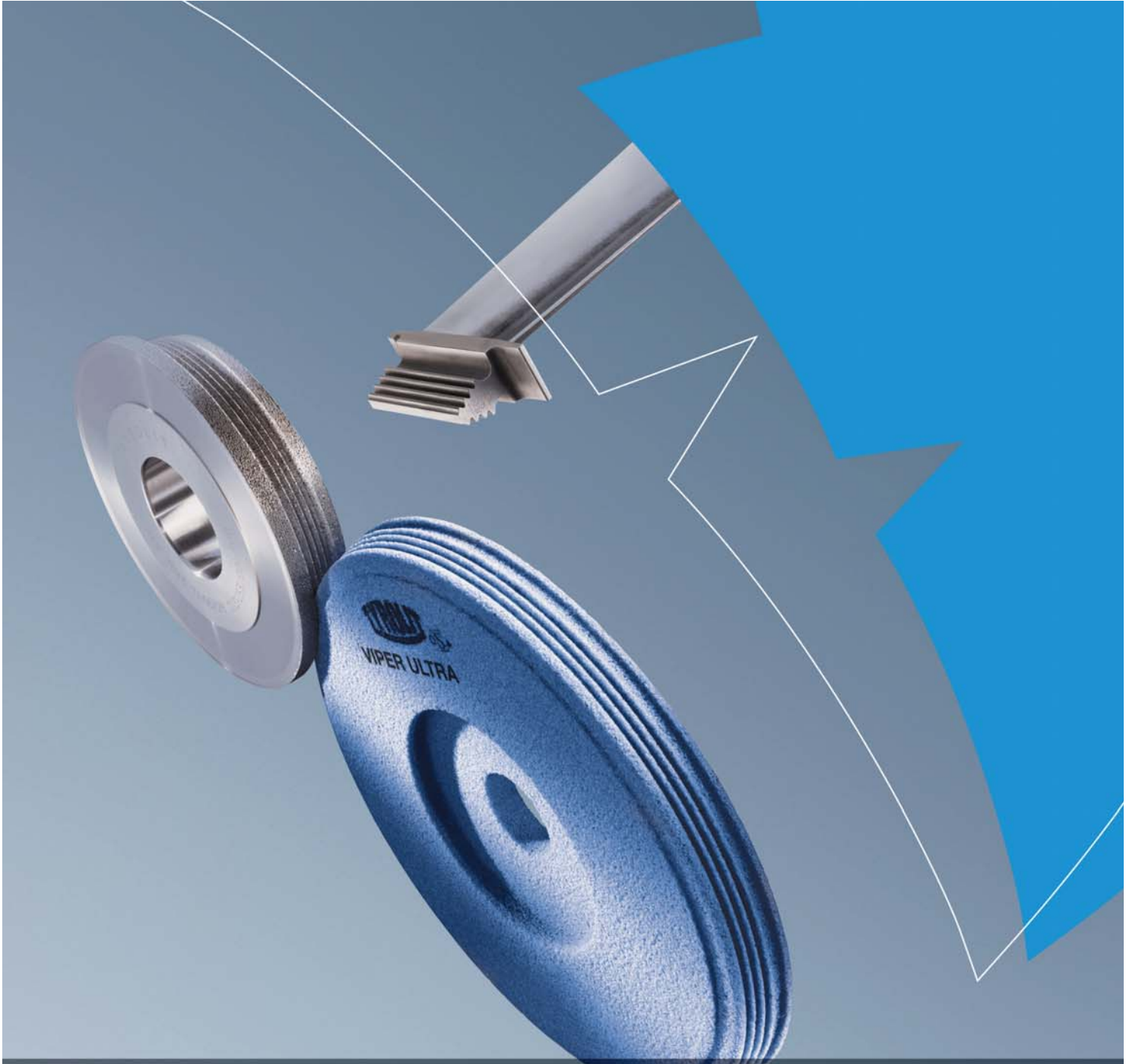
By Niranjan Mudholkar

**Q You have been planning to expand the operations of the International Aerospace Manufacturing Pvt Ltd (IAMPL), Rolls-Royce's joint venture Hindustan Aeronautics Ltd. How and when is it happening?**

The International Aerospace Manufacturing Pvt. Ltd (IAMPL) became operational in 2013. We have now successfully started production and will reach full capacity by the end of 2014. Built with an investment of US$25 million, this facility is spread across 7,200 sq m in Bangalore. IAMPL manufactures compressor shrouds and cones for Rolls-Royce gas turbines for new production and the aftermarket. Currently IAMPL ships more than 130 different engine compressor parts to Rolls-Royce aero engines facilities. This new facility represents another commitment to the long-standing partnership with HAL and the future of Indian aerospace industry. This means that the journey has begun and the destination is dependent on future growth and market potential.

**Q HAL and National Aeronautics Ltd are jointly planning to develop a new regional airliner. You have been exploring the possibility of providing engines to this project. Any progress on this front? If this goes ahead, then what options will you offer?**

At this point, it is too early to talk about RTA. As and when such opportunities do arise Rolls-Royce will be prepared as we have the relevant technologies and products to support the growth of the Indian aviation market. Globally, our civil aerospace segment is a major manufacturer of aero engines for the airliner and corporate jet markets. Rolls-Royce engines power more than 30 types of commercial aircrafts and has almost 13,000 engines in service around the world.

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**What is your reaction to the budget announcements? How do you see the opening up of the defence sector contributing to this industry's growth?**

The Union Budget 2014 was a realistic budget with long term view which affirms the vision of the government to bring about an all-round development in the country, with emphasis on manufacturing, job creation, and skill development. From an industry point of view, we welcome the move to increase the FDI in defence. We are confident that such timely measures will allow the sector to brave the slow economic growth and a host of other factors to ensure longer terms sustainable growth.

> The winning solution from the Open Innovation Programme will get the opportunity of integrating into Rolls-Royce global operations through a collaborative relationship with the company.

**Do you see Rolls-Royce playing a bigger role in the above context?**

Rolls-Royce has been a partner in India's defence modernisation needs for the past eight decades. FDI is just one piece, we will continue to invest in India and contribute to realising the country's efforts to indigenise defence production and reach strategic self-reliance.

At Roll-Royce, we remain committed towards the indigenisation of the Indian defence industry by exploring strong partnerships who share similar synergies with us. We are already working with many partners in India which we are proud of – TCS/ Quest, HAL, etc. With a higher FDI limit, there will be opportunities to further contribute in the development and modernisation of India's defence sector by offering world-class innovative products and services. This initiative to boost FDI in the sector will be marked as an example of the new government's commitment to implement important reforms at a quicker pace.

**Rolls-Royce currently operates two engineering centers in Bangalore along with Quest and TCS, which were established in 2005 and 2010, respectively. How are you leveraging on these two?**

Globally, Rolls-Royce has an engineering resource of over 16,000 engineers. In Bangalore, through our relationship with QuEST and TCS — who supply us with contract R&D services, we employ over 1,000 engineers. This is the largest population of Rolls-Royce engineers outside the UK and they provide high quality engineering solutions and services across the entire product development life-cycle.

**Rolls Royce has been running the India Open Innovation programme (IOiN-RR) designed to identify SME organisations to buy or license technologies or techniques that are new and are outside their traditional areas of operation and potentially beneficial. What's the progress on this front?**

Globally, Rolls-Royce is committed to innovation. In 2013 alone, Rolls-Royce invested £1,118 in R&D. We continuously pursue innovation that will improve the performance of our power systems and benefit our customers.

We believe that India is home to some of the most innovative small and medium sized companies. Being a key entrepreneurial nation, the Open Innovation Programme, was launched in India last year in July. Earlier in 2012, Rolls-Royce had undertaken a similar programme in Japan. Being the pilot programme, we received a tremendous response from several companies in India. We received some game changing ideas from Indian companies for the challenges shared by us. This unique programme by Rolls-Royce has provided Indian participants the opportunity to leverage their technology globally. The winning solution will get the opportunity of integrating into Rolls-Royce global operations through a collaborative relationship with the company. We were looking for two-three game-changing ideas and we got those. Rolls-Royce is planning to come back again in autumn with new set of challenges for India Open Innovation programme.

> "Rolls-Royce is planning to come back again in autumn with new set of challenges for India Open Innovation programme."

Globally, Rolls-Royce has an engineering resource of over 16,000 engineers

**How do you see India's defence manufacturing sector growing in the next five?**

India's defence industry, which has grown substantially in recent years, seems headed for even better days. Growth in domestic demand should continue to be robust, the government has a clear vision for an indigenous defence industry and there is tremendous export potential in engineering services and component sourcing. India is in a position to build a vibrant local defence industry ecosystem that could support both domestic and export demand.

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Titan's Aerospace journey started in 2005 with an investment of over Rs 45 crore in a green field facility in Bommasandra, near Electronic city, Bangalore.

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Apart from the machining facility, PECSA has state of the art inspection facility including CMMs, VMM, ULM, Form & Contour testers, various special measuring equipments and instruments, XRF equipment and special cleaning facility. Titan also has a NADCAP approved NDT facility for MPI and FPI along with Ultrasonic Patch testing with In-house ASNT and NAS 410 Level III. Titan has strong vendor base for special processes like, Anodizing, Passivation, Chemical conversion Coating, Powder coating, Nickel plating, Brazing, Xylan and HVOF coating.

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# Scaling greater heights

## Electro chemical machining technology is opening up new opportunities in aero engine manufacturing.

In only a few other branches of industry are development pressures as enormous as in aircraft construction. One of the reasons is the fact that legislation is getting ever stricter about the CO2 emission of aircrafts at the same time as market expectations are of a rapidly accelerating growth in the sector. It is as a consequence of this development that aero engines are becoming a focal point. They need to show a reduction in fuel consumption, whilst – at the same time – ensuring greater propulsion values.

It is obvious that such a development has a massive effect on the components used in the engines. They are made of extreme materials that have to withstand high stresses. The question is: how can one machine these materials with speed, precision and process integrity? The Emag experts have a highly effective answer to this question: the ECM (Electro Chemical Machining) technology. Cutting processes often lose out in the decision making. The ECM machines from Emag open up new opportunities in aero engine manufacturing.

There is one important correlation to be found in the manufacture of aero engines: the higher the temperatures generated by the engine, the more efficient it is. The aircraft will consume less fuel over the same distance and increase its flying range. It is easy to imagine what this means for the materials used in the bowels of an aero engine. The higher temperatures irrevocably lead to the use of extremely hardwearing materials that perform better under stress. But that is only 'half of the truth' as, at the same time, many components are becoming more complex and still have to be machined at the highest precision. It is the only way to achieve the targets set over a decade ago by the aero engine sector, namely a 20 percent reduction in both CO2 emission and fuel consumption.

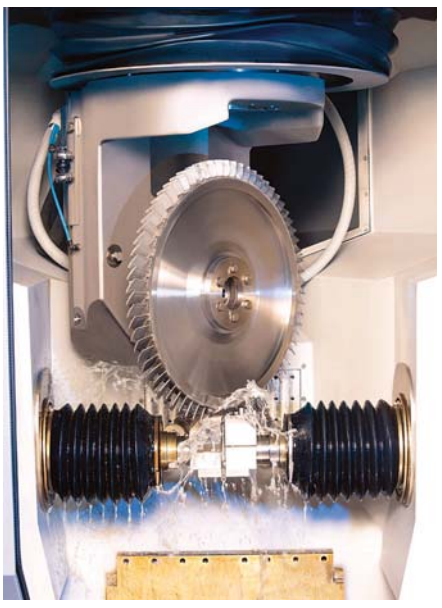
### An exceptional option

Of course, this is not an unfamiliar development (growing environmental and efficiency requirements), as the automotive sector provides another example. However, in aircraft manufacture it has more extreme consequences. And the industry has arrived at a crossroads.


**Blisk machining on an Emag PO 900 BF**

"The electro-chemical process ensures a particularly soft removal of the material. The workpiece acts as positive anode and the tool as negative cathode."

Experts estimate that over the next two decades air traffic will increase by five percent per annum. The prediction voiced by Airbus is that there will be a demand for 7,600 new engines every ten years. Although this offers great opportunities, it is certain that to conquer new markets the aero engine manufacturers will have to come up with constantly greater improvements. New aero engines are becoming top of the agenda.



**Machining area of an Emag PO 900 BF for the machining of blisks using PECM (Precise Electro-Chemical Machining) technology**

What are the manufacturing solutions that ensure the new high-performance engine components can be produced efficiently? ECM und PECM technology (Precise Electro Chemical Machining) from Emag is an exceptional option, even though many developers and design engineers have not yet recognised the fact. This process comes into its own where complex components are to be produced in demanding materials, as it machines high-tensile alloys and similar materials with a minimum of tool wear. The surfaces are of outstanding qual-

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ity – with no burrs and no changes in the microstructure of the material. In contrast, using cutting processes could lead to a number of problems. The temperatures generated by traditional machining methods often have a negative effect on the microstructure of the material. Tool life in the machining of high-tensile materials is short. And the high infeed rates required to make the machining process economically viable, make the machining of filigree geometries difficult. It should therefore not come as a surprise that the demand for ECM is increasing in aero engine manufacture. Since Emag entered into this technology in 2009, a number of its machines have been delivered to the supply chain for aero engine manufacturers, where they are used to machine central components, such as blisks, disks and individual blades in nickel alloys at speed and with great precision.

**Emag ECM machine for the multi-station machining of turbine disks**

### Selective process

The electro-chemical process ensures a particularly soft removal of the material. The workpiece acts as positive anode and the tool as negative cathode. Between the two flows an electrolyte solution that dissolves metal ions on the workpiece. The contour of the cathode and the workpiece with their active, current-conducting sectors, are matched, to ensure that the material removal on the workpiece leads to the desired contour of the component.

Contours, channels, grooves and cavities are generated without touching the component – and at the highest possible precision. And tool wear is minimal. With PECM, Emag has developed the ECM technology further. The gap, through which the electrolyte solution flows, is particularly narrow; and the flow is optimised by a mechanical oscillation. This guarantees a particularly effective and precise removal of the material. The possibilities this technology opens up are best shown by the example of blisk productions.

For the machining of turbine blade disks the specialists from Emag have developed an ECM system equipped with 11 machining stations that carry out drilling, contouring, radius machining and polishing operations in one machine. The high-tensile Inconel material is machined at a feedrate of 5 mm per minute, without burrs or negative thermal effects. The tolerances achieved are between 0.1 and 0.3 mm. The life expectancy of ECM tools is very high, making sure that the tooling costs in production are much lower than those using cutting tools for the process.

> "The high-tensile Inconel material is machined at a feedrate of 5 mm per minute, without burrs or negative thermal effects."

### Establishing feasibility in the lab

The experts at Emag ECM see themselves as their customers' partners in development. The centre of activities is an on-site laboratory, which offers the possibility to carry out feasibility studies and preliminary investigations on single- and multi-axes machines. In addition, the laboratory also offers comprehensive measuring systems (roughness, contour, coordinates).

The laboratory not only establishes the feasibility of a project, but also the cost-benefit ratio of the process with a view to the specific component and the material it is made of. This way, the customer will find out what component tolerances and cycle times he can expect to achieve.

### In cooperation with RWTH Aachen

That the technological demands of the experts at Emag ECM are far-reaching is shown by the fact that they work in close cooperation with the machine tool laboratory at the RWTH (Rhenish-Westfalian Technical College) Aachen. It is here that experimental analyses for the electro-chemical machining of materials establish the feasibility of the process and where improved cathode designs are simulated. The comprehensive objective is integrated optimisation. The process is constantly developed further with a view to the incorporation of new materials and changing component geometries.

Large batch sizes, hardest possible materials, precision results without negative effect on the material, perfect surfaces – this is the background against which the outstanding market opportunities for the machine builder and their technology in aero engine manufacturing are generated. The company offers a modular machine concept that can be quickly tailored to suit individual component requirements.

The customer also benefits from the generally high degree of Emag expertise in the development and manufacture of machine tools. Pivotal innovations, such as Mineralit machine base, intelligent soft- and hardware interfaces and effective automation solutions are part of the company's developments. It ensures that Emag ECM can create tailor-made (P) ECM turnkey solutions. In fact, the machine builders at Gaildorf are convinced that their technology will prove indispensable for many future innovations in aero engine manufacturing. The clamour for the ECM process has begun.

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# Cut the Tough Stuff

Correct work flow and processing techniques are paramount and part of an overall system for hard metal machining. Here machinist Tripp Cook from Machine Specialties, Inc. monitors the finishing operations performed on a Ti 10-2-3 workpiece.

## Difficult-to-machine workpieces have forced an even greater design discipline on machine builders and associated suppliers.

**By Scott Walker**

Unlike the 'Sorting Hat' in the popular Harry Potter book series by JK Rowling that made decisions quickly and intuitively, sorting out the best ways to cut tough materials has taken a few years of chips soaring, spindles smoking, tools exploding, and brains frying. While that sounds like a spell gone wrong, that's the kind of magic we conjure in the metalworking industry.

Aerospace OEMs and their parts suppliers have been grappling with the influx of hard, difficult-to-machine materials, such as titanium 5553 and tough stainless steel grades. These materials have grown quickly in application because they are strong, flexible, light in weight, corrosion-resistant, and can take the heat. These characteristics are carrying over into the jet engines where the rotating parts can run hotter and be made smaller, and into such skeletal parts as struts, floor ribs, window frames, door hinges and engine mounts to enhance structural integrity. Thanks to these challenging materials, all of these new components ultimately assemble into aircraft that require lower fuel costs to fly. The newer generation materials make up 15 percent of the weight of the latest jet fleets, such as the Boeing 787 Dreamliner. In each airplane there will

### About the author

Scott Walker is the President, Mitsui Seiki USA, Inc. and has 35 years of experience in machine tool design, engineering, technical sales, and marketing. He started with Mitsui Seiki in 1991 following various manufacturing management positions at Okuma Corporation and Pratt & Whitney Machine Tools. Walker holds an MBA from Rensselaer Polytechnic Institute and a BS in mechanical and aeronautical engineering from Wentworth Institute/ Massachusetts Institute of Technology.

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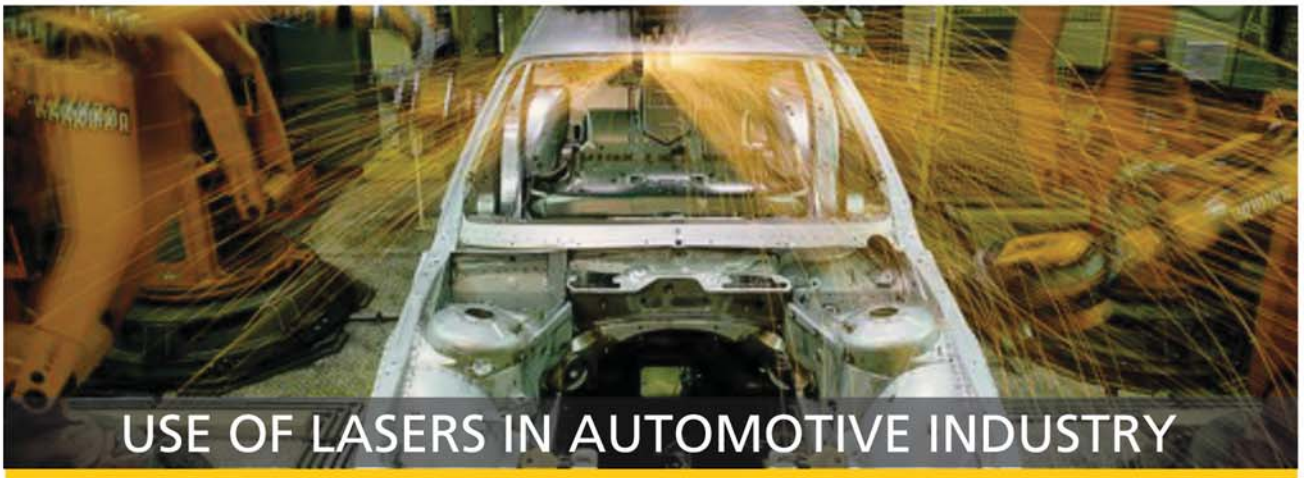

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**These latest generation hard metal machining systems, which also include the latest tool/spindle interfaces, can handle up to 35,000 inch-pounds of tool taper moment loads to accommodate long tools cutting highly resilient materials.**

be about 21,000 pounds of these heavy metal parts that will be machined out of 240,000 pounds of raw stock. The volume of titanium used in aircraft in 2012 was projected to be at 100 million lbs. (45,359 tonnes). Remarkably, this represents only 35 percent of total titanium consumption.

Our crystal ball shows the flurry of activity for new aircraft orders will continue for the next five years. However, even when the economic boom in the commercial aerospace sector was just a hint on the horizon, forward-looking manufacturers began seeking out the best methods for machining these demanding parts.

Our company was fortunate to be involved right at the start, with Boeing's research engineers, to develop machine tool technology designed specifically to cut these hard materials. We published and presented this research as the data unfolded, and it's time for an update. Manufacturers and technology providers have learned more about the nature of the materials and what is required to turn them into parts, profitably. Further, advancements in cutting tool technology in particular have caught up with the machine tool designs, providing users with a complete, viable system that is working successfully in factories around the world.

The crux of the matter for optimum hard metal part production lies in the ability of the system to perform low frequency machining without chatter, hold tools tightly with heavy-duty tool tapers, increase machine stiffness construction, and deliver the power necessary.

**Turn the frequency dial down**

Machining moderately complex titanium parts up to one meter in length, which include three, four and five axes simultaneous machining, requires machine tools with the proper structural design to machine at low amplitude ranges in less than 350 Hz (especially at the 20, 90, and 320 Hz ranges). In hard metal machining, all of the materials in the machine tool structure must stay within a specific range of stiffness and resiliency so that when cutting, the spring memory of the machine is very repeatable. This repeatability is paramount for tightly controlling the cutting edge as the tools pass through the materials. A one-inch diameter, four-flute end mill, for example would be run at about 90 RPM. Each time a cutting edge engages with the material, it sends a shock wave into the machine. As each cutting edge 'hits' the metal in a consistent, repetitive sequence it creates a low frequency wave into the machine.

One of the misconceptions about machining titanium and similar grade materials is that general purpose machines can handle these parts just fine. The truth is, that class of machines, while ideal for many applications in a shop, have a tendency to chatter at low frequencies. This negatively affects both the quality of the part and tool life. Tooling costs can be astronomical. A machine that is designed specifically for low frequency machining dramatically reduces chatter at the necessary low RPMs that the cutting tools must run to cut these materials. Logic follows that eliminating chatter significantly increases tool life and cost savings.

Titanium 5553 is a material that exhibits superior linear-elastic behaviour. However, when machining these types of materials this behaviour dramatically increases cutting forces, and generates tremendous heat directly at the cutting edge shear location. In aerospace components, tool lengths are long, axial cuts are deeper, and many application engineering hours are dedicated to process development. Material-specific machine tools allow engineers a wider range of process opportunities in the specific cutting ranges needed. This dramatically contributes to longer tool life, chatter control, part finish quality, and predictable process control for FMS operations. Mitsui Seiki has application specific machines that have structural modifications to reduce the amplitudes of the excitation frequencies in the low frequency ranges. We have paid attention to requirements for handling the low frequency stresses such as height to width ratios on columns and tables to accommodate high moment loads, and

"The crux of the matter for optimum hard metal part production lies in the ability of the system to perform low frequency machining without chatter, hold tools tightly with heavy-duty tool tapers, increase machine stiffness construction, and deliver the power necessary.

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**Mitsui Seiki's HU100-5XL is one of the company's models designed specifically with construction criteria necessary to produce hard metal parts.**

optimal ball screw locations for axes stability. Skilled craftsmen handscrape surfaces throughout to provide the high accuracy needed to make quality parts in these materials.

**Turn up the torque**

To cut heavy metals, the machining system needs ample torque. The spindles should produce 2000 ft-lb (2711 N//pd//m) of torque at 100 rpm and large servo motor drives on fine-pitch lead ball screws. Ti5553 is about four times more difficult to machine than the well-established Ti6A14V in terms of tool life, stock-removal rate, and the required resiliency of the machine structure to push a cutting tool through the metal. At a depth of cut 1-1/4" diameter x 3/8" in triple nickel titanium, the tool starts to separate from the taper at about 8,500 inch-pounds of moment load on general purpose machines with a BT/Cat 50 taper.

> The combination of a precise, low frequency, horizontal machine tool, new milling cutters, and high pressure coolant is the 'titanium triangle'.

A seven inch long, one-inch diameter four flute cutter will remove about 1.2 cubic inches per minute of material from Ti5553 before the tool separates from the spindle taper. If the radial depth of cut is increased to remove more stock, the upper range 8,500 inch-pounds will be exceeded. Latest generation machines feature tool taper interfaces, such as Kennametal's KM4X, that can handle up to 35,000 inch-pounds of tool taper moment loads to accommodate long tools cutting highly resilient materials with a horizontal machining centre. These elements provide the advantages to push the tool through these tough materials. These power mechanisms are designed so as not influence the low frequency excitation conditions.

**The 'Titanium Triangle'**

Other 'must haves' in a hard metal machining system include adequate chip control, high-pressure coolant, and the right cutting tools as mentioned. There are some massive older-generation, triple spindle, high horsepower vertical machines that have been on factory floors for 25 years, making hard metal components fairly successfully. But they are using cobalt-coated carbide cutting tools that require maintenance and regrinding. Further, since they are cutting in the vertical mode, the chips are often remachined. Plus the work area is wide open; high pressure coolant application is out of the question.

New machines specifically designed for hard metal parts have a horizontal spindle orientation. The chips fall to the bottom of the machine, and the work area is completely enclosed to flush coolant through the spindles at high pressures. Adequate flooding aimed at the cutting edge contributes to long tool life significantly. Also, cobalt tools are easing out of the scenario and being replaced by new generation indexable carbide cutters, which offer high stock removal rates and eliminate the regrinding maintenance of the colbalt coated cutters.

The combination of a precise, low frequency, horizontal machine tool, new milling cutters, and high pressure coolant is the 'titanium triangle' required for optimal, cost-effective hard metal machining. Other considerations of course are work flow considerations and CNC toolpath creation. All aspects of the hard metal machining process must be taken into account when considering the ideal system.

**Cost vs. Profits**

Stiffer machine tool materials simply cost more, so naturally the machine tool technology costs more, too -- up front. However the definition of "cost" as it relates to "profit" is worth consideration. If companies would profit by cutting deeper, faster, and with better quality, then they may be losing money by not doing so. The roughly 25 percent extra up-front cost, after scrutiny, could be miniscule by comparison to what might be lost. Further, general purpose machines last about 20,000 hours versus the 75,000 hours that application-specific machines provide. Beware of the witchcraft and wizardry of "false economy", especially when it comes to getting what is required to produce titanium and other hard metal parts.

Difficult-to-machine workpieces, typically the newest titanium grades, Inconels, high strength stainless steel alloys, and other alloys have forced an even greater design discipline on machine builders and suppliers of cutting tools, toolholders, coolant systems, and controls. They comprise a system and are necessary for successful machining results. Seek out experts who truly understand what it takes. As the "Sorting Hat" at Hogwarts School of Witchcraft & Wizardry might say, "Do your homework."

*The author can be reached in India through SAP Technical & Marketing Consultants at saptech@eth.net*

# Creating customer delight

Tooling needs to have very high security, durability and consistency, says **Gautam K. Ahuja,** MD, Dormer Tools India Pvt. Ltd.

By Niranjan Mudholkar

**At IMTEX 2013, Dormer Tools globally launched its new brand Carboloy for tools and inserts. How has that brand evolved?**

This has been a first for any multinational cutting tool company to start operations from India. The journey has been full of learning, excitement and lots of activity. There have been a lot of challenges which we have overcome. The advantage of being new is that we have nothing to lose, and only to gain. There has been tremendous product support, due to the high consistency of our products being offered. Our customers are very happy with the productivity improvement, high tool life and consistency of Carboloy inserts and we look forward to create 'customer delight'. Carboloy has become a popular brand in a short span of time.

**How would you compare your performance vis-à-vis the overall cutting tools market in India?**

Carboloy has been welcomed by the industry due to the strong legacy of the brand, and the concept of providing good quality, high tool life, consistent products, and quick delivery at a reasonable price. Many of our competitors falter on the above, and we are creating a niche for ourselves. Carboloy is known for solving customer's ever-increasing demands for greater productivity, quality and cost-effectiveness.

The cutting tool market has been practically flat since the last couple of years. However, even in the fiercely competitive world of cutting tools, we are improving sales every month, and growing at a much rapid pace than the industry. However, it will take some time till we are able to get some reasonable market share.

**What are the key challenges faced by the industry?**

Technology is evolving at a rapid pace. With newer materials especially for the aerospace, automobile and energy sector, the cutting tools also have to keep pace with them. Secondly, customers are becoming very demanding in terms of stringent quality parameters of the components, high productivity levels while maintaining the process capability, and shortest possible delivery times. Also, all large global companies need to ensure a smooth supply of raw material (Tungsten), which is mainly controlled by China. Then, the Indian rupee is depreciating on a regular basis, and thereby all imports are becoming very expensive. There is also a scarcity of knowledgeable cutting tool engineers who are capable of providing a solution to the customer.

With the increasing cost of input materials, it is extremely difficult to maintain competitive pricing. We are addressing this issue mainly through higher volumes and economies of scale. Also, our marketing model is based on lean manpower, with strategic alliances with our channel partners.

**Productivity and speed are the driving forces for manufacturing companies. How are you helping them?**

We are constantly developing cutting tool grades which are capable of running at very high cutting speeds and can withstand higher temperature. Our tools ensure very high level of productivity, giving them a distinct cutting edge against competition, where many would perish much faster than our new grades. Thus with increasing machine hour rates due to high cost of capital, infrastructure, electricity, labour etc., we help our customers to produce more components in lesser time, and sometimes save on buying a new machine.

**Manufacturing companies are increasingly relying on more and more difficult to machine work piece materials. How are you addressing the needs on this front?**

Various combinations of chip geometry with base materials and special coatings are being evolved to meet the expectations of the industry. Our manufacturing plants have good intellectual and management capabilities. The future is bright, and we need to leverage our potential. Dormer is one of the world's foremost producers of solid carbide and high speed steel rotary cutting tools, with a reputation for quality, innovation and brand leadership. We have newly launched a large range for different materials, and are expanding our range on a regular basis. Tooling needs to have very high security, durability and consistency. And Dormer, Pramet and Carboloy are built on these pillars.

*In appreciation of the critical role played by Plant Heads in the success of manufacturing organisations, The Machinist has started a section called 'Plant Head of the Month'. We will be featuring some illustrious plant heads in this section giving preference to the ones whose plants have accomplished noteworthy milestones recently.*

# Built-In-Quality

The Bangalore plant of Faurecia Emissions Control Technology is working on improvements in efficiencies of equipments, labour and adapting to the reduced demand by changing its working shifts pattern, says **Srikanth Bhadravathi**, its Plant Manager.

**By Niranjan Mudholkar**

The automotive industry now seems to be getting back on track. However, many challenges remain due to various factors including but not limited to growing competition, dynamic customer demands, rising raw material costs and labour issues. These factors have had a direct impact on the auto component sector as well. Srikanth Bhadravathi, Plant Manager, Faurecia Emissions Control Technology, Bangalore, and his team are addressing the situation by focusing on efficiencies and innovation.

"We are focusing on lot on cost reduction initiatives like eliminating wastes, reducing consumptions, promoting recycle/reuse concepts to keep our manufacturing costs down."
**Srikanth Bhadravathi**

"We are working on many VA/VE activities along with our customer and suppliers, localisation of imported materials etc. To overcome the issues, we are focusing on lot on cost reduction initiatives like eliminating wastes, reducing consumptions, promoting recycle/reuse concepts to keep our manufacturing costs down. We are also working on improvements in efficiencies of equipments, labour and adapting to the reduced demand by changing our working shifts pattern," Bhadravathi says.

Faurecia has also been a pioneer in introducing

## Plant data

**Faurecia Emissions Control Technologies India Pvt Ltd**

Location: **Bidadi Industrial Area, Near Bangalore**

In-charge: **Srikanth Bhadravathi**

Size: **10,000 sq m**

Products manufactured: **Exhaust systems & Instrument Panel Reinforcement Tubes**

Manufacturing principle: **Faurecia Excellence System (FES)**

Key client: **Toyota Kirloskar Motors**

Staff strength: **175 people**

Recent milestones achieved:

- **Toyota Supplier of the Year Award – 2nd Best supplier**
- **Quality Appreciation Certificate from Toyota**
- **Delivery Appreciation Certificate from Toyota**
- **Highest score on Faurecia Excellence System Audit by Business Group Auditors.**

some key processes technologies in the manufacturing of emissions control systems in India. "Technology innovation lies at the heart of the worldwide automotive market, which is undergoing significant transformations. Innovation drives each of Faurecia's core businesses, supported by 5,500 R&D engineers and technicians in 30 R&D centres across the world. Passenger vehicles are experiencing fundamental transformations across all segments as they, tomorrow, become cleaner, lighter, and more comfortable and premium. To achieve this revolution, automakers need global partners – such as Faurecia – able to combine their technology leadership and engineering know-how with an organisation shaped for the steady development of global automotive markets."

Globally, Faurecia Emissions Control Technologies is a leading 'Emissions Solution Provider' for the automotive and off-road vehicle segments and is already supplying Euro V emissions norm compliant cars, while it is also ready with solutions for Euro VI norms. "As far as the Indian market is concerned, it has emerged as a critical market for us and we are expecting the introduction of Euro V norms by 2016 beginning with the Tier 1 markets. We are in the process of introducing our latest emissions control technologies to the Indian market, owing to the increasing demand, to capture the first mover's advantage and in an effort to adapt our products to the evolving Indian emissions norms (Bharat – VI and Bharat V) over a longer period of time."

> "The company strongly adheres to the Quick Response Continuous Improvement (QRCI) Process for every system to ensure stringent quality management parameters in their process and products."

But were the equipment required and the technical know-how available in India for the introduction of these technologies? What about the availability of the skilled man power? "Yes we have the required equipments, processes and the technical expertise to introduce the technology innovations to the Indian market. In addition to this, at a global level, Faurecia identifies a team of technical experts who are deployed as a support team to various markets for manpower training and skill development. This in turn helps achieve efficiencies in designs, manufacturing processes and products."

Faurecia recently inaugurated a state-of-the-art R&D centre in Bangalore dedicated to emissions control technologies. "The Tech Centre for Faurecia Emissions Control Technology recently inaugurated in Bangalore, joins the three other existing plants in Pune, Chennai and Bangalore dedicated to the production of hot end, cold end, manifold, welded & lock-seam muffler boxes, spun mufflers, bent pipes for Ford, Hyundai, Nissan, Toyota, Tata and Cummins. The centre also supports the global engineering in the design and validation of the entire product with design, CAD, FEA, CFD and Acoustics services for programs in Europe, North America, South America and Asia."

In line with one of the major band pillars of innovation, this Tech Centre has further strengthened Faurecia's ability to deliver cleaner and more environment friendly automotive solution and technologies. "The engineers at the centre are

## New R&D centre

Faurecia has recently inaugurated a new state-of-the-art TechCenter dedicated to Faurecia Emissions Control Technologies. The TechCenter is designed to accommodate about 200 automotive engineers. It is a fully-owned subsidiary of Faurecia and an R&D centre dedicated to Faurecia Emissions Control Technologies for global projects. The centre supports the global engineering teams in the design and validation of the entire product range. The technical team that consists of program development leads, specialists in durability, thermo fluids, acoustics simulation, product Design and engineering systems will enable the design and validation of Emissions Control Systems for programs in Europe, North America, South America and Asia. The TechCenter is spread over 30,000 sq ft and has a capacity to accommodate up to 360 engineers.


further supported by technical leaders identified by the group who assist with constant improvement, innovation and refinement in the processes. This gives us an excellent opportunity for knowledge sharing and expanding the scope of understanding for both the teams at the plant and the tech centre. While the teams working at the plant get guidance and training on aspects of product design and development, the product designers get a better understanding of process and manufacturing challenges, which in-turn helps them in optimising their product designs."

Globally, Faurecia follows a strict quality management process and under Bhadravathi's leadership, the Bangalore plant is adhering it to a tee. "Maintaining and delivering utmost quality standards is a culture at Faurecia and is one of the major forces driving continuous developments and advancements within the system globally as well as in India. The company strongly adheres to the Quick Response Continuous Improvement (QRCI) Process for every system to ensure stringent quality management parameters in their process and products."

At a brand level, Faurecia follow seven basic rules for achieving the right quality of product. It starts with 'OK first part', which is the confirmation on first part for quality at shift beginning, after changeover, breakdown, tool change etc. Next is 'Poka Yoke'. "Here we focus on implementing simple mistake proof solutions for the failure modes identified during FMEA analysis and all Poka yokes are checked at the beginning of each shift and during changeover," explains Bhadravathi. The third step is 'Self-inspection'. "At the third

## Some technology innovations introduced by Faurecia in India

- Manifolds/Maniverters (fabricated and casted): This product specific Smooth flow of exhaust noise, reduces back pressure, increases torque & reduces weight.
- Mufflers/Cold End (technologies like -Spun technology, Lock-seam, Clamshell & Welded types): This technology reduces back pressure and exhaust noise.
- Hot Ends (Canning processes -Stuffing, Tourniquet, Control GBD & Clamshell) This technology is specifically used for emissions reduction
- Catalytic Converters: Spun type (Eccentric, Concentric, size down) and Tourniquet
- IPRT – MIG welding and Spot welded types: This technology is used for cross car beam safety application for instrument mounting.
- SCR- Selective Catalyst Reductions: It is specifically used for Euro 6 application for the reduction of NOX.

step, we follow the principle of "Next process is our customer, no defect outflow to next process."

Then comes the 'final inspection'. "Final inspection of assemblies are conducted to that all quality parameters have been meet. This becomes critical owing to the complicated profiles of our product fitments." The fifth step is called 'Red bins', where scrap identification and handling is done at the source of generation itself (i.e. at process) to avoid mix-up and defect outflow. "We review every single scrap part daily and accordingly decide on temporary or permanent actions," Bhadravathi explains. The penultimate step is called 'Rework control' where the parts that need to be reworked on are identified at the process and put in yellow bins. The rework is done by authorised personnel only which then sent to the quality control team for certification. And the ultimate step is the 'Quick Response Continuous Improvement' or the QRCI where in case of defect, quick actions are taken at the process stage itself and escalated for solving the same permanently.

"Broadly put, our process of quality control is based on two approaches that include 'Built-In-Quality' and Outflow Prevention," says Bhadravathi. "Quality is built-in at the process itself – Proper selection of equipment, good design of processes, tools, jigs & fixtures are the keys. Even if we any quality issue is identified, we have a strong outflow prevention process, to avoid defect outflow and ensure best quality delivery to our customers."

The Bangalore plant complies with the requirements of TS-16949 and is certified for the same. "Attaining customer delight is something that we take pride in and a testament to the fact is the awards and recognition received from Toyota each year for having successfully achieved and maintained their challenging quality benchmarks."

Attracting and retaining skilled workers has been a major challenge for Indian manufacturing. "Skilled manpower is the most critical resource for any industry and lack of this resource is a universal phenomenon," agrees Bhadravathi. However at the group level, Faurecia has a very strong Employee Empowerment system and processes in place which are strictly adhered to in India as well. "At a fundamental level, Faurecia believes in empowerment of employees through better understanding of their role, communication, proper supervision, implementing of improvement ideas, improving skill level, reduce wastages and imparting better training. We have various employee engagement initiatives like employee progression, overseas training, education assistance, introducing and supporting employees to become process experts making them capable to in-turn develop skilled manpower. Other macro aspects which we look into are ensuring safe work environment and ensure work life balance, fostering positive work culture, providing growth opportunities through internal mobility and career progression."

# The ACE LIST

Powered By SHW Machine Tools India

The term ACE stands for Auto Component Entrepreneurs. And our 2014 ACE List features nine of the most dynamic entrepreneurs from the Indian auto component sector. Well, they are not listed in any particular order. Some of them are big and some of them have just started growing. Some of them are first generation pioneers while some are next gen leaders. But they are all driven by the entrepreneurial spirit to build, to achieve, to grow and to take others along with them. Find out how they are taking their industry to the next level. Besides being big on manufacturing, they are creating a niche through innovation, operational excellence and brand building.

**By Niranjan Mudholkar**

**Girish Arora**
Chairman, Managing Director & Founder, Base Corporation

**SK Arya**
Chairman, JBM Group

**RK Behera**
Founder & Chairman, RSB Group

**Aravind Melligeri**
Chairman & CEO, Aequs

**Anshul Goel**
Managing Director, Duroshox Pvt Ltd

**Baba Kalyani**
Chairman & Managing Director, Bharat Forge Ltd

**Farrokh Cooper**
Chairman & Managing Director, Cooper Corporation

**Sunjay Kapur,** Vice Chairman & Managing Director, Sona Koyo Steering Systems Ltd

**Harish K. Sheth**
Founder Chairman & Managing Director, Setco Automotive Ltd

**Seven reasons why they are on 'The ACE List'**

- ✓ They are entrepreneurs.
- ✓ They are expanding.
- ✓ They are either Tier 1 suppliers or are single source suppliers to OEMs.
- ✓ They have at least two manufacturing plants (some have ten or more).
- ✓ They are either diversifying or acquiring new businesses.
- ✓ They are big on exports.
- ✓ And importantly, they have done well even during the recession.

**The term 'ACE List' is an exclusive editorial property of The Machinist magazine. We do not claim this to be an exhaustive list and are well aware that we may have missed out on many names. But this is a beginning and we will be building this into a strong editorial platform in the times to come. Also, this is the first time that entrepreneurs from the auto component sector are being covered in a single feature. - Editor*

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# Girish Arora

## Chairman, Managing Director & Founder, Base Corporation

"We see a future trend in localisation of parts from automobile manufacturers to offer their products to the consumer at more affordable prices."

Although a teacher's son, Girish Arora always wanted to be a 'business man'. And he started his entrepreneurial journey by setting up a small business of schoolbags. The next step was importing used Xerox machines from Australia, repairing them and selling them in the Indian market. Then he saw a huge potential in batteries and founded Base to become a distributor for this sector in 1987.

The business grew substantially and he went on to become the exclusive distributor for Panasonic batteries in 2000. While the business was doing quite good, he was far from satisfied and soon took the leap from being a distributor to becoming a manufacturer. But this was far from easy as he himself points out: "The biggest challenge was shifting the line of business from being a battery distributor to a technologically advanced battery manufacturer. The challenge also included understanding the gap between the manufacturer and customer and trying to bridge that gap by developing products that customers wanted."

"Considering we have already accomplished tailoring a battery specifically designed for F1 cars, we see this as an opportunity to cater to more automobile manufacturers."

Of course, he never looked back from then. Today, Base is a Rs897crore organisation employing 800+ people working in field for sales and service and another 800+ people employed at the manufacturing unit in Solan. A second manufacturing plant with one of the largest manufacturing capacities in South East Asia has been set up in Hosur, Tamil Nadu with an estimated investment of Rs432 crore. The new plant is expected to start operations in September 2014.

Arora explains: "The focus for the past few years has been on increasing production and strengthening distribution. To tackle production we have successfully set up the second plant." With the new plant getting operational, he is expecting the company turnover to cross Rs1,200 crore this financial year.

Arora believes that his company's growth has been powered by innovation across its interface with customers. "Our biggest strength is innovation." Base has also transcended innovation into servicing with first in the market service offerings like Dial-a-battery, free service camps and free home delivery. "Base was one of the first to change the way customers perceived the battery industry. We have also been innovating in terms of reach as we possess the largest distribution network in the country in comparison to other battery manufacturers and this is an added benefit."

This pursuit of innovation has also led Base to become the first Indian battery company to have tailor-made a special battery for F1 cars. So while Arora has achieved considerable success in this industry, his personal vision is to become the leader in storage power and deliver eco-friendly cost effective products to consumers. "I envisioned Base Batteries as a company that stresses on values of innovativeness, teamwork, integrity, spirit of learning, customer focus, and commitment to quality, care and concern," he says.

The founder of Base Batteries is also quite upbeat about the improving market conditions in the country. He believes that the Indian auto components sector has been given a boost by the new government's stress on the need to improve manufacturing. "We see a future trend in localisation of parts from automobile manufacturers to offer their products to the consumer at more affordable prices. Considering we have already accomplished tailoring a battery specifically designed for F1 cars, we see this as an opportunity to cater to more automobile manufacturers," he says.

# SK Arya

## Founder & Chairman, JBM Group

"Being economically viable and qualitatively superior is a constant norm we have to meet to be competent in the market today."

He is driven by the constant pursuit of excellence in everything that he undertakes and that's his biggest inspiration. SK Arya, Chairman of US$1.2 bln JBM Group, has meticulously curated the organisation that he established, on the pillars of excellence since its very inception. "I consider people who have stood by me over all these years as my biggest strength," he says.

Arya started his journey in 1983 by setting up JBM Industries (formerly known as Gurera Gas Cylinders Ltd) as his first entrepreneurial venture. With the advent of Maruti Suzuki India Ltd (MSIL), the foresighted Arya spotted the big opportunity and in 1986 he collaborated with MSIL to form a joint venture company called Jay Bharat Maruti Ltd (JBML). Soon the Group was also working with clients Ford, Mahindra, Honda, VW, and so on covering all major auto OEMs.

Of course, as Arya himself says, a business without challenges is not a business. "Challenges are core to business functioning and we have been able to address these challenges very effectively at every stage of the JBM journey." He knows that India is a cost sensitive market and that's exactly where the challenge arises. "Being economically viable and qualitatively superior is a constant norm we have to meet to be competent in the market today. We have been successfully able to adopt lean manufacturing processes to minimise the cost to a significant extent that has given JBM Group an edge over other players in the industry. We have also proactively been able to sense the future requirements of our customers well in time with regard to technology, innovation and systems and have incorporated the same to be consistently in sync with the customers' expectations," he says.

Despite adverse sentiments, the last year has been promising for the JBM Group. "One of our flagship companies, JBM Auto Ltd, launched an intra-city luxurious bus at the Auto Expo this year. We strongly believe that the bus project shall be an important growth driver for the entire group going ahead. We have earmarked a total investment of Rs500 crore in this project. We have also announced new plants for our component manufacturing business. These manufacturing facilities shall be set up in Indore and Bangalore. Hence, the coming years are going to be extremely exciting for the JBM family."

"We have also proactively been able to sense the future requirements of our customers well in time with regard to technology, innovation and systems."

Acquisitions have been very much a part of the JBM journey providing solidarity and edge to the business. "We consistently keep evaluating options in this regard and finalise once we are able to see a strategic fit to the ongoing business. We are in talks with various companies but it is too premature to comment on them," he says.

So what is his mantra for taking Indian auto components sector to the next level? "Providing customised solutions to customers resulting in minimising costs and delivery time and enhancing quality holds the key to the game. At JBM Group, we aim to provide localised solutions matching global standards. India has already established itself as one of the fastest growing auto markets on the global map and we intend to also make it the largest sourcing hub for all global auto OEMs," he says.

Arya wants to see every vehicle on Indian roads with at least one JBM component in it. "We are already very close to achieving this feat as almost all leading automobile manufacturers are our customers across various segments i.e. 4 wheelers, 2 wheelers, 3 wheelers, commercial vehicles, farm equipment, construction equipment," he shares.

# RK Behera

## Founder & Chairman, RSB Group

"Make your products continually redundant through research and development, lest global competition will make for you."

RK Behera, Founder and Chairman of the RSB Group, started his entrepreneurial journey in Jamshedpur in 1975 along with his brother SK Behera. Together, they established International Auto Products, which eventually merged with RSB Transmissions (I) Ltd in 2009.

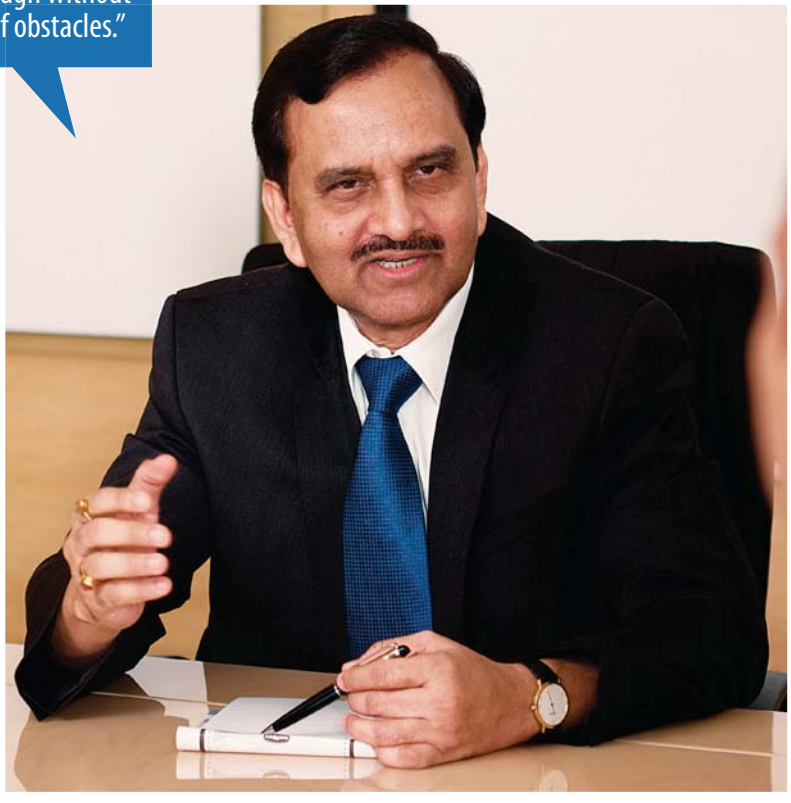
Today, the RSB Group is a leading global engineering institution with turnover of more than Rs1,400 crore, manufacturing a wide range of products for the automotive, construction equipment and other sectors. Presently, it has 14 manufacturing plants spread over seven locations in India, and one each in US, Belgium and Mexico, besides a partnered venture in Brazil.

> "However, with aggressive tapping of unexplored market and cost reduction drive, we have managed to sail through without much of obstacles."

Last year has been very challenging for RSB due to the 'volatile swing of economy, unfriendly fiscal measures, rupee gone for a free slide, liquid gold taking up a beating with dollar unparallelly strengthening and buyers shunning their shopping fist'. "This has had a cascading effect on us being in auto-comp sector. However, with aggressive tapping of unexplored market and cost reduction drive, we have managed to sail through without much of obstacles," Behera says.

Taking challenges head on and emerging successfully is something Behera actually cherishes. While the Group has grown into a giant today, Behera cannot forget the challenging times when he had to overcome huge financial hurdles. During the adolescence of his entrepreneurship, in 1990, he had embarked to set up Neelachal Auto Pvt Ltd (the original version of RSB). At that time, International Auto Products had a turnover of around Rs100 lakh while the Neelachal Auto project was worth about Rs130 lakh, many times over his financial capability. Behera could manage a term loan of Rs90 lakh from the state government financial institution but was still falling short by about Rs32 lakh. "We aimed to fill this gap through Rs15 lakh of state subsidy and Rs15 lakh of seed capital (meant only for first generation technocrat entrepreneurs) from a national level financial institution."

The seed capital was an attractive source of fund, because it was like quasi equity as it bore only one percent interest rate with liberal repayment terms. But securing these two sources of fund was considerably difficult as they entailed a lot of stringent scrutiny and evaluation. In those days, sanction and disbursal also used to consume a lot time. "But I had conviction in the project. I myself prepared the detailed project feasibility report – technical, marketing and financial aspects. Even though the funds were not tied up, it was my



firm conviction that gave me the confidence to go ahead with the project – buying land, ordering for equipment and firming up the customer orders."

In the meantime, Behera also continued negotiating with the industry department and the financial institution for the state subsidy and the seed capital respectively. "While the negotiations were on, I had to arrange for alternate source of fund to continue with the execution of the project. I was fortunate enough to meet a senior official of a nationalised commercial bank who appreciated my effort. We gave the bank the required comfort through endorsement from our prospective customer. Convinced, the bank extended a bridge loan." Also, after much difficulty, he was also able to convince both the industry department and the financial institution about the merit of the project and he could secure the approval for Rs12 lakh each towards state subsidy and seed capital respectively. "In spite of the hurdles, the project implementation was on schedule and we delivered to the customer on time," Behera remembers.

He calls the ordeal tiring but exhilarating. "It made me aware that there is a divine force which always conspires to grant success if there is deep conviction and strong desire to do something noble and good. This was a life changing experience for me. It infused in me the confidence and belief to take challenging projects and by the grace of God I have done that serially. This is one of the most memorable chapters in my life," recollects Behera with nostalgia.

Behera is also extremely emotional about his parents and believes that the moral values he inherited from them are the moorings of his life. "Since childhood and even today they continue to inspire and motivate me. Their values help me to stand rock steady even in times adversities which have been many," he says with gratitude.

It is this emotional quotient that also motivated Behera to have a strong focus on people engagement. In fact, Behera has been leading the Company by mentoring and facilitating the top management, principally, in evolving the strategic roadmap of the Company and overseeing its implementation. Today, the RSB Group is marching ahead propelled by innovation and efficiency. Behera's simple mantra for staying ahead of competition is continually redefining and reinventing the organisation and its products. "Make your products continually redundant through research and development, lest global competition will make for you," he emphasises. His personal vision for the organisation is to be amongst the most admired organisation with a significant global presence.

# Aravind Melligeri

**Chairman & CEO, Aequs**

"With India having emerged as a major auto component procurement hub, there is a rising thrust on technology innovation and cost optimisation."

His passion for manufacturing drove Aravind Melligeri, Chairman & CEO, Aequs, to enter this field from an engineering services background. "At the end of the day, I believe that we need to have a physical product to realise anything virtual. The fact that Aequs has investments in every stage of making something from the conceptual stage to reality in mechanical products is what inspires me to strive for more and achieve perfection at every stage of delivery. My biggest strength is to visualise what can bring value to customer and how to realise that deliverable by optimising the supply chain globally," he says, with a sense of pride. After all, Aequs sources materials from 20 locations, manufactures in three locations, and delivers to global customers in multiple locations.

"My mantra for taking Indian auto components sector to the next level is to delegate meaningfully and appropriately. This division of powers has helped Aequs in not just boosting productivity but also to emerge as an employer of choice."

Aequs is amongst India's fastest growing precision manufacturing companies. It recently laid the foundation for a new automotive components plant at its 250 acre Aequs SEZ in Belgaum. The new automotive plant will add machining capacity of over 100,000 hours annually and will support the company's rapid expansion plans in the US and Europe markets this year. Aequs aims to increase its revenues from the automotive business to US$ 30 million by 2020 and is scouting to establish joint ventures to add to its capabilities in this vertical.

The new plant, which is expected to be operational from March 2015, will further strengthen Aequs' emergence in the last few years as among the few Indian companies in the automotive component manufacturing space to provide a 'manufacturing ecosystem model' wherein interconnected processes in the manufacturing value stream such as forging, machining, heat treatment, grinding, and so on are delivered at the same location thereby minimising supply chain inefficiencies. Aequs will manufacture engine and transmission parts, sub-assemblies and assemblies in the new plant.

"With India having emerged as a major auto component procurement hub for global OEM players, there is a rising thrust on technology innovation and cost optimisation for manufacturers. Most leading auto manufacturers of the world outsource their component manufacturing to India and by 2020, India's exports from this industry is expected to reach US$40 billion, from the current US$12 billion. With the new plant and our continued expansion plans in this vertical, we are looking to garner significant share of this market opportunity," believes Melligeri. A strong supporter of the JV approach, he believes it will 'enable his company to offer top quality ancillaries and sub-assemblies to global customers at a very competitive price as we can access the

latest world-class technologies through our collaborations'.

According to Melligeri, the biggest challenge for him has been getting quality manpower for precision engineering in India. "It requires highly skilled operators. For that we have experts in Belgaum to train operators on how to perform optimally on the machines. We work with machine tool manufacturers on an ongoing basis to upgrade controllers to the latest versions and train machine operators. The availability of machine tools at the right time is very crucial to ensure production doesn't get hampered," he says.

Melligeri took a barren land of 250+ acres 30km away from Belgaum city and built a world class infrastructure to have 24x7 operations in 24 months period in 2009 during the middle of the global recession! "That was challenging. Our organisational ability to focus on the end goal and deliver against commitments against all odds makes us unique in that sense," he says.

Last year was an inflection point for Aequs. "After eight years we saw a growth phase achieving profitability. Automotive has been a profitable venture for long period of time." The company has extensive plans for India this year and looks forward to expand its capabilities and offerings. "We are always scouting for acquisitions to enhance our global capabilities," he shares. Melligeri believes that if India needs to think global, Indian firms needs to streamline their manufacturing process as well. "At Aequs, our top management comprises a global team that handles individual divisions. We also take great effort to have right man at the right place for the right job with a right portfolio to achieve our goals in our capabilities," he explains.

"My mantra for taking Indian auto components sector to the next level is to delegate meaningfully and appropriately. This division of powers has helped Aequs in not just boosting productivity but also to emerge as an employer of choice. Employees at Aequs know that each of them has an important role to play and everybody is crucial to the Aequs ecosystem," he shares.

His personal vision to have Aequs SEZ evolve into a leading integrated manufacturing ecosystem. "At Aequs, we offer a fast, efficient, and extremely conducive environment with no bureaucratic delays or roadblocks -- most of the units took less than two years to go from green field to production. Our location in Belgaum enables us to attract the considerable engineering talent across South India, Goa, and Maharashtra. We see enormous potential for growth as a low cost manufacturing ecosystem."

# Anshul Goel

## Managing Director, Duroshox Pvt Ltd

"We are working on product supplementation, engineering capability enhancement, cost synergy and enhanced product offering capability as potential strategies while looking at potential targets."

Anshul Goel took charge of his father's business with the sole intention of taking it to the next level. His entrepreneurial abilities are reflected in the fact that Duroshox, which started as a manufacturer of shock absorbers for two and three wheeler applications for a few Indian customers, has now become a major player across a variety of product segments. And importantly, it caters to not just domestic OEMs but also to many international players.

Of course, the young Goel believes that the journey has just begun. "I am inspired by the prospect and aspiration to grow and learn new things. Many times I feel that I'm not at peace with myself until I know I am working at my full potential. I believe my strengths are in my ability to persevere, ability to inspire, ability to lead by example joined with an analytical approach towards business," he says, explaining his desire and drive to continually go beyond.

"We believe that there could be significant value creation if we are able to identify inorganic growth opportunities in products lines that are aligned with our long term growth plans."

The biggest challenge in Goel's professional journey was the global crisis of 2008. "The output of goods and services in some of our key markets decreased at dramatic rates in the fourth quarter of calendar year 2008 and first quarter of 2009. We saw our company orders drop by 35 percent to 40 percent overnight." Under his leadership, the Duroshox team did some noteworthy work during that period in terms of cost optimisation, new product development and enhancing the internal capabilities (in IT systems as well as manufacturing efficiency). "We bounced back a year later stronger, leaner and more focused," he says.

The last one year has been very exciting for Duroshox. "We have seen growth in volumes related to our current product portfolio and also had great success in identification of new product lines that will provide growth to the company in the mid to long term."

Now Goel has set his eyes beyond the Indian shores in terms of increasing the company's footprints. "We believe that there could be significant value creation if we are able to identify inorganic growth opportunities in products lines that are aligned with our long term growth plans. We have initiated the process of evaluating potential opportunities and identifying markets where we would like to be present in the future."

Of course, he doesn't have a timeline. He believes it is critical to identify the right opportunity that provides synergy and creates value in the long term – both for customers and other stakeholders. "We are working on product supplementation, engineering capability enhancement, cost synergy and enhanced product offering capability as potential strategies while looking at potential targets."

His mantra for taking Indian auto components sector to the next level includes a combination of 'core competence', world class manufacturing, lean, QFD, six sigma, automation and robotics, simultaneous engineering, bottom of the pyramid and TPS. Goel wants Duroshox to operate in niche suspensions products. "My aim is to be one of the top 3 producers globally in the segments that we operate."

# Baba Kalyani

## Chairman & Managing Director, Bharat Forge Ltd

"We first built an organisation on the foundations of cost, quality and processes and then leveraged the domestic market to build an export oriented global company."

No entrepreneurial list would be complete – auto components or otherwise – without the inclusion of Baba Kalyani. If the term 'living legend' applies to anybody in this sector then it is him.

This mechanical engineer from the Birla Institute of Technology and Science (Pilani, Rajasthan), has single handedly transformed the Pune based Bharat Forge Ltd into a technology-driven global leader in metal forming. Today, BFL has trans-continental presence across eight manufacturing locations and serves a wide range of sectors including automotive, oil and gas, power, locomotive & marine, aerospace, construction & mining, etc.

"A robust manufacturing sector is the key to India's economic progress."

Kalyani's leadership and entrepreneurial capabilities have been instrumental in making Bharat Forge a world leader in the forging industry. Today, as part of the Kalyani Group – a US$2.5 billion conglomerate, Bharat Forge has the largest repository of metallurgical knowledge and is the largest manufacturer and exporter of automotive components from India.

Kalyani, who also has an MS in Engineering from the Massachusetts Institute of Technology, US, was one of the few Indian entrepreneurs to look beyond Indian shores at a time when most Indian manufacturers were happy in serving just the domestic market. Of course, it was anything but easy. There was almost zero acceptance for Indian manufactured goods in the developed markets. But with strong perseverance and conviction, Kalyani stood his ground and won over customers with a stringent focus on quality, innovation and consistency.

In his own words, Bharat Forge has followed a step-by-step approach in building its business. "We first built an organisation on the foundations of cost, quality and processes and then leveraged the domestic market to build an export oriented global company." We are now engaged in transforming into a global engineering conglomerate and an end-to-end service provider for customers in the automotive and non-automotive space.

Kalyani's 'look overseas' strategy not only grew his business manifold but also safeguarded it during the recessionary cycles as it had diversified substantially to make up for the losses suffered in one market by making profits in another. Another reason why Kalyani has been successful in taking his company into the big league is because of his hunger for new technologies that made business more market oriented and dynamic.

Kalyani has always believed that a robust manufacturing sector is the key to India's economic progress. Quite satisfied with the new government's emphasis on the manufacturing and infrastructure sectors, he believes the recent budget is one of the few times that the manufacturing sector has received special attention. His vision is to see Indian become a global manufacturing leader integrating both innovation and development.

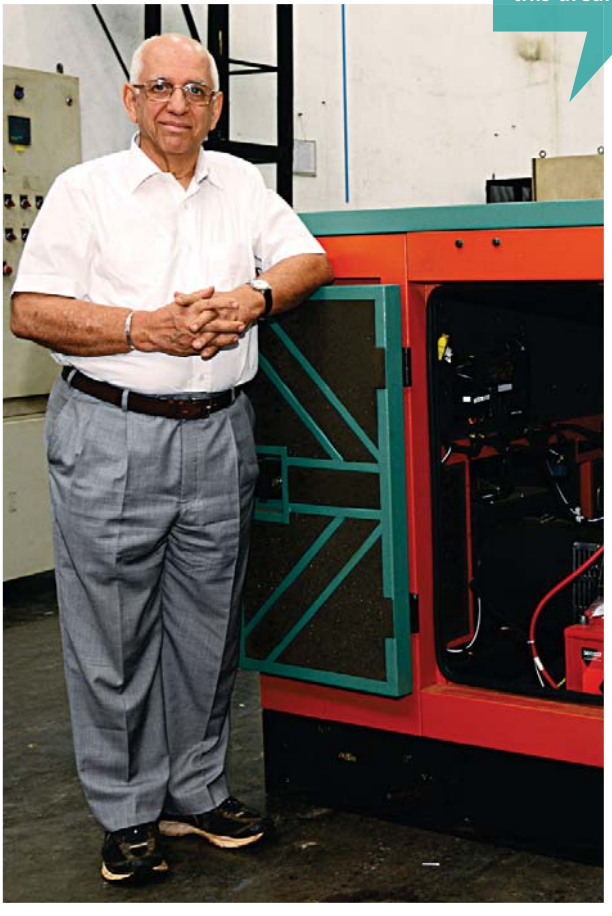
A strong believer in giving back to the society and industry, Kalyani is the Founder Chairman of Pratham Pune Education Foundation, an NGO that is engaged in providing primary education to children belonging to under privileged sections of the local community. Since its inception in 2000, Pratham Pune has made a difference in the lives of over 150,000 children in Pune society. Kalyani is also steering a unique initiative to empower rural youth at a Taluka in Pune district by providing free technical and vocational training at an ITI that is being run as a Public-Private partnership.

# Farrokh Cooper

## Chairman & Managing Director, Cooper Corporation

"Have a good product, maintain discipline at all levels, invest in new technology, focus on innovation, take good care of your people and keep your ego at the gate."

While Farrokh Cooper, Chairman & Managing Director, Cooper Corporation, is extremely proud of his legacy, he is also equally future oriented with his feet firmly grounded in the present times. His paternal grandfather, Sir Dhunjisha established Cooper Engineering in Satara way back in 1922, manufacturing metal ploughs and built India's first diesel engine. While Cooper Engineering lost its way after independence for many reasons, Farrokh Cooper not only revived it with entrepreneurial zest but also ensured that it set new benchmarks of success inspired by his grandfather's legacy and vision.



"We want to be really big in the engine segment and are working to make this dream possible."

Under his leadership, the company has grown over a whopping 500 percent just in the last ten years. The secret of his success? "Have a good product, maintain discipline at all levels, invest in new technology, focus on innovation, take good care of your people and keep your ego at the gate," he says with a smile. Cooper strongly believes that India's strength lies in its people. "We are an extremely talented bunch of people with skills rarely found in people of other region. Indian skills are unique. Unfortunately, our country and its people are not projected properly at the global stage. Yes, some start has been made but we have a long way to go," he believes.

Cooper gives full credit to his people for the company's successful journey so far. And in turn, the company has taken good care of its people. This is reflected in the fact that Cooper Corporation has retained many of its employees for decades. "In some cases there are three generations of the same family working at Cooper and there are more than 200 people who have been around for more than 25 years," he says with pride.

From being the first company in India to make diesel engines to the recent technical collaboration with Ricardo UK for the design of its family of engines in 2, 3, 4 & 6 cylinder configurations, Cooper Corporation has always branched out into new products.

A strong proponent of technology and innovation, Cooper has ensured that his organisation has consistently invested in advanced technology across its eight manufacturing plants in Satara. The company is currently establishing its ninth plant as well as a new corporate office also in Satara. It has its own R&D. Cooper's manufacturing set up boasts of the latest equipment and machinery along with 28 robots. "I was the first person in Satara to buy a computer and use it for work at a time when type writers were still ruling the roost. But I knew that computers were the future and I was right," he says.

Today Cooper supplies auto spare parts and engine components to all leading manufacturers in India and across the world from Japan to Europe and the USA. Besides, it is a market leader in centrifugal castings.

Farrokh Cooper now wants his Corporation to become a global brand in the next five years clocking ten times the growth of now. "We want to be really big in the engine segment and are working to make this dream possible," he says. And that's not all, he harbours bigger ambitions. Cooper Corporation has also been quietly building its LCV and tractor. "The prototypes are almost ready. While we will wait for a better time to launch our LCV, the tractor will be launched quite soon," he informs.

# Sunjay Kapur

## Vice Chairman & Managing Director, Sona Koyo Steering Systems Ltd

"We should become like a sophisticated engineering app store for the global automotive OEMs, including those in India."

His fetish for cars started at The Doon School, where he spent a lot of his spare time in the Motor Mechanics Shed. Of course, Sunjay Kapur, Vice Chairman & Managing Director, Sona Koyo Steering Systems Ltd, excelled in both academics as well as sports. But it was while pursuing his BBA from The University of Buckingham (UK) that he started to compare the business and manufacturing processes in India with those in Europe; he then undertook several projects at Sona Koyo Steering Systems Ltd, a company founded by his father.

When Kapur came back to India he started working with of the Group companies. Working through the ranks was one of the most grounding experiences for him. In his quest to take his legacy business forward and provide a turnkey solution to his customers, Kapur started an engineering design and outsourcing company in January of 2000 - Sona e-Design & Technologies Ltd. Today the company caters to European and Japanese markets in the automotive and tool design industry, providing CAD/CAM/CAE solutions. The success of this company reflected his entrepreneurial abilities strongly. His second most successful project which got his company the 'Best Start Up' Award in 2007 was Sona Mobility Services Ltd, a diversification into the car rental business.

All these experiences also taught Kapur to look at his manufacturing business from a service perspective. In fact, he is a big admirer of the culture of innovation in the IT sector and endeavours to replicate the same in his industry.

"The tough times have already taught us how to manage business in difficult times and now we are all set for a positive period of growth ahead."

While last year was a difficult period, but his biggest professional challenge was during the 2008-2009 recession. "But it showed me how to manage business in tough conditions and taught me that business models need to keep evolving with times," he says. Accordingly, he used to lean period to streamline the operations and diversify into new areas (off highway vehicles). Of course, with the challenging times behind the back, Kapur is hopeful for a good positive growth in the times to come. He wants the Indian auto components industry to become the global sourcing platform for the auto industry worldwide. "We should become like a sophisticated engineering app store for the global automotive OEMs, including those in India," he says. And the Sona Group is already working towards making this happen. This is the reason why Kapur has been emphasising on having robust in-house design capabilities.

Sona Koyo Steering Systems Ltd is the largest manufacturer of steering systems and driveline components for the passenger car market having over 50 percent market share in India. Kapur is focussed on consolidating this position but is also open to diversify in the safety category. While there are no plans in the immediate future, he also doesn't rule out any acquisitions going ahead. "If the right opportunity exists then we will definitely go for it," he says.

A key reason for the Group's success has been its ability to leverage on technological partnerships at global level and Kapur is confident of taking this factor to the higher level as he readies for the next stage of growth.

# Harish K. Sheth

## Founder, Chairman & Managing Director, Setco Automotive Ltd

"Today, Setco Automotive is the largest manufacturer of clutches for Medium and Heavy commercial vehicles in India,"

If you go to the alumni page of the University of Michigan's Michigan Engineering department, one Indian name that stands out remarkably is that of Harish K. Sheth, Founder Chairman & Managing Director, Setco Automotive Ltd. It was at that University where he built the foundation of his engineering knowledge and career. In fact, he even participated in the campaigning of an American Presidential election (1968) and became the Vice President of the Student Association. These were his first stints with leadership.

In 1982, a few years after his return to India, Sheth established a small manufacturing company producing a single product in a small village of Gujarat. Of course, he had learnt his lessons well (Besides his BS (Mechanical) from the University of Michigan, Sheth also holds a MBA in finance from Columbia University.) That coupled with an entrepreneurial zeal enabled him to build his company into a multi-product, multi-location manufacturing giant through a relentless focus on efficiency and quality. "Today, Setco Automotive is the largest manufacturer of clutches for Medium and Heavy commercial vehicles in India," he says with pride.

"The acquisitions have opened the doors to global markets with new products which will considerably help in our future growth."

As its CMD, Sheth has been instrumental in moulding the vision and the mission of the organisation. Sheth today guides a robust team of highly qualified and experienced professionals from the industry, proving his ability as a good leader. With a vision to craft Setco into the premier clutch manufacturer globally, he plans to expand capacities and introduce new value added product lines. Setco Automotive today employs more than 950 people worldwide with two manufacturing facilities in India, one in UK and one in US. Sheth has built this company over the last 30 years where he led and successfully completed two acquisitions from global automotive majors thus strategically extending Setco's global footprint. "The acquisitions have opened the doors to global markets with new products which will considerably help in our future growth," he shares.

Setco manufactures and markets proprietary LIPE clutch solutions for the medium and heavy commercial vehicles worldwide. In LIPE, it has emerged to be an undisputed leader with an imposing market share. Today, Setco is one of the five largest manufacturers of clutches for Medium and Heavy commercial vehicles in the world. Its diversified portfolio includes non automotive areas such as Hydraulics for off-highway construction equipment and marine products through its overseas subsidiaries. In India, Setco caters to all the major OEMs such as Tata Motors, Daimler, Ashok Leyland, Eicher and AMW. "We are also working with other international players like the UK, USA & China who have entered India. In India and the UK, we only cater to the automotive industry. Our unit in the US however also produces hydraulics products to cater to the construction industry and highway vehicles."

Sheth is also a member of the national executive committee of Automotive Components Manufacturer Association (ACMA). Sheth is actively involved in contributing to the society. He believes that the community, in which he operates, must also benefit from the success of the organisation. To this effect he has set up the Setco Foundation, which is responsible for contributing to the health and education of people in backward areas of India. In January 2009, the Setco Foundation built and gifted to the people of Gujarat, a Nandghar (a secure, spacious and modern 'Anganwadis' in the Panchmahal district), with capacity to cater to over 300 children for health and education. They provide uniforms for all the children; give medical check-ups by a qualified people; nutritional supplements and qualified teachers adept in taking care of the children. The Setco foundation under his direct supervision will be contributing many such Nandghars to the region.

# Building partnerships

Through events like Demo Day and HaasTec, Haas Automation India is engaging with its customers closely to exchange ideas and technology, says **Terrence Miranda,** its Managing Director

By Niranjan Mudholkar

**Q. Congratulations on successfully concluding the Haas Demo Days in Nasik recently. This follows the equally successful first HaasTec Open House of 2014. It seems you are taking customer engagement to the next level with these events?**

The immensely popular HaasTec events held in Chennai, Ahmedabad, Delhi and Mumbai are large events with six or more Haas CNC machines on display cutting parts and the active presence of a number of our key technology partners for accessories, tools and software. These are conducted on the lines of the HaasTec show held every alternate year at our parent company Haas Automation Inc USA. We conduct HaasTecs in India in the major industrial hubs where we have our largest Haas Factory Outlets located.

We have a number of customers located in smaller industrial cities and towns such as Nasik, Aurangabad, Kolhapur, Ludhiana, and Jamshedpur etc. who have expressed interest in attending similar HaasTec events in their local cities. We use the Haas Demo Day format conducting smaller, focused Open Houses in these cities and towns. The principle remains the same: engage with our customers closely, mutually exchange ideas and technology and actively showcase our CNC machines cutting live demos in remote locations even if we do not have Haas Factory Outlets there. During the Demo Days which are usually two or three day events we have at least two of our latest Haas CNC machine models on display. In Nasik we showcased our new DS-30Y Dual Spindle CNC Turning Center with Y axis and our popular VF-3 Vertical Machining Center. We also had seminars from industry leading experts throughout the three days.

**500+ customers**

**Overall turnover at the Nasik Haas Demo Days. The HaasTec Mumbai show had more than 1,500 customers visiting**

> "The stable political situation and promise of a proactive approach towards industry in general and manufacturing in particular augurs well for us in India. We have seen renewed interest in our CNC machines and quote, order levels are going up."

**Q. Where can we expect more such events in the current calendar year?**

The year 2014 promises to be an exciting year for us with a strong marketing push planned this year. Expanding on the HaasTec and Demo Day theme we plan to conduct Demo Day events in Kolhapur and Ludhiana later this year and have HaasTec events at Ahmedabad and Manesar.

**Q. While the last two years have been quite challenging for the manufacturing industry, do you think things will start getting better**

**now? Do you see any indications from the response to your events?**

The response to the recent HaasTec show in our new HFO in Navi Mumbai and Haas Demo Days in Nasik truly exceeded our expectations. Customers who visited the show were extremely knowledgeable, posed interesting questions and displayed considerable interest and understanding of the machining technologies on display. The overall turnout was also very encouraging with over 1,500 customers visiting the HaasTec Mumbai show and over 500 customers visiting the Nasik Haas Demo Days.

The stable political situation and promise of a proactive approach towards industry in general and manufacturing in particular augurs well for us in India. We have seen renewed interest in our CNC machines and quote, order levels are going up. While there is no doubt that the policy initiatives will take time to produce results we appear to be on the right track and we are optimistic about the future.


**Officials at the Nasik Demo Day event**

**How are you enabling customers to draw the maximum benefits from your machines?**

We have focused on building up our application and education capabilities with a dedicated team and a single minded focus to help our customers exploit the true potential of their Haas machines and the extremely user friendly and feature packed Haas control. We provide fully tooled up, fixtured solutions for customers in varied industries from automotive to medical to aerospace and general engineering.

We also provide free lifetime training to all Haas users in our local Haas Factory Outlets with a scheduled training calendar for both applications and maintenance training. These short term courses typically from three to five days held monthly at our local HFOs are a complimentary service provided to our customers who are encouraged to send their operators, programmers and maintenance personnel for the appropriate courses. A typical training class would have a maximum of 10 students and would be a combination of classroom and lab training with our CNC machines and simulators.

| Coming soon | | |
|---|---|---|
| **Demo Day event** | **HaasTec event** | **Haas Factory Outlet (HFO)** |
| Kolhapur and Ludhiana | Ahmedabad and Manesar | Ludhiana and Kolkata |

> "We have focused on building up our application and education capabilities with a dedicated team and a single minded focus to help our customers exploit the true potential of their Haas machines and the extremely user friendly and feature packed Haas control."


**The ST-10 CNC lathe has a small footprint, yet provides a maximum capacity**

**Have you launched any new product recently?**

We have recently launched the UMC-750 Universal Machining Center in India. This versatile CNC Vertical Machining Center features a 630 x 500 mm integrated 2-axis trunnion rotary table with a generous work envelope and compact footprint. This model has been tremendously successful in the US and European markets and the unique features, capability and pricing make it an attractive proposition to our customers in India as well.

We also recently launched the Big Bore series of the popular Haas ST Turning Center line with C and Y axis capability. The response to our Y axis turning centers has been very good over the last few months as customers upgrade their machining capabilities to combine turning and milling operations in a single machine thereby reducing the number of setups and improving efficiencies and accuracy.

**Any plans of expanding your reach further?**

We continue to grow in India as our Haas Factory Outlet (HFO) network continues to expand. We recently opened an HFO in Dharwad and plan to open two more HFOs this year in Ludhiana and Kolkata respectively. We have over 5,000 HAAS machines working in the Indian market.

# Passionate about Precision


The Machinist caught up with **Stephan Nell,** CEO, United Grinding Group AG, after the successful conclusion of the third Grinding Symposium in Switzerland to understand how all companies in the Group are endeavouring to set new benchmarks.

**By Niranjan Mudholkar**

**Q First of all, congratulations on the successful organisation of the third edition of the Grinding Symposium. How satisfied are you personally with this year's show?**

Thank you very much! The event was really a success. We're satisfied because of three reasons. First, our customers gave us a great feedback regarding the event. They appreciated that they got a full 360 degree overview of the grinding industry. The combination of technology presentations and world innovations, cross-cutting lectures and partner stands offered during the Symposium allowed our visitors to actively experience how the United Grinding Group fulfils the claim to offer to our customers more than just the right grinding technology. In fact a customer from India said that 'the Symposium is unique because in just a short time you can understand things that are very difficult to grasp through other information channels'.

Secondly, with more than 1,400 guests per day from more than 40 countries worldwide we have reached our targets. It was a great pleasure to welcome so many international guests.

And thirdly, thanks to you as well. We've got 70 journalists (three from India!) coming to the Symposium from around the world. I would like to thank you personally for your interest in our company and our solutions. Thank you!

**Q And how has this Symposium evolved since it started?**

The first edition was in 2005, the second one in 2009 and now in 2014. The main concept is and was always the same. Giving to the customers in a nice environment the possibility to get the latest information and insights of the grinding industry and other topics! This year we had one big topic: Innovation. Therefore we had several guest speakers talking about this topic. Our core target is that our customers should have enough time to share and discuss their ideas and plans with a broad network of specialists – and, all of that in a nice and relaxing environment with a business approach.

**Q 'Anyone who talks about future is all the more credible, if he also takes account**

For the third time, the United Grinding Group held the largest symposium in the international grinding machine industry in Thun (Switzerland) a few months back. 'Making our customers more successful' was the central motto. A total of 30 machines from the Group were presented at 14 stations. Every day more than 1,400 visitors from over 40 countries took the opportunity to learn more about the future of grinding in more than 154 technology presentations and 20 lectures. The breadth of the lectures ranged from materials in grinding tool development to increasing productivity in the design of grinding processes, as well as the reduction of grinding forces or processing and auxiliary times.

**of reality,' is what you have said at the beginning of the Symposium. Indeed, the approach behind the Symposium has been quite future-oriented and at the same time it is grounded in reality. What key future trends have emerged this year and how will you leverage on the same?**

This is a really good but broad question. Ultimately, our approach and target is helping our customers to be more successful. For being successful, I believe, we need more than only a perfect machine. For many customers it is really crucial that we have next to them skilled and experienced customer care technicians for quick and competent help. This trend will be more and more important. United Grinding has the target that with our more than 2,300 employees and representatives in all relevant markets we will be close to the customer.

Furthermore, I think with PuLs (Precision and Passion; our company philosophy) we're working on an 'internal' topic which in future will be even interesting for our customers. For example, giving answers to the question 'how you can avoid waste for being more efficient, and finally successful'. Here we are working on concrete things. We have trained a huge number of our employees for the PuLs-philosophy during the last months.

Future means asking today the right questions, developing tomorrow the right solutions for finally being ready the day after tomorrow for helping our customers. Therefore we are investing every year a significant amount of our sales in R&D – year after year. In many fields – e.g. lasering, as showed at the Symposium – we are investing and working on basic researches (close with universities) for being at the top of innovation.

As a member of the Körber Group we have some more advantages. On this level we have teams working and thinking about what can be the next big trends and how we will face it.

Innovation BLOHM & JUNG

> "Future means asking today the right questions, developing tomorrow the right solutions for finally being ready the day after tomorrow for helping our customers."

**Another fact that you have emphasised at the Symposium is that all your innovations are driven by the single objective of making your customers more successful. Can you share a couple of examples in this regard?**

I can't go really deep into this topic because our relationships with our customers and the solutions for them are not public and confidential. I can share some general examples though.

The new CrankGrind from Schaudt was driven exactly from the customer purpose. We had to learn a lot about the processes in the automotive industry for producing crank shafts. Here one concrete example is the way you can change the wheel. With our new CrankGrind it is e.g. really easy to change the grinding wheel without climbing up the machine.

Another example is the smallest grinding machine in the market: the Studer S11 with a footprint of only 1.6 sq m. This allows customers to save space for production – but without losing quality and performance.


Innovation STUDER S141 rain

**Going ahead, where do you see the big potential for innovation in Grinding?**

Again, we're not thinking only about technical innovation. Big innovation


**Innovation SCHAUDT CrankGrind**

field we see apart from the machine in know-how and training and even for the software and machine control. For example, we are investing every year a lot in our Service Academy and in PuLs. We really believe that we can only sell the best products and services if we will set the benchmark in our internal processes and we will invest in our employees. Finally you have more than one dimension for being innovative: on the product and service side, on the process side, and even on the design side.

**Q As seen at some of the launches at the Symposium, the Group companies are now working towards collaborative synergy. How is this benefitting your customers?**

The benefit is that customers get worldwide the same quality and promise – made by a company of the United Grinding Group. Here I have two examples: For customer care, we have worldwide the same products and the same quality level. So the customers will get worldwide the same level of services.

With PuLs we incorporate a worldwide philosophy in all our companies. Finally those group-wide standards give our customers the safety that all our solutions are at United Grinding quality level.

> “Often we really design, in cooperation with the customer, complete new processes and we help to think about new solutions.”

**Q Buying the right machine is one thing and using that machine optimally is another. This can be particularly true in case of new customers. Tell us how you are helping customers use your machines more effectively and profitably?**

Before buying a machine we help customers finding the right solution for their application. Here we have, what I think, the broadest application know-how in the world. Often we really design, in cooperation with the customer, complete new processes and we help to think about new solutions. Furthermore, we have worldwide showrooms with a lot of skilled engineers testing ways to have the best solution. Also in India we've opened a new and modern Showroom for being close to our Indian customers!

Additionally in our own academies the customer gets the chance to cover different modules and gets finally a United Grinding approved certificate. This is not only a good opportunity for new customers but even for our existing customers to bring their staff to the actual know-how. Then we have a broad service portfolio within our Customer Care division: e.g. production support, training at customers' facilities, etc.

**Q Tell us something more about the Group's 'PuLs program' focused on optimisation of processes. Would you also be sharing it with your customers?**

PuLs is not only a program – it's our philosophy how we work. PuLs is relevant for all divisions and functions. It describes a tool box with which we optimise our processes and procedures and implement (Lean). Moreover, PuLs is not a finite project but is ongoing, aimed at becoming and remaining 'Best in Class'. This philosophy will be implemented in all our Group companies. Its aim is to learn from each other

To transport all targets and visions from PuLs we are setting up a big worldwide training program. And of course, we will communicate about PuLs more actively in future.

Over the past few years, manufacturers have seen an explosion of new technologies

# Era of Disruptive Complexity

Manufacturers the world over are now starting to take stock of the more complex world that they are operating in, says a KPMG survey

Manufacturers are entering into a new era of 'disruptive complexity' which is fundamentally changing the way manufacturers compete and succeed, according to the KPMG's 2014 Global Manufacturing Outlook (GMO).

"Over the past few years, manufacturers have seen an explosion of new technologies and innovative developments in material science, advanced manufacturing and synergistic operating models. With this accelerating pace of change, manufacturers the world over are now starting to take stock of the more complex world that they are operating in, and are using that insight to redefine 'the art of the possible'," said Jeff Dobbs, Global Chair, Industrial Manufacturing and a Partner with KPMG in the US.

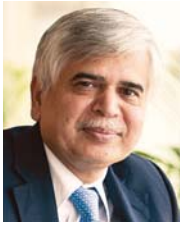
In an attempt to capitalise on this environment, manufacturers say they will dramatically increase spending in R&D, pursue new collaborative business models and integrate new technologies to analyse and stimulate profitable growth.

**A focus on understanding profitability**

This year's GMO reveals that only 12 percent of manufacturers would categorise themselves as being 'very effective' at determining product profitability. Further, 85 percent of respondents said they plan to make either 'moderate' to 'substantial' investments into systems for product or service cost improvement over the next 12-24 months.

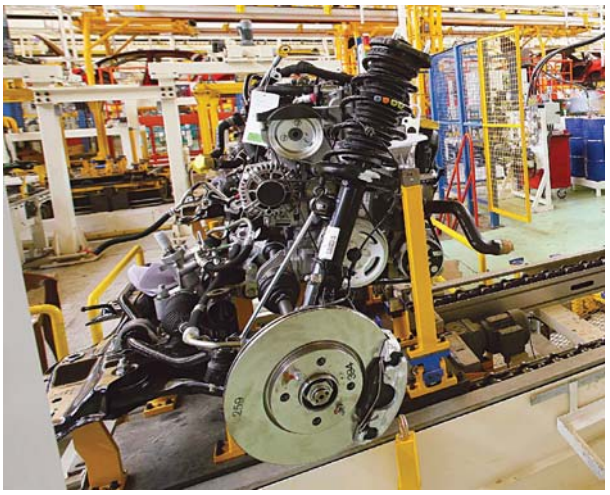
"This isn't simply about mining data and building

## Innovation – the major theme



"Innovation has been a major theme for manufacturers in the emerging markets. But, whereas much of the focus was once on product innovation (particularly in creating global products with local flavour), today's manufacturers are now looking at innovation across other management spheres such as cost optimisation, feature addition and partnership value programs which aim to generate innovative ideas in collaboration with suppliers and business partners. In India, for example, companies are keenly focused on collaborating with supply chain and logistics providers to improve reliability, enhance capacity and reduce costs by identifying and maximising process and business practice innovation." –

**Richard Rekhy,** *Chief Executive Officer, KPMG in India.*



**There could be a shift from the traditional product innovation to other spheres of management such as cost optimisation, feature addition**

spreadsheets; it's about accessing the appropriate information, at the right level of granularity and – maybe most importantly – with the right speed and frequency to generate timely insights that help people make better business decisions," noted Jim Scalise, a Management Consulting Partner with KPMG in the US.

**Growth through innovation and collaboration**

According to the KPMG's 2014 GMO, almost half of manufacturers plan to double R&D spending in product development over the next 12-24 months. There are also signs that breakthrough innovation is gaining importance as a strategy for 39 percent of industrial manufacturers, up 8 percentage points from KPMG's 2013 GMO, representing a 25 percent increase in companies pursuing such strategies.

"The manufacturing world is in an era of hyper-innovation," said Dobbs. "Ultimately, those organisations that do not balance investment in 'incremental innovation' with investment in 'breakthrough innovation' may find themselves left behind competitively."

"Innovation is becoming a key success driver for every organisation worldwide and India will be no different. Innovation is likely to move from the traditional product innovations to other sphere of management such as cost optimisation, feature addition etc. Partnership value program which aims to generate innovative ideas in collaboration with the suppliers and business partners for cost compression and quality enhancement will gather momentum in the coming years", added SV Sukumar, Partner and Head of Operation and Supply Chain, KPMG in India on the subject of 'Collaboration to innovate in India'.

Manufacturers in Germany appear set to lead in breakthrough innovation with 77 percent citing it as their primary R&D strategy for product development. Among the industrial sectors included in the survey, 50 percent of respondents from the Conglomerates sector say breakthrough innovation will be their primary R&D strategy.

In terms of business models, 88 percent of respondents say partnerships over in-house efforts will shape manufacturers' approach to innovation, up significantly from 51 percent in KPMG's 2013 GMO. Additionally, 68 percent say they are adopting more collaborative business models with suppliers and customers. In EMEA, respondents were overwhelmingly in strong agreement with adopting more collaborative models (82 percent).

**Improving supply chain visibility**

This year's GMO reveals that limited visibility across the supply chain remains a growing concern for manufacturers, even though many have made notable progress towards improving transparency.

## Reviving manufacturing in India

Resolving issues around Coal and mining sector as quickly as possible as this is not only affecting this sector but it has a cascading effect on other sectors and the whole economy.

The short term, medium term and long term focus should be on improving Road, rail and port infrastructure as the industry is suffering from bottleneck in these areas for both domestic and overseas movements.

Boosting Small and medium enterprises (SME) segment in manufacturing sector should assume greater priority as they are under severe stress for the past few years, and more so as they employ large number of people.

*Recommended by SV Sukumar, Partner and Head of Operation and Supply Chain, KPMG in India*

On integrating the supply chain SV Sukumar, Partner and Head of Operation and Supply Chain, KPMG in India said, "In India, planning has always been the weakest link for quite some years now. Given many unpredictable factors associated, planning will have to be even more robust. The successful integration and hence the visibility of the entire supply chain will call for a significant change in the way organisations manage their 'Planning and execution'. Apart from leveraging 'Technology' for managing complex planning process, the organisations may need to change the 'Philosophies, Assumptions and Rules of the Planning & Execution' appropriate to the market they serve."

"The upward trend is promising given the fact that almost three quarters of our respondents think they can achieve a globally integrated supply chain within the next five years," Dobbs said.

*This fifth annual 'Global Manufacturing Outlook, Performance in the Crosshairs', was completed in early 2014 and surveyed 460 senior executives across six industrial sectors split equally among the Americas; Europe, Middle East and Africa; and Asia-Pacific.*

# Fuelling leadership development

A leading manufacturer derived benefits by enrolling a talent pool of 150 high potential managers for a structured and sustainable development intervention coupled with action learning projects which would demonstrate business impact.

As one of India's largest energy and environment engineering companies, Thermax manufactures, boilers, vapour absorption machines, offers water and waste solutions and installs captive power projects.

**Identifying the need to change**

Working across diverse industries and geographies, Thermax is fast growing company that recognises the need for developing talent and creating robust leadership pipeline. The Leadership & Organizational Development (L&OD) Team at Thermax identified a talent pool of 150 High Potential Managers (HIPOs), representing strategic business units. These HIPOs being first time managers had to be enrolled for a structured and sustainable development intervention coupled with action learning projects which would demonstrate business impact.

**Measures taken**

Thermax selected Acumen Business Consulting, a management consulting firm to conduct talent assessment and development for the high performing young managers from across the company. Acumen supported Thermax talent assessment exercise by developing competency assessment tools appropriate for the target participants, training assessors within Thermax and deploying a Master Assessor during the assessment exercises.

On assessing the talent, the participants were taken through Leadership Development Programme (LDP) - a series of four two-day training programmes which included an outbound session. Participants were trained on a comprehensive curriculum that introduced them to the concepts of managing oneself and one's team, managing execution, problem solving, decision making, innovation and thought leadership.

To ensure that the learning programs translated to tangible results and the learnings were implemented

on the ground, the consulting partner designed a sustenance program which involved taking up a month-long project after each workshop which would help the participants practice and implement the concepts they had learnt during the workshop for their professional as well as personal development. As part of the sustenance program, participants were given access to a learning portal and received support in the form of fortnightly reviews which were conducted by the consulting partner's coaches.

Currently, the participants are taking up a six month long sustenance project powered by this Portal called 'FUEL which helps them define milestones, review progress at each stage and seek mentorship at various levels of the project. The projects will involve participants taking up operational excellence projects and holistically applying what they have learnt through the LDP under the guidance of the coaches.

**Impact of the intervention**

The workshop and the subsequent coaching sessions had a positive impact on the organisational culture with employees reporting significant changes in their ability to deal with peers, customers and suppliers. The various communication and negotiation techniques helped them negotiate better contract with both, employees and suppliers thereby strengthening their relationships. Participants found it easier to delegate to their team members and also monitor work. Participants reported that their delegating work improved the team's morale while also freeing up their bandwidth. They also led brainstorming and problem solving sessions within their departments and reported improvements to long standing issues.

"The projects will involve participants taking up operational excellence projects and holistically applying what they have learnt through the LDP under the guidance of the coaches."

# Broken tool detection

A famous two-wheeler manufacturer relies on tool breakage detection to produce unique camshafts preventing damage caused by tool breakage during the machining process

Ducati has realised that the machining of valuable components for its Desmodromic engines must be carefully controlled. Different tools are used hundreds of thousands of times during the course of a year, with the constant risk of a chipped or broken tool being picked up from the magazine, which would result in serious problems. This has been solved using a Renishaw tool breakage detection system based on innovative non-contact laser technology.

The most important stage of the Ducati Desmodromic camshaft production process is carried out on two Stama machining centres. The machines work non-stop throughout the year producing camshafts for all the different Ducati engines.

Fulvio Abbondi, Manufacturing Technology Specialist at Ducati Motor, comments, "Great precision is required when making the shaft, with the rather elaborate machining process carried out entirely within our factory. This is a very expensive component. It is made of a special steel alloy and is already expensive when, as a blank, it reaches the machine tool, after its first rough-turning".

A tool breakage during the camshaft production process would be particularly serious, and could result in scrap, costly re-machining and wasted time. There could also be damage to the machine spindle which, when added to the cost of the specialist tools themselves, would total thousands of Euro.

**Taking control**

Abbondi mentions the role played by tool breakage detection. "It is essential that checks be carried out on the work performed by the machines. Renishaw NC4 systems were installed on two work centres: immediately after a tool is loaded in the spindle ready for machining, it crosses the device's beam at a set height. If the cutting tip is broken, for example instead of being 100mm long it is 97mm, the laser system triggers an alarm. Clearly, each tool has its own length, diameter, etc. and the system takes this into account when the tool passes through the checking beam."

He continues: "The NC4 also allows us to check for

> "Great precision is required when making the shaft. This is a very expensive component. It is made of a special steel alloy and is already expensive when, as a blank, it reaches the machine tool, after its first rough-turning."
>
> **Fulvio Abbondi**, Manufacturing Technology Specialist at Ducati Motor


The Ducati 1098

breakages of small tools used to make keys and other reference points on the cam, which are vital if the engine is to operate properly. If it wasn't for the Renishaw system, the machine could, for example, operate with a broken cutting tip, with disastrous results. Furthermore, since tools are checked for breakage automatically, one operator can easily manage both machines: all he needs to do is load the pieces and ensure that everything is running smoothly."

**Process control critical to machining operations**

As Abbondi describes: "The first thing we did was to install a system provided by the machine tool manufacturer, which enables the power used by the spindle motor to be checked. This system checks the degree of wear of the larger bits, used to drill the deepest holes, in which the stress during machining is more apparent - if the torque increases, it means that the tool is worn and so the alarm goes off. But we also needed, quickly and reliably, to detect when tools break, even the smallest ones, which usually manage to escape most detection systems."

The Renishaw NC4 system is used to prevent damage caused by damaged tools to very expensive parts – eliminating resultant scrap, re-machining and wasted time.

"Improvements in laser technology have led to the development of non-contact detection systems, capable of safely measuring ever smaller tools."

Conventional contact-detection systems have certain weak points and are usually unsuitable for small tools - the tool is brought into contact with a 'button' or 'rod' which activates the device. There is also the danger that the contact itself could break or damage the tool. This means that work can only be done at low speed, which slows down the process and considerably lengthens cycle times. The systems must often be fitted inside the operating area, occupying valuable space and causing possible collision risks, not to mention poor reliability due to the fact that they tend to jam. This is why the Renishaw system was adopted, to replace these devices.

The Desmodromic camshaft is not conventional, and has been designed with special 'lifting ramps'

**Checking with light**

Improvements in laser technology have led to the development of non-contact detection systems, capable of safely measuring ever smaller tools. A laser beam runs between a transmitter and a receiver, fitted on the machine table or mounted on opposite sides of it, so that the beam crosses the operating area. When the tool enters the beam, the amount of light detected by the receiver is reduced, which generates a trigger pulse. If no reduction in light is detected, the system emits a tool-broken signal.

**The Desmodromic system**

The vast majority of the world's motor manufacturers use return springs in their engines to close the (exhaust and inlet) valves, these springs pulling the valve back to its original position after operation. The one exception to this is Ducati, achieving great advantages with a less conventional Desmodromic system. Desmodromic distribution offers greater engine reliability at high speeds, by solving the problem of spring inertia and reducing operating friction by about 30 percent. In theory the engine can easily top 20,000 RPM.

Desmodromic uses a mechanical system to close the valves, a concept originated in America but then abandoned due to excessive cost. Bologna's famous manufacturer had other ideas however, incorporating desmodromic distribution into its two-cylinder engines in 1972, and using this winning feature for decades. The valves are closed by a special cam rather than a simple spring, in every respect creating a strict link between the valve and its position - the term desmodromic originates from the Greek 'desmòs', meaning 'link'.

The Desmodromic system introduces major complications to the design and manufacture of components such as camshafts. The cam itself is not a simple conventional cam shape, instead using special lifting ramps. Ducati's design team has carefully designed the shape so as to achieve the required acceleration and speed performance. Precision is everything; the "clearance" between the stem and the cam is adjusted by hand during assembly and is a critical operation. As Abbondi says, "It's not possible to take up the slack as you can with hydraulic tappets on cars. We use one pad at the bottom and one at the top and these must be adjusted with extreme precision."

*Source: Renishaw*

## From heavy roughing to precision finishing

KX-10i


HMC-560


These portal type high performance machining centre enables machining operation in 3-Axis from roughing to finishing with a broad job envelope. High Performance structure which maximises structural rigidity and allows optimum harmonic stability & maximum damping during demanding cutting conditions. Powerful spindle with high torque allows high mental removal rate & spindle vibration monitoring allowing high level of harmonic stability.

High speed, high performance 4-Axis Horizontal Machining Centers is equipped with Electro-Spindle which can easily perform variety of operation starting from heavy roughing to precision finishing work. Heavily ribbed Structure provides excellent balancing while machining operations, enabling the centre of gravity of moving mass to remain always within driving points of slides. The machines are having many alternates in spindles, ATC and palletisation.

*For more information, visit www.jyoti.co.in/*

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## Efficient extras for clamping force blocks

Schunk, the competence leader for clamping technology and gripping systems extends its series of TANDEM KSP plus clamping force blocks with two helpful extras. With the jaw quick-change system BWM clamping blocks can be retrofitted independent from its installation position in less than 30 seconds onto a new chuck jaw set for O.D. clamping. The re-peat accuracy achieves 0.02 mm. Since the base jaw and the changing jaw are connected with each other via an integrated diagonal pull, the interfering contour of the clamping block remains unchanged. A spring mechanism ensures that the changing jaw will not fall out in the open position. Since the locking mechanism can be optionally actuated from the top, from behind, or from either side, the dirt-resistant and maintenance-free set-up time turbo can be also used in confined spaces without any restrictions. A smooth-running drive ensures an extremely simple operation. The changing jaws can be equipped with standardised clamping inserts from the world's largest standard chuck jaw program from Schunk, as well as workpiece-specific changing jaws can be used. The changing system is available for every TANDEM KSP plus clamping force block in sizes 100, 160, and 250.

The second addition is the multi-functional jaw monitoring, by which the whole jaw stroke can be detected. No matter if I.D. or O.D. clamping: With a few simple steps the positions 'opened' or 'clamped' for any desired base jaw position can be adjusted. Monitoring is done via two inductive proximity switches, which are integrated in the special recess of the base jaws. Since the system is enclosed, it is particularly resistant against dirt. As the signal can be directly processed in the machine's control unit, the flexibly monitoring clamping force blocks can be quickly and easily integrated into the existing machine.

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**The jaw quick-change system BWM minimises the set-up time of the TANDEM KSP plus clamping force blocks to less than 30 seconds.**

**The jaw monitoring increases flexibility and process reliability during automated machine loading.**

## House show on turbine blade machining in Hyderabad


Ace Micromatic group, India's largest machine tool conglomerate, recently concluded its house show at Hyderabad. This was the first house show in Hyderabad where a live machining demo was made, specifically for turbine blade manufacturers.

The Vertical Machining Center, 'Super Winner' manufactured by Ace Manufacturing Systems, an Ace Micromatic group company, was displayed. This machine has a table size of 800 X 400 mm, standard spindle speed of 6000 rpm with an option for higher spindle speed up to 8000 rpm. The machine is provided with BT-40 spindle and HSK spindle is also available as an option. The machine can be provided with either Fanuc or Siemens CNC control system.

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

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

*Contact: Micromatic Machine Tools Pvt. Ltd, Email: connect@acemicromatic.com; Web: www.acemicromatic.net*

## Crankshaft grinding to perfection

The new CrankGrind from Schaudt celebrated its world debut at the Grinding Symposium 2014. This machine is perfectly designed for high speed grinding of crankshaft main and pin bearings. Constantly new requirements on lower emission values, more powerful but economical motors with long maintenance intervals and high reliability occupy combustion engine manufacturers today. Quality and ever narrower tolerances are particularly important during the production of the crankshaft, the heart of any engine. Only with the highest precision and ever faster machining times can the constantly increasing requirements of the automotive industry be fulfilled.

With the new CrankGrind crankshaft grinding machine, Schaudt has now developed a machine, which combines its decades of experience in noncircular grinding with cutting-edge machine design and the highest precision. This machine for the high speed grinding of crankshafts is equipped with a dual cross slide. This enables synchronous machining of adjacent main and pin bearings with two wheels with a minimum grinding wheel distance of 15 mm. The machining time is thus significantly reduced, while the grinding quality is improved.

The basis for high-precision, stable grinding processes is provided by the proven Granitan machine bed, which is characterised by its high thermal stability and optimum vibration damping. The Z-axis of the CrankGrind is equipped with the well proven StuderGuide guideway, a combination of hydrodynamic guideway and hydrostatic guideway. It

offers the highest precision, load bearing capacity and strong damping across the entire speed range. The X-axes, on the other hand, are equipped with fully hydrostatic guideways with an undercut. The drive is provided by linear motor, in order to guarantee the highest precision and dynamics.

When developing the CrankGrind the primary focus was on the operability and ergonomics of the machine, in addition to workpiece precision and productivity. All access points are designed to be very maintenance-friendly and easily accessible. An enlarged field of vision in the machine interior provides the operator with a better overview during grinding. The compact machine design also enables both manual loading and automatic loading via a loading portal without any problem.

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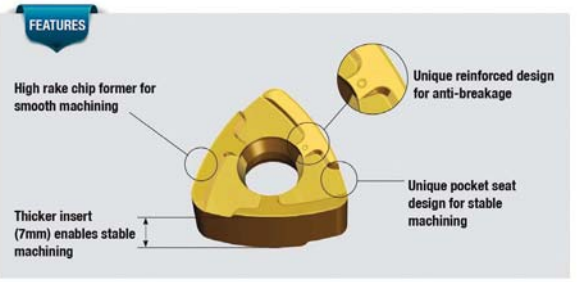
## Perfect for high feed milling applications

TaeguTec has added the new BLMP 13 size to its Chase2Feed range of high-feed cutters. This extended range of insert and cutters can tackle machining applications of up to 2 millimetres in depth of milling during high-feed conditions.

The insert's unique characteristics make it an excellent addition to the line which is specifically designed for heavy, die and mould, power generation and general industries milling applications.




The reinforced unique design and high rake angle offers better anti-breakage capabilities, while the reduced cutting load advantage over BLMP 12 provides for excellent chip evacuation.

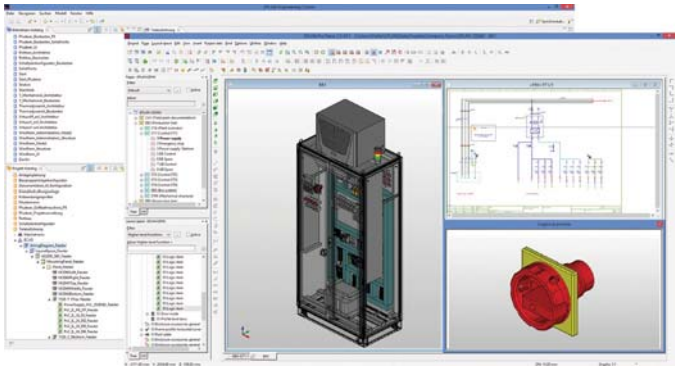
Other positive attributes include its 7 mm thickness and unique pocket seat which allows for stable machining in high-feed conditions and its six cutting edges – an added benefit over the previous Chase2Feed offering that came with four cutting edges.

Overall, the Chase2Feed's cost effective multiple cutting edges offer exceptional performance advantages in facing, shouldering, straight ramping, helical ramping and cavity machining. During product tests, the Chase2Feed BLMP 13 registered a 242 percent increase in tool life and a 578 percent increase in productivity over a leading competitor's similar offering while machining a work piece made from tool steel!

*Contact: TaeguTec India P Ltd, Tel: +91-(0)80-27839111; Fax: +91-(0)80-27839123; E-mail: sales@taegutec-india.com*

## Switchgear configured efficiently

Configuration instead of planning, this maxim has been a key factor for the continuously growing requirement of accelerating product development processes since introduction of the Eplan Engineering Centre (EEC). With the coupling of EEC and Eplan Pro Panel Professional to form an integrated solution, the future-orientated technology of configuration is now also moving into control cabinet and switchgear manufacturing. The main advantage for users: configuration is based upon predefined rules and standards. All of the knowledge relating to components, modules, mechanical forms and electrical requirements are deposited in the system. This considerably improves the quality of documentation. The optional connection of Eplan Pro Panel to the EEC is available with the new release of the EEC.



**Control cabinets and switchgear can be automatically configured with the new coupling of EEC and Eplan Pro Panel.** *Source: Eplan Software & Service GmbH & Co. KG*

Companies that produce their own control cabinets can map the various components of control cabinet or switchgear manufacture in one modular system with the integrated solution of EEC and Eplan Pro Panel. This modular system is the basis for the configuration of new, customer-specific control cabinets and switchgear. The options for reutilisation increase within the framework of configuration. In this way, users not only save time and money – the quality of documentation is also optimised due to standardisation and quality control of the modules. If the modular system is filled with corresponding information, the mounting layout can be automatically generated in 3D. If required, the configuration can be expanded or adapted to suit the customer's needs. This also supports last-minute changes. The options for configuration in conjunction with the 3D software Eplan Pro Panel unlocks new potential for use in technological engineering within the field of control cabinet and switchgear manufacturing.

At the same time, the mounting layout is the basis for numerous other process steps in the manufacturing and assembly of the control cabinet solutions, such as e.g. virtual control cabinet wiring including length calculation of wires and cables. In this way, a continuous product development process is supported from the first concept draft via hardware and technological engineering right up to manufacture.

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