VOL 1, ISSUE 4 - NOVEMBER 2017

# MODERN MANUFACTURING INDIA

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The Official Magazine of

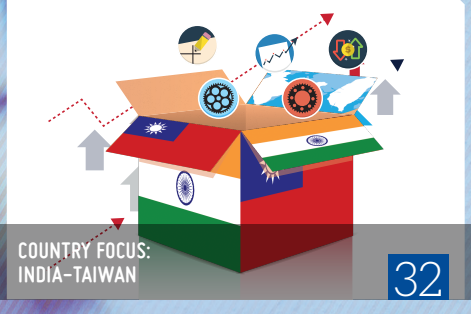
Indian Machine Tool Manufacturers' Association

In Association with

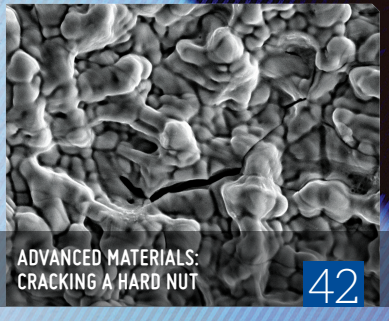
Modern Machine Shop

# IN TUNE WITH THE CHANGING TIMES

DEMAND-DRIVEN MANUFACTURING









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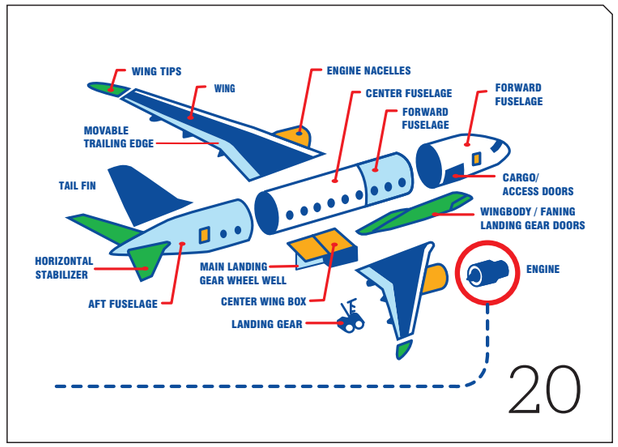
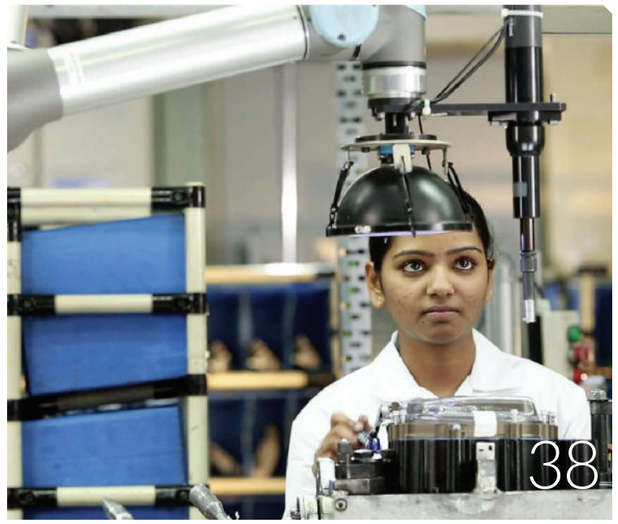









# IMPRINT


**PUBLISHER &**
**DIRECTOR GENERAL & CEO, IMTMA**
V Anbu

**EDITORIAL**
**Editor-in-Chief**
Soumi Mitra

**Chief Copy Editor**
Poonam Pednekar

**Senior Correspondent**
P K Chatterjee

**Correspondent**
Arunima Nath

**Design**
Manesh Bajaj

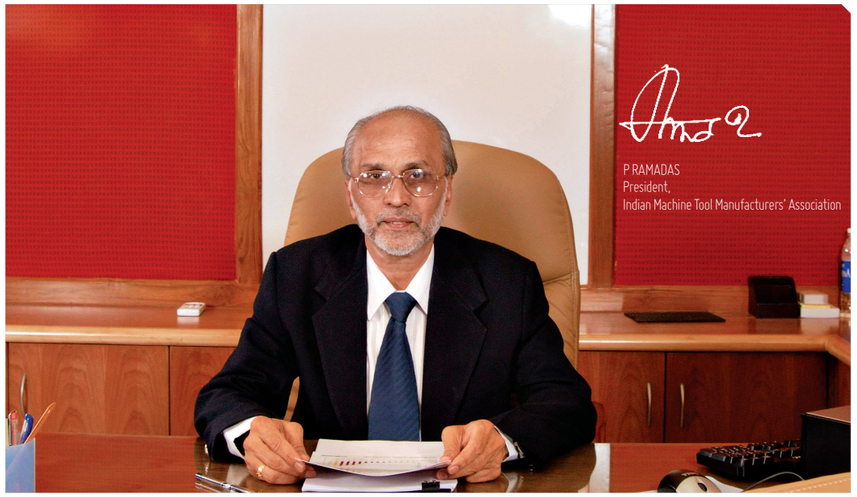
**SALES & MARKETING**
Indian Machine Tool Manufacturers' Association (IMTMA)

Murali Sundaram, Magic Wand Media Inc

Published and Printed by V Anbu on behalf of Indian Machine Tool Manufacturers' Association. Printed at Pentaplus Printer's Pvt Ltd 20/1, 4th main, 5th cross, Industrial Town, Rajaji Nagar, Bangalore-560044, Karnataka and Published from Indian Machine Tool Manufacturers' Association; Head Office : 10th Mile, Tumkur Road, Madavara Post, Bengaluru - 562123, Karnataka. Editor: Soumi Mitra

**Publishing frequency:** 6 times per year

**Manuscripts:** No liability is accepted for unsolicited manuscripts. They will be returned only if accompanied by sufficient return postage.




# **'FORMING'** THE INDIAN MACHINE TOOL INDUSTRY

Greetings from Indian Machine Tool Manufacturers' Association (IMTMA) and Modern Manufacturing India (MMI) magazine November 2017 edition.

India has been debating on the effects of the Goods & Services Tax (GST) bill on the manufacturing industry and particularly its implications on micro, small and medium enterprises (MSME) sector.

The manufacturing industry sees this as a transitional phase as it would stabilize the economy and every industry will begin getting used to the new tax regime.

It is encouraging to see India moving up 30 places in the World Bank's rating on the ease of doing business. This would perhaps bring in greater confidence among foreign investors and improve FDI. It would also add strength to the Indian manufacturing as well as create jobs in the future.

Technology and innovations have a major role in shaping a country's manufacturing. Keeping this in view, India's machine tool industry has been constantly reinventing itself on the back of policy initiatives set forth by the government and strengthening its inherent capabilities.

As the manufacturing world takes to the charted course, it is expected that the contribution of manufacturing to India's economy will improve from 16.6 to around 25 percent. With the measures of the government and policy initiatives, this could well become a reality. It is, therefore, an apt time for the industry to tap into the various opportunities and forge technology and production partnerships with overseas companies.

IMTMA's flagship exhibition on metal forming, 'IMTEX FORMING 2018' will showcase the trendsetters in the metal forming industry including automation and robotics. I firmly believe that by participating in the show, companies can take a quantum leap and transform the machine tool and metal forming machinery market into a globally competitive industry.

I call upon the industry to support the Association's initiatives by giving feedback which will guide us in our journey to make the manufacturing sector competitive.

This issue of MMI focuses on automation, robotics and metal forming. The magazine includes an opinion piece from IMTMA in which the Association shares its thoughts on the development of the metal forming sector in India.

Happy reading!

**P RAMADAS**
**President, Indian Machine Tool Manufacturers' Association**

Dear MMI Readers,

Indian Machine Tool Manufacturers' Association (IMTMA) is delighted to bring November edition of Modern Manufacturing India (MMI) magazine. Many thanks for your continued interest.

MMI, through its insightful and informative articles, strives to bring forth the best of innovations taking place in the world to the desk of our readers. This month's edition features articles on automation, robotics and metal forming.

Adopting these technologies in the manufacturing process will enable the industry to meet the expectations of its customers besides establishing a 'connect' between sellers of machine tools and their users.

Do read the opinion piece by IMTMA to gain a better understanding on metal forming that plays an important role in the production of manufactured goods, including high precision components in instrumentation and electronics industries.

As we continue to share inspirational stories on the developments in the manufacturing sector, we also reach out to you for your feedback, comments and thoughts. This will aid us in gaining an understanding of your requirements and enable us to cater for them. We have also made the previous issues of MMI available on the IMTMA website for you to read and revert.

I thank you once again for your consistent support to the activities of the Association.

**V ANBU**
**Director General and CEO, IMTMA**

SOUMI MITRA
Editor-in-Chief
Modern Manufacturing India
soumi.mitra@magicwandmedia.in

# PICKING UP THE PACE

Necessity has always been the reason for inventions. Of late, the industry too has started feeling an acute need for the academia to pay heed to the changing times and bring forth a workforce that is ready to cater to the dynamic global market place.

With engineering colleges in every nook and cranny of the country, we have rightfully earned the repute of being a land of engineers. The All India Council of Technical Education (AICTE) claims that India has more than 3,000 registered engineering institutes that produce an estimated seven lakh engineers every year. The situation thereafter is far from an ideal one: Only half of them get hired on campus. This is precisely due to the fact that our engineers still lack the requisite know-how and skill that the industry wants of them. There is no doubting their talent or acumen here. The onus lies on the academic institutions to structure the curriculum in such a way that makes them industry-ready, equipped with the expected expertise.

> *"If you want to thrive, you need to sow the seeds of self-development."*

This impending issue of knowledge-gap has been addressed by AICTE with a revision in the curriculum. From the next academic year, technologies such as big data analytics, robotics, artificial intelligence and IoT will be introduced in the very first year of engineering. There will be more emphasis on project works and internships to make students aware of the real industry scenarios and their demands.

In addition, visits to mega technology fairs like IMTEX that showcase the latest trends in technologies and products also aid in raising their awareness of the industry and its progress. And last but not the least, making them read industrial magazines like MMI to feel the pulse of the machining world.

In the same endeavor, this issue highlights advanced technologies that have become imperative in manufacturing, and also case studies that reflect on the resolve of the industry to keep innovating until breakthroughs are attained.

With a salute to that spirit, we wish you an insightful read!

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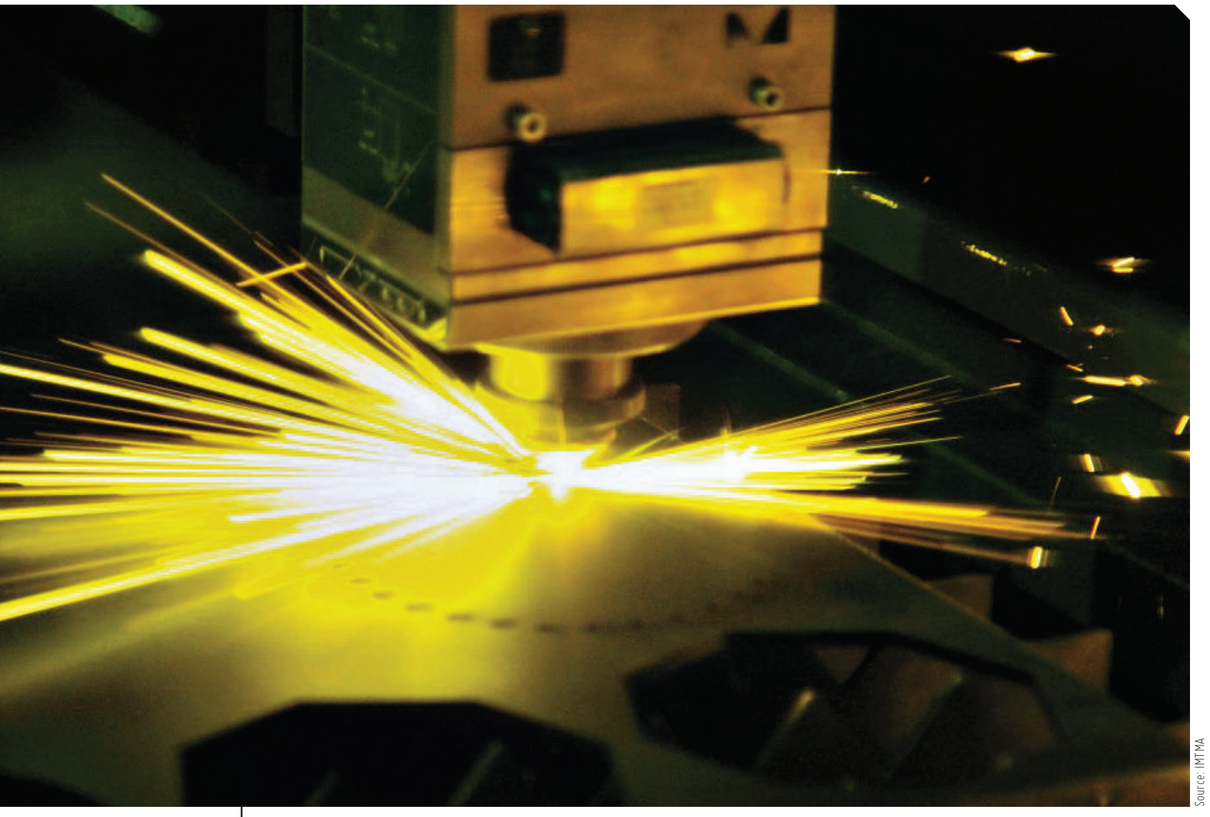


Source: IMTMA

Many manufacturing firms are coming up with innovations for the development of the metal forming segment.

# GIVING WINGS

## TO THE INDIAN METAL FORMING SECTOR

**There has been a strong surge in demand in the sectors that are dependent on the metal forming segment for providing them manufacturing machinery. This spells a bright future for the machine tools industry.**

Metal forming has a vital role to play when it comes to the production of various manufactured goods — beginning with automobile industry to high precision components in instrumentation and electronics industries.

Metal forming machine tool buyers have a lot to unearth at the upcoming IMTEX FORMING 2018 & Tooltech 2018 exhibition scheduled at the Bangalore International Exhibition Centre from January 25-30, 2018.

India's metal forming machinery industry has been serving the need for formed parts through the manufacture of metal forming presses, laser metal forming processes, wire forming, sheet metal parts, and so on.

The demand for high technology machine tools has been increasing over a period of time. This is mostly met through imports. However, many foreign firms are establishing businesses in India through JVs bringing latest technologies to Indian shores. Access to such technologies is expected to enhance the manufacturing capabilities of domestic manufacturers and give a boost to indigenous production.

India's metal forming sector contributed around 15 percent of the total machine tool demand in India during 2016-2017. The long-term prospects look good with demand picking up in consumer durables, electronics and automobile industries. Metal forming industry serves as the core manufacturing machinery provider for these industries.

Other sectors propelling the demand for metal forming machinery include aerospace, power, construction, railways, heavy transportation, office furniture, instrumentation industry, steel industry, forging, and structural engineering.

### Metal forming and technology

Metal forming is poised to present immense possibilities for India's manufacturing sector through embracing the concept of intelligent manufacturing as elucidated by Industry 4.0, Industrial Internet of Things, and increasing use of metal additive manufacturing or 3D printing. For micro, small and medium enterprises, metal forming offers a lot of potential for highly productive and specialized niche machines / processes and import substitution.

As the demand for quality end products go up, metal forming sector could witness technology shifts in the coming years. Small and unorganized sectors could also opt for new technologies such as near net shape forming, hydro forming, laser processing, three point bending and folding, etc.

### Automation

In India there is scope for automation in sheet metal industry. While automation is immensely popular in developed countries, India is warming up to it and this provides opportunities to grow. Customers in India are realizing the potential of Industry 4.0 in terms of quality improvement, safety in handling of sheet metal, etc.

Automotive industry is already using high level automation for presses, sheet metal forming and robotics for welding. These technological changes witnessed in automotive industry are likely to play a major role in consumer durables and other high precision manufacturing technology.

### Industry trends

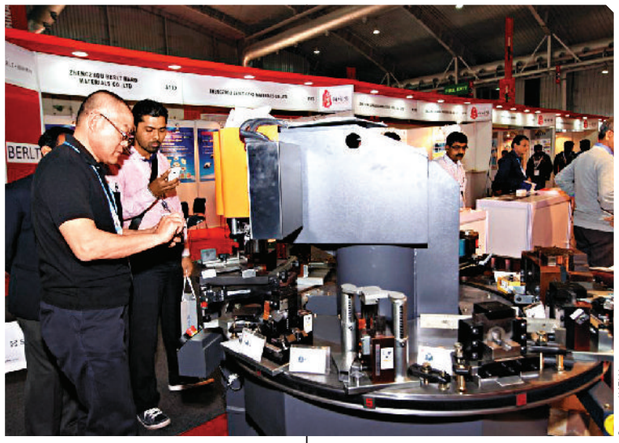
Many manufacturing firms are coming up with innovations for the development of the metal forming segment. Companies in India are offering hydraulic and mechanical presses with servo drive options. Presses for metal forming are available with a variety of features for applications such as deep drawing, stamping, trimming, and cold extrusion.

Manufacturers are also using hydroforming to open up new possibilities in manufacturing a variety of parts for different applications that are otherwise difficult to do. The industry is continuously researching and developing hydroforming to produce better dies and parts, reduce cycle times, and improve process controls and repeatability.

The demand for consumer durables, autos, and white goods of different types including office equipment will have great demand and will also see technology moving to more advanced applications. All these developments can be construed as a harbinger of growth for the Indian machine tool industry.

**HIGHLIGHT**

**Metal forming machine tool buyers have a lot to unearth at the upcoming IMTEX FORMING 2018 exhibition scheduled at the Bangalore International Exhibition Centre from January 25-30, 2018.**



Source: IMTMA

Visitors at IMTEX FORMING 2016 & Tooltech 2016 learning the latest in technologies at an exhibitor's stall.

# AN ODE TO THE GAME CHANGERS

That India is emulating the global trend of self-employment is evident from the various startups mushrooming all over the country across a myriad of sectors. It is not the sloth of striving for someone else or the desire for a better work-life balance or more income that is driving the younger generation towards such risk-taking ventures that come with no guarantee of success. On the contrary, they end up putting in more work hours and earning less on an average. So, what exactly is the thing that's drawing them away from the perks and prestige that accompany a traditional job and making them chart their own pathway? It's the freedom to take decisions, flexibility to operate at one's own pace, liberty to be creative and, above all, pursuit of true fulfillment that make up the causes for such a leap. Sounds fair, isn't it?

**Organizations that were earlier struggling to engage quality workforce will soon be brimming over with 'doers' 'chasing their dream'. By helping employees be the best versions of themselves, companies can unlock their highest potential, thereby achieving their highest goals.**

T K RAMESH
Whole time Director and CEO
Micromatic Machine Tools Pvt Ltd

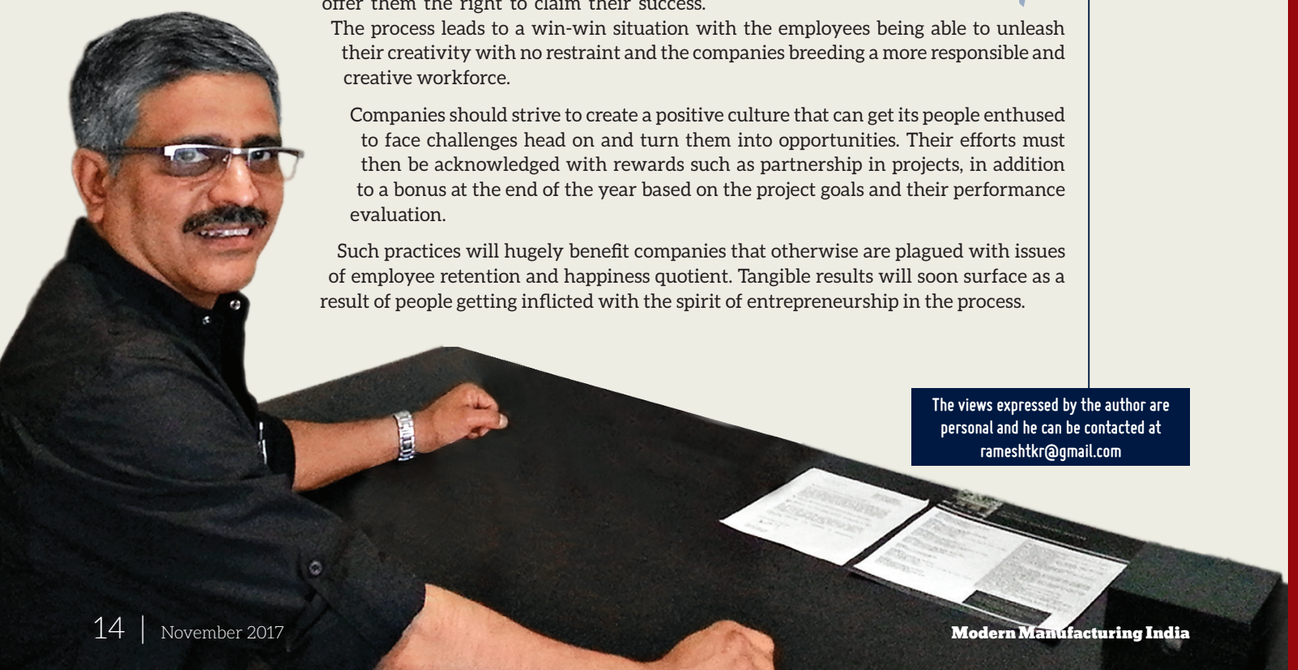
## Symbiosis helps

If one pays closer heed, it's the message being conveyed to the organizations that they must decipher. There is an immense scope for a mutual exchange: If all the things that the aspiring entrepreneurs pursue are provided to them by bringing in challenging roles with a fair share of recognition and reward the organizations can harness the entrepreneurial passion, talent, and disruptive innovation that can fuel the company's growth and help take it to the next level.

Organizations must start offering their workforce a sense of purpose with adequate autonomy to execute the tasks assigned to them with minimal intervention, providing them a guide in case they need any assistance. This would instill in them a sense of owning their failures, which would have otherwise been swept under the proverbial rug. Similarly, this would offer them the right to claim their success. The process leads to a win-win situation with the employees being able to unleash their creativity with no restraint and the companies breeding a more responsible and creative workforce.

Companies should strive to create a positive culture that can get its people enthused to face challenges head on and turn them into opportunities. Their efforts must then be acknowledged with rewards such as partnership in projects, in addition to a bonus at the end of the year based on the project goals and their performance evaluation.

Such practices will hugely benefit companies that otherwise are plagued with issues of employee retention and happiness quotient. Tangible results will soon surface as a result of people getting inflicted with the spirit of entrepreneurship in the process.



The views expressed by the author are personal and he can be contacted at rameshtkr@gmail.com

# High GST impacting Electrical Sector

**New Delhi, India –** Indian Electrical and Electronics Manufacturers' Association (IEEMA) has made a representation to the Government of India and the GST Council regarding high GST rates on electrical wires and cables. Presently, electrical wires and cables attract a GST rate of 28%, which is very high as compared to previous tax incidence of about 14%. IEEMA has requested the government to get these items reclassified under 18%. This huge gap between the rate of tax applicable on inputs and outputs is resulting in an effective increase of 14% in the working capital requirement by the manufacturers, leading to an increase in the cost of manufacturing. Sunil Misra, Director General, IEEMA, said "As electricity is kept out of GST, no input credit of GST paid on electrical products is available to electricity companies. This means a higher rate of GST is incurred on inputs resulting in higher cost of final product."

"Since the electrical industry supplies equipment for infrastructure development of the country, IEEMA feels that 18% rate of GST should be imposed on all products used for generation, transmission, distribution and consumption of power."

**Sunil Misra**
**Director General, IEEMA**

# Nath bestowed with highest honor

The Cross of the Order of Merit was handed over to Rajesh Nath, MD, VDMA by the Hon'ble Consul General of Germany, Dr Michael Feiner in Kolkata German Consulate.

**Kolkata, India –** Germany has conferred the 'Cross of the Order of Merit' to Rajesh Nath, Managing Director, VDMA India. Instituted in 1951 the award is also known as Bundesverdienstkreuz. It is Germany's highest civilian honor awarded to individuals for their services to the country and can be awarded to both Germans and foreigners in all fields of endeavor. The Cross of Merit along with the certificate signed by the President of the Federal Republic of Germany, Dr Frank Walter Steinmeier, was handed over to Nath by the Hon'ble Consul General of Germany in Kolkata, Dr Michael Feiner at the German Consulate.

# Greenko Group explores buying Gati's project

**New Delhi, India –** Greenko Group is in talks with Gati Infrastructure Pvt Ltd (GIPL) for the acquisition of its 110 megawatt (MW) Chuzachen hydroelectric project in east Sikkim, revealed sources requesting anonymity. Backed by Singapore's sovereign wealth fund GIC Holdings Pte and Abu Dhabi Investment Authority, the Hyderabad-based Greenko's plan to acquire the privately-owned project aligns with its goal of becoming an integrated energy company. It currently has 21 operational hydropower projects with a total installed capacity of 379.8 MW.

According to one of the sources, Greenko has been present in the hydropower sector for a long time. It then ventured into wind and solar and now is looking at the transmission and distribution assets to become an integrated utility. In 2016, Greenko acquired SunEdison's Indian assets at a value of $392 million. It currently has over 2.7 gigawatts (GW) of operating capacity with plans to achieve 3GW capacity by December and 5GW capacity by 2019.

# M&M acquires Turkish tractor maker

**Mumbai, India –** Mahindra & Mahindra (M&M) has acquired Turkey-based Erkunt Group's tractor manufacturing business that stands fourth in the country, and also its foundry for ₹ 800 crore.

The Indian company will acquire 100% of the share capital of Erkunt Tractor Sanayii A.S and at least 80% of Erkunt Sanayi A.s, the foundry business that operates in the casting and manufacturing sector.

The foundry unit is a full-service provider — from castings to machining and focuses on engine blocks, cylinder heads and transmission cases — and has a strong customer portfolio, including JCB, MAN, Ford and Deutz. The foundry also gets 75% of its revenue from exporting to the European Union, the UK and other countries.

The deal provides M&M the advantage of a local presence in the large market with a wide product portfolio and dealer network. It also gains access to the Middle East, CIS and North African markets.





# TAGMA India gets new President

**Bangalore, India –** The Tool & Gauge Manufacturers Association of India (TAGMA India) recently elected DK Sharma, Executive Vice President & Business Head, Godrej Tooling, as its new President.

The new Executive Council is highly optimistic of materializing the plans in the pipeline such as setting up of TAGMA Centre of Excellence and Training (TAGMA CET) and TAGMA Common Engineering Facility Centre (TAGMA CEFC) at Chakan, Pune with requisite support from the Department of Heavy Industries, Government of India (GOI). The GOI has encouraged TAGMA to set up such centers pan India once the maiden project takes shape.

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

TAGMA India has been actively promoting the tooling industry since its inception in 1990 The industrial body completed its 25 years of successful functioning in 2015. The non-profit organization has been making significant and successful efforts in bringing the tool-making fraternity closer to OEMs by organizing International Tooling Summit and the Die & Mould exhibitions.

# Accurate bags award

**Pune, India –** It is indeed a proud moment for Accurate Gauging & Instruments Pvt Ltd for being acknowledged for its contribution of supplying quality assured coordinate measuring machines (CMMs) to Tata Motors. For the last 15 years, the company has been providing Tata Motors high precision CMMs required for the inspection of various components, fixtures etc. with consistent satisfactory feedback. The honor received acts as an encouragement for Accurate to remain steadfast on its journey of making continuous improvements in its products and services.


(From L-R): Thomas Flack, President & Chief Purchasing Officer (CPO), Tata Motors; Guenter Butschek, CEO & MD, Tata Motors Worldwide; Vikram Salunke, MD, Accurate Gauging & Instruments Pvt Ltd; and Satish Borwankar, COO, Tata Motors during the felicitation.

Despite tough competition from giant foreign suppliers, Accurate has made a mark by successfully meeting industry demands with its high quality 'Make in India' precision machines and on time delivery and has, thus, proven itself every bit worthy of this highly distinguished recognition.

# BFW to expand in India

**Hosur, India –** The leading manufacturer of machine tools, Bharat Fritz Werner (BFW) has announced a major facility expansion for its Hosur and Bangalore locations to cater to the increased market demand in Hosur recently. Arun Kothari, Chairman, Kothari Group; Shailesh Sheth, Director, BFW; and Ravi Raghavan, MD & CEO, BFW; commemorated the ceremony in the presence of the BFW leadership team.

The first phase will spread across 30,000 sq mt which will include a significant number of modern mother machines to enable integration of the existing foundry facility with machining capability. The second phase will expand to 60,000 sq mt. Once operational, these facilities will double the machine building capacity of BFW.

"This expansion represents our enhanced commitment to enable progress of our manufacturing clients who continue to remain the purpose of our existence and stay at the nucleus of our every initiative," said Raghavan.

(From L-R): Ravi Raghavan, MD & CEO, BFW, explaining the facility layout to Arun Kothari, Chairman, Kothari Group and Shailesh Sheth, Director, BFW.

# Emphasis on manufacturing sector

**Pune, India –** In an interactive session organized by the Confederation of Indian Industry (CII) in Pune, Suresh Prabhu, Hon'ble Minister of Commerce and Industry, Government of India, laid emphasis on modernizing the manufacturing sector by bringing in new ideas and technology. This, he said, will aid in increasing the sector's contribution to the country's GDP.


(From L-R): Dr Naushad Forbes, Immediate Past President, CII and Co- Chairman, Forbes Marshall Pvt Ltd; Suresh Prabhu, Hon'ble Minister of Commerce and Industry, Government of India and Rajan Navani, Chairman, CII Council on Future Businesses and Managing Director, Jetline Group of Companies at the event.

Speaking on the various policies that the government is working on for the sector, he shed light on the new industrial policy, the foreign trade policy and the Agri Export policy. He elaborated on the government's initiatives on better utilization of resources and the ease of doing business focusing more on the district-level plans to understand the ground reality.

# thyssenkrupp, Tata Steel merges European units

**Mumbai, India –** German steelmaker thyssenkrupp AG and Tata Steel Ltd are merging their European steel operations to create Europe's steelmaker second only to ArcelorMittal. The cashless deal will have both groups contributing debt and liabilities to achieve an equal shareholding and will remain long-term investors.

The new company, a Netherlands-based entity called thyssenkrupp Tata Steel, will generate annual pro forma sales of €15 billion, ship 21m tonne of flat steel products per year and employ about 48,000 people at 34 locations.

The 50:50 joint venture outlines an annual cost synergy of about €400-600 million through integration of sales and administration, research and development, optimization of procurement, logistics, service centers and other support activities.

Natarajan Chandrasekaran, Executive Chairman, Tata Sons Ltd, the group holding company, said, "The Tata Group and thyssenkrupp have a strong heritage in the global steel industry and share similar culture and values. This partnership is a momentous occasion for both partners, who will focus on building a strong European steel enterprise. The strategic logic of the proposed joint venture in Europe is based on very strong fundamentals and I am confident that thyssenkrupp Tata Steel will have a great future."

According to him, it will put Tata Steel India in a strong position to accelerate expansion and "double its capacity through organic or inorganic route".

## parts2clean 2017 receives raves

**Hannover, Germany –** The 15th edition of the parts2clean show for industrial parts and surface cleaning was the biggest in its history, and ranked among the best in terms of attendance. Held in Stuttgart, Germany, from October 24-26, parts2clean 2017 featured 253 exhibitors from 16 nations. Its displays filled more than 7,300 sq mt of space, making it the biggest parts2clean ever in terms of booked space. The show attracted some 4,900 quality visitors with high degree of decision-making authority from 41 countries. This makes the figure nearly 20% more than the comparable show in 2015. "These outstanding figures reflect the key importance of parts2clean for the industrial parts and surface cleaning industry," commented Olaf Daebler, Global Director for parts2clean, Deutsche Messe. "Something of equal importance was the dynamic, upbeat mood that prevailed throughout the show," he added.

Visitors thronging the booths at part2clean 2017.

## AES kicks off on a high note

**Chennai, India –** The 11th edition of Automotive Engineering Show (AES) hosted by Messe Frankfurt India, was held recently in Chennai. Thiru M C Sampath, Hon'ble Minister for Industries - Industries, Steel Control and Special Initiatives, Government of Tamil Nadu, inaugurated the event and announced Business Facilitation Act & Rules 2017 enacted by the Government of Tamil Nadu to provide an investor-friendly environment to enable the potential investors to do business with ease. Around 75 exhibitors showcased new technology trends that can be adapted to create an efficient working environment on the factory shop floors. The trade fair also hosted seminars on "Surface Engineering in Automotive Industry" and "Industrie 4.0 and IIoT". ACMA (Automotive Component Manufacturers Association of India) also conducted an exclusive interactive seminar focusing on post GST implementation.

Industry Minister, Thiru M C Sampath inaugurating the show along with other dignitaries.

## Haimer opens technology center

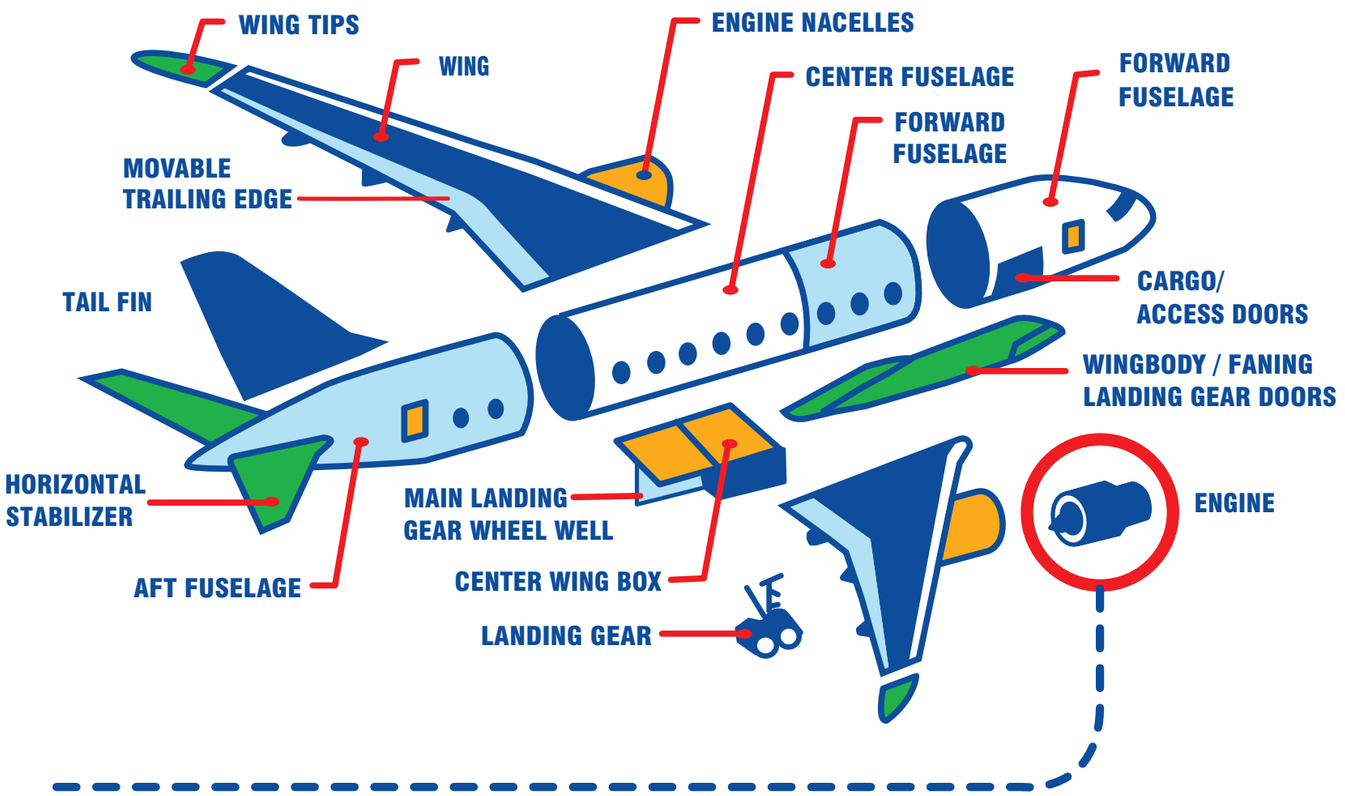
**Pune, India –** A leading player in metal cutting technology, Haimer recently started its technology center at Mulshi-Paud Road Pune. The company is celebrating 10 years of operations in the Indian market. The inauguration of its 1,000 sq mt state-of-the-art technology center is meant to mark the occasion. With this center, the company aims to provide optimum service, training and better sales support.

"The idea for opening this showroom is to invite our customers and demonstrate the latest technologies of shrink fit tool clamping, tool dynamic balancing and presetting," informed Makarand Dande, Managing Director, Haimer India Pvt Ltd.

"The new investment in the Indian market is a reinforcement of our commitment to the Indian market," he added.

Haimer India offers a comprehensive product portfolio for tooling industry including tool holders, grinding wheel adapters, tools balancing technology, shrinking technology, presetting technology, measuring instruments, and accessories.

(From L-R): Claudia Haimer, CMO, Haimer GmbH; Kathrin Haimer, Head of Human Resources, Haimer GmbH; Andreas Haimer, Managing Director & President, Haimer Group; and Makarand Dande, Managing Director, Haimer India Pvt Ltd.




Source: Tata Industries Ltd & Tata Advanced Materials Ltd

The Indian Aerospace industry is poised for an aggressive growth phase over the next 10 years based on significant tailwinds.

## INDIAN AEROSPACE INDUSTRY:

# ON A HIGH GROWTH **TRAJECTORY**

With favorable factors such as low labor costs; easy availability of manpower and expertise; high growth markets and active support from the government's new policies, India is all set to catapult itself into a world-class arena for global aerospace players.

MILIND M SHAHANE
Senior VP,
Tata Industries Ltd
Director, Tata Advanced Materials Ltd
mshahane@tata.com

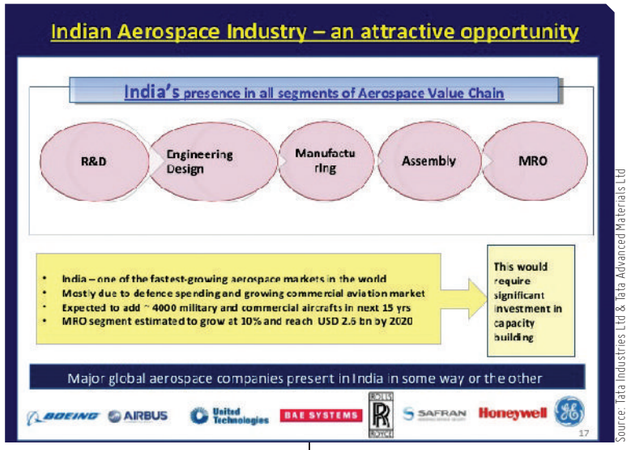
The Aerospace and Defence (A&D) market in India is estimated to reach around $70 billion by 2030 as the momentum is expected to further pick up with improving infrastructure and government thrust. The growth of airlines and passenger traffic in India has been highly rapid in the past five years at over 15 percent per year and this has increased from around 70 to 200 million passengers in the past 10 years in domestic and international air travel. Further, the number of flyers from India for international travel is also estimated to be around 100 million last year which indicates high demand for airline services and seats.

From a single carrier, viz. Air India /Indian Airlines until the 1990s, today there are strong private airlines like Indigo, Jet, Go Air, Vistara etc. which are competing for a share in the rapidly growing market pie. This is giving rise to unprecedented demand for new airplanes with all airlines placing large orders for airplanes over the next five years to meet the growing needs of the domestic and international Indian traveler. This growth trend is expected to continue strongly in future years as the economy develops and fuels the demand from a growing middle class for air travel for tourism, business, other visits etc.

There is large growth expected for smaller aircraft, business jets, helicopters etc. for regional connectivity and faster movement as the demand from business and other travelers increases with economic growth.

Today there are strong private airlines competing for a share in the rapidly growing market pie.

THE AERO-SPACE AND DEFENCE (A&D) MARKET IN INDIA IS ESTIMATED TO REACH AROUND $70 BILLION BY 2030.




Source: Tata Industries Ltd & Tata Advanced Materials Ltd

### Component manufacturing

This makes a strong case for global OEMs and their suppliers to examine India as a destination to play a vital role in the global supply chain for aerospace components and parts. There could be several advantages to gain from the low costs in India along with the technical and engineering expertise / skills available for high-precision and high-quality components. What has been witnessed in the automobile components and auto (small car) industry can very well be replicated for aerospace and related

The industry structure can be broadly classified into following areas:

- **Commercial airlines and air services operators:** Offering passenger and cargo services and procuring airplanes, helicopters etc. from global companies like Boeing, Airbus, Sikorsky etc.
- **MOD and other government entities:** For purchasing aircraft and other equipment for defence and other requirements.
- **Aircraft/airplane, helicopter, space equipment manufacturers:** OEMs largely restricted to PSUs like HAL, NAL, ISRO and other government entities.
- **Ancillary manufacturers of aerospace components and assemblies:** Various types of metallic, non-metallic and composite parts for engines, aero structures, airplane interiors, space programs etc. for both domestic supply and exports to international manufacturers.
- **MRO and other service operators:** For maintenance and repair services for airplanes and other aircrafts.

components and services.

In the past century, the progress of the domestic aerospace manufacturing of local aircrafts, helicopters and other aerospace products has largely been limited to the government-owned entities like HAL, NAL, ISRO etc. but the turn of this century has seen an aggressive growth of the private industry participation, backed by large corporate houses such as Tata, Mahindra, L&T and Godrej. These companies have made a successful entry into the aerospace industry on the strength of their engineering skills and expertise acquired in other industry sectors.

Many private companies have made rapid strides in developing India as a preferred destination for aero structures, components, sub-assemblies and complex system assemblies. Leading global OEMs have established JVs in India for the manufacturing of aerospace related parts and assemblies which find their way into many commercial and defence aircraft and helicopters. The sector has seen adoption of best practices and maintains international standards in quality for components but India as a country has yet to address the need to develop more facilities that provide end-to-end aerospace solutions.

### Defence procurement and offset obligations

Today the Indian Aerospace industry for the manufacture of components is relatively small ($250 million) as compared to developed Western economies. However, it is poised for an aggressive growth phase over the next 10 years based on significant tailwinds.

Factors driving the growth are as illustrated:


a) Large acquisition of defence aircraft with offset obligations and opportunities;

b) India is poised to break into the top three markets in the world for civil aviation with a growth in traffic of 20%+ in the past five years leading to large orders for commercial airplanes for domestic airlines;

c) Availability of engineering skills and talent;

d) Enabling policy framework by the Government towards "Make in India", infrastructure development, ease of doing business and the maiden National Civil Aviation Policy.

### Other services

The growth in all the areas mentioned would also lead to increasing need for MRO and related services in India, and many global majors like Boeing have been looking at the opportunities available for the same. All these have substantial potential to generate employment opportunities for technicians and engineers to fulfill the need for manufacturing and services for aerospace industry. The MRO market for repairs and maintenance services for aircraft is itself expected to touch $4 billion by 2025. In addition, there is scope for design and engineering services related to components and assemblies to be given as services to OEMs. There would also be requirement of leasing, financial, ground support and other types of services with growth of the aerospace sector.

### Favorable factors

In conclusion, the Indian aerospace industry is close to catapulting itself into a global arena with rapid rise in demand for aircraft and components. The country has many advantages such as low labor costs, high availability of engineering, design and technical manpower andexpertise, high growth markets etc and active support from the government's new policies. This presents a unique opportunity for global companies to tap into the Indian aerospace market across the entirevalue chain for aero structures, components, assemblies and even complete equipment / aircraft and related services.

The MRO market for repairs and maintenance services for aircraft is expected to touch $4 bn by 2025. (KEEP $4 and bn TOGETHER)

THE TURN OF THIS CENTURY HAS SEEN AN AGGRESSIVE GROWTH OF THE PRIVATE INDUSTRY PARTICIPATION, BACKED BY LARGE CORPORATE HOUSES SUCH AS TATA, MAHINDRA, L&T AND GODREJ.


# In **Tune** With the Changing **Times**

**In the modern industrial world, a forging company, along with being a forging supplier, has also become a supplier of turned parts. The design aspects and practical factors in the automatic handling of forgings for feeding into the first machining process of turning operation play a crucial role in the quality and cost of the final product.**

Image Source: Murata Machinery, Ltd, Japan

K RAGHUNANDAN
Marketing Advisor
Murata Machinery Ltd
Japan
k.raghunandan@nan.muratec.co.jp

During the past two decades, there has been a revolutionary change in the design and production of forgings, especially for the high-volume requirement industry worldwide. In earlier days, forging companies were only forging manufacturers. With the evolution of modern supply chain management, especially in the high-volume automotive parts industry, many forging companies started doing value addition to their forgings for their clients globally.

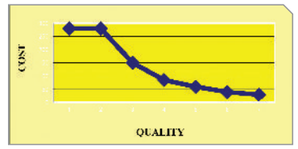
In the modern industrial world, a forging company, along with being a forging supplier, is also a supplier of either fully-finish or semi-finish turned parts. In several cases, forging companies offer value addition by heat treatment and other finishing operations up to ready-to-assemble stage of components. Further up the ladder are the suppliers of unit assemblies as well. The evolved forging companies now do not stop at the economics of the forging technology to produce raw forgings. They have started considering things on a macro level, including the value-adding first metal cutting operation process.

There is a link between raw forging as it comes out of the forging process and the feeding into the value-adding first operation of turning or turn-milling. Globally, as the automotive parts industry volumes are getting integrated and enlarging with a fewer number of tier 1 and 2 suppliers, there is an increasing need for the automation of workpiece handling even at this first operation stage after forging. The focus is to know about the various types of automatic feeding and handling devices of workpieces to load on the first operation chuck and highlight their designing factors relating to the forging quality and material.

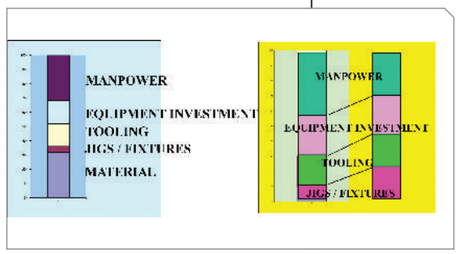
### Design aspects and practical factors

There are varieties of forgings with illustrations and the practical issues to consider for achieving the highest level of efficiency in a fully automated value-adding first operation. It focuses on the below points:

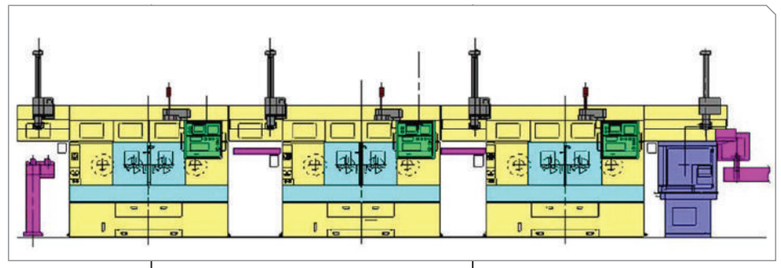

Forging cost




Machining cost




Distribution of per piece cost of machined product and life cycle balancing of the cost



Muratec's full turnkey solution for first process of turning / turn milling for forgings.

**Challenges & Solutions**

**Challenges**

- End-user (OEM / Tier 1) request for higher volumes
- Cost reduction
- Competitive advantage

**Solution**

Full turnkey solution and application support from machine tool supplier.

- Automatic handling of forgings for feeding into the first machining process of turning / turn-mill operation
- Chucking for the first machining process of turning operation
- Machining process (Turning / Turn-Mill Operation)

Automation in turning process is mainly considered for forgings from 0.5 to 25 Kg weight, 30 to 350 mm diameter and 10 to 400 mm length. Turning process of forgings achieving high efficiency of productivity can be broadly classified into:

- Automotive sector with high volumes and minimum part varieties
- Non-automotive sector with medium to high volumes and medium part varieties

### Forging quality vs cost

It is a myth that to achieve a better quality of forging, higher cost is involved in the forging process. On the contrary, better quality of the forgings reduces the cost of machining and automation. The various classification and effects of quality of forging on manufacturing costs are such as:

- Dimensional variations (diameter, length / width): Too small or too large variations make the control of the turning process more difficult.
- Geometrical variations (taper, step, burr): Small variations make the control of turning process easier than large variations.
- Material issues (hard spots, sand inclusions, pin holes): More of such abnormalities in forgings make the control of turning process more difficult.

### Quality vs problems vs countermeasures

Forging quality issues lead to several problems. Most obvious problems are directly in the machining process:

- More tool passes to remove excess material
- Unstable tool life resulting in productivity loss
- Longer cutting cycles due to above
- Unstable chucking resulting in the workpiece flying out

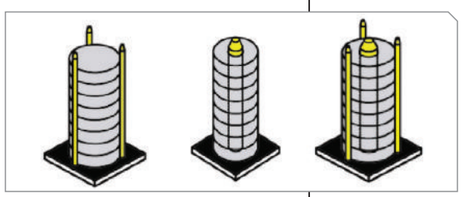
| Gauging device | Sensitivity | Relative cost |
|---|---|---|
| Laser Sensor with suitable jigs | ±1 mm | Medium |
| Proximity Sensor or Optical sensor with suitable jigs | ±3 mm | Low |
| Scale cylinder with suitable jigs | ±0.5 mm | High |
| Direct Sensing by loader | ±3 mm | Low |
| Orientation device (for non-circular forging shapes of chucking surface) | Includes one of the above | Higher |

- Ultimately may lead to tool and machine damage.

The simple countermeasure is to sort out the forgings with excessive variations manually and pre-machine the excessive material by low-cost manual machines to bring the variation within controllable limits. Though this countermeasure sounds simple, it involves additional management of machines, manpower and logistics. More comprehensive countermeasure is sorting of forgings automatically and using suitable gauging system for just the critical dimension, which is directly related to chucking and tooling cycle. The objective is not to measure the actual dimension, but to gauge if the critical dimension of height to diameter is in the allowable limit for efficient handling and chucking. It is also possible to check if the part is being loaded in to the chuck with the correct side in and out. To certain extent it can also be designed for Poka-Yoke.

There are various countermeasures for automation of the feeding-in of forgings to the first machining process of turning.

It is a myth that to achieve a better quality of forging, higher cost is involved in the forging process. On the contrary, better quality of forging reduces the cost of machining and automation.



Stacking type work feeder

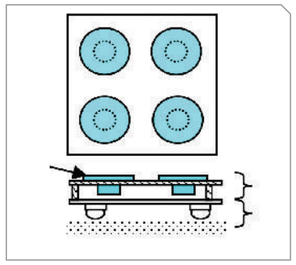
### Feed-In devices

There is a variety of solutions possible based on following factors:

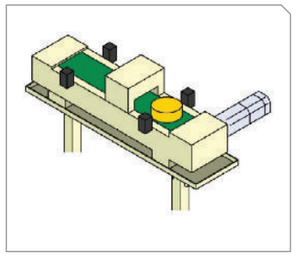
- Stackability
- Round or non-round external shapes
- Volume of feed-in stock required: Typically to run unmanned even during lunch breaks of the operator, depending on the TACT time of the line and overall size of the forging.

### Standard work feeders

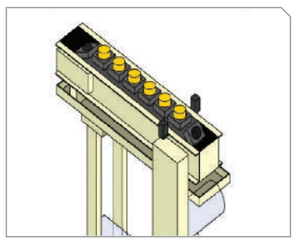
**Stacking type:** It is suitable for fairly good quality uniform shaped forgings which can be stacked one above the other in the orientation as required for loading into the chuck.



Flat non-stacking type work feeder



Feed-in flat belt conveyor



Pitch-feed conveyor

- 3-Pole centralizing pallet system: For round external shapes
- Center pole pallet system: For forgings with smooth round or symmetrical punched bores
- Combination of above for uneven forgings
- Customized pole pallet system: For non-round and unsymmetrical shaped forgings where orientation is required to load the forging into the chuck.

**Flat non-stacking type:** This is suitable for forgings which cannot be stacked easily. One or more forgings are set into special jigs on a square pallet for the loader to pick up by a special palletized program.

### Feed-In conveyors

- Flat belt or Mesh conveyor
- Pitch-feed conveyor
- Parts Feeder – Vibratory bowl feeder
- Magnetic picker type for direct setting of forging bin

Muratec's full turnkey solution for first process of turning / turn mill for forgings:

- Feed-In device
- Poka-Yoke / Orientation units
- Loading / Unloading on first chucking process
- Turnaround unit
- Loading / Unloading on second and / or further chucking processes
- Washing station
- Post-process gauging unit
- Feed-out device
- Interfacing to next process

### Chucking and machining issues

#### Chucking surface

There are several effects of forging design on chucking and machining. The most common chucking surface is the outside diameter of the forging or in case of larger forgings, sometimes inside diameter. If this chucking diameter has a large draft angle or step due to forging die mismatch etc., standard straight action wedge type jaw chucks are not suitable for safe chucking.

The effect on machining mainly would be interrupted cutting affecting tool life. Most common chuck type is universal ball lock type chuck with centralizing action. Cylinder stroke is sensed by proximity switches to ensure that forging is clamped properly.

#### Locating surface

If the locating surface has a large taper or burr, it results in uneven stock removal in first chucking process which in turn affects the subsequent chucking processes and may result in uncleaned surfaces. The effect on machining is again interrupted cutting affecting tool life. If the locating surface is not too rough, location sensing system with air pin-hole check can be used.

#### Bore with / without pre-punching

Many designers want to reduce forging cost by avoiding punching out the bore. If the face is straight, drilling operation can be easier but most of the forgings are with a dimple in the center. In such cases special drilling tool may be required, which increases machining cost and cycle time as well. On the other hand, if punching is done with too much stock removal left or eccentric punching, can have adverse effect in rough boring operation. Especially if bore length to diameter ratio is high, stable rough boring may not be possible or special boring bar has to be used, again resulting in more cost and cycle time.

### Types of chucks for forgings

A variety of chucks are commonly used for the first operation chucking of forgings in turning process.

**Standard wedge type chuck:** Even though this is low cost, it is suitable for only very good quality forgings where defects mentioned earlier are non-existent.

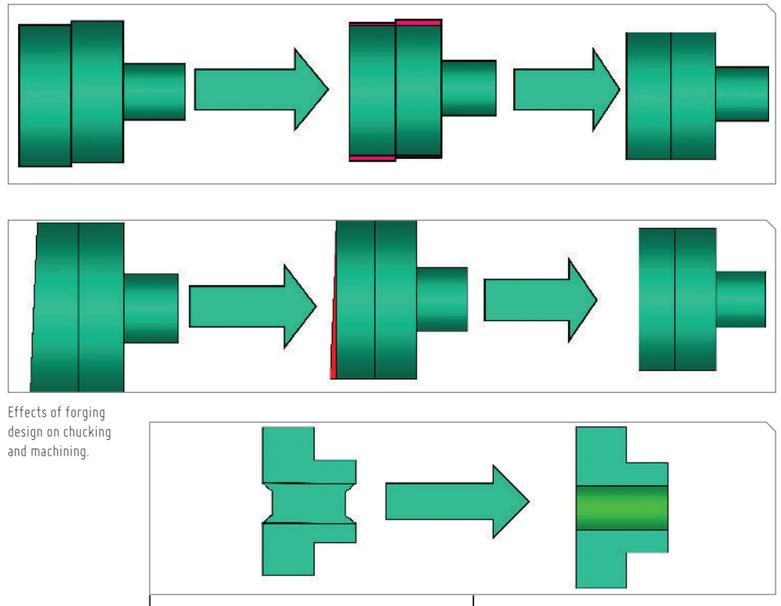
**Long stroke chuck:** This is basically the standard chuck with longer jaw strokes. If chucking diameter surface is good but there is burr at the back which must be avoided, this chuck can be useful.

**Universal ball lock chuck (centralizing):** This is probably most commonly used chuck for forgings, especially for automation to ensure proper chucking. It can take care of a certain level of forging issues as mentioned above.

**Swing jaw chuck:** For forgings where face clamping is required, this chuck is useful in automation.

**Universal ball chuck (compensating) with center location and tailstock:** For shaft forgings with pre-forged or pre-machined faces and centers, this type of chuck is required.

**2-Jaw, 4-Jaw or 6-Jaw chucks:** For odd shaped forgings and specialized applications, where automatic loading and unloading has to be coupled with automatic chucking, such options are available.



Effects of forging design on chucking and machining.

The company's integrated Gantry Loader System and additional pick-and-place units facilitate in complete handling of the forging to finish machined product to meet the TACT time requirement of the complete production line.

### Wrap up

In the global perspective of raw materials, forgings, initial machining process, finish machining process, sub-assemblies and final assemblies, quality and cost are no more independently controllable. To achieve the objective of the final assembled product to be globally marketable, all the links in the supply chain – machine tool suppliers, logistics suppliers – must work together. Equipped with the global know-how and expertise, Muratec has so far been consistently achieving its goals of providing full turnkey solutions to suit local needs and working environments, and hence, enjoys a leading position in the manufacture and integration of turning technology and automation.


Source: Magic Wand Media Inc

Hon'ble Minister of Commerce and Industry, Shri Suresh Prabhu at an industry interaction in Pune with Dr Naushad Forbes, Immediate Past President, CII and Rajan Navani, Chairman CII Council on Future Businesses.

# "HOLD THE **VISION**, TRUST THE **PROCESS**"

Hon'ble Minister of Commerce and Industry, Government of India, Shri Suresh Prabhu, recently addressed an august audience of distinguished leaders from the manufacturing industry, shedding light on the current economic and industrial scene of the country along with the urge to collaborate to propel towards the shared vision of a greater India. An excerpt of the interaction...

Team MMI @ CII's event: Interaction with Shri Suresh Prabhu, Hon'ble Minister of Commerce & Industry

**Strategizing is crucial**

We all want to see India in a certain way. This transformation from our vision to reality is only possible when the resources needed for it are created. The fundamental issue is to have an economy with the capability to deploy these resources in the various growth sectors and do so efficiently. To address this and various other issues that act as hurdles in the way, well planned strategies are required.

**Modernize Manufacturing**

GDP has three important contributors: agriculture, manufacturing and services. The growth that has happened in the last few decades can be attributed majorly to manufacturing and agriculture. Thoughts must be put to accelerating the growth trajectory by giving thrust to these two sectors.

**INDIA'S SUCCESS STORY IS PRIVATE SECTOR DRIVEN. DESPITE VARIOUS ISSUES THE PRIVATE SECTOR FACES TODAY, IT WILL BE THE GROWTH ENGINE FOR TOMORROW AS WELL.**

An industrial output in the region of $1.25 trillion is required to double the current economy of $2.5 trillion to $5 trillion in the next few years. Hence, the need is to quantify 'Make in India'. What we manufacture today may get redundant or be subject to various global changes. To increase the share of manufacturing to GDP, it is therefore important to ensure that it be must be modernized to make it relevant to tomorrow's market. This process requires timely infusion of new ideas, which we are currently considering. Sectors that have not yet emerged as greenfield areas must also be identified.

**System detoxification**

China's success can be attributed to state intervention. Contrastingly, India's success story is private sector driven. Despite various issues the private sector faces today, it will be the growth engine for tomorrow as well. The ease of doing business is one of the many factors that we are working at to make that happen. The efforts have seen the light of day with the ranking coming up from 130 to 100. And we have already started gearing up to reach our present goal of 50. This is aimed at solving the issues entrepreneurs face today, which is our Prime Minister's whole idea. It is to create an honest and transparent ecosystem that will allow entrepreneurs to work on their own with least interference and maximum facilitation from the Government. It is meant to detoxify the system.

**Being part of global supply chain**

Today the profile of manufacturing has changed. It is no more necessary to make everything in once place. We are to be part of global supply chain, which will lead to our total manufacturing to increase manifold. It was not a planned strategy to get linked with the auto component supply chain. But it worked and has succeeded. Ten such global supply chains are in the process to be identified for them to be the driving force for manufacturing. A new industrial policy will thus be framed. A mid term review of our foreign trade policies is also to happen. Industry must come ahead to put forth its ideas to help us improve on the policies and do away with regulations that impede its growth.

**SMEs to benefit**

A district development plan is getting chalked out, which will have its equal focus on the various parts of a state. The district administration will be trained in the ease of doing business so that the entrepreneurs of the area can encounter least of issues in being part of supply chain. This will majorly benefit SMEs.

**Ease of trading**

This is similar to the ease of doing business. The idea is to bring all the elements of export on one common digital platform. Slated to be a game changer, it will be linking even smaller places in the interiors of the country for exports. Talks are also on with the ASEAN leaders on our south east coastal strategy to create coastal zones.

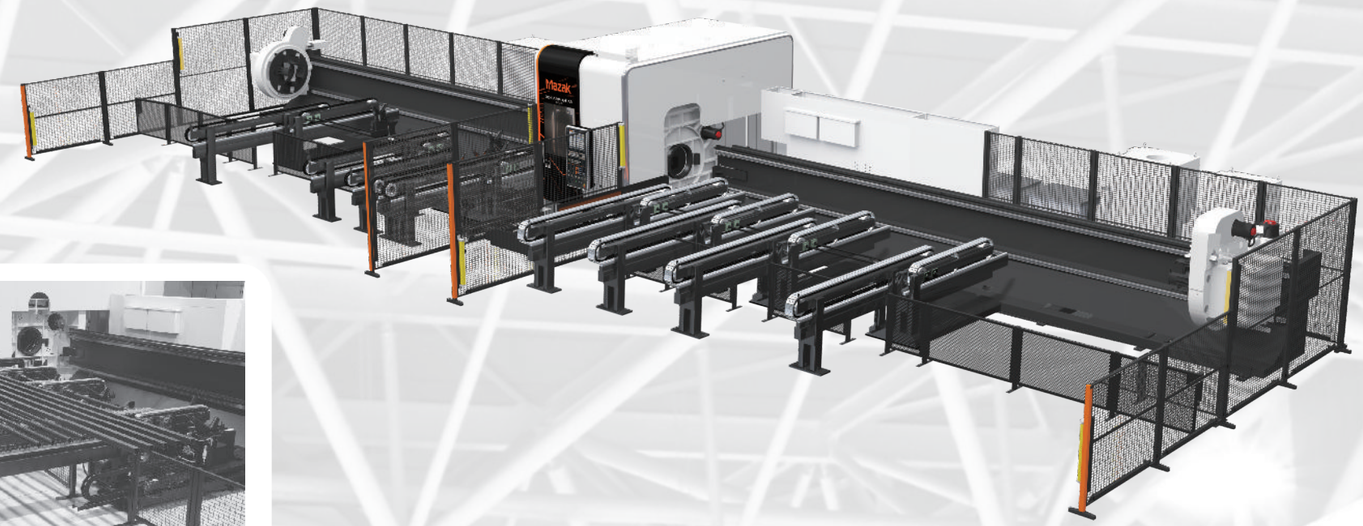
For exports, we plan to bring in new commodities. Focussing on markets, we are in the process to plan separate strategies for different geographies for which I have been to various places like Latin America, South East Asia and East Asia. To state an example: We have FTA with Korea. We are the one of the largest exporters of marine products but we do not do any value add. If we do the value addition with the Korean money coming into India, we will be able to export more to Korea itself and also to the neighbouring countries due to the high Korean standard. Another thing that we must focus on is building trading houses that will be of huge benefit to SMEs. This is the model that Korea and Japan have adopted.

**"**The idea is to create an honest and transparent ecosystem that will allow entrepreneurs to work on their own with least interference and maximum facilitation from the Government. It is meant to detoxify the system.**"**

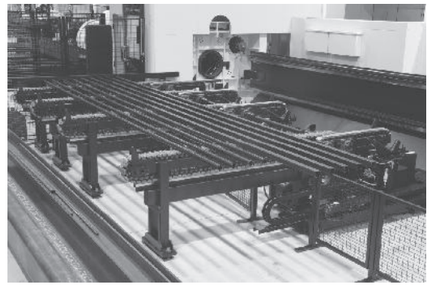
**Hon'ble Minister Shri Suresh Prabhu Ministry of Commerce & Industry Government of India**

3D Laser Processing Machine for Long Pipes and Structural Material

# 3D FABRI GEAR 400 III

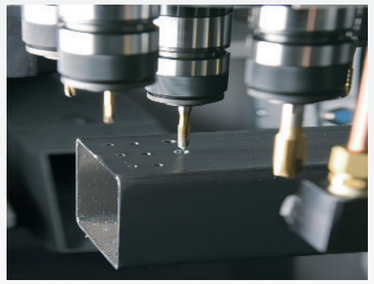


| | |
|---|---|
| Max. material length | 8000mm (314.96”), 6100 mm* (240.16”), 12200 mm* (480.31”), 15100 mm* (594.49”) |
| Max. cutting length for unloading | 8000mm (314.96”), 6100 mm* (240.16”), 12200 mm* (480.31”), 15100 mm* (594.49”) |
| Max. material diameter | Round Pipe ⌀406.4 mm (16.00”) square pipe □300 mm (□11.81”) H beam 300 mm (11.81”) |

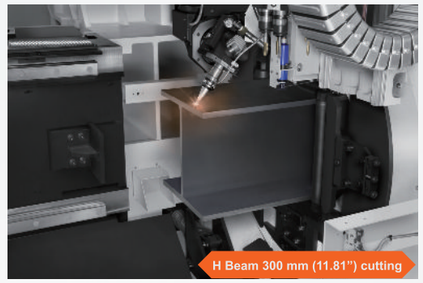


- Automatic and Continuous 3D Laser Cutting of Large and Long Structural material
- High Precision cutting of complex features by 3D laser head and automatic focus positioning
- Optional chain conveyor for increase versatility and maximum quantity of workpieces
- Fully Automatic processing of pipe and structural material by a total of 32 axis

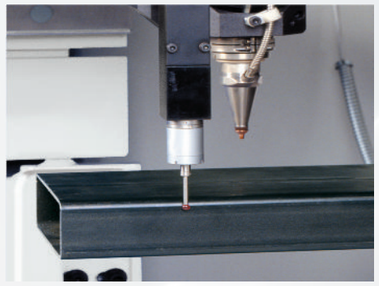
## High value and high quality cutting



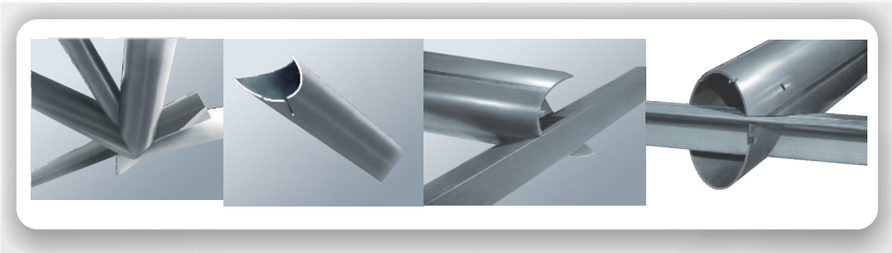
1 Tapping Unit




2 Beam Cutting



3 Touch Censor




INDIA TECHNOLOGY CENTER

**Yamazaki Mazak Pvt. Ltd.**
115, Pune Nagar Road, Sanaswadi, Pune. 412208.
TEL: +(91)-2137-668800. FAX: +(91)-2137-668829
marketing@mazakindia.com - +919970002068
www.mazakindia.in

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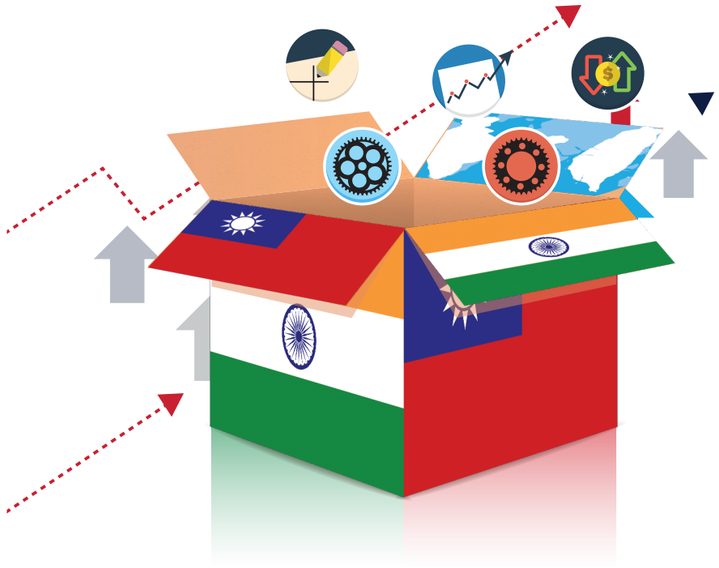


Source: Magic Wand Media Inc

# INDIA-TAIWAN: PARTNERS IN SUCCESS

India and Taiwan have started realizing each other's potential in their respective progress. Making use of the factors that favor their growth, they have joined hands with a resolve to win.

POONAM PEDNEKAR
Chief Copy Editor
Magic Wand Media Inc
poonam.pednekar@magicwandmedia.org

The transformation of India's 'Look East Policy' into 'Act East Policy' with Taiwan has redefined its relation with the country and has deepened its focus to collaborate and get the best of each other exchanged.

That Taiwan shares the sentiment in equal measure was evident at the recently held Smart Asia 2017 expo where James C F Huang, Chairman, Taiwan External Trade Development Council (TAITRA) expressed the importance of India in Taiwan's scheme of things.

With its 1.3 billion people, India makes for a lucrative market for Taiwan that has plans to collaborate with India to enhance its electronic manufacturing capability and develop industrial parks and smart cities as part of 'Make in India' initiative, informed Huang. The country can be of immense help to India in its plans to phase out combustion engines by 2030 since Taiwan has an entire ecosystem in this business, he added.

## India - investment destination

The bilateral trade between the countries is constantly on the rise. It grew nearly five-fold from $1.19 billion in 2001 to more than $5 billion in 2016 and, as informed by Huang, is set to touch $6 billion by the end of 2017.

India ranks as Taiwan's 16th largest export destination and 21st largest source of imports. India's exports to Taiwan increased from $550 million to $2.2 billion, while India's imports from Taiwan increased from $640 million to $3 billion in the same period.

"As of the end of 2016, around 90 Taiwanese companies have set up business operations in India, with a total investment amount of $1.4 billion in the fields of information and communication technology, medical devices, automobile components, machinery, steel, electronics, construction, engineering, financial services, etc.," said Walter M S Yeh, President & CEO, TAITRA.

The Taiwan Electrical and Electronic Manufacturers' Association has selected one site in Greater Noida to build an electronics manufacturing cluster with a view to deepening supply chain collaboration with Indian partners, he revealed.

According to George Lin, Director, Taipei World Trade Center, Liaison Office in Kolkata, Taiwan has the best and efficient industrial clusters, which can be the most practical model for India to develop manufacturing industry. "The scale of the Indian market provides the best opportunity for Taiwanese companies to expand. Most of all, Indian companies and Taiwanese companies can join hands to create their own brands," he added.

## Machine tools exports

Taiwan plays a prominent role in the machine tool industry by developing leading-edge technologies and providing critical components. Its companies are able to supply all necessary machinery, machine tool components, and turnkey solutions to world's manufacturers for their production lines. The country's domestic market is too small and hence its manufacturing sector relies heavily on the global market. Nearly 70 percent of its total output is for export, which is highest in the world. And most of its companies being MSMEs, their focus is on OEMs rather than marketing their own brand.

This co-operation has led to it becoming the sixth largest machine tool manufacturing country and the fourth largest machine tool exporter of the world.

India is one of the major users of Taiwan-made machine tools. The nation is Taiwan's 8th largest trade partner. Metal-cutting machine tools, machine tool parts, and forging equipment are among the major machinery shipped to India. Last year India imported $130.9 million worth of assorted machine tools from Taiwan, 3.41 percent higher than in 2015.

**"**India's procurement from Taiwan continues to grow. Taiwan's excellent quality products are highly competitive and can meet the strict requirements of the buyers from India. **"**

**Walter M S Yeh**
**President & CEO**
**TAITRA**

**"**IMTEX FORMING 2018 & Tooltech 2018 is an ideal platform for forging business ties. We want to collect more information about India's market to enhance the cooperation between Taiwan's manufacturers and India's customers.**"**

**C C Wang, President**
**Taiwan Association of Machinery Industry (TAMI)**

**"**With technology know-how, Taiwanese manufacturers are skilled at customization and most importantly, they have been responding swiftly to changing market demands.**"**

**Shanmugasundram**
**Managing Director**
**S&T Engineers**

"India's procurement from Taiwan continues to grow. Taiwan's excellent quality products are highly competitive and can meet the strict requirements of the buyers from India," said Yeh.

"The increase in the demand for the metal forming machinery is from the local automobile industry. The export volume of lathes has reached $11 million which is more than twice as compared to the same period last year," explained C C Wang, President, Taiwan Association of Machinery Industry (TAMI).

## Metal forming expertise

According to Wang, Taiwan's technologies and the efficiency that they promise can build a strong foundation for the Indian industry. In the metal forming sector, Taiwan has its expertise in mass production technologies in materials such as carbon fiber and aluminum alloy. Its servomotors, which meet the qualification of green manufacturing, can help Indian companies contribute to environmental protection. Its Intelligent Manufacturing Execution System (MES) allows the customers to receive the information for the product line and make the adjustment accordingly any time through the Internet.

## Manufacturing collaboration

Taiwanese manufacturers have been showing their interest in Indian companies. Their strong participation in the recently held Delhi Machine Tools Expo (DMTX) was a testimony to the fact. Tongtai debuted its OEM co-operation with Lokesh Machines Ltd to develop EZ-5 Drilling & Tapping Center, an advanced model that is suitable for automotive industry.

S&T Engineers Pvt Ltd is yet another Indian company that was keen to bring in innovative Taiwanese innovative technology at an affordable cost. It has tied up with Manford Machinery Co Ltd for a co-production venture and has launched STM range of machining centers. "While completely assembled machines come from Taiwan, the guarding, electric work, application testing and inspection is done in our unit in India," said Shanmugasundram, Managing Director, S&T Engineers.

With 1.3 billion people, India makes for a lucrative market for Taiwan that has plans to collaborate with India to enhance its electronic manufacturing capability and develop industrial parks and smart cities as part of 'Make in India' initiative.

**"**For us the Indian market is very important. The growth of Indian machine tools has been very rapid in the last few years. The sector holds immense potential. **"**

**James Hsieh**
**President**
**Manford Machinery Co Ltd**

**"**We bought our first Taiwanese machine -- a CNC Circular Saw machine manufactured by SOCO Machinery Co Ltd -- in 2004. The machine is still in a good running condition.**"**

**Bharat Raj Goel**
**Managing Director**
**Reva Transmission**

**"**The scale of the Indian market provides the best opportunity for Taiwanese companies to expand. Most of all, Indian and Taiwanese companies can join hands to create their own brands.**"**

**George Lin**
**Director, Taipei World Trade Center**
**Liaison Office in Kolkata**

"In the past two years, we have successfully installed over 400 STM vertical machining centers pan India out of which many are repeat buying customers," he informed. Taiwan brands majorly represented by S&T are YCM, Vertex, Excetek, Palmary, Manford, and Detron.

James Hsieh, President, Manford Machinery Co. Ltd reciprocated similarly, "We have doing business with S&T for the last 20 years and find the company very promising. There is a lot of technology transfer from Taiwan to S&T. The growth of Indian machine tools has been very rapid in the last few years. The sector holds immense potential. For us the Indian market is very important."

## Taiwan's strength

In the past decades, Taiwan has grown significantly in the production of machine tool components including castings, cutters, ball screws, and linear guide ways. Added to this, its comprehensive supply chain is one of its core strengths.

Indian manufacturers in their respective sectors use Taiwanese machinery because of its lower cost, rigid quality, and plentiful services. "With technology know-how, Taiwanese manufacturers are skilled at customization and most importantly, they have been responding swiftly to changing market demands," pointed out Sundram with the example of Taichung-based firm, Gifu Enterprise Co., Ltd that specializes in automatic tool changers and custom-builds more than 80 percent of orders from its clients.

According to Sundram, the Taiwan machine tool industry is known for its attention to detail and the quality and versatility of its machining centers that are known for high quality Meehanite Castings which offer highest level of static and dynamic stability, optimum dampening capacity, and superb vibration absorption. "Taiwanese spindle suppliers are proficient at building spindles with simple designs and a wide range of specifications, which solve temperature issues while improving working conditions. Taiwanese are adept at integrating tooling systems with ATC systems and tool magazines, supported by domestic cam ATC suppliers and the metalworking supply chain in the Greater Taichung area. The development of gears and index tables is also highly touted in Taiwan," he added.

Having had first-hand experience with Taiwanese machines for the past many years, auto components manufacturer, Bharat Raj Goel, Managing Director, Reva Transmission, testifies to their reliability. "We bought our first Taiwanese machine in 2004 and presently own 52 machines including Cold Forging Presses, Hot Cold Forging Presses, SPMs for cutting ferrous and non-ferrous metals. Their know-how in technology makes us repeatedly place orders for the Taiwan-make."

## Important for each other

The countries have realized each other's significance in their progress. While Taiwan is known for its hardware manufacturing, India's software industry is famous world over. It's about time India explored Taiwan's potential to contribute in "Make in India", "Digital India" and "Smart Cities" campaigns, and attain the common goal of success.


Source: Amada India Pvt Ltd

AIPL's 32,000 sq mt Technical Center at Aerospace Park in Bangalore

# GROWING TOGETHER WITH CUSTOMERS

The company, upon its arrival, ushered in a wave of revolution in sheet metal fabrication which was still quite nascent in the country. Since then it has been leading the industry with prime focus on customer success through well researched products, process and strong after sales support. A run-through of Amada's strategies that have taken it to the top.

POONAM PEDNEKAR
Chief Copy Editor
Magic Wand Media Inc
poonam.pednekar@magicwandmedia.org

It's been over 70 years for Amada in the development of metal working machinery and the experience gained has only made the company increasingly confident of its originality. Its journey in India began in 1982 when sheet metal fabrication was done using traditional methods. It was then that companies like L&T, Voltas, and Godrej thought beyond conventional processes and got Amada to introduce its first NC Turret Punch Press at L&T.

Since then the company has been taking the sheet metal industry by storm and upgrading it by conducting technical seminars, KAIZEN and 5S events. "We take pride in being the market leader in India with the highest machine population," notes Niraj Seth, President, Amada India Pvt Ltd (AIPL).

## Footprint in India

Established in April 2000, AIPL is a wholly-owned subsidiary of Amada Co Ltd, Japan, with its Technical Center in Bangalore which was set up in 2014 and presently serves as headquarter and parts warehouse. One just has to lay their eyes on the AIPL's 32,000 sq mt, lush green Technical Center at Aerospace Park in Bangalore to have a sense of the befitting magnitude and scale of its operations. Its grandeur adds veracity to the tale of its ever ruling status in the industry. And there isn't any room left for surprise when Seth reveals the company's current turnover of ₹ 300 crore and its target of ₹ 370 crore.

## Wide customer portfolio

The company currently enjoys catering to a myriad of business segments such as Machine Tool, Construction Machines and Aerospace. However, maximum volume of business is generated by Switch Gear, Silent Diesel Gensets, Construction Machines, Railways and so on.

AIPL's latest products include Fiber Laser Cutting Machine 3KW, 6KW, 9KW with automation on Laser Cutting, CNC Turret Punch Press and Press Brake with complete automation which can run unmanned. "Our unique concept of VPSS 3i (Virtual Prototype Simulation System) 3i creates digital factory environment which can help customers make their product with not so highly skilled man power without creating any scrap," explains Seth.

According to him, AIPL sees no threat from domestic players in its main segment of Laser and Punch Press but there is some competition for the Press Brakes for the entry level product. "However, when it comes to cost performance ratio, we win. We have a strong technological product backed by best service support with quick parts delivery from our Bangalore Parts Warehouse," he notes.

## Customer engagement is the key

Amada's impressive list of customers that includes leaders in the industry such as L&T, Kone Elevators, Johnson Lifts, Kirloskar Toyota Textile Machinery, Jyoti CNC, Kirloskar Oil Engines, Bluestar, Daikin, Panasonic, and Havells is a testimony to it being true to its philosophy of "growing together with customers".

The company has been walking the talk of staying in touch with its customers and keeping tabs on the challenges they encounter to propose suitable solutions to them. In order to provide prompt services, it has stationed its sales and service engineers in Delhi, Bangalore, Chennai, Coimbatore, Hyderabad, Pune and Vadodara, and hence has become the first machine tool company to start direct sales and service in the sheet metal processing machinery.

## Raising awareness

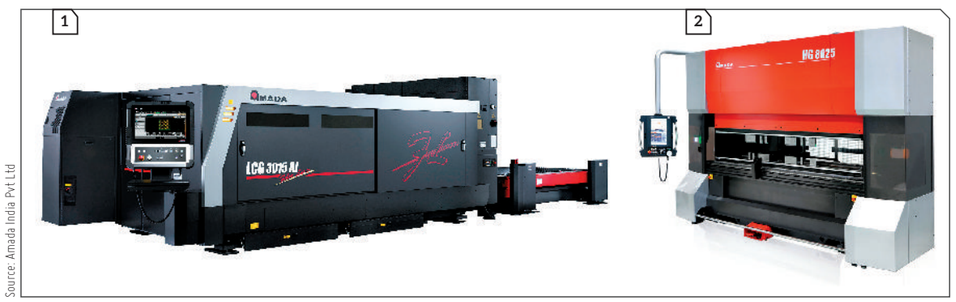
The company initially faced the challenge of finding skilled manpower in India to operate its high-tech machines. Educating the staff in safe machine operation to achieve optimum efficiency and safety aspects has now become its primary focus. To do that Amada has set up a vocational training center in Bangalore with dedicated machines and equipped training rooms that conducts training all year round.

"We make sure the operator gets skilled and then follow up to ensure his upgradation. Along with imparting technical training, we also educate operators to follow 5S and other best practices," informs Seth.

**"**We make sure the machine operator are educated properly and ensure their continuous upgradation through our follow up training.**"**

**Niraj Seth**
**President**
**Amada India Pvt Ltd (AIPL)**

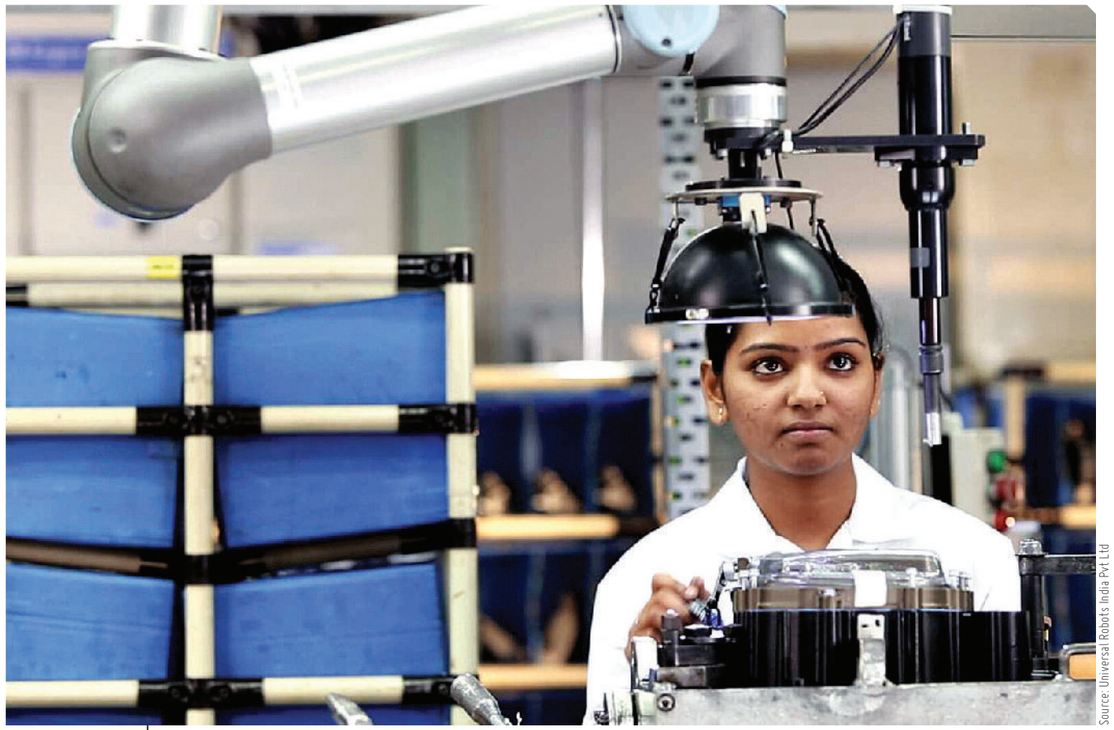
Further it has also undertaken several other initiatives that prove its commitment towards the community. Donation of CNC Laser Machine and CNC Press Brake to IITM, Chennai and CNC Punch Press and CNC Press Brake to IIITDM, Jabalpur by Amada Headquarters are just a few examples. "The company is keen on students from these premium institutions to get exposed to and study these latest technologies and practices in the sheet metal fabrication process. Amada has been doing is in other countries as well," concludes Seth with a contagious vibe of supporting worthy causes.




Source: Amada India Pvt Ltd

1 Amada's Fiber Laser Cutting Machine LCG 3015AJ.

2 Bending Machine HG 8025 is a solution with high speed and accuracy for all production environments.



Source: Universal Robots India Pvt Ltd

Being the first company in India to implement collaborative robots has enabled Bajaj to improve its production capabilities and evolve its multi-modelling offerings.

# TECHNOLOGY AS A HELPING HAND

Driven by its commitment to produce best-in-class motorcycles, Bajaj Auto Ltd became the first company in India to implement Universal Robots' cobots for its assembly lines. The results, as expected, were enhanced production capabilities, improved ergonomics and evolved offerings.

Source:Universal Robots India Pvt Ltd

Bajaj Auto Ltd, the flagship company of the Bajaj Group, is not only a well-known name in the Indian household, but it also holds an impressive reputation worldwide. Ranked as the world's fourth largest three and two wheeler manufacturer, the Bajaj brand is popular across several countries in Latin America, Africa, Middle East, South and South East Asia.

## In need of standardized automation

"We were looking for solutions to automate our assembly lines," said Vikas Sawhney, General Manager Engineering (Robotics and Automation), Bajaj Auto, in response to the automation advancements in the manufacturing industry over the last few decades. "Two-wheeler assembly lines are highly labor-intensive, spatially challenged and they have physically taxing movements that require high-end precision. While trying to automate these lines, one of the basic requirements was for standardization. Moreover, we also wanted to be cognizant of the requirements of the large women workforce at Bajaj."

While standardization of models was a key tenet of Bajaj's success in the market, it was rapidly expanding its production capabilities due to the growing scale of multiple models and the wide-ranging number of vehicles supplied in the market. The key then was to find a standardized automation solution that could be horizontally deployed and that could provide the productivity, flexibility and reliability that Bajaj's workers could capitalize upon.

**Challenges overcome through cobots:**

- Space constraint issue is resolved by ceiling mounted cobots in a manufacturing facility.
- Redundancy of work is reduced as repetitive movements that require precision are done by them.
- Standardization is achieved.
- Multi-modelling adaptability is catered to.
- Top tasks that require flexibility, productivity and reliability are taken care of.
- Work for women workforce is eased.

## Cobots as the solution

After three months of extensive testing of Universal Robots' collaborative robots at its facilities, Bajaj deployed them as a standardized solution for all its functional requirements. Several processes such as material handling and machine tending were collaboratively handled by the cobots and Bajaj employees. Moreover, new decal applications, which are now patented by Bajaj, were also devised by the company to make the most out of the flexibility provided by the cobots.

## Advantages abound

Other benefits such as zero annual maintenance costs, reduced power consumption and retention of IP within the company are also organically driving forward the growth of the organization. Additionally, almost 50 percent of Bajaj's workforce is comprised of women on this assembly line.

"Thanks to the high-quality output I achieve with the cobots, I feel very proud of my accomplishments," said Rameshwari, assembly line operator at Bajaj Auto. "Operating this advanced technology is interesting and easy, and all the physically challenging parts are taken care of by it. I and the other women employees enjoy working with these cobots."

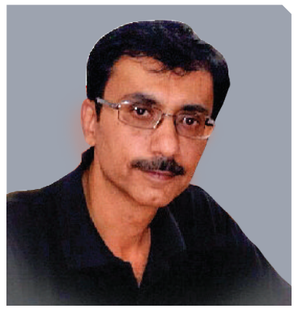
Bajaj Auto employees now have the advanced tools to carry out repetitive tasks with faultless precision; this is one of the key factors driving the company's phenomenal growth globally. Not only does Bajaj deliver high-quality vehicles to its customers, it does so with a collaborative technology that leaves its employees beaming with smiles at the end of their day.

**Tasks performed by collaborative robots:**

- Material handling
- Machine tending
- Decal application
- Deburring
- Vision application
- Bolt tightening
- Sealant application
- Welding

**Cobots as key value drivers:**

- Collaborative in nature.
- Compact, extremely flexible (all axes + or – 360 degree rotation) and lightweight.
- Safe, with 30 patented force limiting features built in compliance with ISO TS 15066.
- Ceiling mount, wall mount or floor mount – with no modifications.
- Lowest running costs - no AMC required and extremely low power consumption.
- Can operate without a cage (subject to application risk assessments) in space constrained areas.



**"**After an intensive study of the options that were available in the market, Bajaj Auto chose Universal Robots primarily due to the collaborative nature of the robots. The key benefits of Universal Robots' products such as their compactness, low pay back period, flexibility, light weight, cost-effectiveness, accuracy and their safety, is what ultimately convinced Bajaj Auto about the suitability of Universal Robots for its standardized offerings.**"**

**Vikas Sawhney**
**General Manager Engineering**
**Bajaj Auto Ltd**

POWERED BY: Modern Machine Shop

# FOR MORE EFFICIENT PRODUCTION SCENARIOS

Developed with inputs from customers, SafeMove2 by ABB is an advanced robot monitoring software package that performs safety certified monitoring of robot motion, tool and standstill supervision as well as speed limitation. The new version's added capabilities allow better flexibility, space savings and cutting edge commissioning tools for more productivity at a lower total investment cost.

CHRIS FELIX
Senior Editor
Production Machining
cfelix@productionmachining.com



Robots are arguably one of the most important components of any flexible automation solution. They are capable of performing any number of applications across the shop floor. To be efficient, robots must be able to move quickly, making them a potential hazard for people working in the immediate vicinity.

Historically, fences or cages have been used to separate man from machine in an effort to keep people out of harm's way. First introduced by ABB Robotics in 2008, SafeMove is a robot monitoring software package that performs safety certified monitoring of robot motion, tool and standstill supervision as well as speed limitation. It allows robots and operators to work more closely together by restricting robot motion to do precisely what is needed for a specific application.

Working hand-in-hand with customers to further develop robot safety technologies, ABB recently introduced SafeMove2, which provides added capabilities to allow for the creation of more efficient and flexible production scenarios and to integrate safety fieldbus connectivity into the company's IRC5 robot controller family. It is designed for better flexibility, space savings and cutting edge commissioning tools for more productivity at a lower total investment cost.

Like the original version of the software, this iteration includes safety functions such as safe speed limits, safe standstill monitoring, safe axis ranges and position and orientation supervision.

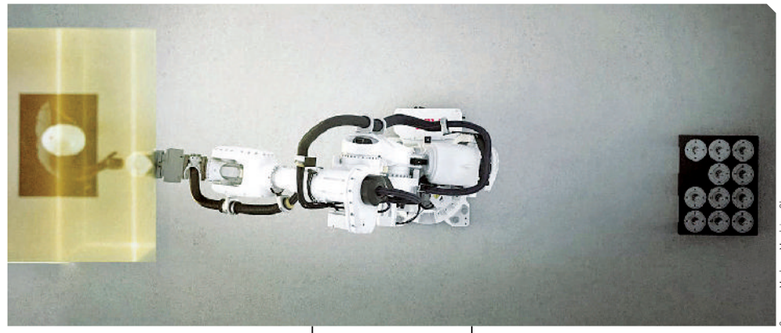

Standstill supervision allows robots and operators to work more closely together by restricting robot motion to do precisely what is needed for a specific application.

Source: Modern Machine Shop

## Added benefits

Updates to the product have helped evolve its functionality from hardware to software. This new generation of SafeMove encourages the development of innovative robot applications by integrating safety features directly into the robot controller. Users can now create features such as more zones, ranges and tools, and the increased flexibility allows for other features to be added in the future. This safety solution helps to improve safety commissioning times and, according to the company, can reduce total investment by as much as 30 percent.

The system also eliminates the need for an IRC5-mounted safety PLC by incorporating safe fieldbus communications directly into the robot controller. It includes miniaturized, dedicated hardware to ensure the performance of the safety system, including a reliable safety IO. This dedicated hardware also ensures that the application running on the controller's main computer operates independently and is predictable. In addition, the IRC5 controller is now available with a keyless mode selector option—the controller's physical mode switch can be removed and replaced with a soft mode switch on the FlexPendant, making access easier and eliminating the need for external control panels.



Source: Modern Machine Shop

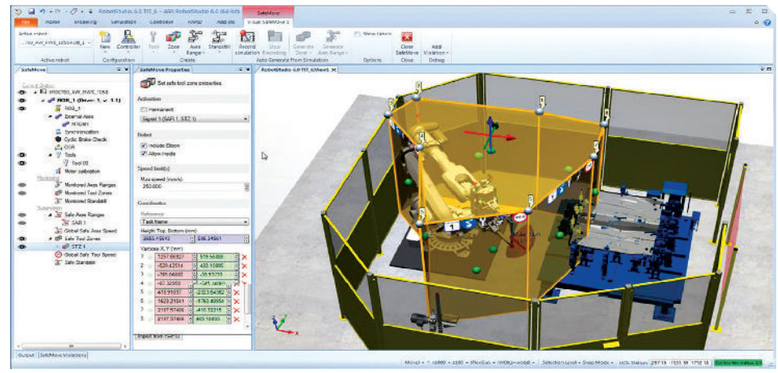
With simplicity and reduced investments in mind, this automation solution is designed to simplify workflow for more efficient production scenarios.

## Working together

Able to support all robot mounting angles, the system is available for use with the majority of ABB's robot portfolio as well as the IRC5 Single, Compact and Paint controllers. It is designed for better collaboration between the machine and operator. If an operator needs to interact with the robot system, safety sensors can be incorporated into the robot cell to detect the person's presence. After detected, SafeMove will either supervise the robot's speed or monitor it while it is standing still. Once the person clears the zone, the robot can resume full operation. The end result is less downtime and increased productivity.

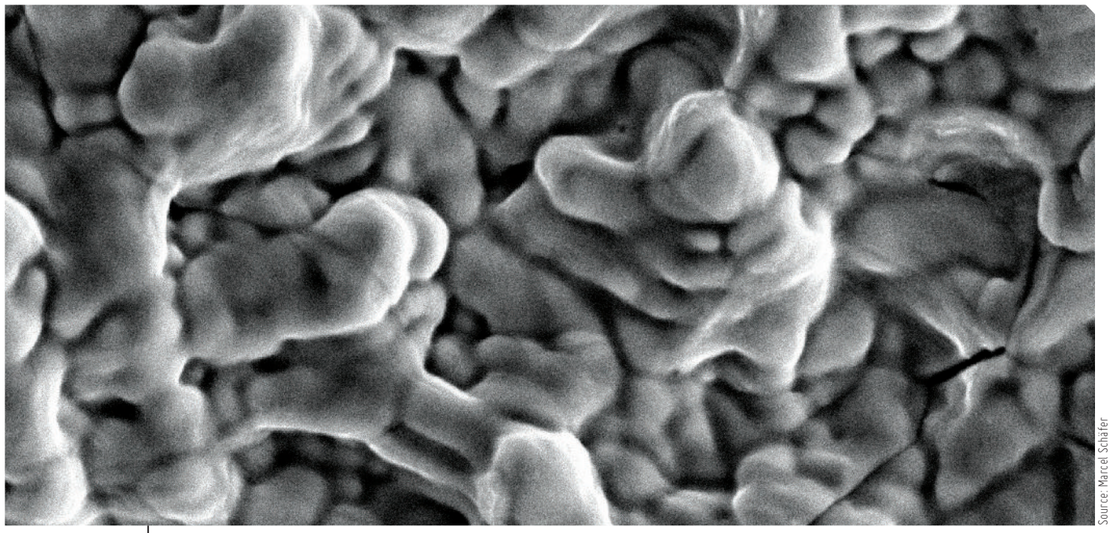
The RobotStudio offline programming tool allows for faster, more efficient safety configuration of the production environment. It provides simulations and 3D graphics to assist programmers in intuitively visualizing the necessary safety zones.

The system also includes a set of tools designed for fast setup, validation and commissioning. One such tool, SafeMove Visualizer, puts configurations directly onto the ABB FlexPendant. The GUI can display detailed safety zones for fast and precise analysis of a zone or axis violation. It also incorporates effective commissioning workflow by offering complete control over all safety functions.



Source: Modern Machine Shop

The offline programming tool allows for faster, more efficient safety configuration of the production environment.



Source: Marcel Schäfer

# CRACKING A HARD NUT

High-strength steels and laser welding are increasingly popular in powertrain manufacturing. But combining those two things leads to a significant risk of hot crack formation. Now there's a solution.

Classifying steel as a lightweight material may seem like a contradiction in terms. Yet, more than almost any other material, steel enables users to tailor its mechanical properties by selecting the right alloy composition and applying heat. That gives it huge potential, such as the ability to make smaller, lighter and thinner-walled parts from high-strength steels that are capable of absorbing the same forces as far heavier, thicker-walled parts made from conventional steels.

At the same time, however, these materials make the joining process far more challenging because of their susceptibility to cracking. This is especially true of axisymmetric, round parts—a typical example being the joint between a toothed wheel and a shaft in a transmission—which pose particular problems at the end of weld seams where the laser power drops to prevent the formation of end craters. These cracks reduce the long-term strength of the seam under operating conditions and are therefore ruled to be inadmissible in the DIN EN ISO 13919 standard.

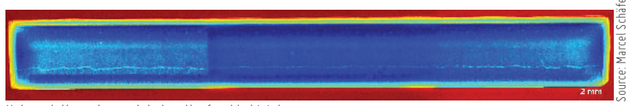
## Hot and cold cracks

There are currently two mainstream methods of avoiding cold cracking. One option is to add another material to the weld as a filler wire to produce localized changes in the composition of the alloy. The other technique is to pre-heat the part to a sufficiently high temperature.

The idea behind both methods is to generate less martensite—a very hard constituent of steel—in the seam, because an excessive amount of this crystalline structure leads to a high degree of hardening as well as significant tension in the joining zone due to the increased volume.

In contrast, hot cracks are formed by a complex interplay between the alloy composition, the structural design, and the position of the seam on the part. They are also influenced by weld process parameters that determine the thermal load on the workpiece. Hot cracks form in the welding process during the transition of the liquid metal melt into a solid state; in other words, during the cooling process. This leads to stress and strain in the material at the same time, with breaks running along the grain boundaries (intercrystalline), due to the existence of low-melting phases.

Hot cracks are small and rarely extend more than a few millimeters. This study focused on hot cracks that form in the actual weld deposit. These solidification cracks are often buried deep below the surface and are difficult to detect. In contrast to cold cracks, hot cracks are characterized by freely solidified dendrite surfaces that can be seen under a scanning electron microscope (SEM).




Source: Marcel Schäfer

Hot crack through complete length of welded joint.

MARCEL SCHÄFER
Business Division Laser Technology Management Office
marcel.schaefer@de.trumpf.com

## The key is in the keyhole

In deep-penetration welding, energy delivery in the welding process occurs when the laser beam vaporizes the material. The resulting vaporization pressure leads to the formation of a deep, vapor-filled hole known as the keyhole. Due to the dynamic behavior of this keyhole, fluid motion occurs within the pool of molten material created by the laser beam as it advances along the weld joint.

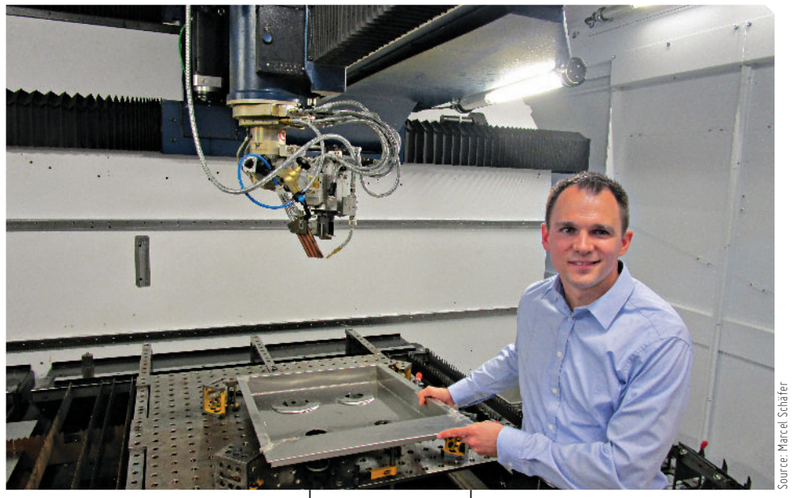
The molten metal flows around the keyhole, generating eddies in the rear section of the melt pool that affect the three-dimensional geometry of the pool. The correlation of these three factors—keyhole, melt flow, hot cracks—lies in a periodicity: the frequency of the oscillations of the keyhole and melt pool correspond to the frequency with which hot cracks form. This also applies the other way around; in other words, the melt pool eddies and weld pool geometry can be influenced by the way in which energy is delivered to the keyhole. Various measuring techniques were used to analyze these melt pool motions. A new method was developed to obtain a kind of footprint of the process by creating a median image of the flow phenomena within the weld pool.

This technique introduces additional particles into the melt pool to observe and track their trajectories with the help of x-rays in order to gather information on the flow conditions. One of the phenomena the scientist observed was that the direction of rotation of the eddies in the upper part of the melt pool reverses when the focal position is shifted by one Rayleigh length.

At the same time, it was also observed that this same shifting of the focal position led to lower hot crack susceptibility.

Thermo-mechanical simulations were used to examine the connection between modified flow phenomena and modified geometry of the melt pool on the one hand, and reduced crack formation on the other.

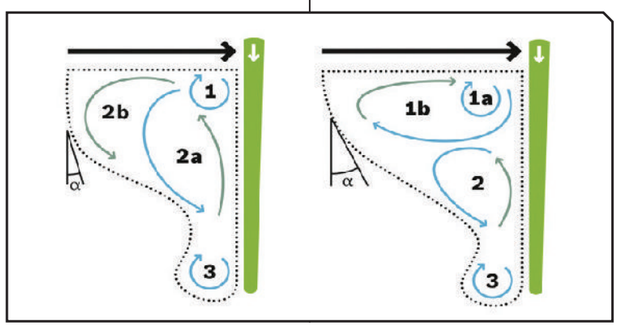
These revealed that the location of maximum strain also shifted in tandem with the focal position as a result of the changes to the melt pool geometry. These findings can be used to influence the conditions that are required for hot cracks to form. As a result, the "only" thing that needs to be



Source: Marcel Schäfer

Part of Marcel's upcoming doctorate focuses on joining high-strength steels. He carried out his experiments at the TRUMPF Laser Application Center and at the Institute of Beam Tools (IFSW) at the University of Stuttgart.

**THE FORMATION OF HOT CRACKS CAN BE INFLUENCED BY MODIFYING THE WAY IN WHICH ENERGY IS DELIVERED TO THE KEYHOLE.**




Changes in fluid dynamics while welding with a shifted focus position.

done to avoid hot cracks is to exert a sufficiently strong influence on the flow characteristics and thus on the geometry of the melt pool. The researcher came up with various options for modifying the way in which energy is delivered to the keyhole.

In one approach, lasers of differing brilliance (beam parameter product 2 mm*mrad to 24 mm*mrad) were used with different focusing conditions. In another, the scientist investigated the effects of the laser's wavelength (1.03 µm and 10.6 µm) while maintaining the same optical and mechanical boundary conditions. Unfortunately, none of these approaches were successful.

In both cases the team succeeded in modifying the form and characteristics of the cracks but were unable to eliminate crack formation entirely. They also detected a significant increase in crack susceptibility as soon as higher welding speeds were used.

## Double breakthrough

The breakthrough was achieved by applying multiple methods simultaneously. The first way of preventing cracks is dual beam welding, which involves splitting the output power of the main beam into a primary beam and a secondary beam at a ratio of 72:28. As long as the beams are arranged in tandem—i.e. with the secondary beam following the primary beam as it advances—and the secondary beam is directed at a specific point in the beams' shared melt pool, then cracking can be avoided entirely. This does, however, require the spacing to be adjusted to the melt pool length in each case, which is dictated by the selected laser output power. The second technique is to carry out welding using a time-modulated laser beam. By carefully selecting the amplitude of the continuous modulation, it is possible to eliminate cracking entirely across a broad spectrum of the modulation frequency, regardless of weld depth and welding speed.

Analysis of the flow characteristics in the melt pool and their geometry has revealed that time-modulated power makes a significant difference. It is also possible to carry out thermodynamic surface measurements of fluctuations in melt pool length during the welding process and to significantly reduce these fluctuations. This yields a measurable parameter that can be used to monitor and stabilize process behavior. Several series of tests on real parts have shown that this method offers considerable potential for welding high-strength steels without cracking in the future.

POWERED BY: Modern Machine Shop

# TO GAIN MUCH MORE THAN UTILIZATION

MARK ALBERT
Editorial Director
Modern Machine Shop
malbert@mmsonline.com

A machine-monitoring system is basically installed to achieve an improvement in utilization. But that's just the start of the slew of benefits that can be derived through it.

LMI Aerospace has the word aerospace in its name because that's the market the supplier serves almost exclusively. This company is a global manufacturer of structural assemblies, kits and components for its diverse aerospace customers. It also provides design engineering services to back up its manufacturing capability (not many machining companies can thrive just by producing parts anymore.)

The firm fabricates, machines, finishes and assembles components that are machined or formed to close tolerances from aluminum, specialty alloys and advanced composite materials. It manufactures more than 40,000 products for large commercial airplanes, business and regional jets, as well as military aircraft. Worldwide, the company employs around 2,000 people.

One of the company's machining facilities is in Washington, Missouri, near St. Louis, and not far from its corporate headquarters in St. Charles. Three years ago, the Washington facility began actively seeking a monitoring system for its CNC machines in order to check status and collect performance data for analysis. One of the main goals and expectations was to see an improvement in utilization.

In fact, once key machine performance measures were being shown on the large-screen monitors on the shop floor, utilization increased by about 10 percent right away, largely because machine operators could spot and avoid easy-to-correct causes of unnecessary downtime. But that was only the beginning. LMI saw other value in the data being captured by this machine-monitoring system.

Looking beyond utilization set this facility up for significant reductions in machining costs on key equipment, more efficient machining parameters such as optimal feed rates, more accurate and timely quotes to customers, and other benefits, including even greater improvement in utilization rates after the monitoring system was in sustained use. However, these benefits were contingent on the monitoring system being able to provide insight into processes and put data into a meaningful context. For LMI Washington, machine monitoring was a definitive step toward a much broader move to data-driven manufacturing.

Source: Modern Machine Shop

LMI points to its multi-axis machining processes backed by efficient shopfloor procedures as the backbone of its machining capability.

## How machine monitoring helps

Like many machine shops today, the Washington facility has a variety of newer and older CNC equipment. Most of the newer machines are equipped with MTConnect-compliant control units, though several of the legacy machines were installed before this interoperability standard was adopted and their control systems have limited data-generating capability.

The facility had four primary goals for its machine-monitoring initiative:

- Capture accurate utilization metrics.
- Create a work environment that drives performance by displaying the utilization data on the shop floor.
- Generate condition-based email alerts to ensure quick action and prevent extended downtimes.
- Understand part production trends and cycle times through analytics.

To this end, the plant connected 22 machines for data reporting and analysis by Vimana software from System Insights (Berkeley, California). Vimana is a standards-based software solution designed to monitor and manage manufacturing productivity. One of the strengths of this system that attracted LMI Washington is its ability to identify periods of production losses using a sophisticated classification engine. This engine provides users with the information and insight needed to improve utilization, the software developer says. Another essential strength was the ability of this system to establish network connections to many types of control systems, including those locked into proprietary data formats or those capable of generating only limited usable data.

Source: Modern Machine Shop

One of the basic functions of a machine-monitoring system is to provide visibility into machine status and utilization rates. This screen is typical of a dashboard displayed on a shopfloor monitor as presented by the Vimana system in use at LMI Washington. This example was provided by System Insights.

With the system in place, large displays mounted in the machining areas show real-time status of connected machines, including various aspects of machine performance and utilization that can help operators recognize opportunities to improve productivity. Nicholas Mueller, then a systems analyst at LMI Washington and project lead for the machine-monitoring system implementation, says these features accounted for the initial bump up in utilization. "We experienced this 10 percent increase just by displaying Vimana on the shop floor."

Source: Modern Machine Shop

Managing an internal supply chain that includes machining, metal fabrication and processing is essential to LMI's workflow and production efficiency to support customer value-added services such as subassembly (shown here) and component kitting.

Previously, the production team relied on red-yellow-green stack lights mounted on each machine to assess their status. Now, the monitoring software enables them to view a machine's status at a glance or check it remotely on a mobile device. The system also alerts them via email to indicate prolonged downtimes—insight that a stack light cannot provide.

Over a sustained period since initial startup, utilization rates have continued to improve. Results of all the machines connected have shown an increase of more than 15 percent, the company says. The best-performing machine has shown improvement of more than 20 percent in average utilization. The palletized lines have also achieved an improvement around 20 percent, which is especially significant because these lines represent a major capital investment in machining capacity, LMI says.

Mueller points to one reason for these results: The software's downtime classification capabilities are able to accurately capture the status of the equipment. These classifications include Producing, Standby, Planned Downtime and Unplanned Downtime. The introduction of the Standby status helped LMI tease out the difference between machines that were down and machines that were ready but not at work because of upstream holdups. This granularity in understanding the machine status helped managers prioritize and make effective decisions to improve machine utilization, he says.

Other benefits are also significant. For example, operators

| Device | Summary | Trend | Feb 01 | Feb 02 | Feb 03 | Feb 06 | Feb 07 | Feb 08 | Feb 09 | Feb 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-Swiss-210 | 48.1 % | | 52.4 % | 56.2 % | 59.5 % | 65.3 % | 21.0 % | 40.3 % | 54.6 % | 15.9 % |
| INDEX-280 | 60.3 % | | 80.8 % | 100.0 % | 100.0 % | 53.9 % | 40.9 % | 19.3 % | 30.1 % | 53.0 % |
| Lathe-240 | 71.2 % | | 69.0 % | 51.2 % | 88.8 % | 41.2 % | 93.2 % | 85.5 % | 83.8 % | 33.9 % |
| Lathe-390 | 49.6 % | | 8.6 % | 31.0 % | 41.7 % | 67.1 % | 55.7 % | 89.1 % | 71.5 % | 4.8 % |
| Lathe-395 | 64.0 % | | 83.3 % | 80.3 % | 84.7 % | 29.8 % | 52.6 % | 43.6 % | 80.6 % | 45.6 % |
| Mill-420 | 72.7 % | | 82.9 % | 60.9 % | 65.0 % | 69.9 % | 52.2 % | 86.6 % | 87.2 % | 84.2 % |
| Mill-425 | 77.5 % | | 95.4 % | 67.8 % | 80.6 % | 55.5 % | 72.9 % | 74.0 % | 88.7 % | 95.9 % |
| Mill-430 | 66.8 % | | 35.4 % | 63.3 % | 67.3 % | 80.5 % | 65.5 % | 88.7 % | 55.5 % | 95.9 % |
| Mill-500 | 68.7 % | | 61.8 % | 86.5 % | 47.6 % | 24.0 % | 76.5 % | 82.2 % | 96.8 % | 82.0 % |
| MillTurn-305 | 49.8 % | | 60.9 % | 55.0 % | 50.8 % | 51.8 % | 45.7 % | 53.1 % | 35.9 % | 37.8 % |
| MillTurn-325 | 32.2 % | | 3.5 % | 0.0 % | 33.7 % | 59.8 % | 56.4 % | 46.9 % | 35.0 % | 7.6 % |
| MillTurn-370 | 38.7 % | | 80.8 % | 17.0 % | 24.8 % | 19.9 % | 36.5 % | 62.2 % | 44.2 % | 2.6 % |
| MillTurn-375 | 32.8 % | | 32.6 % | 22.5 % | 30.6 % | 31.8 % | 45.4 % | 45.9 % | 28.4 % | 13.5 % |
| MillTurn-380 | 41.1 % | | 63.8 % | 60.2 % | 62.4 % | 25.2 % | 15.1 % | 0.0 % | 48.6 % | 73.1 % |
| MultiSpindle-345 | 35.4 % | | 31.5 % | 4.7 % | 37.5 % | 14.2 % | 45.9 % | 39.4 % | 56.3 % | 81.4 % |
| MultiSpindle-365 | 40.3 % | | 11.8 % | 0.0 % | 17.3 % | 26.1 % | 92.8 % | 85.0 % | 33.6 % | 78.8 % |
| QTN-285 | 33.6 % | | 19.5 % | 6.5 % | 18.3 % | 23.7 % | 59.3 % | 71.7 % | 45.1 % | 11.1 % |
| Swiss Two Hundred | 44.9 % | | 61.6 % | 27.6 % | 55.5 % | 15.6 % | 49.8 % | 68.8 % | 49.4 % | 10.1 % |

Source: Modern Machine Shop

Data collected from monitored machines can be analyzed in a number of ways to give managers insight into machine performance trends. This example of the Performance Grid--Producing, as provided by the developers of Vimana, shows a summary of the time during which machines were producing parts.

have created healthy competition amongst themselves by following the system's main dashboard, which is displayed on shopfloor monitors. Likewise, customized production rules and alerts based on toolpath feed-rate overrides and rapid override values have led to improved identification of production cycles.

In addition, visibility to actual asset production utilization of machines has enabled LMI to provide more competitive bids to its customers.

## Using Part Metrics to increase capacity

Vimana's Part Metrics report gives detailed information about how a part was made, including information on the production and setup times involved. LMI Washington has been able to use this report to obtain an accurate part cycle time for its job-costing calculations. Workorders at this facility are typically one week in duration. The total time taken to make a part is compared across three categories—Estimated, CAM Analysis and Actual Run-time. The monitoring software provides actual run time, a calculation which helps improve estimates for upcoming workorders.

Managers use an internal tool called the Capacity Chart to assess how long it actually takes a machine to make a part. Data from the Part Metrics report is populated in the Capacity Chart. Vimana automatically identifies which part is running on the machine by analyzing the G code during run time, and provides the actual amount of time that went into producing each part. The report also identifies planned and unplanned downtime periods associated with the part, along with the time required to set up each part across various machines. This detailed understanding of the actual time required to make a part has improved the company's ability to accurately determine part cost and have clarity on the true cost per machining hour.

Mueller notes that on one of the facility's most valuable five-axis machines, "We were able to identify that the actual cost per machining hour varied from the calculations previously used, helping us reassess our competitiveness in the market." The software also helped LMI understand how much value was being added by each of its workcenters and the cost of operating those workcenters. This precise information helps make cost estimates and planning more accurate.

## Always moving ahead

The aerospace industry is constantly changing and evolving. In response, LMI operations must change and evolve to keep ahead of its customers' needs. At the Washington facility, the machine-monitoring system has to be flexible and dynamic as well. In fact, it has created a growth path for a deeper and broader understanding of what is happening on the shop floor, and provides the facts and figures that enable the plant to make better decisions about these happenings.

This is reflected in the improved utilization rates, for sure, but there seems to be no end to other improvements that can follow new insights into production processes and machine performance. For LMI, this ongoing effort naturally involves Vimana's Client Services team, which helps adjust the rules by which alerts are issued, how reports are configured and what analytic routines are applied. These are just a few of the ways that the monitoring system can grow and change along with the entire facility.

| | Total Duration | | | | | Duration per part | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Count | Producing | Unplanned Downtime | Planned Downtime | Setup | Standby | Producing | Unplanned Downtime | Planned Downtime | Setup | Standby |
| 1 | 4h 23m 20s | 21m 55s | 48m 1s | - | - | 4h 23m 20s | 21m 55s | 48m 1s | - | - |
| 1 | 2h 43m 31s | 8h 10m 10s | 47m 14s | - | - | 2h 43m 31s | 8h 10m 10s | 47m 14s | - | - |
| 1 | 2h 35m 52s | 47m 30s | 40m 24s | - | - | 2h 35m 52s | 47m 30s | 40m 24s | - | - |
| 6 | 5h 52m 36s | 3h 44m 33s | 27m 18s | - | - | 58m 46s | 37m 25s | 4m 33s | - | - |
| 1 | 50m 22s | 47m 13s | 22m 17s | - | - | 50m 22s | 47m 13s | 22m 17s | - | - |
| 6 | 4h 7m 17s | 1m 14s | - | 9h 47m | - | 41m 12s | 12s | - | 1h 37m 50s | - |
| 1 | 39m 32s | 2h 39m 20s | - | 3h 25m 8s | - | 39m 32s | 2h 39m 20s | - | 3h 25m 8s | - |
| 20 | 9h 4m 33s | 1h 44m 50s | 7h 40m 38s | - | - | 27m 13s | 5m 14s | 23m 1s | - | - |
| 1 | 22m 7s | - | 31m 24s | 3h 11m 55s | - | 22m 7s | - | 31m 24s | 3h 11m 55s | - |
| 71 | 21h 22m 47s | 33m 24s | 2h 3m 48s | - | - | 18m 4s | 28s | 1m 44s | - | - |
| 52 | 15h 19m 28s | 37m 55s | 57m 51s | - | - | 17m 40s | 43s | 1m 6s | - | - |
| 1 | 16m 57s | - | - | 1h 52m 56s | - | 16m 57s | - | - | 1h 52m 56s | - |
| 23 | 6h 12m 42s | 59m 54s | 2h 24m 22s | - | - | 16m 12s | 2m 36s | 6m 16s | - | - |
| 45 | 12h 3m 7s | 5h 5m 15s | 48m 27s | - | - | 16m 4s | 6m 47s | 1m 4s | - | - |
| 2 | 28m 47s | 23h 28m 58s | 2m 13s | - | - | 14m 23s | 11h 44m 29s | 1m 6s | - | - |
| 24 | 5h 33m 9s | 1h 24m 22s | 1h 45m 51s | - | - | 13m 52s | 3m 30s | 4m 24s | - | - |
| 39 | 8h 7m 57s | 1h 9m 48s | 1h 35m 11s | - | - | 12m 30s | 1m 47s | 2m 26s | - | - |
| 56 | 11h 40m 26s | 10h 34m | 1h 45m 43s | - | - | 12m 30s | 11m 19s | 1m 53s | - | - |
| 1 | 11m 5s | 23h 48m 54s | - | - | - | 11m 5s | 23h 48m 54s | - | - | - |

Source: Modern Machine Shop

LMI Washington finds the Part Metrics report particular valuable for checking how much time is required to finish a run of workpieces, with a breakdown of cycle time, types of downtime and duration of setup. A sample of this report provided by System Insights is shown above.

This grid shows a similar summary of unplanned downtime experienced by these machines. LMI Washington uses reports like these to evaluate shop efficiency and identify opportunities for improvement.

| Device | Summary | Trend | Feb 01 | Feb 02 | Feb 03 | Feb 06 | Feb 07 | Feb 08 | Feb 09 | Feb 10 |
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| INDEX-280 | 11.0 % | | 4.3 % | 0.0 % | 0.0 % | 7.9 % | 24.3 % | 33.7 % | 7.3 % | 10.6 % |
| Lathe-240 | 14.2 % | | 11.5 % | 9.4 % | 3.3 % | 57.8 % | 5.2 % | 1.8 % | 5.7 % | 27.2 % |
| Lathe-390 | 18.7 % | | 41.6 % | 3.7 % | 15.7 % | 16.3 % | 20.2 % | 2.3 % | 2.6 % | 92.1 % |
| Lathe-395 | 8.7 % | | 4.2 % | 2.8 % | 4.2 % | 18.4 % | 12.0 % | 11.4 % | 4.3 % | 16.8 % |
| Mill-420 | 17.7 % | | 9.1 % | 31.3 % | 34.5 % | 19.8 % | 15.2 % | 6.3 % | 12.0 % | 4.8 % |
| Mill-425 | 15.7 % | | 2.4 % | 16.9 % | 3.8 % | 43.5 % | 12.0 % | 25.2 % | 10.9 % | 3.3 % |
| Mill-430 | 24.1 % | | 58.0 % | 36.3 % | 10.4 % | 6.6 % | 20.3 % | 9.8 % | 35.1 % | 3.0 % |
| Mill-500 | 24.9 % | | 37.2 % | 12.9 % | 44.5 % | 55.3 % | 9.8 % | 17.1 % | 2.2 % | 12.7 % |
| MillTurn-305 | 23.4 % | | 9.8 % | 25.2 % | 21.0 % | 21.0 % | 32.2 % | 23.9 % | 32.6 % | 20.2 % |
| MillTurn-325 | 54.1 % | | 96.3 % | 100.0 % | 48.3 % | 19.0 % | 22.3 % | 38.1 % | 40.6 % | 92.4 % |
| MillTurn-370 | 44.9 % | | 9.3 % | 61.7 % | 43.7 % | 68.4 % | 48.7 % | 32.6 % | 30.8 % | 96.5 % |
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| MillTurn-380 | 39.5 % | | 11.1 % | 8.6 % | 15.0 % | 48.0 % | 60.5 % | 100.0 % | 44.0 % | 12.3 % |
| MultiSpindle-345 | 42.2 % | | 46.2 % | 71.8 % | 60.5 % | 57.2 % | 26.9 % | 9.6 % | 36.9 % | 8.9 % |
| MultiSpindle-365 | 52.5 % | | 88.2 % | 100.0 % | 82.7 % | 44.5 % | 7.1 % | 12.6 % | 45.0 % | 19.9 % |
| QTN-285 | 39.9 % | | 61.9 % | 71.1 % | 33.6 % | 25.8 % | 13.6 % | 10.4 % | 44.9 % | 86.6 % |
| Swiss Two Hundred | 46.6 % | | 37.5 % | 69.2 % | 23.3 % | 80.3 % | 41.3 % | 13.4 % | 46.4 % | 85.4 % |

Source: Modern Machine Shop

# KEEPING EVERYTHING **RUNNING**

Preventive Maintenance is a comprehensive, regular, and routine maintenance of machines or equipment that helps reduce the likelihood of their failure, thus saving on downtime and expensive repair costs.

Mitsubishi Electric India (MEI) has grown to become a company offering a wide range of innovative and high-quality products for the Indian market. This includes products andsolutions for Air Conditioners, Automotive Equipment, Elevators & Escalators, Factory Automation and Industrial Systems, Hydronics & Commercial Air Conditioners, Power Systems, Semiconductor & Devices,Transportation Systems and Visual & Imaging.

Source:Mitsubishi India Pvt Ltd

**Preventive maintenance contract**

When machines are run continuously, there is a possibility of deterioration of CNC parts due to the entry of dust, moisture, coolant mist etc., resulting in early failure of parts and machine breakdown. Also, variation in incoming voltage, cabinet temperature, machine vibration affects the life of CNC parts. To overcome these issues and increase the machine availability for production, MEI offers a regular Preventive Maintenance to their customers. The maintenance involves a systematic, periodic inspection of the machines where potential problems are detected and corrected to prevent their failure. It involves:

- Complete health check of all CNC parts including supply, temperature and vibration;
- Cleaning of units and replacement of consumable parts such as battery and fans;
- Complete data back-up of CNC including hard disc;
- Overhauling of drives and motor at Mitsubishi Repair Center.

To avail of the preventive maintenance service, customers have to opt for a contract with MEI that covers the maintenance of CNCs of models A and B with different payment structure for each. Model A includes Standard CNC (M60/ M70/ E60/ E70), Mazak Mazatrol (EIA). Model B includes Standard CNC (M700 with Windows), Mazatrol (Matrix, Fusion, Smart), Citizen (M730, M635), M720BM, M730BM/UM, M750BM/UM, C70. Both models have a very competitive pricing, for each machine for the same duration of 2 years.


Source: Mitsubishi India Pvt Ltd

Mitsubishi Electric's experienced field engineers providing high-quality services to its customers.

### Advantages of preventive maintenance

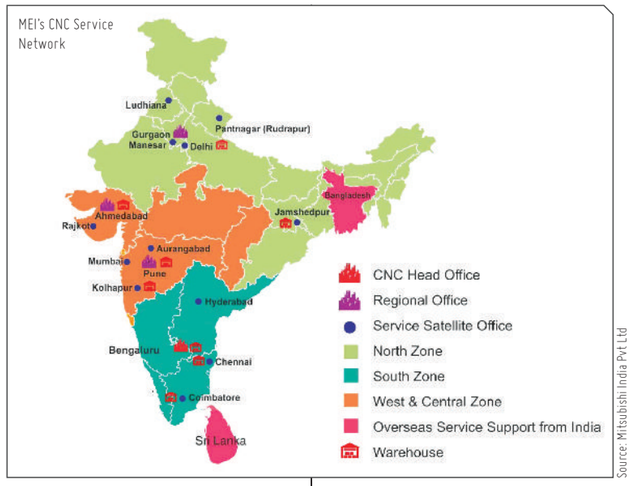
- Machine downtime is decreased, and the number of major surprise repairs are reduced.
- Efficiency of machines is enhanced, keeping then running more efficiently and lowering power expenses.
- It also includes a complete data backup including NC data and hard disk, and latest software upgradation.
- Consumables are replaced, parts are overhauled, and complete health check-up is done.

**CNC service support**

MEI's CNC Service Network is spread globally and throughout the country with its head and branch offices in North, South, West, East, and Central zones. This encourages customers who expect quick responses, solid technologies and user-friendly support to prefer Mitsubishi CNC.

Service support is provided within 24 hours of the work order. Prompt and precise online support is provided by dedicated front engineers who assist customers on all queries from technical to commercial via phone and email.

Highly experienced field engineers provide high-quality customer service and handle troubleshooting, diagnosing, problem fixing and root cause analysis.




Source: Mitsubishi India Pvt Ltd

**Parts support, repair and exchange**

The company maintains a stock of around 2,400 varieties of genuine parts manufactured at Mitsubishi Electric, Japan and provides lifetime part support for all type of controllers from M300 series to M80/800 series CNC. Spare part support is present across India, Bangladesh and Sri Lanka and parts are delivered within 24 hours to pan India customers. For part repair, skilled repair engineers provide quick and efficient support for Mean Time to Repair (MTTR) reduction. There exists a 24 hours testing facility with an average turnaround time of two days. Part exchange facility is available for selected parts and is subject to the condition of the faulty part under exchange. New or reconditioned parts are provided against faulty parts with a benefit of 30 percent. Faulty parts are taken back by MEI and those then become the company's asset.

**Extended Warranty Contract (EWC)**

MEI's extended warranty for its machines ensures low running costs, quick response time and high productivity due to lower breakdown time. The reasonably priced contract covers all products including Spindle and Servo Motor and also includes free inspection visits. Round the clock customer support is provided by qualified and trained engineers via phone and email. Dedicated toll-free number with a password is allotted to customers to facilitate priority service to those registered under this service. Parts and engineers for service are dispatched on the next working day as per MEI's standard service policy.

**A stitch in time**

The adage is all the more powerful in the industrial context where a machine breakdown can spiral into a number of other issues resulting in a drop in production and wastage of productive working hours. Hence, a maintenance regime helps to attain the goal of consistent industrial practices with better safety of the equipment and improved production. The other perks that come along make it too good to pass up.

Source: Sahajanand Laser Technology Ltd

SLTL's OTF Marking Machine setup at Dolphin Production Facility.

# IN SEARCH OF PERMANENCE: MATCHING PRODUCTION SPEED

An explainer on how Sahajanand Laser Technology Ltd (SLTL), a pioneer in the field of lasers, came up with a cost-effective solution for a Dolphin company to help it achieve quality pipe marking that could last, with the reduction in manpower, production downtime and scrap as other perks.

Established in 1986, the Dolphin Group is a leading conglomerate in the country comprising nine associated companies, all engaged in a diverse range of manufacturing. One of its companies, Dolphin Poly Plast Pvt Ltd is based in Rajkot and is a well-recognized name among the manufacturers of HDPE pipes and micro irrigation systems. It offers a comprehensive range of plastic products in India, and is a market leader in the field of PVC pipes and fittings.

Source:Sahajanand Laser Technology Ltd

## Challenges faced

Pipe making is a rapid process and involves a procedure to follow. Marking is just a part of the process, but a highly important one because the visibility of logos, texts and other marks contributes to the perceived quality of the product. Processes cannot be stopped without expensive downtime and scrap, and these lines move at hundreds of meters per minute.

The process for marking on pipes that Dolphin was using had following limitations:

**Traceability:** The marking lacked contrast and resolution, hence was difficult to view from a distance.

**Labor cost:** Manpower was required for preparing custom solution for different batches.

**Downtime:** Changing the solution for every batch required considerable amount of time.

**Wastage:** Because of the quality of marking, a lot of scrap was produced.

**Power:** Inability to utilize the full line speed resulted in high power consumption.

**Speed:** The marking solution used did not support the high production speed.

**Impermanence :** The marking done was not permanent and often was at a risk of being removed by solvents and abrasive cleaners.

**Stencil:** The custom stencil that contained the image to be marked posed problems in running sequential data such as serial numbers etc.

## Finding the way out

Dolphin being a stickler for quality, had to find some solution for the challenges it was facing in the pipe production. The company approached Sahajanand Laser Technology Ltd (SLTL) that complemented the former's business with its OTF (On-The-Fly) Laser Marking Solution. SLTL customized a solution to match Dolphin's production requirements, which:

- Helped achieve a line speed of 200 m/min with 92 characters marked;
- Reduced manpower by two units;
- Proved to be cost-effective;
- Reduced one hour of production downtime daily;
- Saved 10 percent scrap in the final product;
- Resulted in best-in-class precision and quality marking.

## SLTL

A pioneer in the field of lasers in India, SLTL offers solutions with its wide range of laser systems for diverse industrial applications. The company houses state-of-the-art facility and holds a reputation of being the largest manufacturer of laser systems in India and the world's first manufacturer of fiber laser cutting machines. Its product portfolio includes laser cutting, marking, welding systems; solar cell cutting systems; customized automation solutions; material handling solutions; press brakes; ultra-precision equipment for diamond and jewelry processing, RF and microwave solutions; and medical machinery. The company started off by setting up its base factory in Gandhinagar, Gujarat in 1991 and introduced for the first time in India a laser system for the diamond industry. Since 1995, the company ventured into other industrial applications and has been a frontrunner for the CNC laser systems in India. It is now heading for global ventures.

### Laser Marking Benefits

**Cost savings from no consumables:** High-volume manufacturers can greatly reduce costs with laser marking compared to other methods. The consumable cost for ink or labels far exceeds the initial cost of a laser.

**Permanence:** Laser etching leads to a permanent mark that can withstand the test of time. It is chemically resistant to solvents, acids and bases. It also has the ability to resist temperatures.

**Precision:** The sharp finish of laser marking makes it the most precise solution. A laser marking is easy to read, making it far superior to any other method.

**Compatibility:** Lasers are flexible enough to fit themselves into any production/packaging line. There is no constraint of space and orientation.

**Flexibility:** Laser marking works on a variety of materials. It can mark any type of image or font and can be programmed in real-time.

**Minimal maintenance:** Downtime associated with cleaning a printer or changing a stencil can be avoided with a laser marking solution.

**High speed:** A very high speed can be achieved with laser engraving. It can also be customized to match the existing process speed.

**Non-contact process:** Laser marking does not have direct contact with the marking surface. Hence, it affects the physical property of the component.

**"**We, at first, were not certain whether the decision to get a laser machine was right. However, within a few months, we could see the difference it made and the considerable gains it helped us achieve**"**

**Haresh Kothiya**
**Director**
**Dolphin Poly Plast Pvt Ltd**

### Challenge & Solution

**Challenge**

Dolphin Poly Plast Pvt Ltd needed a permanent marking solution matching their production line speed for the visibility of logos and other text on its pipes.

**Solution:**

SLTL's OTF (On-The-Fly) customized Laser Marking Solution that proved to be best-in-class in precision and quality marking. It was fast and cost-effective, and also helped in saving downtime, expensive labor cost and scrap.


This pipe is laser marked by SLTLs Laser Marking Machine


Source: Magic Wand Media Inc

# CONSUMING **RESPONSIBLY**

**Dynamic customer requirements, intricate manufacturing processes, and a sudden upsurge of distributed assets have led to manufacturing transformation. Smart and sustainable manufacturing, as it is called, is basically smartly optimizing resources at the system level to achieve higher productivity and operational efficiency.**

Source: Automation & Electronics Practice, Frost & Sullivan – Middle East, North Africa & South Asia

As manufacturing processes evolve, customers are also on the lookout for additional functionality in the form of manufacturing intelligent tools to address key manufacturing requirements and improve the overall efficiency of their operations. Smart manufacturing involves use of sensors and automation and digital technologies for a more efficient manufacturing system with an ability to adapt to changing demands. It connects manufacturing and logistics to gather, visualize, analyze, and monitor machine, process, and sensor data.

### Saving energy

In an era where industries are adopting methods to reduce their energy footprint, usage of machine tools with features to reduce energy consumption and increase operational efficiency are gaining importance. Usage of electric drives (which reduce energy consumption), integrated hydraulic systems to increase the operational efficiency and capacity, effective design to enhance effective heat dissipation, thereby reducing the cooling requirements are some areas where machine tool manufacturers globally are focusing on. Integrating automation systems with energy intelligence systems help users monitor the performance of the machines and provide them with key data on energy consumption.

### Facilitating real-time decision making

Inter-connected machines, which can leverage seamless real-time machine-to-machine (M2M) communication, can adapt and respond faster to changing customer needs. Multiple field devices connected on the same control network, such as Programmable Logic Controller (PLC) or Distributed Control System (DCS) would be able to unite various processes across the value chain. The control system is connected to the Level 3 manufacturing execution system to communicate to the central purchase or production system. Enterprise Resource Planning (ERP) or the Product Lifecycle Management (PLM) integrate the various divisions and allow exchange of data and communication through the network. IoT brings in interconnectivity within the field devices and increases collaboration between equipment and users. Adoption of these advanced manufacturing systems will lead to high levels of data availability, which will also facilitate creation of intelligent control resulting in improved operational excellence. Real-time decision making will enable higher productivity, operational efficiency, and better utilization of current assets.

### Automation as an efficiency enabler

Automation, in a manufacturing scenario, aims at using control systems for operating equipment to reduce human intervention and provide data for real-time performance management. Seamless integration and connectivity between multiple equipment including machine tools can lead to an integrated shop floor. M2M integration will also allow mass customization and mass production of customized products where all manufacturing systems are agile to adapt to changing requirements. Furthermore, automation of workplaces and machines including robotics can help in increasing productivity and utilization levels. Automation of the overall production process provides added advantages such as reduction in errors, along with reduced downtime of the machine, while also reducing manual labor in the process.

### Flexible Manufacturing Systems

Flexible Manufacturing System (FMS) refers to an extremely automated Group Technology (GT) machine cell, comprising processing workstations, mostly CNC machine tools, attached to an automated material handling and storage system, and controlled by distributed computer systems. The FMS is capable of processing a range of different parts or products at various workstations concurrently. The desired quantities of production can be achieved according to the changing demand patterns; hence, it is referred to as flexible manufacturing system.

With better implementation, the FMS can lower the manufacturing cost, reduce the cost per unit, provide higher labor productivity and enhance machine performance, improve reliability, reduce the lead time, lower the inventories, and provide a more sustainable manufacturing ecosystem.

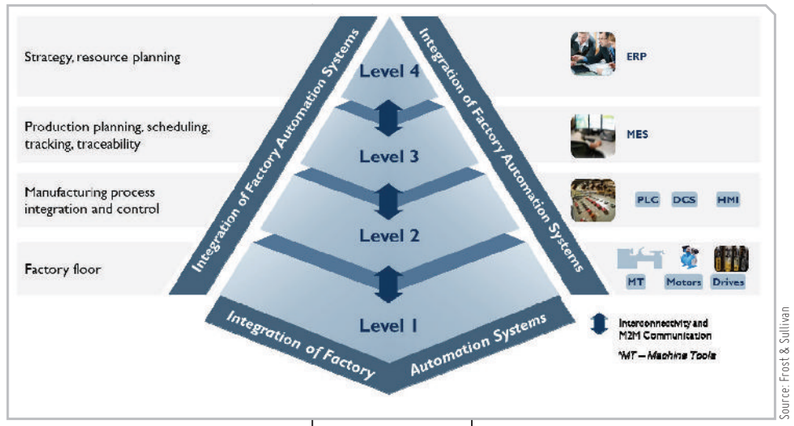
### Additive manufacturing

Additive manufacturing, also referred as 3D printing, is the process of attaching layers upon layers to create products from 3D model data, as opposed to subtractive manufacturing, which involves cutting away what is not needed from larger pieces of the material. Additive manufacturing has massive potential in almost every market ranging from automotive to aerospace, whereas subtractive manufacturing is becoming obsolete. However, the combination of both subtractive and additive manufacturing into a single machine provides economical parts or products, with minimum assembly requirements, lower lead time, lesser skilled labor, and lower wastage of materials.

### Working towards the goal

The machine tool industry is a crucial aspect of the manufacturing sector as it acts as a differentiator that helps in building the competitive edge. Technology-driven manufacturing is poised to build the confidence and faith of global customers, bringing in large-scale investments for development of manufacturing sourcing and knowledge center to India. For successful smart manufacturing systems implementation, existing and upcoming manufacturers have to embrace new technologies and the older generation has to invest their vast experience to ensure higher returns on investment.

Developing synchronized policies and frameworks for higher adoption of machine tools, strategically tied to technology transfer can revive and transform the domestic manufacturing sector and project it as a global manufacturing hub.




Source: Frost & Sullivan

Smart and Sustainable Manufacturing — Integration with levels of automation

Smart manufacturing involves use of sensors and automation and digital technologies for a more efficient manufacturing system with an ability to adapt to changing demands.

# THE **DRIVING FORCE** BEHIND SUCCESS

Swedish company Comeco had its newly launched line of rebar benders configured with electric drives with integrated PLC from Nord Drivesystems. This helped the company attain a simpler, more robust, and easier to maintain solution. Along with substantial savings for procured parts, the assembly time also halved.

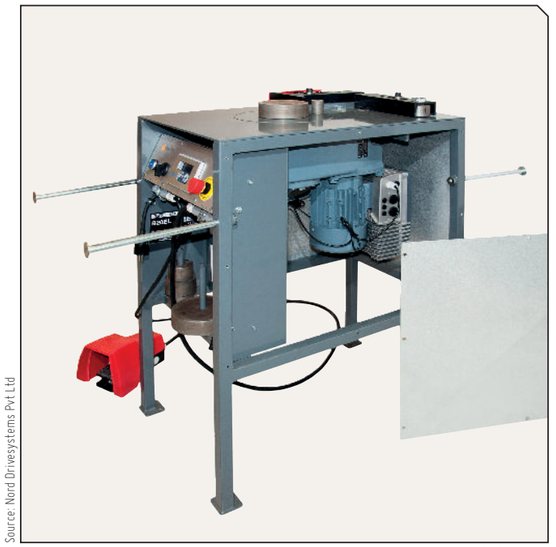
Fredric Hallberg, Owner & Manager, Comeco, found the machine retrofit a great success.

Source: Nord Drivesystems Pvt Ltd

Swedish manufacturer Comeco offers bending machines for different rebar diameters to suit demands of construction and rental companies. The company used hydraulics in designing rebar benders, a common choice for such machines. But the specialists for construction-site machinery found several problems with the tried and tested technology.

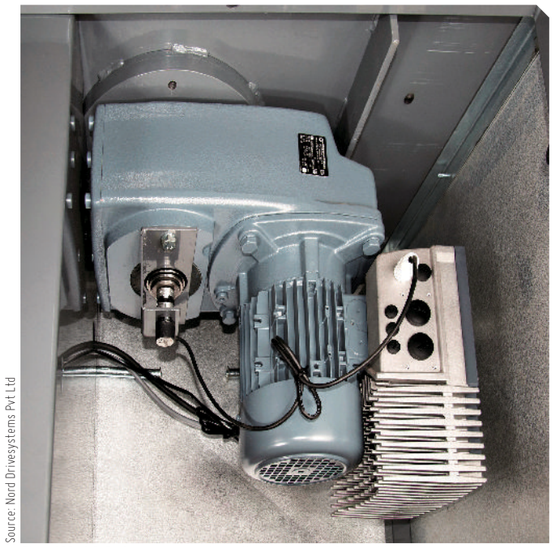
Fredric Hallberg, Owner & Manager, Comeco, shared, "Installing the hydraulic power unit, piping network, and sensors took a lot of time. The machine design was much more complex and more prone to problems than our new electromechanical machines."

Comeco therefore researched ways to make the machines more robust and ideally cheaper to build. That is when Hallberg chanced upon the Nord brand when he was giving another bending machine a closer look which had Nord components in it.



Source: Nord Drivesystems Pvt Ltd

By providing a plug-and-play drive with a motor-mounted inverter, Nord has simplified Comeco's assembly and commissioning work.



Source: Nord Drivesystems Pvt Ltd

The NORDAC FLEX frequency inverter with its integrated PLC enables safe and highly comfortable bending of rebars to exactly the desired angle.

## High usability

As per Comeco's requirements, all machine functions were to be controlled by a PLC. Nord therefore, proposed its NORDAC FLEX AC vector drive. The motor-mounted inverter integrates a PLC for precise speed control and positioning. Machine operators can select from two speed settings according to their skill level and the thickness of the steel bar. The 20 mm machine allows two angles to be programmed at a time. Operators can then conveniently go from one setting to the other with a switch button. The parallel-shaft geared motors of these drive systems deliver high torques at a very compact size.

The drives are delivered pre-assembled and pre-parameterized with a Parameter Box, which Comeco takes as is and installs in the machine operation panel. Instead of complex wiring of the hydraulic control system, the electronic drive only needs a power connection. "We certainly save money here as well," said Hallberg.

"The ParameterBox saves us a lot of switches. The company delivered it with the buttons and the display programmed according to our specifications. You change the angle with the up and down arrows, the speed with right and left. It is very simple. Operators do not need to navigate through a menu."

## Safety first

After bending, the PLC reverses the drive for easy and safe removal of the rebar. "The simpler machines do this by means of springs. A spring is another mechanical part that can fail. We prefer our new state-of-the-art electronic solution. It is much safer," said Hallberg. In addition to an emergency stop button, the machine also stops if a plate near the infeed is touched – for instance, because a glove has been caught on a rough metal part. "One advantage of using Nord instead of hydraulics," he added, "is that the motor is not jammed. That way, you can manually remove the piece of rebar." The gears run so smoothly that removing an obstacle from the machine in any direction is not a problem.

### Challenge & Solution

**Challenge**

Swedish company Comeco was looking for ways to improve its machines' usability and to economize on manufacturing costs.

**Solution:**

Nord Drivesystems' AC vector drive with an integrated PLC. The new drive solution led to hard-wearing design, ease of use, substantial savings for procured parts, and a 50% reduction in the assembly time.

## Knowing NORD

In addition to standard drives, Nord Drivesystems supplies application-specific concepts and solutions for special applications. The company produces a wide variety of drive units for torques from 10 to 200,000 Nm, electric motors with powers from 0.12 kW to 1,000 kW as well as the necessary power electronics in the form of frequency inverters and servo controllers. Inverter solutions are available for classical installations in the switch cabinet and for decentralized and fully integrated drive units.

# MAKING **EXCELLENCE** A HABIT

A systematic application of tools and techniques of lean manufacturing coupled with innovation helped this company in achieving manufacturing excellence. An interesting read.

Source: Mahle Behr India Pvt Ltd

Operator moving along with a fixture trolley starting from the left corner and completing the entire assembly by the time he reaches the right corner.

Mahle Behr India Pvt Ltd is among the leading manufacturers and suppliers of thermal management systems for passenger and commercial vehicles. With a state-of-the-art manufacturing facility at Chakan, Pune, Mahle Behr India designs and manufactures HVAC modules, Engine cooling modules, Visco fan drive systems and EGR coolers for new generation automobiles.

## Disrupt to innovate

With uncertainties in the business scenario and ever-changing customer demands, a need to become more efficient in the way operations were being carried out was felt. The need was acute particularly with respect to the flexibility in catering to customer demands; maintaining and increasing productivity levels despite volume fluctuations; and improving floor space utilization over the life of the product.

The team, encouraged and supported by the top management, took up the challenge to bring about a disruption in the traditional way of designing and setting up an HVAC line, which would become a model of excellence for future at Mahle Behr.

With the increasing focus from Global OEMs to set up their facilities or increase their scale of operations in India, in line with the 'Make in India' initiative, implementing this breakthrough not only helped Mahle Behr, but also, in some or the other way, the overall auto sector.

## Resorting to new measures

A review of the existing way of operations in HVAC assembly lines revealed:

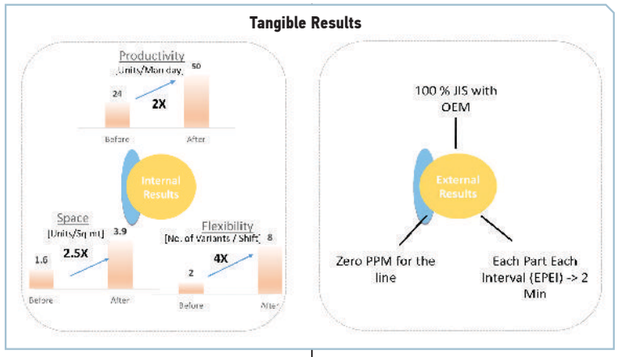
- A traditional method of having customer-specific lines.
- Batch type production being followed for different variants on the assembly line.
- More of fixed man-machine-material type of layouts.

Looking at future business prospects, with the addition of new customers and constraints on expansion, utilization of available floor space was bound to become the most crucial factor. Hence, in addition to traditional indices like human productivity, in-process inventory reduction, etc., the team created new measures of efficiency like units produced per sq mt of area occupied by the line.

### Uniqueness of the breakthrough

- Seven stationary fixtures converted into a single moving fixture mounted on trolley;
- Flexibility was achieved -- One variant at a time to multiple variants one after the other at the same time.
- Set-up time of less than the cycle time was achieved.
- Combined ownership of a product between operators deployed in a line converted to individual ownership as the complete product was assembled by the same person.

AMIT M DESAI
Senior Manager – Production & Innovation
Mahle Behr India Pvt Ltd
amit.desai@in.mahle.com




## HIGHLIGHT

Implementing this breakthrough to bring about a disruption in the traditional way of designing and setting up an HVAC line not only helped Mahle Behr, but also, the overall auto sector.

## Evolution of the breakthrough

V Map (Visual Map) was used as a scientific tool to understand the current scenario with respect to line balancing, human efficiency, man and material flow within the cell, non-value added activities including walking with or without parts, etc.

A future state map was made with improvement activities to overcome the issues identified in the current state map. Different proposals in reference to layout were made and evaluated on indices such as floor space, flow, flexibility, ease of material feeding and, needless to say, productivity.

Although significant improvement was visible on each of these parameters, the team was not satisfied as the objective was to create a breakthrough. The members, being skilled in application of 3 Gear Innovation techniques, decided to look at and learn from similar and dissimilar industries. The significant finding was that the man moves in most scenarios – in supermarkets he moves along with the trolley for picking up the required items, in thali restaurants he moves along with his plate to serve himself. It's only in the industrial sector, traditionally, that the man is kept stationary at the machine / workstation, which in some or the other way tends to make him less active with boredom creeping in as the shift progresses.

## Prototyping

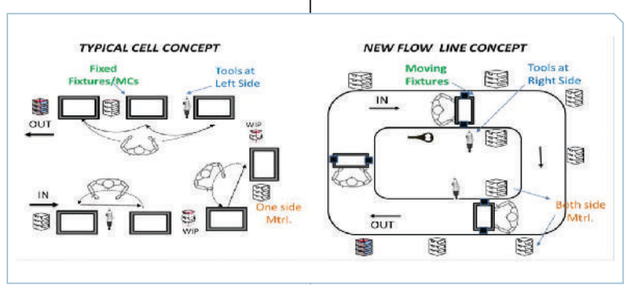
The concept was prototyped with a Lego game with two scenarios: the first one with five persons stationed at five stages and the material moving between them after the completion of activities at respective workstations, and second one with one person moving along with the material through all the five stages completing the defined activities at each stage.

The results of the second scenario showed significant improvement in line balancing, human efficiency and productivity in terms of units produced with no in-process inventory as the same person is completing all the processes.

It was thus decided to devise a unique concept of moving fixture wherein the operator would move along with the fixture picking up parts placed on both sides and complete the entire HVAC unit. While designing the fixture, the team managed to combine seven different assembly fixtures used at different workstations into one single fixture which could be used for the assembly of both RHD and LHD HVAC variants with a set-up time of less than one minute.

Key aspects like the direction of man and material flow, tool arrangements to be on right hand side for better control and precision work, and the material arrangement with visual controls were also considered.

Environmental aspects were also paid heed to during setting up of the line through the use of LED lights and line documents displayed in soft versions (partially implemented), reduction in the use of compressed air, etc.




## Challenge & Solution

**Challenge**

Mahle Behr India Pvt Ltd needed a more efficient way of operations to achieve flexibility in catering to customer demands, increase productivity levels and improve floor space utilization.

**Solution**

The traditional way of bottleneck stations was changed to flow-based operations.

Source: Kennametal India Ltd

Kennametal is actively involved in training technical professionals with different levels of educational qualification.

# COLLABORATING FOR AN EMPOWERED FUTURE

Despite our strong focus on education and training in academic institutions, there still remains an acute dearth of industry-ready workforce equipped with the right kind and amount of skill sets. Along with the Government's schemes to address the issue, the industry also needs to play its part and extend its support to the academia to groom candidates accordingly.

The Indian manufacturing industry is poised for an accelerated growth in the coming years. However, it is widely acknowledged thatdespite the emphasis placed oneducation and training in our country, one of the significant challenges to greater growth is the shortage of skilled manpower needed to address the changing demands of the industry. Hence, there is a desperate need of workers with employable skill sets who are 'industry readyresources' at the entry level.

To overcome this situation, the government is striving dedicatedly with initiatives like Skill India that are designed to develop and improve multiple skills required by the industry through the active involvement of all key stake holders. However, it becomes imminent for corporates and industry bodies to do their bit in support of skill building efforts.

It is in this context that, Kennametal, as a responsible corporate citizen is doing its part to fill the void with a program designed to churn out a trained and certified labor force having employable skill sets.

## Apprenticeship Program

Kennametal is actively involved in training technical professionals with different levels of educational qualification. There are three types of apprentices engaged on a regular basis: ITI Apprentices, Technician Apprentices and Graduate Apprentices.

All apprentices are taken on board after a written technical test and a personal interview to ensure their aptitude, attitude and learning agility.

**ITI Apprentices:** Students with ITI training are taken in for Turner/Fitter/Grinder trades in one-year apprenticeship program as per Apprenticeship Act. During the program, the students attend weekly instruction classes and learn through on-the-job training which ensures that their knowledge is further enhanced, and they have a practical experience of working on the shop-floor.

**Technician Apprentices:** Diploma students are engaged for one year on-the-job and class room training. The training provides them the exposure to the latest technology and work practices as per industry trends. The students are made aware of the soft skills (workplace etiquettes), shop-floor safety practices and high work ethics, which are critical disciplinary elements of working on the shop-floor. This also gives them an opportunity to learn and imbibe best in industry practices. The students become technically competent and develop the capability of understanding finer aspects of Quality and TPM, thus preparing them well for the industry.

**Graduate Apprentices:** Graduate Apprentice Trainees (or GAT as they are referred internally) who have completed 4-year engineering course in Mechanical/Electrical/Automobile are engaged in one year extensive training and are made to work in different functions under direct supervision of the senior management. As per business needs, these students undergo a course at IMTMA, which along with the OJT (On the Job training) and Soft Skill courses helps them realize their potential fully. All these inputs and development make them excellent candidates to be recruited in Kennametal. Equipped with the right skill sets, GATs who have completed their Apprenticeship program with the company are welcome in the industry at large, which is reflected in their placements at many Indian and MNC organizations.

## Knowledge Center

Apart from the above Apprentice programs, Kennametal has its own 'Knowledge Center' (KC) that spearheads training programs designed to enhance knowledge and skills of Cutting Tools professionals at the users' end. The center is among the most reckoned technical training centers in India in the field of Metal Cutting Application Engineering and has created a benchmark in the manufacturing industry.

**On the Human Resource front, India is a land rich in natural talent and favorable demographics. This demographic dividend is waiting to be transformed into a platform of skilled workforce and Kennametal is actively involved in supporting skill building activities for a New India.**

This is especially relevant in the present context of globalization where the demand for skilled and multi-tasking workers is on the rise.

## What Knowledge Center does

Every year KC conducts Metal Cutting Application Engineering training programs impacting around 1000 manufacturing professionals from the user industries, enabling them to be better equipped to select the right tools, deal with the changing machining requirements and focus on getting the right productivity with cost saving opportunities.

The KIL leadership team also actively shares inputs on curriculum with select educational institutions in addition to providing corporate exposure to their students in an effort to bridge gap between corporate and academia.

We have been to educational institutes in Bangalore and beyond for spreading awareness among the teaching staff and students regarding corporate expectations and sharing success tips with them.

## Industry's pivotal role

As part of the company's Corporate Social Responsibility (CSR), an active involvement with selected educational institutions is ensured, right from primary schools to professional colleges, to improve the quality of learning and enhance the learning skills of underprivileged students. Scholarships are also offered to deserving students to enable them to pursue higher education. Students are provided with the opportunities of industry visits as well as internships, which is highly appreciated by the academia.

The Government of India's ongoing initiatives towards this will pay off in due time. The issue, however, needs a holistic approach to bridge the skill gap in the industry. Hence, it becomes highly imperative for the industry itself to come forward to play a supportive role in the building of New India.


Source: Kennametal India Ltd

Kennametal Knowledge Center is widely known for producing successful batches in metal cutting applications.

BC RAO
Managing Director
Kennametal India Ltd
bc.rao@kennametal.com

# ACCOMPLISHING GOALS TOGETHER

The 6th VDMA Mechanical Engineering Summit was a huge success with the association promoting the benefits of mechanical engineering and serving as a meeting point for its member companies in India. The prestigious event gained special significance as VDMA celebrates its 125th anniversary this year under the motto 'Man – Machine – Progress'.

Source: VDMA India

(From L–R) Ulrich Ackermann, Managing Director, Foreign Trade division, VDMA Frankfurt; Margit Hellwig-Boette, Consul General, Federal Republic of Germany, Bangalore; Rajesh Nath, Managing Director, VDMA India and Shri R V Deshpande, Hon'ble Minister for Large & Medium Industries & Infrastructure Development, Government of Karnataka launching VDMA India app.

POONAM PEDNEKAR
Chief Copy Editor
Magic Wand Media Inc
poonam.pednekar@magicwandmedia.org

The Indo-German ties have been just getting stronger with each benefitting from the other's strength. This is reflected in a number of areas – from machinery, space research to marine science. Pointing towards this economic co-operation, Rajesh Nath, Managing Director, VDMA India, said, "Innovation should be the basis of partnership between two countries. Germany's engineering expertise and India's strength in IT have created natural synergies for collaboration in innovation."

Nath lauded the inclusive nature of the government's new reforms including GST which can potentially help in making the business environment increasingly conducive. He also spoke about the government framing a new industrial policy with an aim to create jobs for the next two decades, promote foreign technology transfer and attract $100 billion FDI annually.

### Youth is the future

The Chief Guest of the summit, Shri RV Deshpande, Minister, Large and Medium Scale Industries, Karnataka, was highly appreciative of the government's efforts of forming a cashless economy with reforms such as GST that will impose the same tax all over the nation removing multiple tax hurdles and bringing in transparency. He went on to urge the industry to come up with a solution to help the youth of the country, who constitute 60-65 percent of the population, by creating more jobs that can suit the present environment.

### Digitization - the need of the hour

Addressing the audience that mostly comprised the top management from the German companies in India, Margit Hellwig-Boette, the German Consul General to India, urged the members to embrace digitization since it's the "new way forward". "We are living in an age of disruptive technologies and companies that don't modernize will fall out of the race," she added. She stressed on the need to adopt Industry 4.0 and IoT and make use of VDMA platforms and services that are made available to the members to digitize their products for the market.

An app for VDMA India was launched at the event by Shri RV Deshpande, Hellwig-Boette and Nath jointly with the aim to provide the latest industry news, update on the members and member interviews. "This is a pioneer move and shows how quickly things are developed in India and taken to a new level," noted Hellwig-Boette commenting on the innovation capacity of the country.

Several discussions were held in tandem with the mood of the event, Vishwanath Godavarty, Sales Account Manager (India, South Asia), Materialise Software gave a presentation on 'Additive Manufacturing (AM) - The Game Changer for the Manufacturing Industry', Gautam Dutta, Senior Director Marketing, Siemens Industry Software India Ltd (Digital Factory Division) spoke on 'Digitalization - India Advantage', and Suvir Davda, Director, Global Market Corporate Services, the Hongkong and Shanghai Banking Corporation Ltd (HSBC) gave an overview on "Macroeconomic Trends and Digitization".

### Pondering over the future of manufacturing

The Knowledge Partner, Euro Asia Consulting (EAC) released a report on "Industrial Clusters in India" along with the dignitaries. Rajeev Singh, Partner Consulting, Deloitte Touche Tohmatsu India LLP spoke on "Business Impact of GST on Manufacturing Industry". A report 'Key Sector Overview in India', prepared by Market Research Partner BDB India Pvt Ltd, was released by Nath, Hellwig-Boette, Ulrich Ackermann, MD, VDMA, Foreign Office, Frankfurt; and KC Mani, Managing Director, BDB India Pvt Ltd.

The final leg of the summit included a panel discussion on "Coping with Growth and Overcoming Challenges in Manufacturing" moderated by Nath. The participants were Marc Jarrault, MD, Lapp India; Georg Graf, CEO, Freudenberg Regional Corporate Centre; Nitin Vyas, Managing Director, Beumer India; Sunil K Gupta, CEO & MD, KION India; Rajesh Mishra, Managing Director, Vulkan Technologies. The discussion had each participant explaining the growth in their organizations and the means used to overcome challenges.

**"The presentation on GST's impact on manufacturing and the discussion on coping with the challenges offered an interesting perspective. The summit was a perfect blend of topics on technology, economy, finance, and digitalization."**

**R P Reddy, Managing Director**
**LMT India Pvt Ltd**

**"The summit, packed with valuable information on digitalization and additive manufacturing, proved to be extremely useful in learning about the changing trends in the industry."**

**Vepul Kaisar,**
**Managing Director**
**DEUTZ Engines (India) Pvt Ltd**

**"The summit provided information on the present economic scenario and addressed a gamut of issues the industry currently deals with, especially the post GST uncertainties. The panel discussions offered possible solutions and showed the way ahead."**

**R Gopinath, Managing Director**
**GERB India**

**"The summit provided an insight into what business units, especially in the manufacturing sector, must focus on. Issues affecting the sector due to GST were addressed and matters regarding supply chain, fiscal policies and training requirements discussed."**

**Abdul Gomaz, Director, Operations**
**SchuF Speciality Valves India Pvt Ltd**

**"The event gave us an opportunity to listen to the industry veterans acknowledging issues that the industry encounters and also to network."**

**Girish Rao, CEO & MD**
**HARTING India Pvt Ltd**

The new industrial policy aims to create jobs for the next two decades promote foreign technology transfer and attract $100 billion FDI annually.

# PAVING THE WAY FOR FUTURE MANUFACTURING

EMO Hannover has over time successfully become the most prestigious exhibition for machine tool makers from all over the world. This edition of the mega show once again did complete justice to its repute and witnessed more business, more international drawing power and more innovations than ever before.


Source: VDW

German President Frank-Walter Steinmeier declaring world's premium metalworking trade fair open in Hannover

SOUMI MITRA
Editor-in-Chief
Modern Manufacturing India
soumi.mitra@magicwandmedia.in

With economic indicators pointing upwards, the time for EMO Hannover 2017 proved to be just perfect: the IMF recently confirmed its growth prognosis of 3.5 percent for global GDP. British-based Oxford Economics have also predicted the global machine tool consumption to grow at a rate of 3.2 percent.

In the backdrop of this vibrant economic growth, German President Frank-Walter Steinmeier inaugurated EMO Hannover 2017 and noted, "An open society and prosperous economy rests on a foundation of communication and trust. Trade fairs like EMO embody this in a concrete and tangible way. Fortunately, this tradition continues to flourish, even in an age of digital catalogs, video conferences and just-in-time production."

Understandably upbeat, Stephan Weil, Premier of the German state of Lower Saxony, remarked, "Germany's and Lower Saxony's economic dynamism is a direct result of our industrial strength. EMO exhibitors are demonstrating ways not only of maintaining, but also expanding this strength by concentrating on the factors of precision, quality, productivity and above all new solutions dedicated to the issues of connectivity and digitization."

### Joining the dots

With the theme of 'Connecting systems for intelligent production', the event hosted around 2,200 exhibitors from 44 countries who unveiled their newly developed machines, solutions and services for industrial production. EMO ignited a spark for production connectivity, while focusing on numerous innovations in the traditional production engineering disciplines. In this context, Carl Martin Welcker, EMO General Commissioner stated, "The machine tool industry demonstrated that its high-tech offerings are in perfect alignment with the latest market requirements."

### Shop window for innovation

Along with digitization and connectivity, additive manufacturing was also high on the agenda for many EMO visitors seeking solutions for their production requirements. The inventiveness displayed ensured to take care of the factors such as precision, quality, speed, and repeatability which are essential when producing products high in demand. For example: Marposs presented the latest addition to its VTS line, VTS WF85 with the capability to measure any tool up to 80mm in diameter, significantly reducing the number of pictures needed to obtain the diameter and length. It can also display the surface integrity of the tool, inside the machine tool. Also, on display was the company's new software in the Robodrill's HMI. Known as Ready2Probe, the software simplifies and makes programming error free. It assists the users in creating codes and commands while guiding them at every step of the way, until a program block is generated.

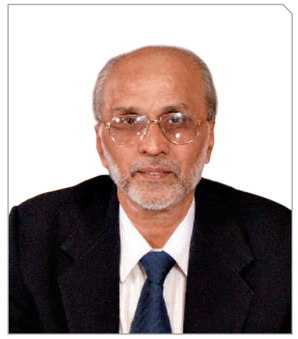
### Hub for dialogue and networking

A rich array of conferences, seminars and special displays put the spotlight on key topics like industry 4.0, future production scenarios, additive manufacturing, intelligent tools, machine safety, training for factory workers and promising markets from India to the US and Mexico, and everywhere in between.

To celebrate India's growth in the manufacturing sector, a session, 'India Day' was hosted by the German Machine Tool Builders' Association (VDW) and German Engineering Association (VDMA). Speaking on the occasion, V Anbu, Director General & CEO, Indian Machine Tool Manufacturers' Association (IMTMA), said,

"The government is shortly coming up with a new policy regime for the manufacturing sector which will provide an impetus to the ease of doing business, creation of industrial institutional capacities, technology development, Industry 4.0, skill development and globalization."

**N Sivanand, Joint Secretary, DHI, Ministry of Heavy Industries & Public Enterprises**



"EMO 2017 has marked the entry of 'Made in India' brand in European machine segment. For the first time, we have seen new dealers from Romania, the US, Spain, Turkey, Jakarta, Italy, the UK, Croatia, South Africa and Russia visiting our stall and showing interest in promoting our products in their country."

**P Ramadas, President, IMTMA & Managing Director, Ace Manufacturing Systems Ltd**

**2,200 EXHIBITORS FROM 44 COUNTRIES**

**DEALS WORTH € 8 BILLION SEALED**

**130,000 VISITORS FROM ABROAD**

"The minds of the people have to change to understand that qualified blue-collar workers are vital for India's growth. The key to success is the combination of theoretical knowledge and practical skills"

**Hermann F Weiler, Chief Patron, Gedee Technical Training Institute**


1 Source: Magic Wand Media Inc

2 Source: Marposs

1 Industry Stalwarts at India Day @ EMO Hannover

2 Marposs showcasing its diversified set of tools ranging from visual and laser tool setter devices to touch probes.

**"**We have received overwhelming response from visitors from Europe, the US, and Asian and East European countries, and several other developing nations. Our continuous presence in EMO has helped us absorb and adopt the latest trends of the industry and pass on the benefits to our customers.**"**

**Mihir Baxi, President, Global Sales, Jyoti CNC Automation Ltd**

**INTERNATIONAL SHOWS IN 2018**

MACH 2018
April 9-13, 2018
NEC, Birmingham, England

31.BI-MU
Oct 9-13, 2018
Fieramilano, Italy

JIMTOF
Nov 1-6, 2018
Tokyo Big Sight, Japan

TIMTOS
March 5-10, 2019
TWTC, Taipei

**"**The show helped us meet world-class manufacturers with a strong vision. It was a learning experience for our Common Engineering Facility Centre, which is set up in Surat in the state of Gujarat.**"**

**Pankaj Trivedi, Director, Science Engineering & Technological Upliftment Foundation**

**"**This year we participated along with our French Company SPMS. For potential customers in Europe, our strong base in France with SPMS obviously carries a lot of appeal. We hope to build a growing business with SPMS**"**

**Milind Kelkar, Chairman, Grind Master Group**

"Game-changing initiatives such as 'Make in India', opening up of strategic sectors to foreign direct investments, and the implementation of 'One nation, one tax' for goods and services have spurred manufacturing growth." According to Anbu, in 2018-2019, there is an estimate of the Indian machine tools worth $1299 million and $2259 million to be produced and consumed respectively.

## India's presence

Around fourteen-member companies of the IMTMA such as: Ace Designers, Ace Manufacturing Systems, Pragati Automation, Emkay Tools, Forbes, Ind-Sphinx Precision, Sphoorti Machine Tools, Chennai Metco, Rajamane, Precision MachineKraft, UCAM, Grind Master Machines, Jyoti CNC Automation and Shobha Industries participated in EMO displaying its best product profiles to the global market place.

## Mark your calendar

This edition of EMO created a major impact on business activity with visitors indicating their intent to invest a total of over € 20 billion in production technology over the course of the next 24 months. The entire industry is already looking forward to another promising edition of EMO in the year 2019. "The themes of digitization and connectivity will still be high on the agenda in two years' time," concluded Welcker. "And by then we will have an even better grasp of what lies ahead."

1 TMBA announcing the show dates of TIMTOS 2019 to the press @ EMO

2 UCIMU addressing a press conference on the upcoming .31. BI-MU @ EMO Hannover

Source: Magic Wand Media Inc

Source: Magic Wand Media Inc





**Measurement and Imaging**

# 3D CAD on the move

**The solution enables large, complex 3D CAD (computer-aided design) data to be transferred to an iPad and then used for mobile visualization and comparison to real world conditions.**

FARO's Visual Inspect is a true next generation solution as it moves 3D CAD viewing away from the traditional desktop PC to a mobile 'in hand, on demand' solution. The 3D CAD data is stored locally on the iPad through an innovative, compressed, mobile format which provides an exceptional degree of flexibility and mobility that together drive increased productivity. It comes in two options:

**Visual Inspect:** enables intuitive mobile viewing, verification, and documentation of complex 3D data with a three-step process of downloading the iPad application from the Apple Apps store, calibrating the iPad and activating the application with the calibration file.

**Visual Inspect AR:** enables complex 3D data to be overlaid and compared to actual data in real time. The integrated iPad camera supports it as a more cost-effective alternative to other Augmented Reality (AR) products that require expensive cameras.

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**Laser Cutting**

# 8kW Fiber Laser

**The machine's laser source has a high wall plug efficiency of up to 40%, offering savings in electrical operating costs.**

LVD Company nv's new ultra-high-speed Electra FL 3015 8kW fiber laser cutting machine cuts a wide range of ferrous and non-ferrous materials as fast as the thermal process. It can maintain 2G acceleration speed while cutting, producing high quality, high accuracy cuts in simple to complex configurations. The machine also features a new cutting head featuring automated adjustment of focus position and focus diameter (zoom focus). Zoom focus control can dramatically improve piercing times, cutting speeds and cut performance in all material types and thicknesses, increase throughput and reduce the need for operator intervention. Electra also has a new 'smooth lead-in' feature, an advanced drive system and the latest generation of LVD's intuitive 19" touch screen graphical interface, making the system easy to operate for virtually any level of user.


**Leistritz Produktionstechnik GmbH**
T: +32 5643 0511
E: kvcl@lvd.be
www.lvdgroup.com

**Simulation Software**

# 3D visualization tool from B&R

**All simulations are based on real machine code and no additional simulation software or interfaces are required.**

A new visualization tool from B&R accelerates development of automation solutions featuring its SuperTrak industrial transport system. The tool displays a 3D simulation of all SuperTrak shuttle movements, as well as synchronized subsystems such as robotics and CNC. Machine builders and operators can accelerate the commissioning process by validating their designs and sequential programming in advance. The visualization tool and extensive simulation options are fully integrated in B&R's Automation Studio software development environment. All simulations are based on real machine code and no additional simulation software or interfaces are required.

In simulation mode, a 3D visualization in the development environment allows processes to be fine-tuned prior to commissioning. With a few clicks of the mouse, the optimized machine code is then transferred to the target hardware. At runtime, the visualization tool processes sensor signals to display machine movements on the HMI screen in real time.

**B&R Industrial Automation Pvt Ltd**
T: +91 (20) 4147 8999
E: sales.in@br-automation.com
www.br-automation.com


3D simulation shows the behavior of all shuttles in combination with synchronized subsystems like robotics and CNC.


Panel of eminent automation experts that discussed challenges faced by the Indian machinery industry at the Bangalore event.

# ENABLING 'MADE BY INDIA': A JOURNEY SO FAR

Beckhoff Automation Pvt Ltd recently completed its 10 successful years in the industry, which called for countrywide celebrations. The events had several industry veterans joining in to applaud the company's growth, acknowledge its contribution in their success and address the issues encountered by the industry.

P K CHATTERJEE
Senior Correspondent
Magic Wand Media Inc
info@magicwandmedia.in

It's been a decade of fruitful efforts for Beckhoff Automation with many Indian machine builders and end users having warmed up to the concept of Open Automation technology using Industrial PC-based Control systems. Hence, to commemorate and celebrate its 10-year-old journey in the country, the company organized multi-city events for machine builders, users and system integrators from various industries from October 9-13, 2017 at Mumbai, Ahmedabad, Chennai, Bengaluru and Pune.

## Marking milestones

For the last ten years, the Beckhoff team in India has remained committed in constantly guiding and supporting Indian manufacturers, machine builders, and solution providers to upgrade the control systems for building high-performance machines. The efforts have paid off in the form of success and recognition the company has gained. The active participation from the industry fraternity of the country at the events served as a testimony to the trust Beckhoff Automation has built over the years.

The occasion was just opportune for the company to express gratitude to its customers and support service providers for enabling its growth. The events, with machinery manufacturers, end users, and system integrators as experts in the panel, provided an ideal platform for discussing issues including creating industry awareness, technology percolation to MSME level, investing in IoT, engaging academics for R&D, new skill development, and training in-house human resource and re-allocating them for long-term sustainability in the new era.

The keynote speakers at the events stressed upon the importance of technology and machine design to make Indian manufacturing most efficient and high quality for 'Make in India' program to be successful. The point that end-users must elevate their equipment standards for MSME vendors to comply was also highlighted.

Jitendrakumar Kataria, MD, Beckhoff Automation, said, "We strongly believe in helping Indian equipment manufacturers to produce world-class equipment using Beckhoff technology so that they can compete in the global market."

Echoing the same sentiment, Kai Ristau, International Sales Head, Beckhoff Automation GmbH & Co KG, stated, "It is indeed satisfying and motivating looking back at the decisions taken to transfer the technology benefits to Indian Industry. Beckhoff India's entire team is simply excellent and highly committed to enable 'Made by India' with PC-based Automation technology."

(From L–R): Jitendrakumar Kataria, Managing Director, Beckhoff Automation Pvt Ltd; Marcel Meier — Area Sales Manager, Beckhoff Automation GmbH & Co KG; Murali Kantharaju, Managing Director, DesignPro; Andrew Hughes, Technical Head, Aditya Auto; and Rajesh Nath, Managing Director, VDMA India; during the lamp lighting ceremony in Bangalore.

A panel discussion on how automation technologies manufactured in India can contribute to 'Make in India' program in progress.


## India intent

Beckhoff Automation came into being in 2007 with a sole intent to enable the Indian manufacturing industry to implement advanced automation solutions in building innovative and high-performance machines using powerful industrial computers and Ethernet fieldbus communication technology. It believed that the Indian manufacturing industry was brimming over with engineering talent but lacked automation technology tools. Identifying this need, Beckhoff Automation GmbH & Co KG, the globally fastest growing automation technology company, decided to set up a subsidiary in the country to enable the industry to design and develop innovative and value-added machines 'Made by India'.

With its ever-growing customer base and acceptance from the Indian industry, the company is all equipped to take on new challenges and position itself still higher in the coming decade. We wish the company best luck!

## Company Index



## Advertiser Index

## INTRODUCING SMART SOLUTIONS FOR PARTING AND GROOVING

● Extensive range of grooving and parting system. ● Economical twin-edged inserts with high stability and good repeatability. ● Molded chipbreaker. ● Top and bottom prism on insert hold the insert firmly and aligned accurately. ● Very rigid seating with strong and secure clamping. ● Simple, accurate and rapid indexing. ● Stable support against side forces. ● Integral shank tools with minimum spare parts, in standard shank dimensions. ● Smartest solution for deep grooving, parting, shallow grooving, recessing, undercutting etc.

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