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VERTICAL TURNING CENTERS



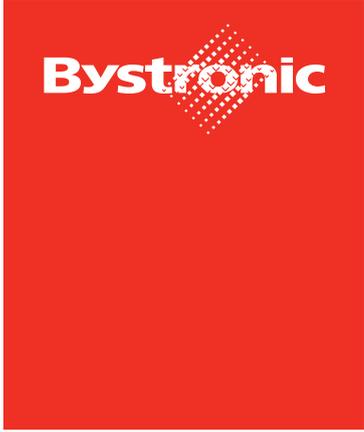
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HORIZONTAL MACHINING CENTERS



5 AXIS MACHINING CENTERS

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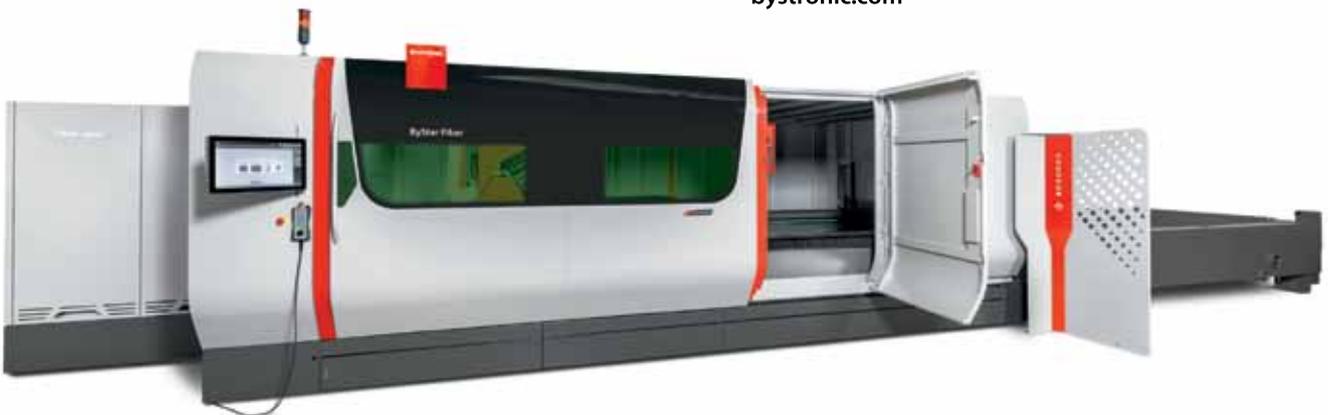
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Optimal Solutions for the future

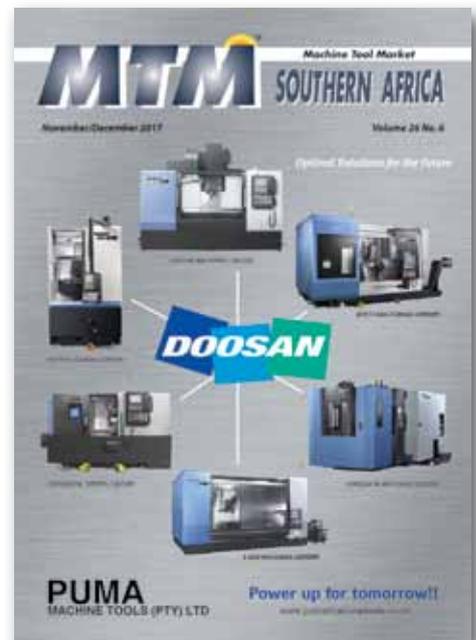


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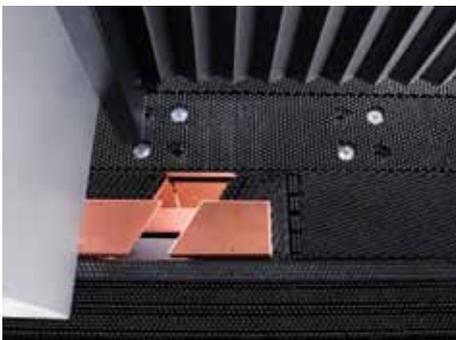




THE DREAM MACHINE FROM TRUMPF

A revolution in 2D laser cutting – the fully automated and compact TruLaser Center 7030 promises unmatched efficiency and process reliability in the manufacture of laser-cut parts.

A high-precision, fully automatic machine that takes care of production largely autonomously – that's the new TruLaser Center 7030. It offers extremely efficient, automated and synchronous processes, from its programming all the way to sorted and stacked workpieces. The machine works with a hybrid drive system to meet the ambitious development goal of eliminating all obstacles to smooth processing in laser cutting today. These include shutdowns due to collisions involving parts tilting over, refinishing work on microjoints, spatter on the undersides of components and excessive programming work.



The SmartGate – two slides move synchronously with the cutting head, and the distance between them changes automatically. As a result, parts rest securely on top and smaller parts can be directly ejected.

The TruLaser Center 7030 moves the sheet and the cutting head simultaneously and the slats have now been replaced by brush tables. The machine can eject small parts safely and sort them into containers, it disposes of residue and slag, it sorts and stacks larger parts during machining, it can load itself with blank sheets on a very tight space, it stacks scrap skeletons and the programming is also largely automatic. Numerous innovative and patented solutions contribute to the coherence of the entire concept. Heinz-Jürgen Prokop, Head of Development and Procurement in the TRUMPF Machine Tools division, explains, “we were gradually having to face more and more calls for help from our customers, asking us for solutions that would create a secure overall process. It turned out that this wasn't possible with the machine concepts we already had, so a complete re-think was required.”

High dynamics through additional axis of the optic

The TruLaser Center 7030 works with a TruDisk solid-state laser, with six kilowatts of laser power. In terms of cutting productivity, it is easily on a par with today's high-end machines with flying optics, even though the sheet, with its relatively high mass, is moved precisely over the brush table in the Y direction. This was made possible by two solutions. Firstly, the sheet – maximum large format 3000mm by 1500mm – is moved across the short side. And secondly, the cutting optic, which moves mainly in the X direction, has an additional axis in the Y direction with travel of $\pm 55\text{mm}$. This means that with smaller contours, only small masses need to be accelerated, enabling high dynamics.

Secure part support thanks to the mobile SmartGate

On a hybrid machine, the support table for the sheet has to be divided beneath the path taken by the cutting head. This creates a gap



Increased process safety due to a pressing-out cylinder – the TruTops Boost programming software calculates the ideal pressing-out point automatically.

through which the laser beam can escape downwards, but through which slag, slugs and cutting gas are also extracted. To prevent any sheet contours from getting caught there and to enable a far more efficient exhaust system, the TRUMPF developers invented the SmartGate – two slides which move synchronously with the cutting head. They can also change their distance from each other, to create different-sized gaps. This results in two major benefits – the sheet is securely supported during the cutting process and small parts measuring up to 160mm by 160mm can be simultaneously ejected downward.

To ensure maximum process reliability, an ejector cylinder has been attached to the cutting head that presses the sheet metal parts outward and downward. The programming system TruTops Boost calculates the ideal pressing-out point automatically to suit the respective part contour. Since the slides below form a counter-bearing parallel to the sheet, the workpieces cannot tilt over. Scrap and slag fall directly into the scrap cart, or are transported out of the machine on a conveyor belt. Good parts are intercepted by a retractable sorting flap and the SortMaster Box Linear distributes them into a maximum of eight containers.

Process-safe removal of parts from the scrap skeleton

For the automatic removal of the remaining parts from the scrap skeleton, the TRUMPF experts developed SmartLift and SortMaster Speed – and this represents an intelligent, completely new and above all, process-safe solution. With one stroke on the SmartLift, the cut parts are lifted off the scrap skeleton from below via a total of 180 freely positionable pins. Each individual pin can lift a weight of up to ten kilograms, making the process far more powerful than today's suction solutions. At the same time, the SortMaster Speed pushes down from above with its suction plates, ensuring precise linear guidance during lifting. As a result, any risk of parts tilting over into the kerf can be safely ruled out. The two telescopic arms on the SortMaster Speed are equipped with three suction plates each, and can sort and stack parts onto a maximum of eight Euro pallets across a total area of 1.6 by 4.8 meters.

Only minimal cutting interruptions

TruTops Boost also calculates the optimal position of the pins and suction plates automatically – enabling removal of very large parts as well as smaller ones no larger than a credit card. Even highly complex or very filigree geometries – considered impossible to remove mechanically until now – are lifted safely from the sheet, without the need for

Automation

any additional programming. The strategies for removing and cutting the parts are coordinated in such a way that the machine continues to cut even while the parts are being transported away.

Today, productivity per unit area is an important criterion, and the developers of the TruLaser Center 7030 were instructed to save space wherever they could. They did so successfully, with a solution that temporarily includes the transport route through the production hall. The machine has three electrically powered drawer-type carts, which can be extended as far as the aisle. Pallets with stacks of blank sheets up to 130mm in height, and weighing a maximum of 3 tons, can be placed onto the middle cart from the aisle by, say, forklift trucks. Similarly, there is a cart for scrap skeleton stacks up to 250mm in height, and also a cart that transports pallets with cut parts from the machine. Separating, lifting and insertion of the blank sheets into the clamping unit takes place automatically, parallel to unloading of the scrap skeleton.

Programming in a single step

The numerous options, and the synchronized interplay of the individual processes, make near-fully automatic programming indispensable. In fact, the TruLaser Center 7030 operates almost as simply as a printer in an office. If you send it a document with corresponding job data – geometries, amounts, material types, thicknesses – it provides you with the finished parts, sorted and stacked to suit the order. This includes nesting of the parts on the sheet, assignment of cutting technologies, removal strategies, placement of cut parts onto the storage shelves and ejection into the container.

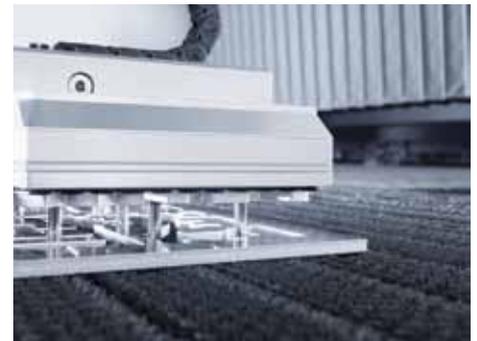
Here, the SmartGate, ejector cylinder, pins, sorting flap and SortMaster Speed do not have to be individually programmed. Simulations running in the background take



The TruLaser Center 7030 is capable of working autonomously over long periods, without the need for any operator intervention.



With its cutting productivity, the TruLaser Center 7030 is easily on a par with any classic high-end machine using flying optics.



Safe removal – with the SmartLift, the freely positionable pins push the cut parts upward from the sheet skeleton, while the SortMaster Speed, with its suction plates, presses down on them from above.

into account the component geometry and material characteristics, ensuring an optimal calculation result. They are supported by the clearly laid-out order management of the programming software TruTops Boost. As a result, programming takes place in one single step and largely automatically, but can be adjusted interactively at any time.

Consistently oriented to the future

The TruLaser Center 7030 is capable of working autonomously over long periods,

without any operator intervention, and is also equipped with all the necessary interfaces and functions. This makes it an ideal machine for Industry 4.0, and many TruConnect solutions can be used directly. The Performance Cockpit gives an overview of relevant production data. The Dot Matrix Code supports connection to various processing technologies and creates transparency during part tracking. Moreover, the MobileControl app reduces the already low attendance of the operator to a minimum via remote control.

With the TruLaser Center 7030, TRUMPF is addressing sheet metal fabricators from all sectors who cut sheets from one to twelve millimeters thick at high capacity. And this fully-automatic laser cutting machine reveals its potential from the very first shift onward. With two-shift operation, processing costs are up to 30 percent lower compared to standard automated machines with solid-state lasers. As Prokop summarizes, "TRUMPF's mission has always been to define the technological state of the art in its core areas, and to give its customers the competitive edge. The TruLaser Center 7030 is further proof of this."



The synchronous interaction of the individual processes is the result of near-fully-automatic programming via push-button.

For more information,
please contact Retecon –
Tel: 011 976-8600.



HOW TO ACHIEVE AN OEE OF 100%

By Paul Savides, PBS Machine Tools.

Driven by rapid development of automation technologies in recent years, automated production systems have been introduced into enterprises. Not only in order to enhance competitiveness, but also to reduce labour costs and improve productivity and yield.

The benefits of automation include increased productivity, enhanced machine quality and yield rates, decreased labour costs and quicker return on investment; add to this improved floor space turnover, prevention of operational mistakes, enhanced production flexibility and lower workplace hazard by limiting labour.

At PBS Machine Tools, we investigate a customer's needs and parts, do a time and motion study in order to identify a specific solution and then apply many different automation techniques in order to help the customer achieve their TAKT time goals.

The most important focus of applying any automation system should be OEE (Overall Equipment Effectiveness). This is a function of—machine **availability** x machine **performance** x **quality**.

Availability is a measurement of up-time, **performance** is the speed at which the line is running vs planned speed and **quality** is a measure of good parts produced vs total parts produced.

In other words to achieve an OEE of 100%, a machine must run for every second it is available, parts must be manufactured as fast as possible and quality must be 100%.

A globally acceptable OEE is around 85%. This can best be achieved by implementing automation, which directly affects the OEE

variables of availability, performance and quality.

Availability is affected in that the machine is now utilized more efficiently and for more time in each day. Performance is affected by minimizing non-productive time and quality is affected in rework or making of new parts for replacement.

TongTai manufactured its first automated production line more than 35 years ago and until now, has produced more than 400 various automated production systems.

Automation Systems

Standard Single Machine (CNC Lathe) with attached universal robot arm and customized loading systems. Ideally used for smaller workpieces. Load and unload within 5 seconds. Workpiece range of Ø5-120mm. With multiple part inlet options such as conveyor or stack type.



Standard Single Machine (VMC) fitted with a compact 6 axis robot for auto loading and unloading small to medium sizes vertical machining centres. This saves floor space and time and brings with it high flexibility. Together with the part stacker, it is also important to consider an auto spare tool supply to achieve longer production runs without human intervention.



Multiple CNC's with overhead gantry loaders—this is the most efficient connection between different machine types and multiple machines. The structure is simple, out of the way and probably the most economical solution. Together with this, stations can be

easily added for measurement, air blow, part turnover, repositioning and cleaning. Parts are generally up to 15kg and gantry robots travel at 120m/min.



Production lines with multiple machines and 6 axis robots—large multi-axis robots are suitable for automation among various large to medium machines. TongTai can design a complete part movement and information system to meet customers' requirements. This includes cameras for part checking, transfer between machining operations, inspection and cleaning.



Flexible Manufacturing Systems (FMS)—which is a complete production management system incorporating material storage, scheduling, machining, inspection, stock and production management. FMS target small-volume and large variety production. This usually incorporates one or two machines with up to 100 pallets. Parts suitable for

Automation



these systems are up to 1000kg with cycle times over 4.5 minutes.



Simple semi-automatic parts flow system – in order to meet the demand of semi-automatic production lines, systems need to be able to provide benefits of time-saving, man-power saving and safety. Such systems make use of man-power assisted by smart automation to make their jobs easier and consistent. These systems generally include a manual loading/unloading station, automatic loading of fixtures into machines, assisted parts feeder and manual jig/fixture assemble.

Together with these systems, a lot of planning and peripheral equipment needs to be considered, such as tool life management, auto workpiece identification, workpiece measuring stations, cleaning stations, fixture auto clamp confirmation and tool breakage detection. These are all examples of items that are critical in running an automated line successfully.

Industry 4.0

TongTai also offers its TIMS system (TongTai Integrated Monitoring System) for automation and machine monitoring. This system will accurately keep track of machine

up-time, alarms, machine waiting functions, non-productive time and reasons. These can be monitored from off of the production line and assist with improved planning and better production costs.

Often customers think of automation simply as a robot arm or something similar. Of course a robot arm to auto-load a part is correct, but there are so many other simpler forms, too, including barfeeders, multiple axis rotary tables, pallet changers, auto-indexing chucks, driven tools and angle heads.

Making use of such accessories can greatly increase OEE and output, thus making a company more price- and time competitive.

It is important to realise that we are playing in the global village and a competitor is no longer the next door neighbour, but rather a factory in China, India or Thailand. How do we, as South Africans, make ourselves more competitive? How do we keep costs down, while running smaller batch production when compared to these countries? Quite simply, by focusing on any and every advantage that can be gained by implementing systems such as automation and keeping OEE at the forefront of our minds.

For more information, please contact PBS Machine Tools - Tel: 011 914-3360.



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Advertorial

CUT-TO-LENGTH LINE WITH FLYING SHEAR

Although the concept of a flying shear is not new, it is a first for this size of machine, involving South African technology. Most people will relate to a flying shear as used on a tube mill, which is relatively small and not quite as technologically advanced. AP DESIGN's latest cut-to-length line is totally electronic, using a dedicated controller and servo drive with precision ball screw.

The advantage of a flying shear is that the line does not have to stop to cut, and it does not require a looping pit as used with a roll feed device, while space saving is also a consideration. In essence a flying shear detects the line speed and theoretical position of the cut and then accelerates to the cut position, cutting the material on the fly, while it is moving. Surprisingly enough, with all the electronic and mechanical components talking to each other, the accuracy of cut is $\pm 0.25\text{mm}$, which is about 0.1% of the average sheet length.

This cut-to-length line with flying shear can decoil, measure and cut coil up to 8mm thick. The range of the cut-to-length line is from 0.9mm to 8.0mm with variable width up to 1850mm, depending on thickness and material yield.

Graham Pike, Technical Manager of AP DESIGN, says: "This machine was built for less than 30% of comparable machines coming out of Europe and that includes the design and drawings costs. This has been achieved primarily through a unique design approach, where two levellers are used to cope with the material range. This approach is more cost effective than having one leveller which requires six high back up rolls, while four high rolls are used between two machines. Cost savings have also been realized through the highly motivated and experienced staff and artisans at AP DESIGN and taking into account that labour costs are lower here than in Europe."

The machine is equipped with an HMI (Human Machine Interface) touch screen that displays a graph of roll positions and roll bend profiles, thus making the operator's job that much easier.

Another feature of this machine is the well known AP DESIGN 30 ton decoiler. South African steel producer "Mittal" produces coil from a slab, which can weigh from 24 to 30 tons. Nobody, including overseas manufacturers, produces such a machine, although there are "cone type decoilers", but these are known to damage the coil inner wraps. AP DESIGN's machine uses a conventional hydraulic expanding mandrel in conjunction with a hydraulic support arm and hydraulic coil cart.

The problem facing most would-be manufacturers is that the mandrel must cope with coils of 510mm inside diameter where the mechanics and spindle have to cope with 30 tons overhung load. AP DESIGN



Flying Shear



70% view of whole line

has overcome this problem and hence, many of these machines have been locally manufactured over the years.

Made in South Africa means that advice and service are close at hand. Many people have had bad experiences with expensive technicians called in from overseas, not only paying the service bill, but air tickets and accommodation as well.

The machine from end to end consists of a 30 ton decoiler and coil cart, a peeler table, a set of crack rolls and rewind rolls, pinch rolls, an entry/squaring system, leveller 1, leveller 2, a telescopic comb guide, the flying shear and guillotine, a telescopic run-out conveyor and an air cushion inclined stacker. The main drive is 75kW variable speed.



Plant Layout

For more information, contact AP Design – Tel: 011 010-0495.

Special Purpose Machinery!

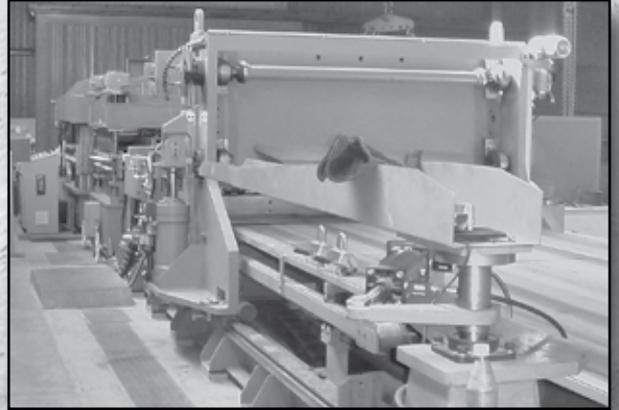
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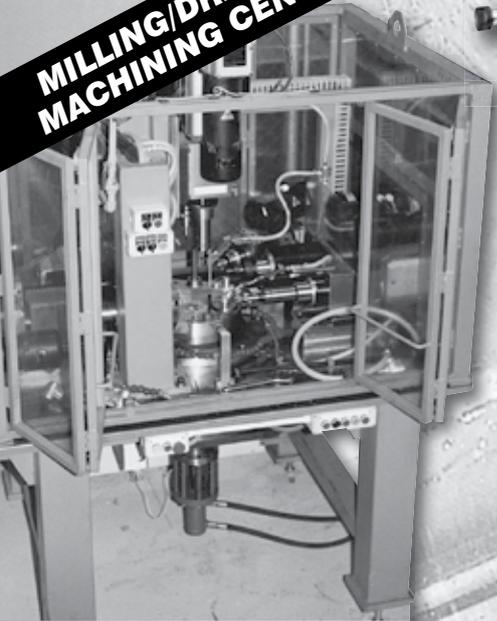


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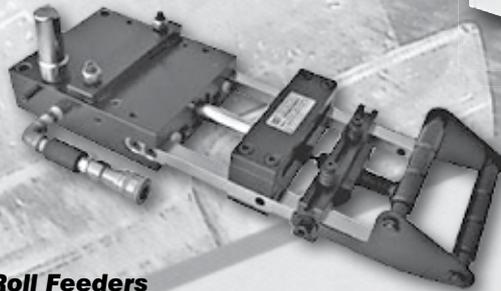
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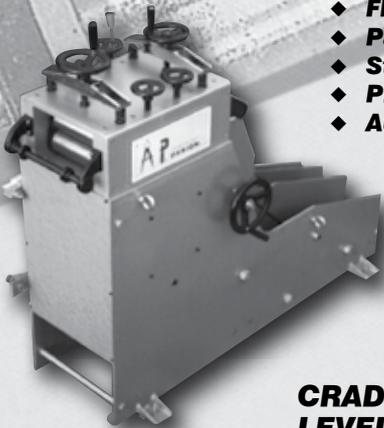
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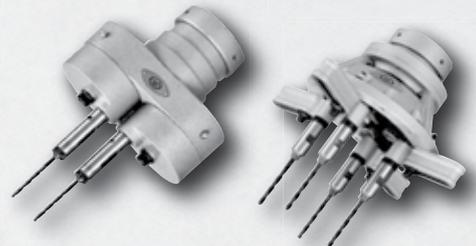
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AUTOMATION SOLUTIONS FOR AMADA PRESS BRAKES

While many assume press brakes to be mature technology, AMADA continues to push the boundaries of what can be achieved with this core metal-forming process. As a result of recent developments, the company can offer a number of important automation advancements that are designed to deskill and reduce costs for fabrication shops everywhere.

A piece of integral technology able to advance productivity is AMADA's innovative ATC (automatic tool changer). The HG-ATC is the company's flagship press brake and is unique in the marketplace. ATC technology facilitates the automatic locating and precise loading of punch and die profiles using an independent four-axis tool manipulator, delivering dramatic time gains. In fact, using a clever algorithm to guarantee the best set-up time means the HG-ATC can load even the most complex tool layout within just 3 minutes.

HG-ATC press brakes can also be equipped with AMADA SF75 sheet followers. These handy devices, which fit to the front of the machine, make it easier to handle large, heavy parts, which perhaps would have previously required two operators. As a result, labour costs can be immediately halved.



Of course, most people associate automation with robotics, and here AMADA's latest offering is the HG-ARs. This robotized bending cell, which is equipped with the new AC-300 automatic pallet changer and ATC, perfectly illustrates all the productivity and flexibility gains that can be achieved using the latest automation technology. Material load/unload and bending functions are performed by a seven-axis articulated robot, which is capable of a complete range of motions.

A seven-axis robot also features in AMADA's HG-Rm press brake system for bending large-scale parts featuring complex rib and panel shapes. Here, special grippers dedicated to rib parts are used to process complex shapes in short cycle times. The automatic re-gripping device, which does not require any manual set-up, is equipped

with two motorized arms and automatic scissor supports.

From a software perspective, AMADA can offer its advanced VPSS 3i suite for the provision of streamlined workflow from initial 3D CAD model to finished product, taking in processes such as cutting, punching, bending and welding. The key to the success of the VPSS 3i system is the constant data link between the separate software modules (such as Blank CAM, Bend CAM and Weld CAM), the machines and the central database. This database stores all parts, machines, tools, materials and technology-related information in a consistent way, distributing the data quickly and reliably. All of AMADA's automation solutions incorporate the latest digital technologies in line with smart factory concepts.

For more information, please contact AMADA - Tel: 011 453-5459.

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Fiber Laser



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Bystronic provides cutting-edge solutions including automation equipment for fiber lasers which are renowned for their exceptionally fast output of finished components. This poses a challenge for the loading and unloading of raw materials, which the company has overcome with – among other automated solutions – the ByTrans, ByTrans Extended and the ByLoader automation solutions.



Bystronic Automation ByTrans Extended.

The ByTrans, which is linked to the Bystronic fiber laser, automatically loads steel sheets onto the fiber laser's shuttle table. After the cutting cycle is completed, it unloads the finished parts and residual sheets.

The ByTrans requires only 60 seconds in which to carry out the loading and unloading cycle, with the result that the automation system is always faster than the cutting plan being processed. While the ByTrans loads a shuttle table with raw material, the fiber laser is cutting components on the other table, meaning that the laser can cut uninterrupted for an extensive period of time.

'Extended' solution with ByTrans Extended

The ByTrans Extended features not one but two cassettes, which increases the automatic capability of the system, while offering greater flexibility as it can not only store and return, but also handle the removal of large parts. It is also capable of preparing plastic protective separators, which are placed between the steel sheets.

The ByTrans Extended is available in 3 x 1.5 metre and 4 x 2 metre options. Bystronic's latest fiber laser solutions are processing raw material substantially faster than earlier systems such as CO² lasers. However, the laser forms the *hub* of an extended automation system, which includes downstream processes such as punching, bending and welding. However, where space in a manufacturing facility is constrained, the Byloader automation system is a compact loading unit that is positioned on the side of the laser system's shuttle table, supplying raw metal sheets to the laser without taking up unnecessary space.

The ByTrans, the ByTrans Extended and the Byloader are operated using the ByVision Fiber's touch screen. Bystronic has seamlessly integrated the control of the two automation systems into the fiber laser's operating software. This enables users to perform all the operating steps on a single touch screen.

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EWF AND CECIMO TO ACCELERATE ADOPTION AND UTILIZATION OF ADDITIVE MANUFACTURING TECHNOLOGIES

Additive manufacturing lies at the leading edge of the transformation that Industry 4.0 is unleashing throughout the world, with close cooperation between all relevant stakeholders being a key element to drive its broad adoption, as it encompasses many relevant technologies, like 3D Printing, Rapid Prototyping (RP), Direct Digital Manufacturing (DDM), layered manufacturing and additive fabrication. Two of the primary drivers for its adoption are the machines that perform the increasingly complex additive manufacturing activities, and the new professional qualifications to operate them. This is why two leading organizations on the field, EWF, who is steering the course on the required professional qualifications, and CECIMO, representing the machine tools industries globally and at the EU level, have joined efforts to drive and accelerate this change, one that will impact all aspects of our lives, from industrial applications to advanced healthcare solutions, as Additive manufacturing is coming of age.

curricula to boost AM in education. CECIMO is also partners in several EU projects, coordinating one on the evolution of skills in the machine tool sector as a result of AM and participating in three others as task leader. Furthermore, CECIMO organizes high-level conferences in the European Parliament with leading AM businesses and European policy-makers and hosts the meetings of its own industry-driven AM Working Group, gathering experts from across Europe.

On its turn, EWF contributes to the VET in the welding sector over 31 member countries across Europe, managing an harmonized system for qualification and certification of personnel working in the welding sector, as well as certification of companies and as such, is developing today the qualifications required for the next batch of professionals entering the workforce while at the same time providing the basis for getting today's workers ready for the challenges posed by new technologies, such as is the case of Additive Manufacturing.



CECIMO and EWF will henceforth work together to support Europe's industry through this profound and impactful change, by finding mutually relevant opportunities and exchanging information on activities such as qualification and advocacy in Additive Manufacturing or on AM-specific EU project proposals, as well as creating joint working groups that will develop relevant activities on areas of mutual interest.

Additive Manufacturing describes the technologies that create 3D objects by using the most diverse type of material, adding them layer-upon-layer. The materials used could vary, and AM application is limitless. Early use of AM in the form of Rapid Prototyping focused on preproduction visualization models. More recently, AM is being used to fabricate end-use products in aircraft, dental restorations, medical implants, automobiles and even fashion products.

The connection between all these technologies is the need to use computers, 3D modelling software (Computer Aided Design or CAD), machine equipment and layering material, that will be used by the AM equipment, once a CAD sketch is produced, to read in data from the CAD file and generate successive layers of liquid, powder, sheet material or other, to create a 3D product.

CECIMO is the association conveying the concerns of the AM industry to the EU authorities. Representing key companies in the AM ecosystem, it engages with policy actors for the creation of an enabling policy, and regulatory and business framework for the uptake of additive technologies in Europe. This includes initiatives such as developing specific AM standards within the remit of EU regulations, advising the European institutions on the AM priority research areas for the next EU budgetary programme and producing



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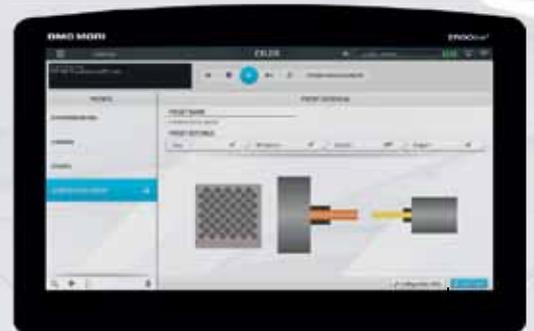
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MOBI HIGHLIGHTS EV POWERTRAIN OPTIMIZATION TECHNIQUES

Prof. Omar Hegazy, head of power electronics and electrical machines at the MOBI Research Centre, University of Brussels (VUB), recently highlighted his team's EV powertrain optimization techniques at CWIEME Istanbul 2017.

Electric vehicle (EV) and hybrid electric vehicle (HEV) technology continues to gain momentum. The more research that goes into it, the more automotive OEMs are hailing it as the inevitable future of the industry. This shift is mirrored throughout the supply chain, with a greater number of parts manufacturers launching products tailored to the needs of hybrid and electric vehicle motor designers.

But such an impending revolutionary shift in the industry raises many questions: Will it be cost effective? Will it be efficient? And what will it take to implement the necessary infrastructure?

One organization in Belgium is helping to provide some answers. The Mobility, Logistics and Automotive Technology Research Centre (MOBI), situated at the Vrije Universiteit Brussel (VUB), is a leader in EV and HEV research and in socio-economic evaluations for urban mobility and sustainable logistics. It employs a multidisciplinary team of over 90 specialists who address the challenges that the transport value chain faces, by integrating engineering, economic, social and environmental sciences and policy issues.

MOBI possesses state-of-the-art infrastructure and models for the testing, development and design of components, vehicle powertrains,



Professor Omar Hegazy.

and inductive and conductive charging infrastructure. Simulation techniques have been developed to define energy-efficient and low-emission power control strategies in hybrid propulsion systems. There is also a team working on big data and analytics.

Hegazy is head of power electronics and electrical machines at MOBI. His team is focused on finding the perfect balance between efficiency and affordability using powertrain optimization techniques. Hegazy recently spoke about MOBI's powertrain optimization techniques at CWIEME Istanbul 2017, during a seminar, entitled *Co-design optimization framework for vehicle powertrains: From technology to topology.*

"The three largest barriers that we currently have in the electric transportation industry are a high purchase cost, a short driving range and a limited charging infrastructure," says Hegazy. "The solutions to the first two points can be found in the powertrains of the machines themselves. My team is focused on the optimization of powertrain sizing components and control system design, known collectively as co-design. We start by looking at the available space in EV or HEV powertrains; we then evaluate which components would work best before trying to find innovative ways to incorporate them – the perfect symbiosis of technology and topology. There are many things to consider, such as battery technology, energy consumption, battery pack voltage, charging power and charging time, but we use our 40 years' experience in electric, hybrid, fuel cell vehicles and stationary applications R&D to produce successful results."

While in recent years, a growing number of industrial companies, public administrations and institutions have approached MOBI for collaboration or direct contract research, MOBI has also worked with companies to deliver social, economic and environmental impact studies, decision-making support, modelling and simulation, engineering and standardization. It offers a unique life cycle assessment (LCA) methodology for the entire automotive sector to analyse the environmental, economical and societal impacts caused by the development and implementation of new vehicle technologies, components, materials and policy measures.

"Using a large database with real-life measurements, which has been developed by MOBI over four decades, we're able to provide accurate technical, economical and environmental assessments," Hegazy says. "The database is kept up-to-date with the latest information obtained during research projects and the execution of contracts."

Over the last five years, the centre has undertaken 23 major European projects, 51 direct contracts with the industry and 76 projects funded by national organizations.

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EMIRATES WELCOMES 100TH A380 TO ITS FLEET



HH Sheikh Ahmed bin Saeed Al-Maktoum, Emirates' Chairman and Chief Executive officiated the ceremony, joined by Tom Enders, Airbus Chief Executive Officer, Sir Tim Clark, President Emirates Airline, Fabrice Brégier, Chief Operating Officer of Airbus and President Airbus Commercial Aircraft, H.E. Ali Ahmed, UAE Ambassador to Germany, Adhel Al Redha, Executive Vice President and Chief Operations Officer and John Leahy, Chief Operating Officer – Customers – Commercial Aircraft.

Emirates recently celebrated the milestone delivery of its 100th Airbus A380 aircraft at a special ceremony with Airbus at the manufacturer's delivery centre in Hamburg.

His Highness Sheikh Ahmed bin Saeed Al-Maktoum, Emirates' Chairman and Chief Executive officiated the ceremony. He was joined at the event by Sir Tim Clark, President Emirates Airline; Tom Enders, Airbus Chief Executive Officer; Dominic Horwood, Rolls-Royce, Director – Customer and Services; His Excellency Ali Al Ahmed, UAE Ambassador to Germany and Frank Horch, Senator for Economy, Transport and Innovation of the Free and Hanseatic City of Hamburg.

Sheikh Ahmed said, "this is a tremendous moment for Emirates, for Airbus and for our many partners involved in the A380 programme. There is no doubt that the A380 has had a big positive impact on aerospace manufacturing and the broader aviation industry, supporting hundreds of thousands of jobs and stimulating innovation and new product development in many related areas such as ground handling, catering, airport facilities and cabin products, to name a few."

Powered by Rolls-Royce engines, Emirates' 100th A380 is configured in three cabin classes, with 14 private suites in First class, 76 seats in Business and 426 seats in Economy. It also features the airline's newly revamped on-board lounge.

Emirates is the world's largest operator of the A380 aircraft, flying this iconic double-decked jet to 48 cities on six continents on scheduled services.

BOEING FORECASTS \$730 BILLION MARKET FOR NEW AIRPLANES IN MIDDLE EAST

Boeing forecasts that airlines in the Middle East will need 3,350 new airplanes over the next 20 years, valued at an estimated \$730 billion. Boeing presented its 2017 Current Market Outlook (CMO) for the region during the Dubai Airshow.



"Traffic growth in the Middle East is expected to grow at 5.6 percent annually during the next 20 years," said Randy Tinseth, vice president of Marketing, Boeing Commercial Airplanes. "The fact that 85 percent of the world's population lives within an eight-hour flight of the Arabian Gulf, coupled with robust business models and investment in infrastructure, allows carriers in the Middle East to channel traffic through their hubs and offer one-stop service between many cities."



AIRBUS RECEIVES GO-AHEAD FOR TWIN GRACE-FO SATELLITES

After a successful year-long test campaign by Airbus at IABG near Munich, the twin GRACE-FO (Gravity Recovery and Climate Experiment Follow-On) satellites will soon travel to their launch site in California.



Twin-aisle airplanes are expected to make up nearly 50 percent of the new airplanes in the Middle East and more than 70 percent of the value at \$520 billion. Both percentages are significantly higher than the global average. The strong long-term demand for widebody airplanes was reinforced at the show as Emirates Airline announced a commitment to purchase 40 Boeing 787-10 Dreamliners in a deal valued at \$15.1 billion at current list prices.

More than half of the total deliveries in the Middle East will be single-aisle airplanes such as the 737 MAX. Operators in the region will need 1,770 single-aisle airplanes valued at \$190 billion, driven by the growth of low-cost carriers.

Boeing's presence and support for the Middle East also includes Global Services, the company's third and newest business unit that is expanding its service capability offerings to better support the region's airlines and aircraft.

Global Services is focused on bringing innovative solutions to market quickly within four capability focus areas: supply chain, engineering, modifications and maintenance, digital aviation and analytics and training and professional services. Boeing's services expertise, global reach and strong customer in-country partnerships, position the company to compete and win.

"From training the next generation of pilots to creating tailored solutions and everything in between, the combined commercial and defense services market is estimated at \$2.6 trillion over the next 10 years and includes strong opportunities in the Middle East," said Tinseth.

Around the world, Boeing has forecasted long-term demand for 41,030 new airplanes, valued at \$6.1 trillion. These new airplanes will replace older, less efficient airplanes, benefiting airlines and passengers and stimulating growth in emerging markets and innovation in airline business models.

During testing, the gravity-measuring satellites, which will track the continuous movement of liquid water, ice and the solid Earth due to Earth's changing seasons, weather and climate processes, earthquakes and even human activities, were subjected to conditions similar to those they will experience during launch and in low Earth orbit. Both satellites, each weighing 600 kilograms, will be flown to the Vandenberg Air Force Base launch site in California in December to begin final launch preparations.

The project is a partnership between NASA's Jet Propulsion Laboratory, located in Pasadena, California, together with the German Research Centre for Geosciences (GFZ, Potsdam). Both GRACE-FO research satellites will be launched into a polar orbit at an altitude of around 500km and at a distance of 220km apart. Both satellites will then take continuous, very precise measurements of the distance variations between each other and make monthly maps of the changes in Earth's gravitational field, which are used to track the monthly movement of liquid water, ice and the solid Earth.

A Global Positioning System and a microwave ranging system measure the distance between the satellites to within a few microns and a sensitive accelerometer accounts for non-gravitational effects, such as atmospheric drag and solar radiation. The GRACE-FO satellites will also feature an additional element: a new, more precise inter-satellite laser ranging instrument, developed by a German/American joint venture, which will be tested for use in future generations of gravitational research. Each satellite also makes up to 200 profiles of temperature distribution and water-vapour content in the atmosphere and the ionosphere on a daily basis to aid weather forecasting.

The German/American GRACE satellites, which have been in space since 2002, are the only satellites that have been capable of monitoring the transport of mass within the Earth system. These include changes in continental water distribution, the melting of polar ice masses or large inland glaciers, and mass redistributions following earthquakes. Data from the GRACE satellites are used to detect groundwater extractions, to monitor droughts and floods, to improve hydrological models, and to precisely quantify the contribution of land glacier and polar ice melt to sea level rise.

Long-duration data sets are vital to provide statistically significant information about climate changes and variations. The GRACE-FO mission will continue the important job started by GRACE and collect essential climate variables.



MICRONORA – A DATE FOR YOUR DIARY

From 25 to 28 September 2018, the microtechnology and micro-nanotechnology trade fair that sets the benchmark in Europe will take place in Besançon, France.

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The fair offers a multitude of solutions designed to meet the ever-increasing challenges set by principals who require smaller, more accurate, more intelligent solutions.

CWIEME CHICAGO A SUCCESSFUL SHOW



CWIEME — the world's leading exhibition for coil winding, electric motor and transformer manufacturing industries — has celebrated another successful event in Chicago this year. From October 3 to 5, the Windy City was at the center of discussions on new electromagnetic design and transformer manufacturing technologies, as well as the future of electric motors and automation.

Over the course of three days, exhibitors displayed their latest products and presented the newest trends in the industry to keen

visitors, interested in exchanging information, relationship-building opportunities, and good deals.

To address the increasing interest in hybrid electric vehicles (HEV) and electric vehicles (EV), one of the hottest topics in the electric motor industry currently, CWIEME Chicago included this year a HEV & EV Trail, which provided the right space for electric motor manufacturers and suppliers to connect.

The free-to-attend seminars and workshops were also a highlight in this year's CWIEME

Chicago. The show assembled a group of prominent experts to discuss hot topics in the electric motor and transformer manufacturing industry, such as the expansion of HEVs and EVs.

A talk with six experts took place on the last day of CWIEME Chicago, where they presented a clear overview over EVs' future development and its impact on internal combustion engines. One of the assertions was that China has been emerging as leader in EVs technologies, closely followed by Europe, both largely driven by regulations over pollution.

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IBR Q3 2017 – GRANT THORNTON

SA execs adopt *wait and see* approach as expansion and investment plans are put on hold for yet another quarter.

Economic instability seems to be the new normal in South Africa as 72% of business executives confirm that turbulence in the SA economy over the past six months has affected business operations and decisions.

When asked in Grant Thornton's International Business Report (IBR) for the third quarter of 2017 to explain how this turbulence had affected privately held businesses and listed companies, 68% of the SA business executives stated that they were delaying business expansion plans, 61% were putting off investment decisions, 38% were considering investing offshore and 28% were contemplating selling their businesses.

"Our IBR data for Q3 to the end of September 2017 shows a nation that is experiencing total uncertainty with no sign of any stability on the horizon," says Gillian Saunders, Head: Advisory Services at Grant Thornton South Africa. "The fact that businesses are delaying important investment decisions or expansion plans, coupled with a challenging economic environment, indicates they are just managing to keep their heads above water, with operations stagnant in a *holding pattern* of sorts. It's very concerning."

The International Business Report (IBR) from Grant Thornton provides tracker insights from around the world on a quarterly basis. These findings are from the IBR's third quarter tracker data for 2017, revealing views from business executive interviews held between August and September 2017. The survey presents perceptions into the views and expectations of over 9600 C-Suite executives in privately-held and listed businesses, across more than 36 economies (more than 2400 interviews per quarter). Regional and national perceptions are also researched every quarter for South Africa, from 400 SA privately held business executives annually (100 executive interviews per

quarter) regarding the business environment, and other issues such as crime, service delivery and the political climate.

SA execs are the second most pessimistic nation worldwide

Coupled with uncertainty affecting investment decisions and expansion plans, when asked how optimistic SA business executives are regarding the outlook for the country's economy over the next 12 months, businesses confirmed a negative outlook for the second consecutive quarter – at on balance -6% (6% pessimistic). This balance statistic is determined by calculating the percentage of respondents who report a positive outlook, less the percentage who report a negative outlook for the year ahead. In the case of Q3 2017 the outlook is negative with net 6% more negative responses expressed than positive.

There is some improvement, though, compared to the previous quarter (Q2) when the

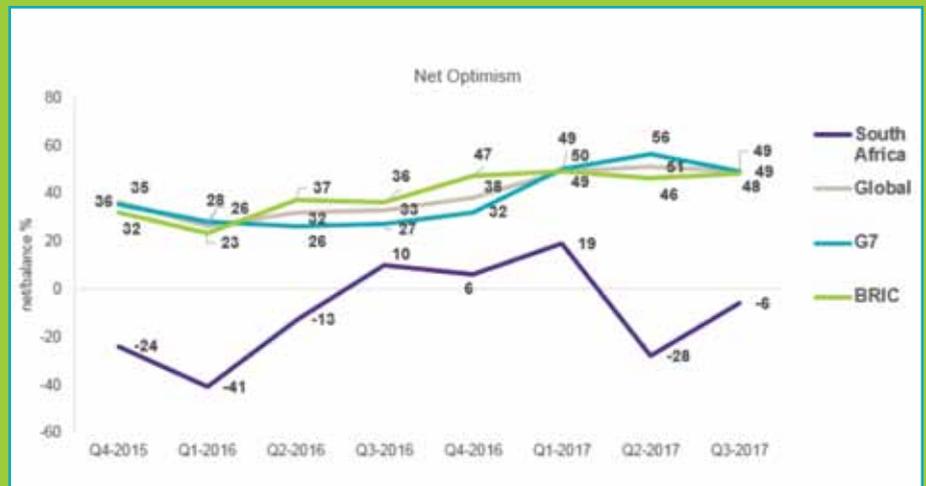
figure was -28% pessimistic and we were the most pessimistic of the surveyed 36 countries. South Africa this quarter recorded the second lowest figure, with Japan at the lowest with a negative 14% (-14%) pessimistic outlook.

"For South Africa, most of 2017 has been marred by political upsets and these were followed by subsequent downgrades of the nation's sovereign credit rating by key ratings agencies," says Saunders. "Then, towards the end of the third quarter massive ructions occurred with further developments which drew the nation deeper into the state capture debacle, and more concerning revelations were uncovered regarding high profile private companies with suspicious Gupta ties. The year is going from bad to worse."

Conversely global business optimism was fairly stable at +49% optimistic for Q3, just two percentage points below the +51% recorded during the second quarter of this year. Optimism among firms in the US is well above the global average at 70% in Q3, while Chinese business optimism has hit a three-year high of 52%.

"South Africa's instability, uncertainty and pessimistic outlook has no doubt influenced the World Economic Forum's Global Competitiveness Report for 2017-2018 in which South Africa's overall ranking declined 14 places to 61st position from 47th. The survey cited political instability, poor work ethic, restrictive labour regulations and an inadequately educated workforce as some of the key reasons for the decline. All signs are pointing to a disturbingly rocky situation – it is crucial for everyone in every corner of the country and across private business, government and public sector, to start working collaboratively to try and re-establish some

How optimistic are you for the outlook of your country's economy over the next 12 months?



Source: Q3 2017 Grant Thornton International Business Report



stability for our nation,” said Saunders.

Business expansion constrained by economic uncertainty, exchange rate volatility and over-regulation

According to Grant Thornton’s IBR data for Q3 2017, the top four constraints to business growth for South African executives are: economic uncertainty (59%); exchange rate fluctuation (48%); rising energy costs (34%); and over-regulation / red tape (33%).

“These four constraints just keep reaffirming the same concerns,” says Saunders. “Naturally a nation will struggle with exchange rate volatility when economic uncertainty is rife. Regulation and red tape is also weighing down on South African businesses’ ability to function effectively as a result of excessive administrative and legal requirements which need constant attention.”

The greatest constraint to growth globally recorded for the third quarter of this year is the lack of availability of a skilled workforce, with 38% of the executives surveyed worldwide lamenting this issue, while economic uncertainty is recorded as the second biggest constraint to expansion by 32% of executives. Over regulation is the world’s third greatest restraint to business growth (IBR Q3 2017 Global: 27%) and this is tied with the issue of a lack of orders (low demand for goods) also at 27%. South Africa therefore shares two of the top four constraints with the general global environment, but experiences them far more acutely.

The South African businessman remains an eternal optimist

Every quarter, Grant Thornton’s IBR asks respondents if they believe that South Africa still presents good business opportunities and every quarter, the responses are surprisingly positive. For the third quarter of 2017, 89% of SA business executives confirmed that they believe the opportunities in SA are good.

“South Africa has always been a country of opportunity. We’re a resourceful, entrepreneurial and resilient group of people who work smart to ensure that business operations continue as best as they can, and can see beyond the current turmoil to a country that does present great opportunity if the political

and economic environment were stable and stimulatory.” says Saunders. “After all, if we didn’t have our positive attitudes, what would we have left?”

Burden of crime on business worsens by 20% since Q3 2016

Saunders laments the desperate crime situation in South Africa which continues to impact on business. When executives were asked if they had been affected by the threat to personal security as a result of contact crime events, 64% said yes. Contact crime is defined in the IBR research as housebreaking, violent crime, road rage or hijacking.

“When analyzing our crime data for the past few quarters, it is even more concerning to note that this figure is 44% higher than what was recorded during the third quarter of 2016,” she says (Q3:16 = 45%). “It is truly alarming to see that the impact of crime is increasing once more.”

South Africa’s national crime stats which were released last month, corroborate this increased impact, when for the period of 1 April 2016 to 31 March 2017, they show that hijacking, aggravated robbery and house robberies have increased by 7% to nearly 180 000 incidents reported, compared to the previous year.

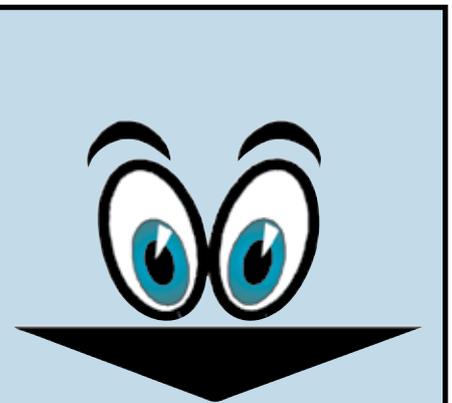
“The figure reported is completely unacceptable though. One hundred and eighty thousand such crime incidents in a year is a shocking figure,” says Saunders. “That equates to nearly 500 of these events every single day of the year. As a nation, our crime situation is abominable, and it directly affects business operations, foreign direct investment and tourism. We have to get a handle on this situation – it’s a matter of national emergency.

Conclusion

Saunders concludes, “despite South Africa being caught in a vortex of despair, we urgently need to re-direct our focus and concentrate on stability. We can only hope that some of the political developments, such as the ANC’s elections, which are taking place in December this year, will work towards stabilizing our nation, following which the rebuilding can hopefully begin in earnest.”

Additional notes of interest:

- While South Africa has a positive outlook in terms of expectations to employ people in the coming 12 months, the nation is placed in the bottom five countries for this metric (net 20% of executives expect to employ more people in the year ahead – Global: 35%)
- South Africa ranked in the bottom 10 countries in terms of how the lack of a skilled workforce constrains business expansion (SA: 27%; Global: 38%)
- South Africa ranked in the top 10 countries worldwide and above the global average in terms of expectations for investment in technology (SA: 54%; Global: 47%)
- South Africa ranked in the top 10 countries worldwide and above the global average in terms of expectations to increase selling prices in the year ahead. This is most likely as a result of the countries high inflation compared to other countries (SA: 41%; Global: 29%).



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IMF MISSION CONCLUDES VISIT TO SOUTH AFRICA

An International Monetary Fund (IMF) mission, led by Ana Lucía Coronel, visited South Africa recently, to discuss economic developments and outlook in the context of its regular surveillance activities.

Coronel pointed out that despite South Africa's institutional strength and favourable global conditions, increasing domestic political uncertainty and stalled reforms point to a challenging economic outlook. Some sectors, including agriculture and mining, are certainly generating growth, but other key activities have stagnated or declined, as investment decisions are being postponed or abandoned.

Coronel stated "IMF staff anticipates that the subdued economic growth of 0.7 percent, projected by the authorities for 2017, is not likely to improve much in 2018. Growth would recover only gradually in the medium

term, unless the pace of implementation of structural reforms accelerates quickly enough to prompt a clear recovery in business and consumer confidence. Against current structural constraints, the envisaged growth upturn would be insufficient to reverse the on-going decline in per-capita income and generate enough jobs to absorb the growing labour force. Downside risks to the outlook relate to worsening perceptions of weak governance, tightening global financial conditions and slowing trading partner growth.

"South Africa's slow growth and inefficiencies in public enterprises have taken a toll on

public finances by generating a substantial revenue shortfall and prompting unplanned expenditure, as described in the 2017 Medium Term Budget Policy Statement. Against this background, IMF staff welcomes the National Treasury's candid acknowledgement of the challenges and its call to the Presidential Fiscal Committee to implement reforms to unlock the economy's potential.

"Specifically, IMF staff urges the Presidential Fiscal Committee to approve, in a timely fashion, fiscal measures to avoid undue increases in the debt-to-GDP ratio, including by strengthening tax revenue compliance and cutting unproductive outlays. The economy will also benefit from expeditious action from the Presidential Fiscal Committee to signal the political will to tackle long-standing issues that have led to deteriorating market sentiment. Reforms to improve governance and procurement practices and remove any obstacles to investment are essential. Special emphasis should be placed on prompt implementation of sanctions against deviations from the Public Financial Management Act to increase deterrence. Early announcement and timely implementation of a strong adjustment and reform plan is now a priority to restore investor and consumer confidence. This would increase competition in key markets, reduce input costs for households and businesses, and in turn, lead to a virtuous cycle between economic growth, job creation, and inequality reduction," concluded Coronel.

SEIFSA WELCOMES PPI IMPROVEMENT

The increase in producer prices in September 2017 provides some much-needed comfort for producers, the Steel and Engineering Industries Federation of Southern Africa (SEIFSA) said recently.

Commenting on the latest data on Producer Price Index (PPI) for intermediate manufactured goods released by Statistics South Africa, SEIFSA Economist Marique Kruger said the industry can be encouraged by the latest data, which show the PPI for intermediate goods remaining in an expansionary terrain for three consecutive months.



SEIFSA economist Marique Kruger.

"This indicates a continued improvement in factory gate prices and operating business conditions in the metals and engineering (M&E) sector. The data provide some relief for producers in the sector, who are beginning to derive the benefit of a modest recovery in domestic demand and declining costs," Kruger said.

This was consistent with SEIFSA's input cost index which decreased to 0.9 percent in September 2017 said Kruger, when compared to 1.7 percent recorded in August. She said the improvement in the latest PPI data was generally in line with an increase in the broader PPI for final manufactured goods, which recorded an annual change of 5.2% in September 2017, compared with 4.2% in August 2017.

The Statistics South Africa data showed that

the PPI for intermediate manufactured goods rose to 2.1 percent in September 2017, up from 2 percent in August.

Kruger said that this was encouraging when viewed "against the backdrop of Finance Minister Malusi Gigaba's bleak news in his Medium-Term Budget Policy Statement (MTBPS), which highlighted a tight economic environment characterized by poor tax efforts and tax morale, expanding government expenditure, ballooning deficits and high debt levels".

However, Kruger cautioned that although the PPI for intermediate goods in the M&E sector provides a glimmer of hope, economic activity within the sector and broader manufacturing

will remain constrained by depressed business and consumer confidence levels that have been linked to perceived policy, uncertainty and political turmoil. She said these will definitely keep producer prices volatile in the near term, thus making it very difficult for businesses to plan in advance and contain costs.

Kruger expressed grave concern about the latest economic and political developments, which have the potential to quickly reverse the positive growth trajectory recorded in the second quarter of 2017.

"In an atmosphere of generally low business and consumer confidence, low domestic demand, structural challenges and political uncertainty, the Finance Minister's bleak news raised more questions than providing answers," she said.

Kruger also raised disquiet about the oscillating rand's effect on the economy, saying that a depreciating rand would be less beneficial for inflation, imported input costs and margins of companies in the M&E sector.

"The M&E sector is relatively small and open, hence volatility in price trends and the variables that impact the price trends does not augur well for it. A positive differential in the selling price inflation and input cost inflation needs to be maintained in order for the sector to stay attractive for existing and new investments," Kruger argued.



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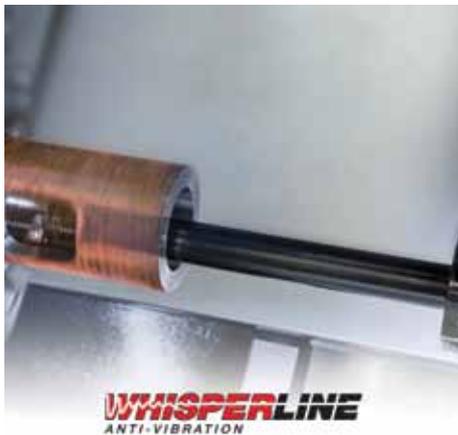
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Cutting Tool Facts

ISCAR WHISPER – A QUIET REVOLUTION IN ANTI-VIBRATION TOOLS

Throughout the world, machinists have to deal with the presence of problematic vibrations on a daily basis. To help solve these difficulties, ISCAR's Research and Development department has developed a wide range of anti-vibration tools that are able to reduce or even eliminate this challenging phenomenon, across a wide range of machining disciplines. Today, ISCAR's acknowledged expertise in the design and development of anti-vibration tools has been applied to the boring bar.



One of the most common turning applications is the boring of components, a function also known as internal turning. The most widespread tools used for this type of machining operation are boring bars. Boring bars' shapes enable them to operate through previously drilled holes, and to efficiently enlarge and accurately profile holes according to their specific requirements. The correct application of a boring bar enables a bore's internal profile to be machined according to specification, an accurate hole diameter to be achieved and the required surface finish quality to be realized.

In order to cover the complete range of applications for internal turning, ISCAR has developed a comprehensive series of high-quality internal boring bars for different insert geometries, covering all machining applications from 4xBD to 10xBD.

ISCAR offers three types of boring bars – solid steel, solid carbide and anti-vibration.

The maximum overhang for solid steel boring bars is up to 4xBD. This limitation is due to the fact that machining with a longer length of steel shank (more than 4xBD) can induce unwelcome vibrations due to the elasticity and characteristics of the steel.

In order to limit the vibration on a higher overhang of more than 4xBD and up to 6xBD, the use of solid carbide boring bars is recommended. Solid carbide boring bars represent an excellent, highly efficient option for boring applications of up to six times the tool's machining depth. This capability is attributable to solid carbide possessing a coefficient of elasticity that is three times higher than that of steel.

However, when the machining of high overhangs of more than 6xBD is required, even the use of a solid carbide shank can cause vibrations. Therefore, in these cases the use of solid carbide can be somewhat limited.

Deep turning

Deep turning solutions for machining high depth to diameter internal applications include special anti-vibration boring bar systems with a live vibration dampening system located inside the tool body.

A product of ISCAR's prolific R&D department, innovative WHISPERLINE anti-vibration boring bars have been designed to significantly reduce and even totally eliminate vibrations when working with a high overhang from 7xBD to 10xBD.

Situated inside these ingenious tools is a unique damping mechanism that consists of a heavy mass that is supported by a rubber spring element containing oil to increase the required dampening effect.

In addition, the system contains other elements which help to further reduce vibrations. The reactive damping mechanism comes into action during machining with high overhang work depths and acts as an effective counter to vibrations.

The highly effective, anti-vibration damper effect is applicable for large D.O.C and high feed rates, and ensures continuous, efficient machining. ISCAR's inspired WHISPERLINE anti-vibration tools considerably improve machining stability and enhance insert life. These factors enable meaningful increases in productivity to be achieved, improvements

in surface quality on high overhangs to be attained, scrap levels to be reduced and users' profitability to be enhanced.

WHISPERLINE anti-vibration tools enable the delivery of internal coolant to be supplied directly to where it is required – the insert's cutting edge. The efficient distribution of coolant increases the insert's tool life by reducing temperature and also improves chip control and chip evacuation.



The WHISPERLINE anti-vibration turning tool line enables the fitting of a wide range of cutting heads with a range of different insert geometries, including all ISCAR standard ISO turning inserts for different applications; thus offering great flexibility.

The WHISPERLINE boring bars represent a cost-effective, modular system with a wide range of standard shanks with diameters of 16, 20, 25, 32, 40, 50 and 60mm. The flexible boring bars are able to carry eight different interchangeable boring heads: CCMT, VCMT, TCMT, DCMT, TNMG, CNMG, WNMG, TNMG, DNMG, SNMG and VNMG.

Insert geometry

Correct insert geometry is a very important factor when using anti-vibration boring bars. The most recommended insert geometry for successful anti-vibration use, is a positive geometry insert with a positive rake angle, as this shape exerts a lower tangential cutting force when machining.

Choosing the appropriate nose radius of the insert is also a vitally important consideration. A lower nose radius is recommended as this configuration significantly reduces the cutting forces, due to the lower contact between the insert and workpiece, which helps to limit and reduce vibration. A greater nose radius creates much larger radial and tangential cutting forces that can produce unwelcome vibrations.

Inserts with the benefit of appropriate chip

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Cutting Tool Facts

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breakers are recommended for improved chip evacuation, as the production of long and curled chips can cause a range of problems when working with long overhang tools. In addition to increasing vibration during machining, long and curled chips are liable to spoil or damage the surface quality of the workpiece. Highly recommended ISCAR chip breakers for anti-vibration tools are the F3P/F3M for finish machining applications using a small D.O.C.; and the M3P/M3M, for medium applications. These highly-efficient chip breakers ensure excellent chip control and the creation of small chips which can be evacuated more easily with the help of the coolant supply.

ISCAR EXPANDS THE BAYO T-REAM LINE WITH 1.5XD EFFECTIVE OVERHANG TOOLS

Following market demand for shorter BAYO T-REAM tools, ISCAR is expanding its family of tools by adding 1.5xD effective overhang tools to the already available 3xD, 5xD and 8xD overhang tools.

The RM-BNT-1.5D tools were designed for effective reaming depths of up to 1.5 times the hole diameter. They feature BN5 to BN9 reaming head connection sizes for a reaming range of 11.501 to 32.000mm.

The new tools should be applied whenever shorter tools are required, mainly on lathe machines or for higher rigidity requirements.



An additional, very important factor in reducing vibrations is ensuring the clamping stability of the anti-vibration boring bar. Secure clamping helps users to achieve the correct workpiece dimension, which results in excellent workpiece surface quantity and assists in avoiding vibrations; clamping length should be 4XBD.

ISCAR's new, anti-vibration boring bars join the ever-growing ISCAR WHISPERLINE family of ingenious tools that are designed for anti-vibration turning and grooving applications. The all-embracing anti-vibration turning tools can be referred to as tuned or damped tools, which provide effective solutions for the reduction and elimination of vibrations.

For more information, please contact ISCAR South Africa - Tel: 011 997-2700.

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BEYOND 5G – AFTER THE NEXT GENERATION

Today it is already becoming apparent that the data rates offered by the coming 5G mobile communications standard will not satiate private users' and industry's hunger for data for very long. That is why Fraunhofer experts are already working on 6G together with partners from industry and research as part of the EU-sponsored TERRANOVA project. Up to the end of 2019, the TERRANOVA team will be working on embedding terahertz wireless solutions into fast fiber optic networks, developing new frequency bands and thereby laying the foundation for a resilient communications infrastructure that is equipped to cope with the demands of the future.

When today's leading 4G standard was introduced back in 2010, it was the first time that you could achieve the sort of data transfer rates on a mobile device that you could on a home network. This is what facilitated many of the applications that mobile users today take for granted, including video calling, on-demand video streaming and connected machines and vehicles. Even so, the hunger for data just keeps on growing, with the result that even the comparatively fast LTE data rates of up to a gigabit a second are increasingly proving the limiting factor in new applications. There is a clamor for faster connections, not just from mobile users but also from industry, where the growing number of connected devices and machines generate ever larger streams of data, which must be relayed as fast and smoothly as possible. The next telecommunications standard, 5G, is already on its way; this new mobile communications standard promises to deliver a huge boost in performance for wireless communications – up to ten gigabits a second. Already, however, developers are realizing that the current frequency bands will not be enough to serve the growing demand for stable wireless communication. For this reason, researchers from the Fraunhofer Institute for Applied Solid State Physics IAF have teamed up with researchers from the Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute, HHI and further partners from industry and research to start work on the communications standard that is set to follow in the EU-sponsored TERRANOVA project. The goal is to create a network connection in the terahertz frequency range that is sufficiently stable to allow for wireless data transmission at speeds of up to 400 gigabits a second.

From fiber optics to wireless

One way of providing such fast data rates is to expand the fiber optic network. However, not only is this expensive, it also fails to address the challenge of how to achieve such high data rates on mobile devices. The researchers' solution is to combine fiber optic technology with wireless transmission. Admittedly, the frequencies currently employed by wireless technology are too low to achieve the kind of bandwidth necessary to relay data at fiber optic speed. "As a rule of thumb, the



In the TERRANOVA project, Fraunhofer IAF is focusing on the integration of wireless modules at the chip level. The image shows a functional prototype of a 300 GHz multichannel wireless system for further integration as a system-on-chip.

© Fraunhofer IAF

lower the frequency, the less the available bandwidth. To achieve the same data rates provided by fiber optics wirelessly, we need to be transmitting on frequencies in the terahertz range. While these have a more restricted range than megahertz frequencies, they have a significantly greater bandwidth. 4G operates on frequencies of between 800 and 2600 megahertz, which give a bandwidth of up to a gigabit a second. With terahertz frequencies, on the other hand, there is enough bandwidth to achieve data rates of up to 400 gigabits a second," explains project lead Dr. Thomas Merkle of Fraunhofer IAF. "As a result, we are working on a transfer from optic to wireless data transmission. In other words, we want to fully exploit the potential of fiber optics without restricting it to cable connections, but rather transferring it to wireless transmissions."

From Wi-Fi to mobile

Bandwidth is one of the central challenges. This is primarily because there are more and more devices and users making use of communications technology – from the mobile phone to the car, the smart home to Industrie 4.0. "It's not just about the speed of the data connection though. Another challenge we are addressing in this project is seamless transition between different



access technologies. Today, mobile users switch back and forth between Wi-Fi and a mobile connection depending on the network coverage, and with laptops you also have the option to connect to the internet via a wired connection. What we don't have at the moment is a seamless transition between the various connection types so that you can switch modes without any disruption," says Dr. Colja Schubert, Head of Submarine and Core Systems Group at Fraunhofer HHI. "In the TERRANOVA project we want to give users an experience where they don't even notice they are switching between access technologies."

Alternatives to conventional fiber optic networks

There are many challenges to overcome on the way to the 6G standard, both in terms of the individual components and the way in which all the network components interact. To address these challenges, the two Fraunhofer Institutes are working on core tasks. Fraunhofer IAF is focusing primarily on the wireless transmission and the integration of wireless modules at chip level. One of the challenges is how to integrate a baseband interface with the fiber optic network and transmit the signals to the chip. Fraunhofer HHI, meanwhile, is working on signal processing so that signals can be transmitted from the antenna with as little disruption as possible. This signal processing must take place extremely rapidly, calling for the development of special algorithms that can make signal processing as efficient and energy saving as possible.

Researchers at Fraunhofer IAF and Fraunhofer HHI are working in close collaboration to develop and test the hardware elements of the pioneering network structure. Here, the strengths of the two institutes come together and complement each other. Fraunhofer HHI contributes its expertise in network concepts and its extensive experience from numerous 5G projects and fiber optics, while Fraunhofer IAF brings its experience in high-frequency wireless technology and millimeter wave technology in the analog realm. Since these areas often work in isolation of one another, the collaboration of the two institutes harbors a great deal of potential for the development of high-speed internet in the long term.

TRACKING DEBRIS IN THE EARTH'S ORBIT WITH CENTIMETER PRECISION USING EFFICIENT LASER TECHNOLOGY

Uncontrollable flying objects in orbit are a massive risk for modern space travel and due to our dependence on satellites today, it is also a risk to global economy. A research team at the Fraunhofer Institute for Applied Optics and Precision Engineering IOF in Jena, Germany, has now especially developed a fiber laser that reliably determines the position and direction of the space debris' movement to mitigate these risks.



Space debris is a massive problem in low Earth orbit space flight. Decommissioned or damaged satellites, fragments of space stations and other remnants of space missions pose a potential threat of collisions with active satellites and spacecraft every day. In addition to their destructive force, collisions also create additional risk creating thousands of new pieces of debris, which in turn could collide with other objects – a dangerous snowball effect.

Today, the global economy depends to a substantial degree on satellites and their functions – these applications are, for example, used in telecommunications, the transmission of TV signals, navigation, weather forecasting and climate research. The damage or destruction of such satellites through a collision with orbiting satellites or remains of rockets can cause immense and lasting damage. Therefore, the hazardous space debris needs to be reliably tracked and recorded before any salvaging or other counter-measures can be considered. Experts from Fraunhofer IOF in Jena have developed a laser system that is perfectly suited for this task.

Reliable recording of the position and movement of objects in the Earth's orbit

“With our robust and efficient system we can reliably and accurately determine the objects' exact position and direction of movement in orbit,” explains Dr. Thomas Schreiber from the fiber lasers group at Fraunhofer IOF. “Laser systems like ours must be exceptionally powerful in order to withstand the extreme conditions in space. In particular, the high physical strain on the carrier rocket during the launch, where the technology is subjected to very strong vibrations. “In the low earth orbit, the high level of exposure to radiation, the extreme temperature fluctuations and the low energy supply are just as great obstacles to overcome. This necessitated the new development by the Jena research team since common laser technologies are not able to cope with these challenges.

Moreover, it is also necessary to analyze space debris over comparatively long distances. For



Fighting the perils of space debris – Fraunhofer IOF's fiber laser technology. © Fraunhofer IOF

this purpose, the laser pulse is propagating through a glass fiber-based amplifier and sent on its kilometers long journey.

Measurements with ten thousands laser pulses per second

“Very short laser pulses, which last only a few billionths of a second, are shot at different positions in space to determine the speed, direction of motion and the rotational motion of the objects,” explains Dr. Oliver de Vries. “With our laser system it is possible to shoot up thousands of pulses per second. If an object is actually at one of the positions examined, part of the radiation is reflected back to a special scanner, which is directly integrated into the system. Even though the laser beam is very fast, it takes some time for the emitted light to get to the object and back again. This so-called *time of flight* can then be converted into a distance and a real 3D coordinate accordingly.” The system's sophisticated sensors, which collect the reflected light reflexes, can detect even billionths of the reflected light.

The principle – originally developed by the two researchers of Fraunhofer IOF for Jena-Optronik and the German Aerospace Centre

(Deutsches Zentrum für Luft- und Raumfahrt, DLR) – has already been successfully tested during a space transporter's docking maneuver at the International Space Station ISS. Previously, the laser system had been installed in a sensor of the Thuringian aerospace company Jena-Optronik and was launched in 2016 with the autonomous supply transporter ATV-5. Jena Optronik's system also excels in energy efficiency: the fiber laser operates at a total power of less than 10 watts – that is significantly less than a commercial laptop, for instance.



A short-pulse fiber laser suitable for LIDAR applications (light detection and ranging) for the centimeter-accurate detection of space debris. © Fraunhofer IOF

TRADE FAIRS & EVENTS



2017

7 – 10 November 2017

BLECH & SCHWEISSTEC

13th Blechexpo – International Trade Fair for sheet metal working. The practical trade fair duo of Blechexpo and Schweisstec takes place on a two-year cycle in the state trade fair centre in Stuttgart and is the only event in the world that deals with the complementary technologies of sheet metal processing and joining technology.

Stuttgart New Exhibition Centre, Germany

www.blechexpo-messe.de

13 – 16 November 2017

CCIMT (China Chongqing International Machine Tool Show)

CCIMT will showcase the latest in manufacturing technology and bring buyers and sellers together from all over the world to the dynamic market of Chongqing and southwest China.

Chongqing International Expo Center, China

www.jmtba.or.jp

2018

25 - 30 January 2018

IMTEX 2018 & TOOLTECH 2018

Imtex is a specialised b2b fair featuring contemporary technological trends in metalworking machine tools and manufacturing solutions.

Tooltech showcases machine tool accessories, metrology and CAD/CAM cutting tools, tooling systems and current trends in the tooling industry.

Bangalore International Exhibition Centre

www.imtex.in

20 – 24 February 2018

METAV 2018

The 20th International Exhibition for Metalworking Technologies. Showcasing automation, robotics, manufacturing technology, production engineering, electronics, machine tools, measurement, instrumentation, quality assurance, metalworking, welding and cutting.

Düsseldorf Exhibition Centre, Germany

www.metav.com

23 – 26 February 2018

NORTEC

Where decision-makers in manufacturing technology and mechanical engineering meet.

Hamburg Fair Grounds, Germany

www.nortec-hamburg.de

14 – 17 March 2018

GRINDTEC

International Trade Fair for Grinding Technology.

Messe Augsburg, Germany

www.grindtec.de

15 - 18 March 2018

WIN EURASIA 2018

Showcasing sheet metal processing to metal forming technologies, automation services to electric and electronic equipment, hydraulic & pneumatic services to intralogistics.

Tüyap Fair & Convention Centre, Istanbul

www.win-eurasia.com

27-30 March 2018

INDUSTRIE PARIS 2018

Professional manufacturing technologies exhibition for all industrial equipment that is required for production technologies: tools, machines, measurement, additives and software.

A multitude of innovations will attract the professional visitors coming not only from Central Europe but also from Morocco, Algeria and Tunisia. Conferences, material demonstrations and innovative animations will complete the programme.

Paris Nord Villepinte, France

www.industrie-expo.com

3 - 7 April 2018

SIMTOS

**Capture the future:
4th Industrial Revolution**

Simtos (Seoul International Machine Tool Show) is held bi-annually attracting decision makers of the automobile, shipbuilding, semiconductor, metal molding industry and other sectors in which machine tools are used.

Represented products include all kinds of industrial machines as well as industrial robots, machine components, measuring instruments, machine controls etc.

Kintex 1-2, Goyang, South Korea

www.simtos.org

9 – 13 April 2018

MACH 2018

MACH is the UK's premier event for engineering-based manufacturing technologies. Taking place from 9-13 April 2018, MACH is poised to be the destination of choice for engineers and manufacturers, bringing together the best of UK manufacturing under one roof. With over 25 000 visitors across a 5 day period, a vibrant seminar programme and unrivalled networking opportunities MACH showcases the heart of UK advanced engineering.

NEC Birmingham, United Kingdom

www.machexhibition.com

16 – 20 April 2018

wire DÜSSELDORF

The most important exhibition for wire manufacturers and processors.

Düsseldorf Exhibition Centre, Germany

www.wire.de

16 – 20 April 2018

TUBE DÜSSELDORF

International Tube and Pipe Fair. The Tube is the world's leading exhibition for the pipe industry and thus the most important showcase for all professionals manufacturing, processing and using pipes.

Focal product groups include raw materials, pipes and fittings, machinery for pipe manufacturing, process technology tools and related tools, measuring, testing and control technology, profiles and associated equipment as well as used machines for the mentioned areas.

Düsseldorf Exhibition Centre, Germany

www.mdna.com

2 - 4 May 2018

FABTECH MEXICO

Showcasing metal stamping, forming and fabricating equipment.

Centro Citibanamex, Mexico City

www.mexico.fabtech.com

14 – 18 May 2018

METALLOBRABOTKA

19th International Specialized Exhibition for equipment, instruments and tools for the metalworking industry.

Expocentre Fairgrounds, Moscow

www.metobr-expo.ru

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TRADE FAIRS & EVENTS

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2018

15 – 18 May 2018

INTERTOOL

Intertool is Austria's only trade fair for manufacturing technology in the metal processing sector. It focuses on machine tools and precision tools for separating and forming work piece processing, as well as fixtures and fittings, techniques, technologies and systems along the entire process chain.

Messe Wien, Austria

www.intertool.at

15 - 19 May 2018

FIMAQH 2018

International Machine Tools and Technologies for Production show.

Tecnopolis Villa Martelli, Buenos Aires Argentina

www.fimaqh.com

16 - 19 May 2018

MTA 2018

The International Precision Engineering, Machine Tool and Metalworking Exhibition and Conference.

Bangkok International Trade & Exhibition Center (BITEC)

www.mta-asia.com

23 - 26 May, 2018

METALTECH

Malaysia's main trade event for metalworking and machine tool industries.

Putra World Trade Centre, Kuala Lumpur, Malaysia

www.metaltech.com.my

28 May - 1 June, 2018

30 BIEMH

The participation of the world's leading machine tool manufacturers makes this event practically unique in its field. The BIEMH is a market driver event that shows off the latest trends and needs of industries and brings visitors up to date in the field of manufacturing.

Bilbao Exhibition Centre

biemh.bilbaoexhibitioncentre.com

5 – 7 June 2018

LASYS

International Trade Fair for laser material processing.

Messe Stuttgart, Germany

www.messe-stuttgart.de

10 - 14 September 2018

ELECTRA MINING AFRICA 2018

Ranked as the second largest mining show in the world and with global recognition for its broad reach across mining, construction, industrial and power generation industry sectors, Electra Mining Africa once again proves its status as a worldclass event attracting high numbers of quality exhibitors and visitors

Expo Centre, Nasrec

www.electramining.co.za

10 – 15 September 2018

IMTS 2018

International Manufacturing Technology Show. Industrial decision-makers attend (IMTS) to get ideas and find answers to their manufacturing problems.

McCormick Place Convention Center, Chicago, USA

www.imts.com

18 – 22 September 2018

AMB

AMB, the international exhibition for metalworking, is the leading industry trade fair and is one of the top five trade fairs worldwide for metal-cutting technology.

New Stuttgart Trade Fair Centre, Germany

www.messe-stuttgart.de

25 – 28 September 2018

MICRONORA

Biennial microtechnology and precision trade fair for cutting edge technology.

Besançon, France

www.micronora.com

9 - 11 October 2018

ALUMINIUM 2018

Aluminium is the world's leading B2B tradeshow for the aluminium industry and its key application areas. The show unites manufacturers, technology suppliers and end users through the entire production chain from raw material to finished products.

Messe Düsseldorf, Germany

www.aluminium-messe.com

9 - 13 October 2018

31. BI-MU

International exhibition dedicated to the Italian machine tools, robot, automation systems and ancillary products industry.

Exhibition Grounds, Fieramilano, Italy

www.bimu.it

23 - 26 October, 2018

EURO BLECH

The 25th International Sheet Metal Working Technology Exhibition will open its doors again in Hanover, Germany.

As the world's leading exhibition for the sheet metal working industry Euro Blech offers a global platform for the presentation of the latest technology to a specialized audience of the industry's key purchasers and decision makers.

Exhibition Grounds, Hanover, Germany

www.euroblech.com

1 - 6 November 2018

JIMTOF 2018

The 29th Japanese International Machine Tool Fair.

Tokyo Big Sight

(Tokyo International Exhibition Center)

www.jimtof.org

7 - 11 November 2018

TMTS 2018

Featuring metal cutting machines, metal forming machines, machine tool accessories, components, parts, fluid power, CNC control systems and auxiliary equipment, cutting tools, toolholding and workholding devices, measurement instruments and smart manufacturing systems.

Greater Taichung International Expo Center (GTIEC) Taiwan

www.tmts.tw

20 - 23 November 2018

PRODEX

International Exhibition for machine tools, tools and production measurement.

Messe Basel, Switzerland

www.prodex.ch

2019

16 – 21 September 2019

EMO HANNOVER

EMO Hannover – the world's premier trade fair for the metalworking sector.

Hannover Fairground, Germany

www.emo-hanover.de



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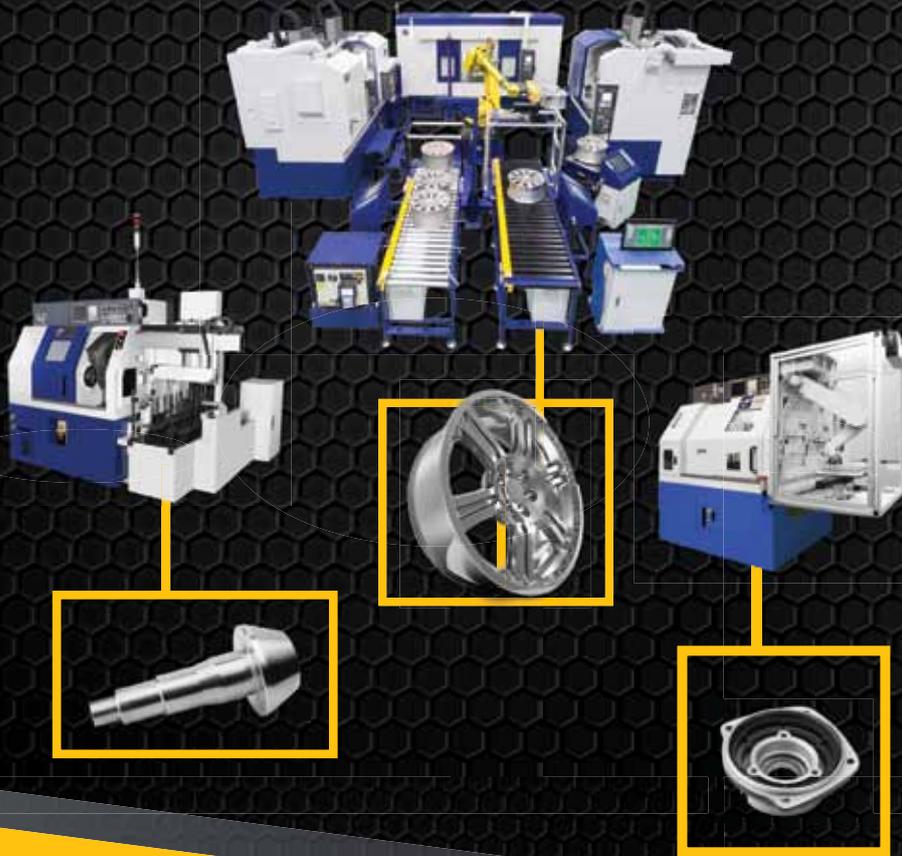
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