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VOL 30 NO 3

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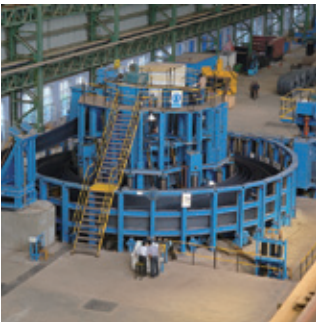
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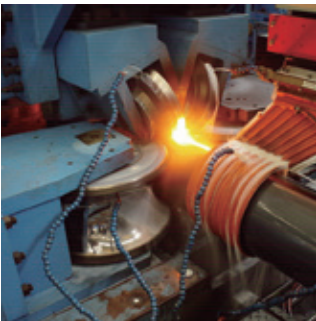
EDGE MILLING



CAGE FORMING SECTION



QUICK CHANGE ROLL STANDS



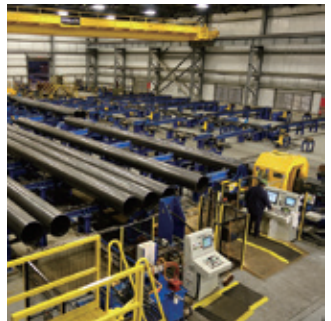
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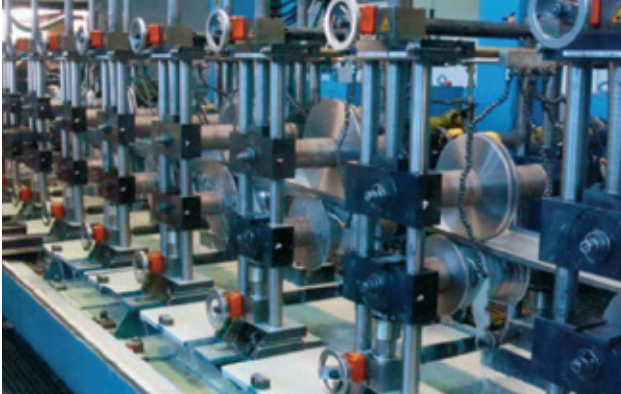
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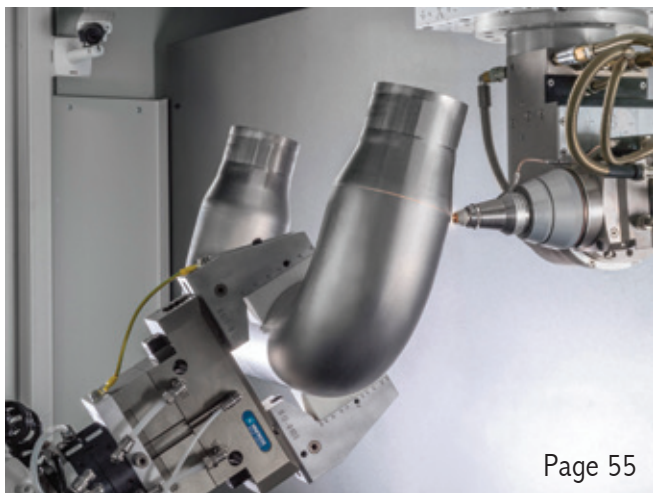
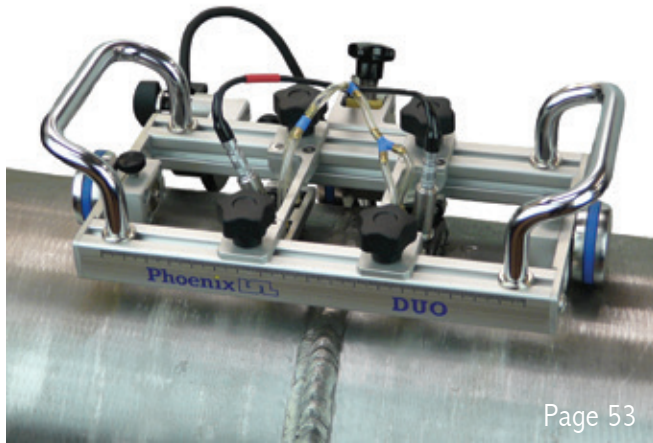
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May/June 2017

Vol 30 No 3



The May Issue

Welcome to the latest issue of Tube & Pipe Technology magazine.



Rory McBride –
Editor

This issue we have a feature on tube mills & rollforming lines (page 66) as well as three extended technical articles from Rivit SpA in Italy, Advanced Machine & Engineering/AMSAW in the US and last but not least an article on heavy walled pipes from Protem SAS, which is based in France.

It has been heartening to read several stories this month about companies that are starting to see an increase in demand for their products based on the rise in the price of oil (see the LIMAB AB story on page 30, for example). Let us hope that 2017 will be a very good year for the industry.

Next issue we have features on bending, forming & swaging, and measuring & marking. We also take an in-depth look at Tube Southeast Asia and Tubotech 2017 in Brazil. The magazine will be distributed at both of these big industry events so please get in touch if you would like your machinery or products featured in the issue.

The editorial deadline is 12 May and the advertising deadline is 2 June. Contact me at: rory@intras.co.uk for further information or to submit your article or technical feature.

Enjoy the magazine.

On the cover . . .

Fives is an international industrial engineering group that designs and supplies machines, process equipment and production lines for the world industrial leaders. Located in over 30 countries, Fives is known for its technological expertise and proficiency in executing international projects. This multisector capacity gives us a global vision of all industries and provides a continuous source of innovation. The effectiveness of our R&D programmes enables us to design forward thinking industrial solutions that anticipate clients' needs in terms of profitability, performance, safety and compliance with all standards. The Fives know-how and solid field experience allow it to manage projects as a whole while respecting deadlines and fulfilling performance commitments.

At Fives, the tube and pipe business line covers engineering, manufacturing, supply and installation of tube making facilities and individual machines to process seamless and welded tube and pipe products. These custom engineered machines are supplied under the historical brands of Abbey, Bronx, OTO and Taylor-Wilson:

- Abbey and OTO: slitting lines, entry systems, welded tube mills, cut-off units, run-out tables, tube handling units, drawbenches
- Bronx: heavy duty tube and pipe straightening machines
- Taylor-Wilson: pipe end finishing, hydrostatic pipe testers, collapse and leak testing machines, packaging systems for round and shaped tubes, and bars
- OTO: automation and control systems

Moreover, a full range of services includes repairs, upgrades, modernisation, operator/maintenance training and feasibility studies.



INDUSTRY

Zekelman Industries places orders with SMS group for modernisation of ERW tube lines

ATLAS Tube, a Zekelman Industries company, has again invested in tube welding technology from SMS group.

Over the past two years the company has placed several orders with SMS group aimed at expanding and enhancing the product spectrum of the 8⁵/₈" and 16" lines installed in Harrow, Canada, and the 16" line installed in Blytheville, Arkansas, USA.

SMS group has now received several follow-up orders for the 16" tube welding line, which was moved to Blytheville in 2006 and which SMS had already extensively modernised and extended as part of that relocation.

The line is now to be equipped with a completely new sizing section to

expand the product spectrum and improve productivity. The use of URD[®] (Uniform Rigidity Design) stands in the sizing section will significantly shorten the size changing times in future.

Once the upgrading measures have been completed the line will be able to roll structurals (round tubes with outside diameters up to 18") as well as square and rectangular hollow sections. Hollow section sizes will range from 14" x 14" square to up to 18" x 10" rectangular. The maximum wall thickness will be 17.3mm.

In order to optimise the cross-welding process the welding equipment on the cross-welder will be replaced with the Perfect arc[®] system developed

and patented by SMS group. No transformers will be required here: the systems will be operated using insulated-gate bipolar transistor (IGBT) power electronics, with the welding current completely digitally controlled. As a result, the welding machines can attain an efficiency rate of over 90 per cent.

Compared to older welding techniques, energy savings are up to 30 per cent, depending on the operating point.

This will further improve process stability, particularly with heavy walls, and contribute to an overall increase in productivity.

The installation of an additional pinch roll/breakdown stand in the 8⁵/₈" ERW line in Harrow, Canada, will allow higher grades and greater wall thicknesses to be produced in the future. Furthermore, the additional stand will enable the existing product portfolio to be expanded.

Two newly developed inside scarfers have been supplied for the 16" line installed by SMS group in Harrow in 2000.

These scarfers are a further optimisation based on Zekelman Industries' and SMS group's experience of the original scarfers of SMS design.

The inside scarfers, which are equipment crucial to the quality of the tubes, are now designed for the extended wall thickness range of up to 17.3mm. The new scarfers are already in operation and have been performing successfully.

With these modernisation measures, Zekelman Industries is significantly strengthening its position in the production of structurals in the North American market.

SMS group – Germany
Website: www.sms-group.com



Two newly developed inside scarfers have been supplied for the 16" ERW line installed by SMS group

Sales director appointment at Kocks

WITH effect from 1 February, Günther Schnell has taken the role of managing director sales and marketing at Friedrich Kocks GmbH & Co KG, taking over from Sergio Filippini, who left the company on 1 March to go into retirement. Mr Filippini spent 16 years with Kocks in a managerial capacity, five of which were spent heading the sales and marketing section at the German headquarters in Hilden.

Mr Schnell has considerable experience in the steel industry, and his appointment adds another expert to the company's executive team. Following his degree in process technology, he began his career in 1997 with VAI Technometal GmbH as a project manager sales and technology in the field of secondary metallurgy. In 2002, he joined Friedrich Kocks for the first time, eventually taking on the position of general manager sales/chief representative China. In 2010, he joined SMS group GmbH, where he headed sales as general manager for wire rod, bar and merchant bar mills.

Friedrich Kocks GmbH & Co KG –
Germany
Email: marketing@kocks.de
Website: www.kocks.de



(from left) Ali Bindernagel, Sergio Filippini, Günther Schnell and Rötger Teyke

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DIARY

of Tube Events

2017



17-19 May

Made In Steel

(Milan, Italy)

International Exhibition

www.madeinsteel.it



17-20 May

Lamiera

(Milan, Italy)

International Exhibition

www.lamiera.net



5-8 June

Tube Russia

(Moscow, Russia)

International Exhibition www.metallurgy-tube-russia.com



28-30 June

Guangzhou Tube Fair

(Guangzhou, China)

International Exhibition

www.chinaexhibition.com



18-23 September

EMO

(Hanover, Germany)

International Exhibition

www.emo-hannover.de



19-21 September

Tube Southeast Asia

(Bangkok, Thailand)

International Exhibition www.tube-southeastasia.com



3-5 October

TUBOTECH

(São Paulo, Brazil)

International Exhibition

www.tubotech-online.com



6-9 November

FABTECH

(Chicago, USA)

International Exhibition

www.fabtech-expo.com



28-30 November

Stainless Steel World

(Paris, France)

Conference & Exhibition www.stainless-steel-world.net

Ajax Tocco expands aftermarket sales resources

AJAX Tocco Magnethermic has appointed three new US aftermarket sales engineers: Emil Weatherbee, responsible for Wisconsin, Minnesota, Illinois, Iowa, Missouri, Kansas and Nebraska; William McArthur – Arkansas, Louisiana, Oklahoma and Texas; and Joe Angilella – Kentucky, Tennessee, Virginia and North Carolina.

Mr Weatherbee has spent several years within the foundry industry including a lengthy tenure as regional sales manager for Lectrotherm in North Canton, Ohio. He is a graduate of Kent State University, and is based in Ajax Tocco's Brookfield, Wisconsin, facility.

Mr McArthur has over twenty years' experience within the metals industry with Emsco, Inc. He is a graduate of Louisiana State University – Shreveport, and later earned an MBA from Louisiana State University. He is based in the facility in Longview, Texas.

Mr Angilella has worked for the last 18 years in the foundry industry, as a sales engineer with Allied Mineral Products and most recently with Fire Brick Engineers. He attended Purdue University and resides in Louisville, Kentucky.

Ajax Tocco maintains a team of skilled technicians strategically located

throughout the world to repair and maintain Ajax Tocco equipment as well as competitors' equipment.

The company also houses a large inventory of parts for all of its equipment, including older units, and some competitor equipment. A 24-hour service hotline is provided to answer urgent requests and for emergency assistance.

Ajax Tocco Magnethermic Corp – USA

Fax: +1 330 372 8608

Email: sales@ajaxtocco.com

Website: www.ajaxtocco.com

New Inductotherm company in Mexico

THERMAL processing equipment supplier Inductotherm Group has opened a new group company in Queretaro, Mexico – Inductotherm Heating and Welding Mexico S de RL de CV.

Mexican customers will benefit from timely and direct access to Inductotherm heating and welding brands, covering the many active market segments in Mexico. The company will provide local qualified, trained service and parts support for Inductoheat induction heating and Thermatool welding equipment to Mexican manufacturers, with fast response.

The company has appointed sales manager Cesar Tejeida, who has more



Inductotherm's new facility in Mexico

than 20 years of pipe and tube making and HF welding experience.

Mr Tejeida is responsible for delivering to Mexican customers the latest technologies offered by Inductotherm Group, including Thermatool's latest line of HF welders featuring HAZControl™ technology.

Kris Livermore, director of business development for Thermatool, commented, "The appointment of Mr Cesar Tejeida highlights the consistent growth of Thermatool and the continuing strategy of creating local business relationships that will serve for many years. In addition, two service engineers will work out of the local office. We recognise that excellent local technical sales, service and support will strengthen our customers' business in Mexico."

Inductotherm Heating and Welding Mexico S de RL de CV – Mexico

Email: info@thermatool.com

Website: www.thermatool.com

Rafter upgrades Yoder tube mill

RAFTER Equipment Corporation has shipped a new RT-2500 forming and sizing "tube mill re-top" to a North American mechanical and sprinkler tube producer.

The equipment will replace older Yoder and home-made tube mill equipment that is worn, difficult to maintain, and has outlived its useful life.

The company worked with the customer to ensure compatibility with the existing mill base and HFI welding equipment.

The new driven and idle side roll stands are mounted on sub-plates that will be permanently secured to the existing mill bases. These roll stands include many updated features to reduce and simplify maintenance. In addition, the roll stands will be more robust than the ones they replace.

This project represents another mill re-top project to add to the company's growing list. Information on past re-tops can be found on the company's website.

Rafter Equipment Corporation is a manufacturer of tube mills, pipe mills, roll forming machines, cut-off machines, and other related tube and pipe mill machinery. Additional services include rebuilding and upgrading mill equipment. Originally started in 1917, the Rafter name is known for reliable, high-quality tube mill and roll forming equipment.

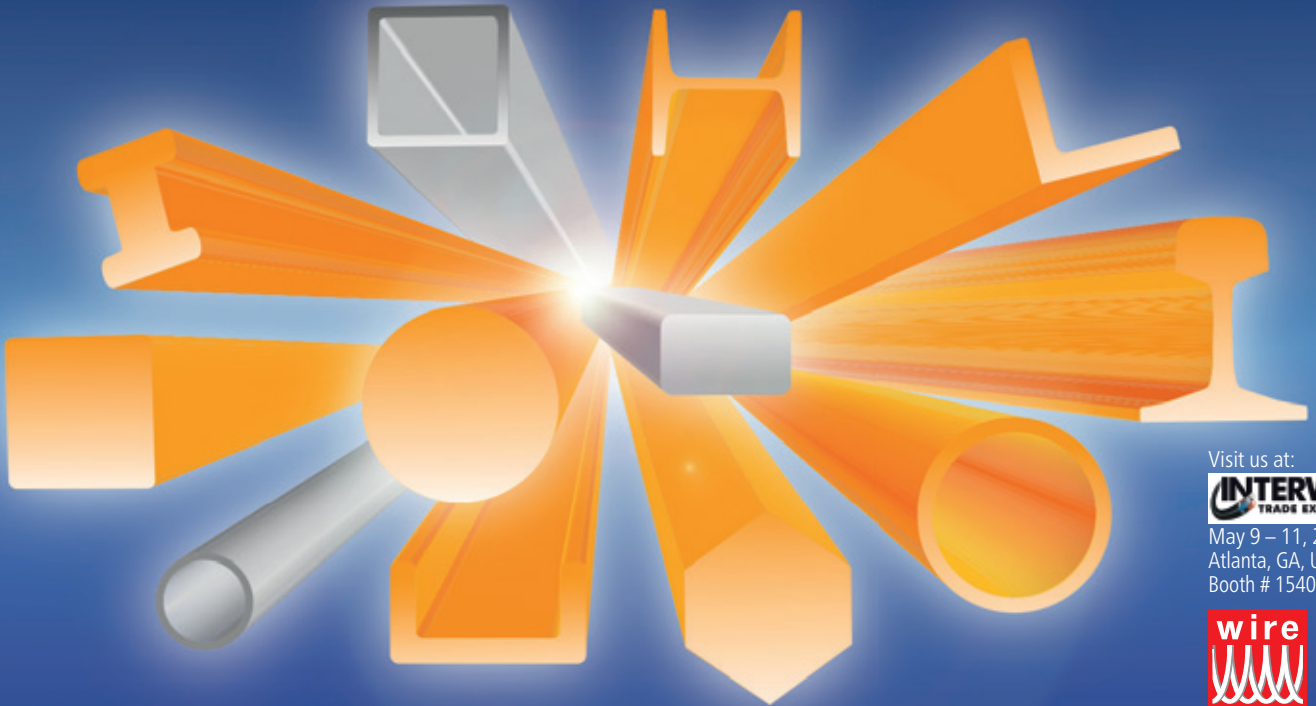
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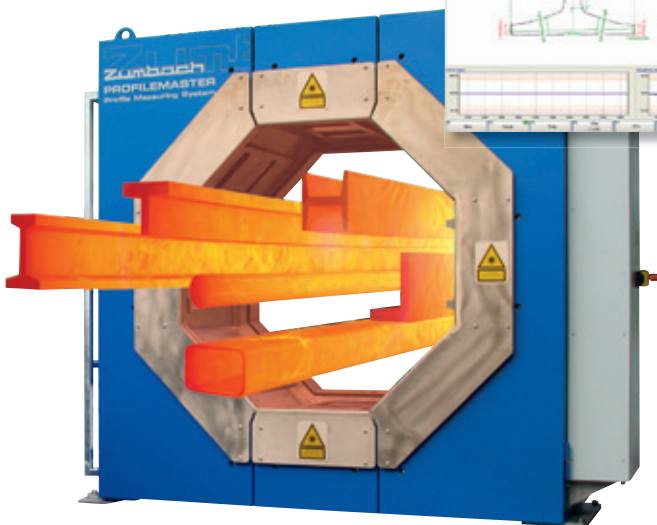
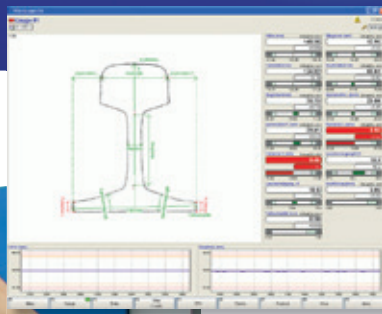


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Transam Extrusions invests in Davis-Standard technology

UK tubing and profile manufacturer Transam Extrusions Ltd is continuing to invest in Davis-Standard extrusion equipment. Transam, which has experienced significant growth in the last ten years, produces both flexible and rigid plastic pipes and profiles up to 180mm wide.

The relationship between the two companies has grown over the past decade, and has included investment in new Davis-Standard extruders, screw technology and other downstream equipment to support the company's growing business.

"Davis-Standard's expertise, dedication and responsiveness to their customers goes beyond all expectations," said Russell Brazier, managing director, Transam. "Their equipment is extremely reliable, screw technology second to none and we've been delighted with the technical staff that support and help us to concentrate on our growing business in the UK."

Most recently, Transam added a new Davis-Standard EB50 EuroBlue extruder – the sixth Davis-Standard

extruder, with associated downstream, to be installed by the company.

The machine was ordered and delivered within five days, resulting in minimal production delays for Transam's clients.

The company also purchased a custom-built Davis-Standard water bath specifically designed for its business requirements.

Transam operates a programme that ensures a proportion of its annual profits are allocated to reinvestment into its business in the form of new equipment.

Davis-Standard, LLC designs, develops and distributes extrusion and converting technology. Its systems encompass more than ten product lines to support manufacturing applications and customers within every major industry, including agriculture, automotive, construction, healthcare, energy, electronics, food and beverage packaging, and retail industries.

The company has a network of independent sales agents and suppliers in nearly every country, with manufacturing and technical facilities in



the USA, and subsidiaries with facilities in China, Germany and the UK.

Davis-Standard, LLC – USA

Fax: +1 860 599 6258

Website: www.davis-standard.com

Transam Extrusions Ltd – UK

Fax: +44 1582 883138

Website: www.transamltd.co.uk

AJT Engineering launches new website

WITH contemporary styling and responsive design, AJT Engineering's new website has been completely redeveloped, and is designed to be entirely customer-focused, with easy navigation and intuitive site structure.

The content has also been rewritten to make it more relevant, clear and interesting, so that it engages with the company's diverse customer base.

AJT managing director Ken Gauld said, "At AJT Engineering, we pride

ourselves on taking a forward-thinking approach and wanted to make sure that our advanced new website reflected the high quality of our customer-focused engineering services. That meant putting ourselves in the mind of the customer to ensure that they could easily access clear information on the benefits of choosing AJT Engineering, and making the website fully accessible from a wide range of devices and platforms."

AJT Engineering Ltd was established in 1948 and has two facilities in Aberdeen, UK, with a total site area of five acres. The company comprises three divisions: AJT Engineering, British Heat Treatments and British Metal Treatments.

AJT Engineering Ltd – UK

Fax: +44 1224 890251

Email: info@ajt-engineering.co.uk

Website: www.ajt-engineering.co.uk

AJT's redesigned website



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<http://www.nakata-mfg.com>

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E-mail: jinpinchina@yahoo.com

Fives anticipating stainless steel growth

GLOBAL stainless steel demand is expected to increase up to 15 per cent in five years from 37.4mn tons in 2015 to 43.2mn tons in 2020, industry analysts say.

Foshan Chengde Stainless Steel Co, based in China, recently contracted Fives for project management of its new stainless steel line.

The new cold annealing and pickling line (CAPL) with a production capacity of 500,000 tons per year will produce 200, 300 and 400 series stainless steel products intended for different applications:



Mr Li Quan

construction, machinery, automotive, household appliances, medical equipment, chemical containers, high-speed rail and aviation. The line is scheduled to be put into operation before the end of 2017.

Fives is responsible for project management as well as design and supply of an annealing furnace and terminal equipment, including in-line skin-pass: DMS SkinPass 2Hi.

The skin-pass mill will remove the yield-point elongation effect and greatly improve the strip-surface roughness and flatness. The equipment will be manufactured by a Fives' subsidiary in Shanghai, China.

Over the last 20 years, Fives has designed, manufactured and supplied more than 44 strip processing lines and cold rolling mills for stainless steel plants in China.


"The stainless steel processing lines designed by Fives have a good reputation in the industry. We believe in Fives' first-class international design



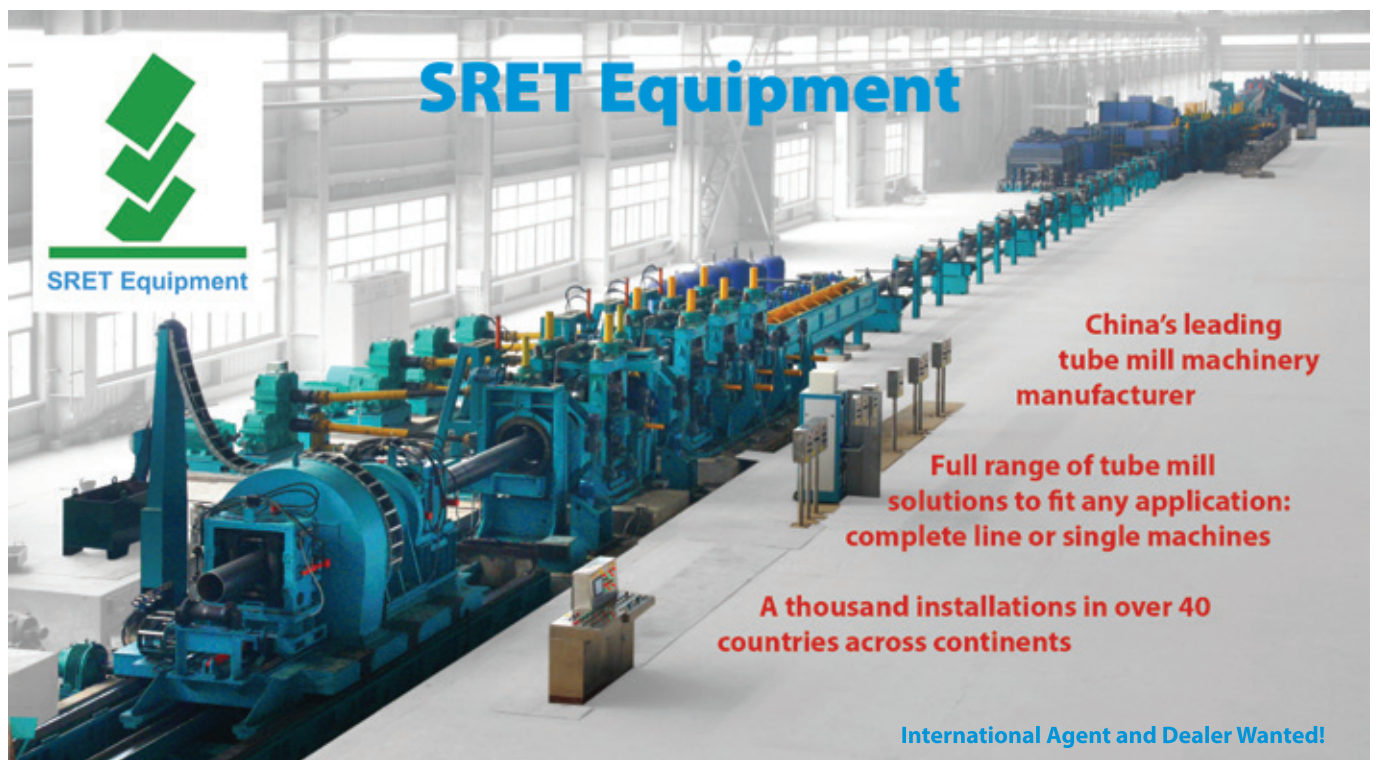
The SkinPass mill

standards and turnkey management experience," said Li Quan, one of the shareholders of Foshan Chengde Stainless Steel.

Fives Group – France
Website: www.fivesgroup.com



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battenfeld-cincinnati receives several orders at K show

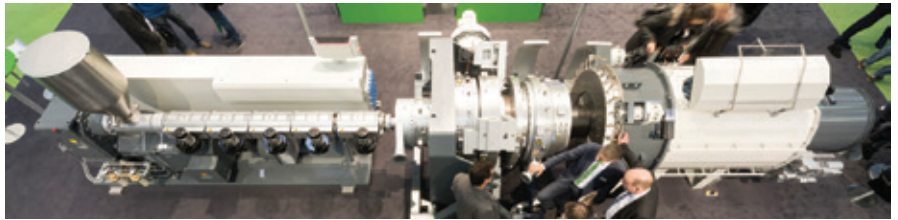
INDIAN customer Jain Irrigation Systems ordered a complete extrusion line, which will be used to manufacture large polyolefin pipes up to 2,500mm in diameter, from battenfeld-cincinnati at the K trade show. This was one of a number of orders received by the manufacturer at the 2016 event.

"We had many more visitors than three years ago, especially from Africa, Asia and the Near and Middle East and we received several major orders directly at the fair. This is pleasing feedback to receive and the orders are evidence that our new machine concepts are able to fulfil our customers' needs," said Gerold Schley, CEO of the battenfeld-cincinnati group.

One of the highlights at the booth was the new solEX NG extruder series, which was ordered by Jain Irrigation Systems. The high-performance extruders, with their processing length of 40D, have been created on the basis of the proven solEX extruders. However, their completely re-designed process technology concept has boosted performance. A barrel with internal grooves and matching screw and grooved bushing geometry optimises the extruder's processing attributes.

The result is a lower melt temperature by up to 10°C along with a completely changed axial pressure profile in the feed zone and barrel, which leads to an overall reduction of the load on the system and consequently a cut in energy consumption of up to 15 per cent. "The interest shown by the pipe industry in these new extruders is very encouraging," said Mr Schley. He added: "Together with our FDC system, which was also on display, the range for pipe manufacturers is very attractive all round."

The fast dimension change system from battenfeld-cincinnati operates automatically across a range of diameters and allows not only a change of external diameters, but also of pipe wall thickness during running production. It is perfectly synchronised from pipe head to cutting unit so that dimension change can be started by the push of a single button. FDC lines cover an enormous bandwidth of diameters, ranging from 90 to 630mm, which is



The K show in Düsseldorf



currently unique on the market. The FDC pipe dies with an adjustable melt gap are available for diameters of up to 1,200mm and FDC vacuum tanks, cooling tanks, haul-offs and cutting devices for diameters of up to 1,000mm.

"At K, the interest in our solutions, not only for pipe production, but also for the packaging industry, was particularly strong," Mr Schley added. With its XXL-Multi-Touch roll stack, the machine manufacturer presented a solution for making stress-free sheet for packaging at high speeds of more than 110m/min and with outputs of up to 3,300kg/h (PET) and 2,700kg/h (PP). The Multi-Touch roll stacks, combined with the high-speed extruders, are suitable for high-speed thermoforming sheet extrusion. battenfeld-cincinnati also offers STARextruders, a special machine series for PET processing.

Also available in the battenfeld-cincinnati product portfolio is a special three-layer feedblock for thermoforming sheet production, which is manufactured in-house in Germany.

The concept of using a pin with a milled distributor curve to achieve an optimal layer thickness distribution has already resulted in eight orders being placed.

This is an added incentive for the machine manufacturer to offer this type

of technology for five-, seven- and nine-layer feedblocks in future as well.

battenfeld-cincinnati stated that it has seldom had so many new extruders and machine components on show at its booth previously. Apart from its new solEX NG single-screw extruder series, the conEX NG twin-screw series for PVC pipe and profile production also celebrated its premiere.

These new extruders were created by a complete re-design of the processing unit: a longer pre-heating zone and an optimised screw geometry ensure higher outputs with significantly reduced shear stress and machine wear. All extruders are easy to operate, thanks to the new BCtouch UX control system, featuring clarity and easy handling, which customers could experience at the booth.

"The very positive response shows that our motto 'driven by innovation' has paid off. We will keep this up and will present an even wider range of new technological solutions both in the coming years and at the K 2019," said Mr Schley.

battenfeld-cincinnati – USA
Website: www.battenfeld-cincinnati.com

Jain Irrigation Systems – India
Website: www.jains.com

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i-Special Forming System uses an edge forming method which gives an advantage over conventional forming facilities. As the strip edges contact each other in an "I" shape on the squeeze stand, it secures excellent welding quality, and it is capable of forming various sizes without changing the roll. In particular, it is excellent for the forming of heavy wall high-strength pipe.

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V-Shear & Welder connects the ends of two coils.

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Available size :
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Available size :
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GLOBAL PATENT

- i - SPECIAL FORMING SYSTEM (2014)
- CASSETTE TYPE ROLL CHANGING BOX (2012)
- INSIDE BEAD REMOVING E/Q (2012)
- BEVELLING CUT IN SHEAR & WELDER (2011)
- ROLL CHANGING METHOD IN TUBE MILL (1996)

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enables fast and easy replacement of the roll by pre-assembling the roll before replacing it on the Cassette Box.

Available size :
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MAJOR SUPPLY LIST

- Supplied 20" i-Special Forming Stand to AJU Besteel Co., Ltd. (2014)
- Exported 20" API OCTG Pipe Threading Line to SAUDI Steel Pipe Co., Ltd. (2013)
- Supplied 8" Heavy wall Tube Mill Line to HUSTEEL Co., Ltd. (2012)
- Supplied 8" Milling Cut-Off M/C and Shear & Welder to HUSTEEL Co., Ltd. (2011)
- Supplied 60" Hydrostatic Tester(Max. 500kg/m²) and End facing to HUSTEEL CO., Ltd. (2009) & GLOBAL PIPE (2010)
- Exported API 20" Tube Mill Line to SAUDI Steel Pipe Co., Ltd. (2009)
- Exported 18" Tube Mill Line to NAKATA Mfg. Co., Ltd. in Japan. (2005)
- Supplied 12" tube mill line and finishing equipments on full turn-key to HUSTEEL. (2004)
- Exported 24" end facing to NKK (JFE) in Japan. (2002)

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- Automatic and Semi-automatic Bundling M/C
- Related Equipment and Facilities to Comply with API Standard

Schuler sells technology centre to Feintool

THE Schuler Group has sold its technology centre in Tianjin, China, to the Swiss company Feintool. Based in Lyss, Switzerland, the company plans to produce precision components for the automotive industry in Tianjin using Schuler presses.

Schuler itself continues to expand its market position in China as a manufacturer of metalforming equipment. The two parties agreed to

maintain confidentiality regarding the details of the transaction.

Feintool intends to expand production capacity in Tianjin during the course of the year with the use of Schuler technology.

"Since its launch in 2014 our TechCenter in Tianjin has been very well received by the market," stated Schuler CEO Stefan Klebert. "Local demand for Schuler to produce automotive components in China grew strongly in 2016 in particular. We have therefore achieved our strategic target of inspiring customers in China to use Schuler technology. However, our core business is the production of plant and machinery rather than vehicle components and we are therefore happy to have found a strong buyer in Feintool

who can now take this task to the next level."

The chairman of the board of directors of Feintool, Alexander von Witzleben, explained that Feintool's investment in China was in response to customer demands for global presence and worldwide expertise.

"This will enable us to close a strategic gap in Asia," he said.

Feintool will retain all employees and infrastructure of the plant in Tianjin, as well as existing customer orders.

Schuler supplies presses, automation solutions, dies, process know-how and services for the metalworking industry and lightweight automotive design. Customers include automobile manufacturers and suppliers as well as companies from the forging, household appliances, packaging, energy and electronics industries.

Schuler AG – Germany

Fax: +49 71 61 66 233

Website: www.schulergroup.com

The Schuler Group has sold its Tianjin technology centre to Feintool



Photo credit: Schuler



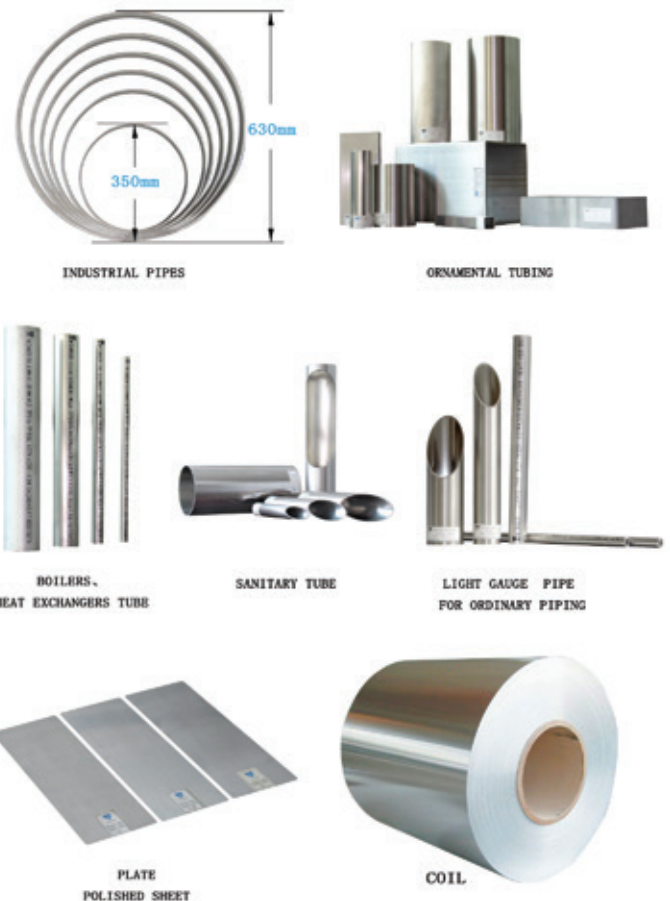
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Comau looks towards digitised manufacturing

THE international conference Digitising Tool Manufacturing in the G20 – Initiatives, Best Practices and Policy Approaches was held in Berlin, Germany, in March. During the two-day event, member countries of the G20 discussed ideas, strategies and programmes aimed at driving the digitisation of the manufacturing sector.

Comau, part of the FCA Group, took part in the event by representing the Italian segment of the industry devoted to innovation and ready to welcome the opportunities and challenges of Industry 4.0. In particular, Mauro Fenzi, CEO of Comau, focused on factories of the future, from global value chains to interconnected value networks, together with Susanto Irwan, founder of Sensify Security; Jan Michael Mrosik, CEO of the digital factory division of Siemens; Karthikeyan Natarajan, global head engineering practice at Tech Mahindra; and Stephan Reimelt, CEO of GE Deutschland. During the debate, Mr Fenzi addressed the issue of

digitisation in the manufacturing industry, starting from Comau's long-standing global experience within the industrial automation sector. He then focused on the major transformations brought about by the 'digital revolution' regarding the organisation of work, production processes and the business models of companies.

Comau's commitment to addressing these issues is seen in technologies such as Aura collaborative industrial robots. In addition, the company is helping develop new skills for digital factory personnel through the activities of Comau Academy, conducted in collaboration with universities and international institutes.

Comau delivers industrial automation solutions that integrate products, technologies and services to help companies increase plant efficiency and optimise returns. The company has over 40 years of experience, and an international network of 34 locations, 15 manufacturing plants and five innovation centres that span 17 countries. Its



Comau CEO Mauro Fenzi

modular, flexible and highly configurable products can be tailored to meet the needs of each individual customer. The range includes manufacturing and assembly solutions, powertrain machining, robotics and asset maintenance services for a wide range of industrial sectors.

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PT Gunung Raja Paksi orders section mill from SMS group

PT GUNUNG Raja Paksi, based in Cikarang City, Indonesia, has commissioned SMS group to supply a continuous light section mill. The new mill will be installed at PT Gunung Raja Paksi's new industrial site close to its existing facilities, with production scheduled to commence in 2018.

With this mill PT Gunung Raja Paksi will be able to expand its product portfolio and meet the increased demand for structural sections in Indonesia.

SMS group is supplying a reheating furnace with a capacity of 100 tons per hour, a one-strand rolling mill equipped with 15 housingless (HL) stands in horizontal, vertical, convertible and universal arrangement, a cooling bed, straightening machine, cold saws, magnetic stacker and tying machines. The furnace will be a walking beam-type, designed to achieve excellent heat efficiency and enhanced process control by means of the renowned SMS Prometheus software. Low-NOx burners ensure a substantial reduction of pollutants released to the atmosphere, markedly contributing to the plant's objective of becoming a local benchmark for environmental awareness.

The rolling mill will include a roughing mill consisting of six HL mill stands, an intermediate mill consisting of five HL mill stands and a finishing mill consisting of four HL mill stands each equipped with multi-groove rolls. Between the stands of the intermediate and finishing mill, vertical loop lifters will be arranged, allowing tension-free rolling to close tolerances.

The intermediate and finishing mill will be designed for flexible operation in horizontal/vertical, horizontal only or universal arrangement. Starting materials will be 150 and 200mm² billets with a length of 12m and 300 x 250mm beam blanks, heated in a walking beam-type reheating furnace.

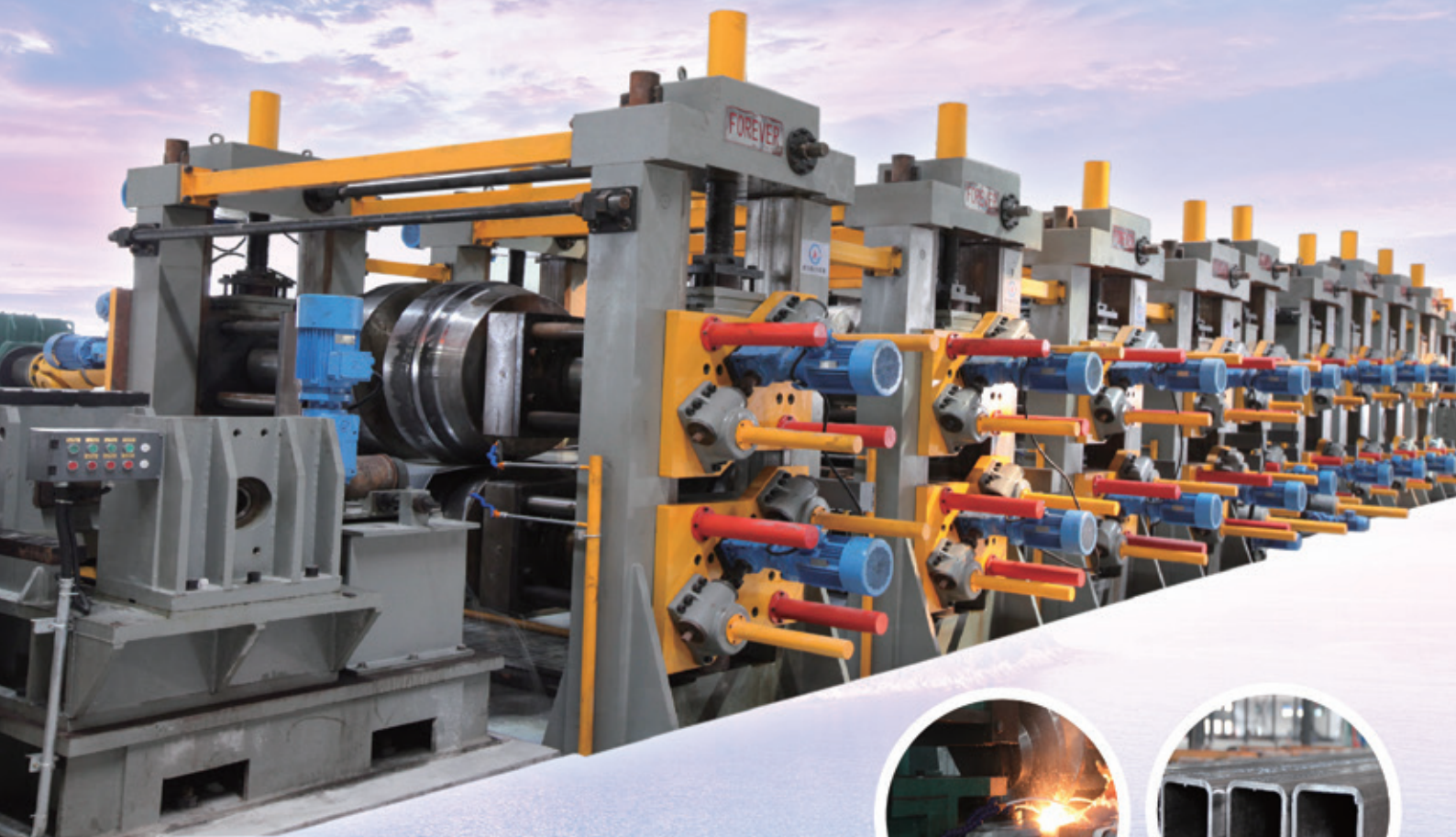
SMS group – Germany
Website: www.sms-group.com



The walking beam furnace, which will be similar to the one shown above, will be equipped with SMS Prometheus software to achieve improved heat efficiency

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Kasto to hold open house event

ECOLOGY and economy when sawing and storing material will be the themes of an open house to be held by Kasto at its UK headquarters and showroom in Milton Keynes, from 16 to 18 May.

The firm's latest sawing machines and storage systems will be launched in the UK, having been introduced last year by the German parent company. They include the new Kastomicut, which

offers higher levels of technology and performance at a lower price than the company's previous range of pivot-bow bandsaws. Also featured will be a production bandsaw for use with either a bimetal or TCT (tungsten carbide tipped) blade. The Kastowin pro AC 5.6 is as productive but less expensive than the established Kastotec, and even faster with the adaptive Kastrorespond system.

It has the added advantage of lower power consumption for the hydraulics, as well as energy recovery features that reduce electricity use. Those interested in attending should telephone Ernst Wagner on +44 7747 802991.

Kasto Ltd – UK
Email: sales@uk.kasto.com
Website: www.kasto.com

CNC machining centre and double mitre saw to support extended manufacturing

INVERTEC Interiors, a UK designer and manufacturer of lighting and interior systems for public transport and commercial vehicles, has purchased a new Mecal MC 305 Kosmos four-axis CNC machining centre and a Mecal CN double mitre saw from Addison Saws.

Invertec recently secured a major order for the manufacture of train doors, cupboards, vestibules and electrical cabinets for a locomotive and carriage builder. The Mecal CNC machining centre will be used to fabricate components from a range of aluminium extrusions after they have been cut to length using the Mecal double mitre saw – an SW 453 Plug model.

"An increase in orders required our business to move to three manufacturing shifts per day," commented Invertec's operations director, Andrew Speers. "To facilitate this, we naturally required additional machining capability. An initial option was outsourcing; however, the business case did not fully support this approach, as it would mean increased reliance on outside suppliers. We

therefore looked at increasing our own manufacturing capability and contacted a number of CNC machine providers."

Addison Saws already has an established relationship with Invertec, having supplied a Mecal Duo CNC machining centre and a Mecal CN saw to the business several years ago. The Mecal machines have provided trouble-free operation, and Addison Saws has assisted Invertec with technical support, guidance, and advice regarding the best way to fabricate certain components.

"When it came down to it, Addison Saws was able to demonstrate a much greater understanding of our production requirements," added Mr Speers. "We also wanted to continue working with them in order to build an even stronger relationship. For example, they have already helped us to develop offline programming for our new Mecal machining centre."

Supplied ex-stock, the new Mecal MC 305 Kosmos four-axis CNC machining centre will be used to mill, drill and tap aluminium extrusions typically



The Mecal MC 305 Kosmos CNC machining centre from Addison Saws

measuring 4m long by 200mm wide. These will be first cut to length using the Mecal CN SW 453 double mitre saw.

"The installation process and subsequent operator training for both new machines was fantastic," continued Mr Speers. "The new Mecal CNC machining centre is also significantly quicker than our existing model." In addition to purchasing the new Mecal machines from Addison, Invertec signed a service contract with the company to cover all its Mecal equipment.

The Mecal MC 305 Kosmos machining centre chosen by Invertec is equipped to automatically machine, drill, mill, slot and prep both aluminium and steel extrusion bars. It is also suited to new product development, while its accuracy and repeatability ensure minimal waste.

Addison Saws Ltd – UK
Email: sales@addisonsaws.co.uk
Website: www.addisonsaws.co.uk

Invertec – UK
Email: info@invertec.co.uk
Website: www.invertec.co.uk

Train interior project by designer and manufacturer Invertec



Final beam placed on new welding centre

CONSTRUCTION on Lincoln Electric's new \$30mn Welding Technology Center project continues to progress toward a projected 2017 opening. Crews placed the final beam on 8 February, completing the structural frame of the building on the company's campus in Euclid, Ohio, USA. The next phase will focus on the building's facade, interior, electrical and plumbing work.

"Construction is progressing rapidly – structural framing just wrapped up, allowing us to move on to the next phase of construction," said John Mueller, director of facility planning and development, Lincoln Electric. "We look

forward to opening the facility later this year."

Before crews hoisted and placed the beam into position, representatives from Lincoln Electric and other companies working on the project participated in a beam-signing ceremony. On hand to sign the beam were Chris Mapes, George Blankenship and Doug Lance from Lincoln Electric's senior management. Members of the Lincoln Electric facilities team and representatives from Panzica Construction Company, Structura Architects Ltd and Ironworker Local Union No 17 also added signatures.

Multiple northeast Ohio contractors are working on the project, including Contemporary Electric Co, Fire Protection Inc, Geauga Mechanical, Harner Plumbing Inc, Mr Excavator Inc, Nova Structural Steel, Panzica Construction Company, Phoenix Cement Contracting LLC and Valentine Contractor Inc.

"We are proud to be using tradesmen from the same trades organisations we actively help to train at a variety of

sites around the country," said Jason Scales, manager, education solutions, Lincoln Electric. "General contractor Panzica Construction Company, steel fabricator Nova Structural Steel and other contractors on the site employ skilled trades workers typically trained on Lincoln Electric equipment in their skilled trade schools."

When the new Welding Technology Center opens, it will mark the centennial anniversary of the company's legacy welding school, claimed to be the longest operating in the USA. The facility reflects Lincoln Electric's 100-year commitment to welding education and innovation. The new 130,000ft² centre will double Lincoln's welding education capacity and will include high-tech classroom and seminar spaces. It will also showcase and integrate Lincoln Electric's latest technologies and solutions into a welding curriculum.



Lincoln Electric – USA

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Inspection technology boost

GEORGE Fischer's HDPE pipe systems have been enhanced through the development of the first non-destructive testing (NDT) regime for HDPE products, which allows the manufacturer to issue a 'fit for service' certificate on both electrofusion and butt welds.

Individual couplings such as tees or crosses already included a 'completion indicator', but the new service offers assurance for the whole project team regarding the quality of the finished installation. This means that clients in the water, gas distribution, food processing and other industries requiring high standards can specify systems such as eco-Fit, Elgef Plus and Progef with the same confidence as with metal pipework alternatives.

The company states that customers will continue to benefit from the systems' speed of installation, versatility, low weight and durability.

GF Pipe System's new ultrasonic-based, non-invasive testing

will see the company's partner provide a responsive on-site service that can check up to 20-30 separate welds per day.

The pass/fail report can include details of any discontinuities detected by the scanners and is accompanied by a ten-year guarantee to provide assurance for the specifier or their end client.

A spokesperson for George Fischer commented, "At GF Pipe Systems we understand the challenges that customers face during the project cycle, which is why we have developed the NDT solution to fulfil the same quality standard they would expect from any other piping system but with the pass/fail fusion long term weld statement. This increases the value of our offering and ensures it is fully fit for purpose."

George Fischer Sales Ltd – UK
Email: uk.ps@georgfischer.com
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Steeltec publishes material selection guide

COMPONENTS used in high-tech applications have to meet increasingly sophisticated demands, such as greater efficiency, improved dynamic strength and longer service life. Cost-effective production processes are essential to maintaining long-term market viability.

In its recently issued Material Selection Guide, Steeltec has identified five steps that manufacturers of advanced steel components can take to select the right high-performance steel for their purposes and to optimise the costs of their manufacturing processes.

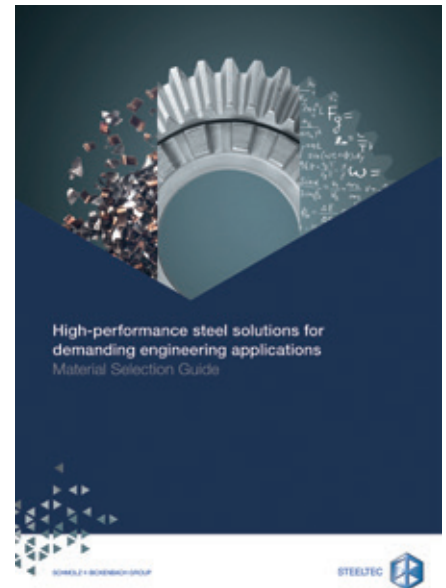
The guide explains the benefits of getting the material selection process right and the problems that can arise when the wrong choice is made, and recommends ways to optimise material processing and machining stages.

It also provides checklists that enable users to translate their individual processing and product requirements into material properties, and illustrates preventive quality assurance measures. A case study of electric power tool manufacturer Metabo is included.

“We help component manufacturers to achieve the best possible cost-benefit ratio along the entire value chain,” explained Guido Olschewski, head of quality and product development at Steeltec.

“The key is simply to provide manufacturers with the best high-performance steel for their specific application needs.”

The free Material Selection Guide is available as a downloadable PDF file or a printed document.



Steeltec's new Material Selection Guide can help users find the right material for manufacturing advanced steel components

Steeltec AG – Switzerland
Website: www.steeltec-group.com

International recognition for Materials Processing Institute chief technology officer

THE chief technology officer at the Materials Processing Institute has won an industry award from the Association for Iron & Steel Technology (AIST). Alan Scholes has been awarded the Best Paper Award by the AIST, as co-author of a paper titled ‘Development of Tailored Roll Grade Materials for the Early Stands of Finishing Hot Metals’, along with other research and steel organisations. The accolade is presented to the author(s) of the best paper submitted to the Rolls Technology Committee.

The paper summarises how a methodology for the manufacture of small castings has been developed using microstructural and thermal-mechanical testing. By using this approach, several new material grades have been produced, analysed and refined, including grades that have now been cast as full-scale rolls. Specific grades have been developed to target mills that have difficulty using standard HSS (high-speed steel) and to further improve the performance of HSS in service. The research, which was supported by the European Research



Fund for Coal and Steel, has provided a means to simulate the rolling environment and to test new material grades. It has removed the need for expensive and high failure risk mill trials.

Mr Scholes commented, “Techniques to develop new material grades were achieved through the combined expertise and collaboration of several organisations, and it is a great honour to be part of this award-winning research team.”

Co-authors of the paper were Andrew J Brown and Jason B Sychterz, Union Electric Steel UK Ltd, UK; Petrus H Bolt, M Krugla, S Sengo and M Rijnders, Tata Steel Research & Development, Netherlands; Alan Scholes, Materials Processing Institute, UK; Eliette Mathey, ArcelorMittal Mazières Research SA, France; and Gisèle Walmag, Olivier Lemaire and Jurgen Malbrancke, Centre de Recherches Métallurgiques ASBL, Belgium.

Chris McDonald, chief executive of the Materials Processing Institute, added, “I am delighted for Alan, whose work has always been of the highest standard, and this international recognition is fully deserved. His research, along with the work of his fellow co-authors, has identified a cost-effective practice within the industry and everyone at the institute is proud of this achievement.”

The award will be presented at AIST 2017, which takes place in Nashville, Tennessee, USA, from 8 to 11 May.

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Mathey Dearman restructures sales team

MATHEY Dearman has restructured its sales organisation. The new team is made up of Brandon Boyd, director of sales; Josh Wilson, area sales manager for the western US and western Canada; Mike Brace, area sales manager for the eastern US and eastern Canada; Sevy Jezek, European sales manager; and Al Smith, training and product support co-ordinator.

Mr Boyd said: "The addition of Josh, Mike, Sevy and Al will be a huge boost to our support team and give us the ability to further our reach with a big focus on our customers' needs."

Mr Wilson has been named area sales manager for the western US and western Canada. He first joined Mathey Dearman in 2012 as a sales application engineer; in 2015 he was named technical sales application manager. His primary duties included organising and heading up all aspects of training for the company, including sales people, distributors and end users.

He is a graduate of OSU with a degree in mechanical engineering, and has a Business Degree from the University of Phoenix. He has also spent time as a project manager, project engineer and field engineer.

Mr Brace has taken on the role of sales manager for the eastern US and

eastern Canada. Currently he is working to build his relationship with potential customers in his territory and help them learn more about Mathey's products as well as working with customers to gather information and work to find the right solution to fulfil their needs.

Mr Brace brings more than 20 years of sales and operational experience. Formerly the welding specialist for the construction products/industrial engine drive group at Miller Electric, he was known for providing customers with excellent levels of service as well as using his experience and training to help customers improve their weld quality and efficiency. He is an AWS certified welding inspector and an AWS certified welding sales representative.

Mr Jezek has been appointed European factory representative for Mathey Dearman. He previously worked for a group that produced steel construction for trucks and has a great deal of experience related to steel construction and heavy industry and working with welders all over Europe. He has been with Mathey since 2009, and has an extensive network of contacts throughout Europe and continues to work to expand the network.

Mr Jezek has a degree in civil engineering from Brno, Czech Republic,

and more than 25 years of experience in the field.

Mr Smith works as the training and product support coordinator. He works with sales and also engineering customers or representatives who require training. His work is frequently driven by new sales or a product launch, but he is also focused on working with representatives to keep them up to date about Mathey's product line. Mr Smith is responsible for the organisation and execution of all Mathey training events and developing training materials for Mathey, its customers and various web-based systems.

He started with Mathey Dearman in 1980 as a machinist and in the late 1990s became production manager. More recently, Mr Smith began working in quality control and documentation of procedures. He has extensive historical knowledge about the industry that he can explain to customers.

"In the end our goal is to create a customer experience that is second to none and creates the same respect our products have earned over the years. Great people make great companies," said Mr Boyd.

Mathey designs and builds cutting and bevelling machines and clamping, aligning and reforming systems for pipe and tubing. It has also developed other related tools and equipment over the years. These products include measuring and layout tools, gauges and inspection devices. It has a strong distribution network made up of some of the most successful and well-known distributors of welding, pipefitting and industrial equipment in most countries around the world.

Mathey Dearman – USA

Email: sales@mathey.com

Website: www.matheycnc.com



Al Smith



Sevy Jezek



Josh Wilson

Zekelman completes acquisition

ZELEKMAN Industries has finalised the acquisition of Western Tube & Conduit Corporation. Through this acquisition, Zekelman will expand its presence across the western half of the US and Canada in the electrical, fence and mechanical tube markets. Western Tube & Conduit Corp will continue to operate

under its individual brand and identity. "Western Tube is an excellent fit for our company," said Jim Hays, president of the electrical, fence and mechanical product divisions of Zekelman Industries. "The acquisition complements our long-term strategies of continued growth in the tubular product market."

Zekelman Industries also includes the operating divisions of Atlas Tube, Picoma, Energex Tube, Sharon Tube, Wheatland Tube and Z Modular.

Zekelman Industries – USA

Email: info@zekelman.com

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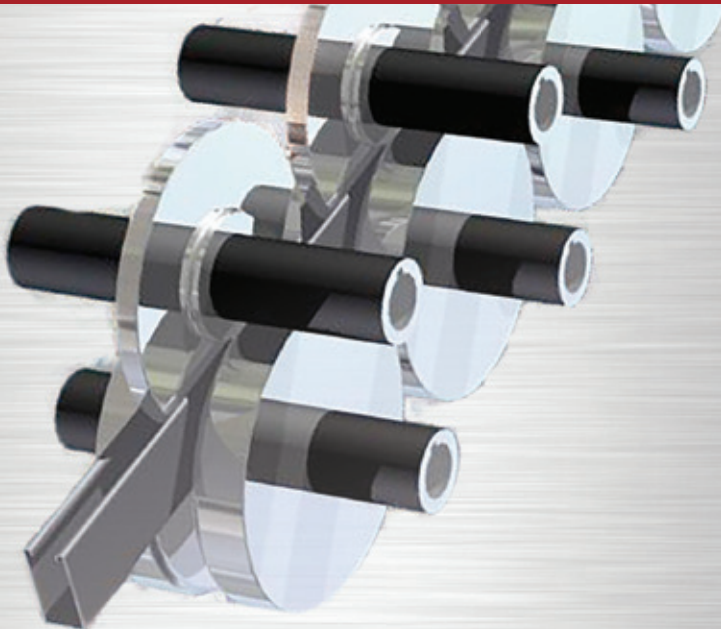
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FORMTEK

New appointment at RMTS

JIM Petkus from James Steel Tube has joined Roll Machining Technologies & Solutions (RMTS) as VP of operations.

Mr Petkus's work history includes 32 years from all aspects of tube production and operation. He started packaging tubes in 1985, moving on to become mill foreman, then plant manager superintendent, and becoming president and general manager in 2008.

With each position he was able to provide improved results through

efficiency and profitability, scrap reduction, cost reduction and running a lean operation. Training and developing mill operators and supervisors was key to maintaining continued improvements.

RMTS states that Mr Petkus is capable of understanding how the customer would use the product, and is able to adjust the product line or shape to fit. He is experienced in producing products and shapes including difficult D/T ratios (eg 7 x 1¼" rectangle x 3/16"

wall, 6.625" x 0.1" wall, 5" x 0.075" wall), many other structural sizes, and small diameter mechanical tube in a wide range of gauges and materials.

This year, Mr Petkus will be the vice chair for the Tube and Pipe Producing Council.

Roll Machining Technologies & Solutions – USA

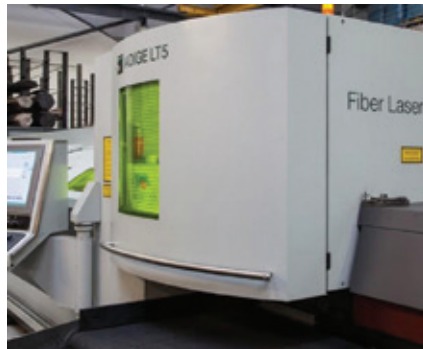
Email: rmts@rollsolutions.com
Website: www.rollsolutions.com

Investment in cutting technology

UKF Stainless Ltd, a supplier of stainless steel tubing, has purchased a Lasertube LT5, in order to allow the company to offer a more specialist cutting service. The purchase represents the culmination of 12 months of research and development within a variety of marketplaces, both new and existing to UKF.

The machine, equipped with a fibre laser generator, is made by BLM Adige in Italy. The project, partly funded by the ERDF, offers precision opportunities for UKF's customers.

The LT5 is designed for cutting tubes with small and medium thickness, and can cut a wide variety of materials with high productivity and quality level, from steels and alloys to copper and brass. The machine will allow UKF to manufacture and add more value to parts



UKF Stainless has invested in the Adige Lasertube LT5

that previously could not be achieved. The addition of the Lasertube LT5 will enhance the company's current suite of machines and allow it to offer customers a 'one stop shop' solution for users

of stainless steel tube and sections. Diameters from 12 to 120mm can be accommodated by the new machine, with the added bonus of a clean and spatter-free product throughout thanks to its use of an accessory that protects the inside of the tube.

The dedicated Artube CAD/CAM package provides the opportunity to exploit all the machine functions during the design stage, and to obtain accurate costings. The use of the laser can eliminate the need for additional operations such as welding, delivering more cost-effective parts that are cosmetically enhanced.

UKF Stainless Ltd – UK

Email: info@ukfstainless.co.uk
Website: www.ukfstainless.co.uk

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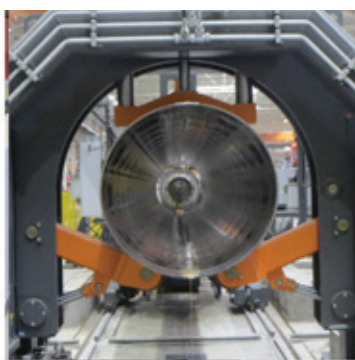
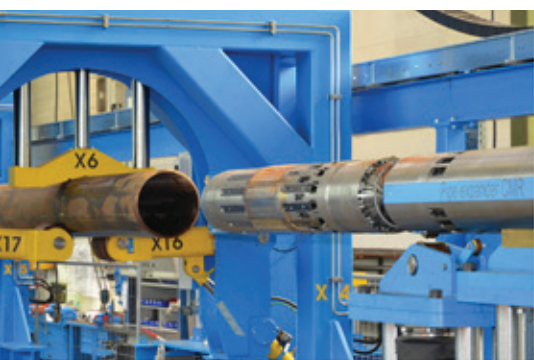
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TECHNOLOGY

Higher oil price filling LIMAB order books

DUE to the increase in oil prices the LIMAB TubeProfiler S is facing higher demand worldwide from those seeking in-line tube straightness measurement expertise.

The Swedish-based company LIMAB, established in 1979 and known for manufacturing laser measurement systems for the metal industry, has developed several innovative measurement solutions such as straightness, diameter, ovality, length, thickness and width measurement.

The TubeProfiler S, which has a well established reputation globally, launched back in 2011 for straightness, length, diameter and ovality/shape measurement and has become a highly recommended process and quality control unit for tube suppliers not only to the oil and gas industry, but also for precision and hydraulic tubes.

The key measurement system includes scanning of end, local and total straightness of tubes and pipes. Due to a unique technology users are able to measure all features with a very compact



system. The LIMAB straightness measurement system contributes to minimising the sometimes large problems with hooked ends, oval tubes, threading, manual measurements and bent tubes.

The system registers and stores all the data for 100 per cent of the produced tubes, including end user certificates. This is an important tool in case of a claim. More and more end users require the tube manufacturer to

have measurement systems installed to be able to guarantee that the tube production fulfils their demands.

The straightness results are displayed in real time with trend graphs including 2D and 3D graphs for easy viewing.

The database provides a source of production data for long-term monitoring and process improvements.

The system will output both the straightness of the total tube, tube ends or segments of the tube and the length, with alarm signals if any of the tolerance or warning limits are exceeded.

All of the data is displayed in combination with other information, such as OD, ovality and shape. The TubeProfiler S is easy to install in the existing line and easy to relocate to other parts of the mill, using the built-in lifting hooks and the quick-change electrical connectors.

LIMAB AB – Sweden

Email: sales@limab.se

Website: www.limab.com

Tube mills from FD Machinery

FD MACHINERY was responsible for manufacturing one of the earliest flexible forming square and rectangular pipe mills available on the market.

In the year 2000 it delivered this first pipe mill – the CFS flexible square and rectangular pipe mill. By 2005, the second generation of CFS pipe mill was put into production.

After a long period of successful production, minor quality problems were discovered in the mill. The final shape of square or rectangular pipe did not always have precisely even corner radius in all four corners and the dimensions of two opposite sides were not easy to create in perfect symmetry. There can sometimes be scratches on the bottom side, and outside scarf

cannot always be 100 per cent clean. With the aim of fixing these problems, after four years of research FD has now introduced the third generation of CFS flexible directly forming pipe mill of the CFS-X flexible square and rectangular pipe mill, in which the above problems are solved and production quality is ensured.

Compared with the original CFS – the same approximate specifications of pipe mill – the CFS-X flexible square and rectangular pipe mill can actually produce products with a specification expanded in size by 30 per cent.

There are two kinds of configuration for FD CFS-X pipe mill: standard and super-high capacity. Super-high capacity pipe mills have two times the

output of the standard one; installed power and line space have 1.5 times and 1.1 times that of the standard one, which can meet strong demands of customers.

In addition, the CFS-X flexible square and rectangular pipe mill has three options for automation: MNC CFS-X manual adjustment, ENC CFS-X motorised tool automatic adjustment and CNC CFS-X automatic adjustment. CNC CFS-X flexible square and rectangular pipe mill can change the product specifications within ten minutes.

FD Machinery – USA

Email: sales@fdmachinery.com

Website: www.fdmachinery.com

Metalworking lubricants for tube bending

BBLUBRICANTS produces and manufactures polymer-based lubricants to meet demands in environmental and clean production. Products are designed for a wide range of metalworking operations, including tube bending, deep drawing, stamping and punching.

Performance and cost are factors in the decision between synthetic lubricant and mineral oil. BBLubricants states that a synthetic base can provide performance benefits such as improved energy efficiency, wider operating temperature range, reduced

maintenance costs, better reliability and safer operations. A key element when developing synthetic BBLubricants is easy clean-up. Water-based lubricants are easily washable using only warm water. They can also be diluted with water to increase volume.

The chemical structure of synthetic fluid is designed to maintain its lubricating stability over a range of temperatures. Compared to petroleum, synthetics survive higher temperatures, last longer, and are not likely to form carbon deposits that create drag and wear.

Synthetics are non-hazardous and can be used in welding operations without needing clean-up. Safer working conditions for workers and the environment are achieved with water as a base. BBLubricants claims that benefits of its products include totally biodegradability; they protect tooling and materials from corrosion, are mineral oil-free, and ready for welding and assembly after cleaning.

BBLubricants sro – Czech Republic
Email: info@bblubricants.cz
Website: www.bblubricants.cz

New industrial laser application technology

A NEW technology designed for industrial laser applications, and developed by Comau in collaboration with Prima Electro, was presented at an open house event at Comau's plant in Turin, Italy.

Lhyte is a modular system intended for both the automotive and the general industry sectors. It allows its end users to choose a fibre, diode or hybrid laser source, meeting the varied and flexible needs of the industrial sector.

The unveiling event, which was attended by OEMs, system integrators and partner companies, opened with a welcome speech by Tobias Daniel, head of sales and marketing for Comau robotics and automation products, who introduced the Lhyte technology with a video presentation. The technical and application advantages of the solution for the industrial sector were then described by Comau head of marketing Maurizio Cremonini and head of materials and process technologies Giovanni Di Stefano, together with Maurizio Gattiglio, Prima Electro executive vice president – laser division.

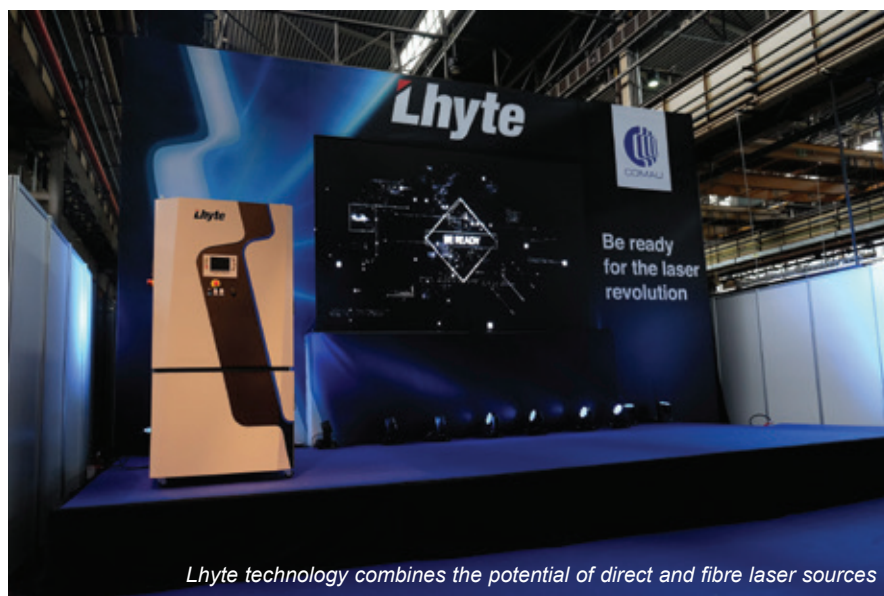
Ulrich Thombsen, a laser technology expert from Fraunhofer ILT, provided

a general explanation of laser solutions and Comau's latest technologies. Mr Daniel then closed the event with a technical demonstration to show the main features of the new solution, and how to use them.

Lhyte is able to combine the potential of direct and fibre laser sources through a modular and flexible structure. It is

adaptable to any industrial application and enables Comau to meet the needs of a market in continuous evolution, in which manufacturers and system integrators seek high-performance, versatile technologies.

Comau SpA – Italy
Website: www.comau.com



Lhyte technology combines the potential of direct and fibre laser sources

Sikora at Chinaplas 2017

SIKORA'S presence at the Chinaplas 2017 show (booth 5.1 C39) in Guangzhou, China, will be focused on measuring, control, inspection, analysis and sorting devices for the hose, tube, sheet and plastics industries.

Technology to be presented will include the Centerwave 6000 system for measuring large plastic tubes, and the Planowave 6000 for measuring plastic sheets. Both devices were premiered at the K 2016 event in Düsseldorf, Germany.

Centerwave 6000 is able to measure the diameter, ovality, wall thickness and sagging of large plastic tubes during extrusion. The system is based on millimetre wave technology and measures tubes from 110 to 3,200mm.

The Centerwave 6000 is available in a rotating version and provides a wall thickness measurement at 360 measuring points of the circumference.

A multi-axis system with static sensors is also available. Both systems measure on an absolutely non-contact basis, do not require coupling media

or calibration, and are independent of material and temperature of the tube.

"The Centerwave 6000 is pioneering for the continuous, on-line measurement of large tubes and sets new standards for a line control and quality control of the extra-class," said Wanbin Chen, president of Sikora China. "It will completely replace the ultrasonic technology previously used."

The Planowave 6000 is also based on millimetre wave technology, and precisely measures the thickness of plastic sheets while continuously scanning across the entire width during extrusion.

At Chinaplas Sikora will also be promoting the Purity Scanner for online inspection and sorting of plastic material. The combination of an X-ray camera with an optical camera system reliably detects contamination on the surface as well as inside plastic pellets. Contaminated pellets are automatically sorted out.

With the new Purity Scanner Advanced, Sikora offers a further online system for inspection and sorting of plastic pellets. The flexible camera system is tailored to special application areas. The Advanced model is equipped with optical high-speed cameras as well as X-ray, colour and infrared cameras. The system can be equipped with up to five different cameras.

For small material throughputs and applications where sample analysis or incoming goods inspection is sufficient, Sikora has developed the Purity Concept Systems. These analysis devices can be equipped with X-ray technology, optical cameras or infrared technology to detect contamination in pellets, flakes and films/tapes.

For hose and tube extrusion lines, Sikora's product range covers devices for diameter measurement with the



The Purity Scanner for online inspection and sorting of plastic pellets



The X-Ray 6000 measures the inner and outer diameter, ovality, wall thickness and eccentricity of hoses and tubes



The Centerwave 6000 measures plastic tubes with a diameter from 110 to 3,200mm

Laser Series 2000 and 6000 and X-ray measuring systems of the X-Ray 6000 series, to precisely measure inner and outer diameter, wall thickness, eccentricity and ovality of products.

Sikora AG – Germany
Website: www.sikora.net

Socket fusion installations for polypropylene pipe and couplings

MCELROY'S Spider 125 with universal clamping performs socket fusion installations for polypropylene pipe and couplings from 63 to 125mm, quickly and accurately.

The lightweight and compact device is

suitable for use in overhead, vertical and tight workspaces. A worm gear drive and parallel link system brings pipes and fittings together evenly and under control, and the universal clamping system accommodates any size of pipe

or coupling, eliminating the need for inserts.

McElroy – USA
Email: fusion@mcelroy.com
Website: www.mcelroy.com



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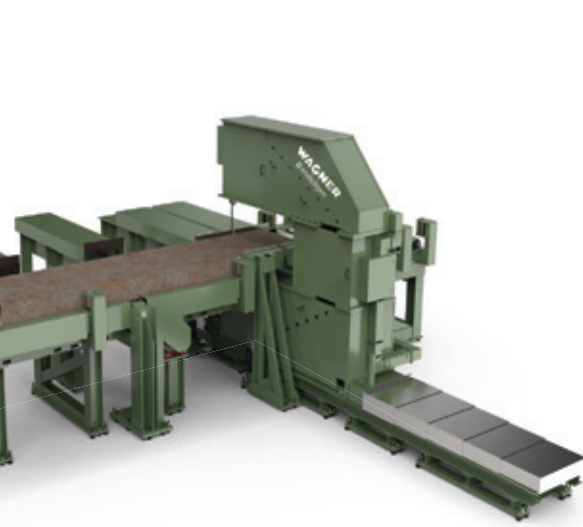


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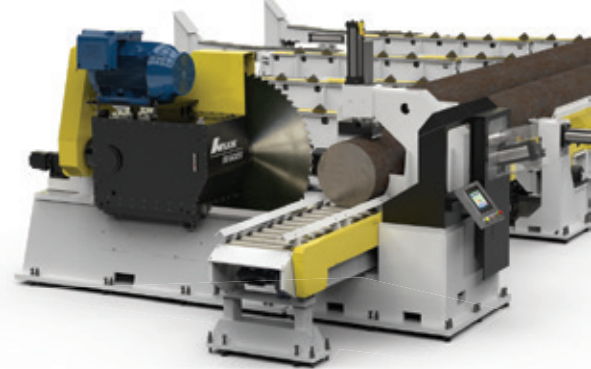
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The Pico 160 cel puls from EWM

EWM AG has designed one of the lightest portable electrode welding machines currently available: the Pico 160 cel puls, weighing only 4.7kg. It can be used safely for vertical-down CEL welding and TIG pulse welding for the 230V lighting main. The latest addition to EWM's Pico range has been optimised in several ways with the focus on welding results, universal usability and enhanced user-friendly operation as well as a high level of robustness.

The Pico 160 cel puls also features a new ergonomic design. With its stable, splash-proof housing made of plastic and aluminium and a transparent protective cap over the new control this is an option for many applications – construction sites, workshops and other assembly work. Another highlight is the simple operability of the welding machine. The new control's easy-to-read display enables the welding parameters to be set precisely. This is an important prerequisite for simple reproducibility in order to ensure that consistent high-



quality welding results are achieved. EWM's single-hand operation concept also enables the functions to be set using a single large button, which means users do not need to remove their gloves every time they need to change a setting.

Other advantages are the remote control connection option and the large connection sockets (50mm²), which enable the machine to be combined with standard electrode holders and standard TIG welding torches with rotary gas valves.

It is not only the external features of the new Pico 160 cel puls that have improved. Hot start and an anti-stick function for sticking electrodes are all integrated as standard, providing support for all welding processes. The new pulse function also enables easy vertical-up and vertical-down welding without having to resort to the complex 'Christmas tree' technique. This makes work easier, especially in hard-to-reach areas or locations with poor visibility. The Pico demonstrates its strengths when welding electrodes up to 4mm and enables 100 per cent safe vertical-down welding when using cellulose electrodes.

The Pico 160 cel puls is suitable for use in industry and in workshops, for both fast repairs and continuous operation.

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Perpetual motion and innovation

THE process of tube bending consists of a series of independent steps, according to Omni-x, which is based in the Czech Republic.

The steps rely upon one another and each can cause a range of problems. As technology progresses customers are increasingly looking to achieve more for less. The best results are achieved by first using the correct set-up of tooling and using the correct lubrication. Lubes are chemical reactants for surface use and thus very sensitive for correct selection and application.

The most important qualification of tube fabricating lubricant is its 'compatibility'. The lubricant's properties must be compatible with the tooling, material, environment of components, cleaning process and any other secondary operations that may have to be performed.

Fabricating without using petroleum oil is becoming an everyday reality. Old-fashioned mineral oil-based lubricants are not only less popular, but operators are aware of alternative methods. The market is being driven by ecological concerns and political mandates. Mineral oil products are no longer the future and the use of clean alternative products is encouraged. Industries that were dominated by mineral oil are becoming environmentally aware and also desire a healthy working environment for the operator.

This matches the Omni-x company philosophy, which is to keep things simple and offer an affordable price.

It has recently introduced the latest tube bending lube that covers all the concerns listed and extends superb results on ferrous and non-ferrous materials.

Cleaning is no longer a problem because every product washes off easily with water. There is no need to clean before welding. Another benefit from moving away from mineral oil products is the easy modification of the product bases on the customer's specific requests. Omni-x gives its clients a full range of modification lube at its plants and helps to find the best and most cost-effective solution.

Omni-x has also extended its product range and introduced ALC series products. Formulating without typical EP additives such as chlorine and sulphur is essential. New improved products merge

all the above benefits and provide non-hazardous products that can be further modified.

Drawing lube, which Omni-x specialises in, is extended by the production of coolants. The company shares some principles and widens the range to high-speed operations. Years of experience from bending gives the company a

strong background when building up synthetic coolants. Complete customer care with all in-house knowledge will help customers to switch from mineral oil, to protect workers and extend tool life.

Omni-x – Czech Republic
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Tube-o-Test from ANUP NDT

ANUP NDT PVT LTD, based in Pune, India, offers the Tube-o-Test System, which is an encircling coil-type eddy current test system with on-line and off-line options.

The system can be used for eddy current inspection of steel, stainless steel, copper and cupronickel tubes. ERW as well as seamless tubes can

be inspected. The system can fulfil any international standard with drill hole reference.

The Tube-o-Test comes with advanced embedded system and is highly reliable, user-friendly and cost-effective.

The Tube-o-Test and its accessories are already in use in South Africa,

the UAE, Oman and extensively in India.

ANUP NDT PVT Ltd provides efficient and reliable support to tube manufacturers for eddy current testing needs.

ANUP NDT PVT – India
Website: www.anupndt.com

Simplifying tube processing with automatic tool change system

BENDING of tubes with diameters of up to 127mm is becoming more demanding. "It isn't only about implementing technical efficiency in processes or machines anymore," said Stefanie Flaeper, managing director at transfluid. "No matter the time efficiency and precision, the solution must be controllable."

The specialists from Germany have developed the tube bending machine t-bend DB 40120-CNC-VE, to permit bending radii of 1 x D at very thin wall thicknesses for such tubes.

In the scope of a current project, the setup of this special bending system has been implemented fully electrically. All

movement axes are optimally synchronised by the special transfluid sequence control or can be programmed controlled against each other. It is also possible to easily optimise the process via this sequence control, which effectively improves product-specific cycle times.

All parameters can be taken from the CAD and necessary form clamps are integrated in the automatic sequence.

The transfluid engineers have implemented reduction of the follow-up costs by using an



The transfluid machine permits bending radii of 1 x D and more for tubes with diameters up to 127mm while reducing wall thicknesses from 2 to 1.5mm

automatic clamp die change system. The time frame for tool change is comparable to that of a radii changer.

The new DB 40120-CNC-VE has two tool levels. It is able to change the clamp dies eight times, so that each tube can be bent even in highly complex geometries. This form of tool equipment is efficient, reducing follow-up costs to an absolute minimum.

"In particular because the diameters are relatively similar and radii are very tight with 1xD, only the bending geometries really change in new products. This means that only new clamp dies need to be used," explained Ms Flaeper. To implement the tight radii at a relatively thin wall thickness, the new tube bending machine has an additional boosting device that can support even the last bend at short rest lengths.

transfluid Maschinenbau GmbH – Germany
Fax: +49 2972 9715 11
Email: sales@transfluid.de
Website: www.transfluid.de



The new pipe bending machine DB 40120-CNC-VE by transfluid changes tools automatically

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Ultrasonic rotary test system

UNICORN Automation (NDT) has supplied ultrasonic test systems globally for more than 20 years. It specialises in the ability to test hot finish tubes such as OCTG tubes using its unique contact shoe technique.

Tubes with pronounced hooked ends and poor straightness can be fully tested using this technique without any compromise to the test. Testing with contact shoes offers repeatability at the fast production speeds required by modern tube mills or third-party inspectors.

To satisfy a growing requirement to test ever smaller diameters – tubing in the OCTG field, Unicorn have developed their contact shoe technique to test tubes down to the 25mm od size. The rotary head designated URP200/S now has the capability to test tubes with a diameter range 25mm to 220mm. The test head can be equipped with up to 30 transducers carrying out inspection for longitudinal, transverse, oblique and lamination/wall thickness defects.

The test systems can cope with off-centre tubes and the unique contact shoe raise/lower system allows the free passage of upset ends or threaded tube ends. With a maximum rotation speed of 700RPM test speeds of up to 40m/min are achievable.

Prior to extending the range of the URP200/S Unicorn could only offer the testing of tubes in the 25 to 48mm diameter range by means of a water chamber head. While these heads work well on tubes with a good surface finish and relatively small diameter variations, they have significant drawbacks when testing hot finished seamless tube with poor straightness, ovality, surface scale and upset ends.

The main problem with water chamber heads when testing hot-finished seamless tubes is the need for relatively large radial guide clearances, which allow the tube to wander off-centre, leading to large signal variations and inconsistent test results. It is impractical to accommodate upset ends

by further increasing the radial guide clearances. A further problem can be that scale from the hot-finished product can build up in the water chamber and affect ultrasonic transmission. The extended range URP200/S resolves these issues by making the Unicorn contact shoe technology available for testing tubes in the (extended) 25 to 48mm diameter range.

The alternative technique of rotating or spiraling a tube using a travelling or fixed carriage containing the transducers, although better than the water chamber from a signal repeatability point of view, has the drawback of being a relatively slow method of testing unless numerous transducers are employed; speed of tube rotation is also limited further when testing bent tubes.

Unicorn Automation (NDT) – UK

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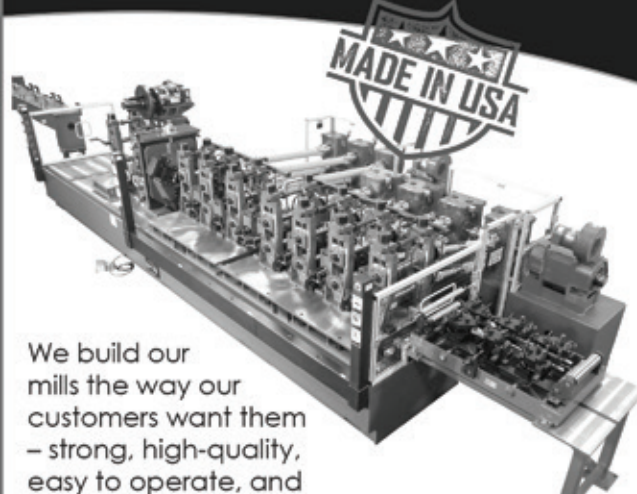
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Carbide-tipped band saw blades

SIMONDS Saw, a manufacturer of band saw blades and files, has introduced CWT carbide-tipped band saw blades for demanding production cutting operations such as those in steel service centres, foundries and aerospace sawing applications.

CWT blades are suitable for aluminium block, aluminium gates and risers, aluminium automation (Mossner), Inconel and nickel-based alloys.

Similar to the 'California wing tip' tooth formation used in circular saw blades, CWT blades have been engineered in a three-tooth set pattern with positive rake geometry.

This provides a faster, aggressive cutting action and penetration, for increased performance in production sawing applications.

"Our CWT blades have been producing outstanding results, significantly out-cutting blades used in foundry

and aerospace applications," said Dale Petts, Simonds Saw's global product manager.

Simonds CWT carbide tipped blades are available in five widths (1¼" x 0.042; 1½" x 0.05; 2" x 0.062; 2⅝" x 0.062; and 3⅛" x 0.062), and are shipped in 150-foot coils. Variable tooth pitch (TPI) options include 2-3, 1.9-2.1, 1.4-1.8 and 0.9-1.1 teeth per inch.

Blades are furnished with plastic capping to protect teeth against damage in transit and handling.

Simonds blades are made to stringent quality standards and are manufactured both in the USA in the company's Fitchburg, Massachusetts, headquarters and in Europe by WESPA®, Simonds's band saw blade technology division located in Melsungen, Germany.

Both factories operate under a single quality system that is ISO 9001:2008 certified.



The CTW Carbide

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New lubricants for welded steel tubes and pipes

IN the mechanical wire drawing market, Condat supplies added value lubricants to the industry. The company has used its 160 years' experience in the formulation of various lubricants to develop a comprehensive range of products dedicated to the metallic tube industry.

The Condatub product range covers most tube forming processes from hot forming to cold forming. It has been designed to answer specific issues for all metals (carbon and stainless steel, aluminium, copper alloys, zirconium, etc), and includes hot forming graphite and ceramics dispersions, non-reactive and reactive drawing soaps, pilger rolling and forming soluble lubricants, neat drawing oils and corrosion inhibitors.

Tubes and pipes produced by high frequency welding technology require a large quantity of coolant along the welding line. The coolant is usually diluted in water at a concentration between two

and ten per cent. Each reduction of one per cent of concentration can lead to savings.

With this objective in mind, Condat developed specific products under the name Condatub SL to serve this application at low concentrations. The same product can be used in different production steps: lubrication of the forming rolls, cooling the tube during and after welding, lubrication during sizing and calibration, cooling at cutting, and corrosion protection, depending on the customer's requirement.

Condatub SL products are easily cleaned without leaving sticky residues. They provide good bio-stability without bacteria development, extended bath lifetime, and good protection against corrosion.

They are free of harmful components such as chlorine, bactericides releasing formaldehyde, phenol derivatives, heavy

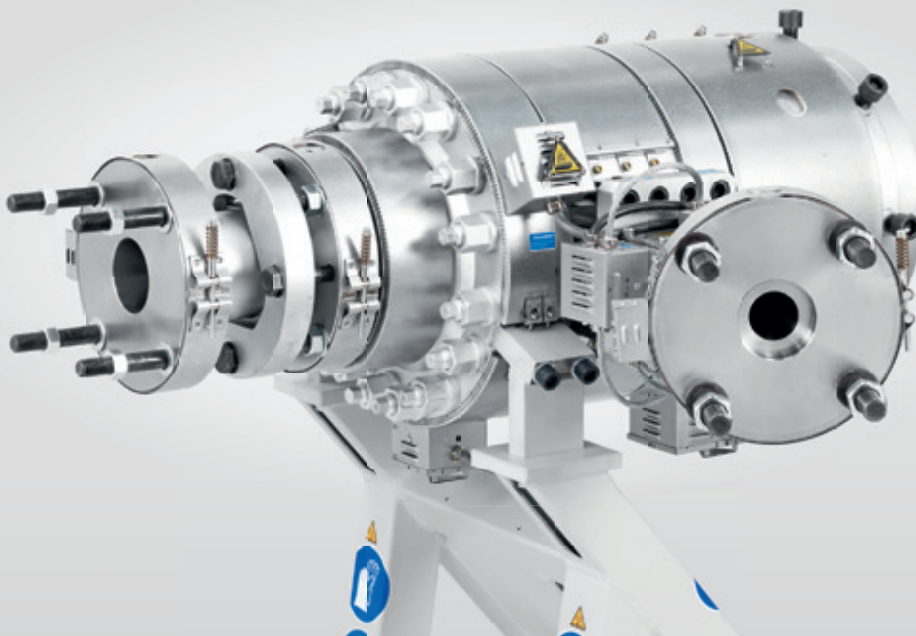


Condat welded steel tube and pipe lubricants

metals and silicones. The range includes mineral and synthetic oil-based products, and also offers a 100 per cent vegetable ester-based alternative lubricant.

Condat's R&D department accommodates the latest regulations and focuses on developing safer products for both people and the environment, without compromising performance. Several production sites, all ISO 9001 certified, enable Condat to deliver products anywhere in the world through its distribution and service network.

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Pipe welding work cell with integrated machine vision

TECNAR has introduced the new Rotoweld 3.0. Rotoweld pipe welding work cells are used in the pipe spool prefabrication industry. Specifically developed for industrial pipe prefabrication, small pressure vessel manufacturing or other similar 1G welding, Rotoweld integrates machine vision, adaptive control and robotics technology in a dedicated package that produces GMAW full penetration 1G girth welds at five times the rate of manual SMAW.

Rotoweld 3.0 is the result of the re-engineering of all aspects of the machine, including mechanical design, servo-controls, computer and software, taking advantage of latest technologies.

The most visible change is the robotised manipulator, which provides increased flexibility for torch positioning in various machine configurations.

The core of the Rotoweld technology is its patented vision-based penetration control loop. It allows any operator, with little or no welding experience, to perform full penetration girth welds with just a few hours of training. Operating like the welder's eyes and hands, the control loop continuously analyses the image of the root weld pool. Image processing algorithms use the image to adjust welding parameters such as travel speed, wire feed rate, arc voltage or weaving width, constantly adapting the process to varying conditions (gap,

alignment, root face and temperature). Rotoweld 3.0 is designed in a modular architecture, allowing users to select different configurations and processes such as SAW or FCAW, to better suit operators' needs. A low-cost base model delivers the same quality welds on the full pipe size range as the previous version, but at lower productivity rates. The base model is built with a single rotator and work bay, compared to the standard setup of two work bays and two rotators.

Tecnar – Canada
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Website: www.tecnar.com

Compact modular vacuum lifting system

THE new CM 3 compact modular vacuum lifting system from Vacuworx is designed for contractors who run compact equipment such as skid steers, track loaders, articulating wheel loaders and mini excavators, to allow them to handle materials such as concrete slabs, steel plates and pipe up to 3 tonnes (6,600lb).

Claimed to be the first vacuum lifting solution of its kind, the CM 3 brings heavy-duty material handling capabilities to larger capacity compact equipment such as skid steers and track loaders. With a modular design and lift capacity of up to 6,600lb depending on the pad or pads used, the CM 3 is adaptable to a wide range of applications including concrete slab removal, road or

trench plate placement and some pipe applications. The CM 3 with standard mounting plate weighs the same as a standard skid steer bucket, so it does not affect the lift capacity of the host machine.

The rugged, all-steel unit is designed to accommodate single or double pad configurations interchangeably to be able to lift a variety of material weights and sizes. The adjustable spreader bar for double pads extends from 61" to 85" (measured from outside to outside of the seal channels). Flat and pipe pads are sold separately to meet specific needs.

The CM 3 is operated by a hydraulically driven vacuum pump using the auxiliary hydraulics from the host machine (minimum 10 GPM required with maximum 3,000 psi). With quick-connect hydraulic hoses and a universal mounting plate assembly, the CM 3 can be quickly attached to a variety of host machines. In addition, the unit is equipped with a factory pre-set flow control valve to ensure optimal performance with any equipment. Designed for both job-site durability and practicality, the CM 3 is supplied with steel legs for

storage, which can either be removed or rotated up when the system is in use.

Founded in 1999 in Oklahoma, USA, Vacuworx engineers and manufactures heavy-duty material handling equipment for the oil and gas, water and sewer, highway and heavy construction, concrete construction, landscaping and manufacturing industries. Its vacuum and hydraulic lifting systems can be customised for many applications and lift capacities.

Standard models lift a variety of materials including steel pipe (with most types of coating), plastic pipe (PVC, fibreglass and long flexible pipe), ductile iron pipe, concrete pipe, pre-cast concrete slabs, pre-cast concrete culverts, concrete road barriers, saw cut concrete (demolition or rehabilitation), landscape pavers, steel plate and piling and road plate.

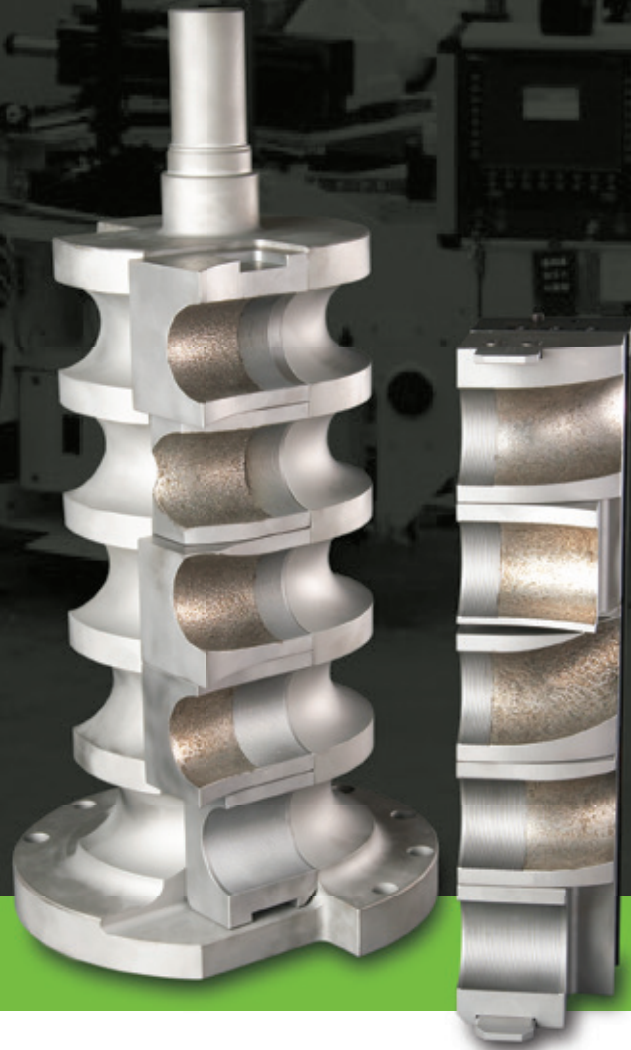
Lifters can be attached to hydraulic excavators and backhoes (with or without a coupler system), wheel or track type loaders, cranes, pipe layers, skid steers, forklifts and knuckle booms, and can also be mounted for a variety of in-plant applications.

Vacuworx – USA
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CM 3 modular vacuum lifting system

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Fast finishing of aluminium die castings

FOR high-volume production of complex aluminium die castings, Kovolis Hedvikov is a partner to car manufacturers and their suppliers. To expand its capacity and achieve more flexibility in the overall manufacturing process the company purchased a new vibratory finishing system that can handle a wide workpiece spectrum and was custom engineered to fit into the available space at the customer's premises.

Kovolis produces components from nine different aluminium alloys and weighing between 200g and 8kg, using casting technologies such as vacuum investment casting and rheocasting. The product range includes brakes, power steering systems, turbo chargers and compressors for air conditioning systems. The company also provides services for machining, heat treatment and surface finishing.

With a trend towards larger and more delicate components, which require a vibratory finishing step after punch deburring for their downstream handling,

the existing finishing system was not suitable and had also reached the end of its productive service life. The new system had to cope with larger workpieces, and the finishing process also had to be gentler.

The Rösler continuous feed vibratory finishing system met the technical requirements and Rösler could also supply the necessary compounds and finishing media. The new finishing system consists of a linear feed machine, type R 550/4600 DA, with a usable length of 4.6m. The functions of the existing loading system and hot air belt drier were integrated into the overall system controls.

Around 30 different workpieces with a maximum diameter of 300mm (12") are currently processed in the R 550/4600 DA. As it can handle parts with diameters of up to 400mm (16"), the machine offers flexibility for the future.

Depending on their individual design, the castings are fed into the finishing system at cycle times

between 30 and 60 seconds. The single curve U-shaped cross section of the processing channel ensures optimum movement of the media and workpieces through the machine. With the use of high-performance plastic media, this design produces finishing results within a maximum processing time of eight minutes. This time can be adjusted by simple inclination of the processing bowl. The undersize media classification system is equipped with an adjustable bar screen that allows Kovolis to decide at which dimensions undersize media must be discharged.

Since the finished die-castings do not undergo a separate cleaning step for removal of media fines from their surface, the separation unit is equipped with a spray-rinse station.

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As the industry is faced with increasing chemical-use regulations, this philosophy is more important than ever.

According to research manager Nicolette Jones, the widespread use of chlorinated paraffins has recently come under intense scrutiny.

The US Environmental Protection Agency has issued new regulations that will eliminate the use of medium and long chain chlorinated paraffins from the manufacturing industry.

The European Chemicals Agency has begun testing these substances and is likely to issue a similar ban. The safer

very long chlorinated paraffins (vLCCP) will continue to be accepted.

Chlorinated paraffins have been used for decades in the metalworking fluids industry. They are classified as short chain (SCCP), medium chain (MCCP), long chain (LCCP), and the newest classification, very long chain (vLCCP).

vLCCPs must be C21 or greater. The shorter the chain length, the less viscous the substance is.

However, the shorter the chain length, the more hazardous it is for the environment. SCCPs have been banned for years, and now MCCPs and LCCPs are being banned based on three factors: whether they are persistent, toxic or bio-accumulative.

There is some evidence that vLCCPs are persistent in the environment but not toxic or bio-accumulative. However, chlorinated paraffins below C21 have

been shown to be persistent, bio-accumulative and toxic.

The reason that many companies have not embraced the use of vLCCPs is that they are the hardest to work with. While the shorter chain lengths are more liquid, vLCCPs are very thick and waxy, making them difficult for most companies to develop and store without making massive technological and equipment changes.

Using vLCCPs has a variety of benefits. They improve surface quality and extend tool life.

Additionally, they are long lasting and reliable. Replacing medium and long chain chlorinated paraffins with vLCCPs also reduces negative environmental impact.

Hangsterfer's Laboratories, Inc – USA

Website: www.hangsterfers.com



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Automatic cold saw pipe/bar cutting machine

JET Machines, from India, has been manufacturing cold saw pipe/bar cutting machines for more than ten years. The company's JE-485 AT-S automatic cold saw pipe/bar cutting machine features auto feed (bunch cutting), auto

clamping, auto cut piece ejecting, PLC and servo control. It is programmable up to five different lengths, with length accuracy within $\pm 0.1\text{mm}$. The clamping source and cutting feeding source are both hydraulic.



The JE-485 AT-S cutting machine

The machine can be connected with SCADA server through Ethernet. Several of the machines can be controlled by the SCADA server at the same time. The user at the server can create programs for the cutting schedule; within each program the user can feed in five different cutting sizes, and each size can have a counter for complete data collection.

The user can define cutter rpm and feed rate for each program, which are saved with PLC/HMI for later recall. The server assigns a program to each machine, and cutting counting can be monitored on the server for each machine in real-time.

SCADA can be integrated with SAP for further automation, such as coordination with the store department relating to which machine will cut each pipe size and in what quantity.

Jet Machines – India
Website: www.jetmachines.net

Yoder turksheads

FORMTEK Group Inc's Yoder brand offers single and double turksheads to control straightness and twist, for rounds and shapes, and frequently designs custom arrangements for specific applications.

These turksheads can be manual adjustment, motorised adjustments or pneumatic adjustment; Yoder's application engineers can assist in determining the appropriate choice.

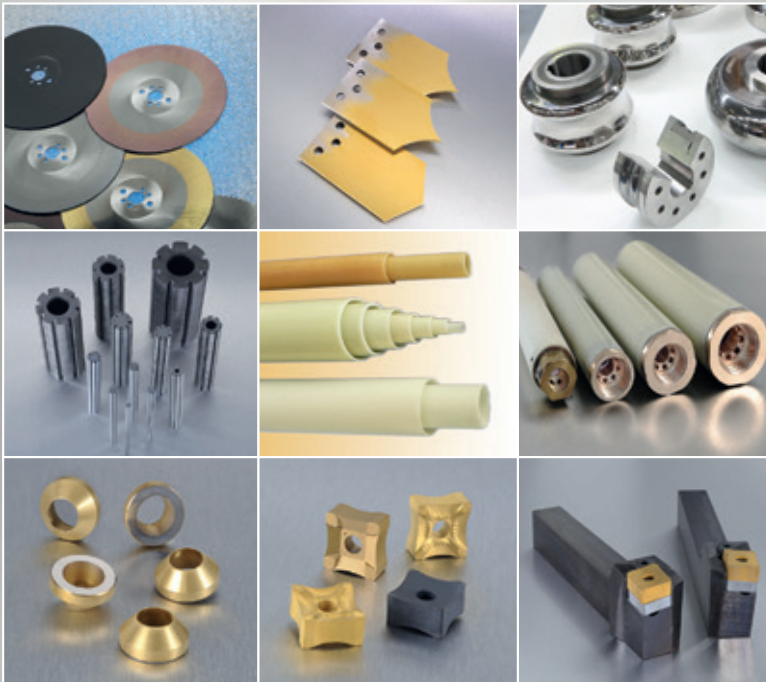
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Tube length: **6,0 ÷ 16,0 m**

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Rust stopper and lubricant for tubes and pipes

HINDERUST is a solution to common problems in the tube and pipe industries, including flash rust. It is a solvent-free, all-in-one, rust-stopping, rust-inhibiting and lubricating product that aggressively wets and spreads across application surfaces.

Uses for HinderRust include protecting newly machined parts and

equipment against flash rust, protecting chains, wire rope cables, tools and weapons, and potentially acting both as a mould release agent and as a protection agent against corrosion on moulds and dies. The lubricating agent in HinderRust not only attacks corrosion, but also frees up frozen joints and fasteners. HinderRust is available

in three versions: R2.0 for short-term surface protection, removable by heavy washing to allow for final finishing; S4.0 for standard uses; and HV100, which slowly self-polymerises over time and provides added protection in cases of extreme exposure to rust-producing conditions. All three versions are solvent-free, allowing them to be used in enclosed areas.

The solvent-free, low-odour combination product uses the PTFE technologies developed by Fluoramics, Inc during its 50-year history. The company is known both for its invention of Tufoil technology, an engine oil additive, and for its line of thread sealants and greases, Lox-8 and Formula-8, which are safe to use in harsh environments.

Fluoramics, Inc – USA

Fax: +1 507 474 4585

Email: information@fluoramics.com

Website: www.fluoramics.com

Portable ultrasonic flow meter

COLTRACO Ultrasonics has launched the Portasonic™ portable ultrasonic flow meter, a handheld, clamp-on device that provides accurate flow measurement from the outside of a pipe.

The self-adapting Portasonic measures the flow rate by utilising two transducers that function as ultrasonic transmitters and receivers. It is suited to checking the flow rates of clean, non-aerated fluids such as water, with the ability to measure anywhere on full pipes from 12 to 4,570mm (½" to 180").

The compact and lightweight Portasonic can penetrate all common metal and plastic pipe materials with its non-invasive external clamp. The technology provides an easy way to cater for sprinkler system maintenance in the fire industry.

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New technology added to laser surface preparation range

FONON Corporation has announced the release of Flexion™ technology, to be incorporated into the CleanTech™ product line. Marketed under the Laser Photonics™ brand, CleanTech laser products are used for surface preparation, paint removal and surface cleaning. The newly released CleanTech systems offer a non-abrasive cleaning process that is safer and more eco-friendly.

Flexion technology allows CleanTech to remove rust, paint, anodisation and other surface materials in areas that are typically difficult to reach. Most other systems are statically positioned, which limits the laser cleaning ability to only the static path of the trajectory beam.

The CleanTech Megacenter with Flexion technology offers a motion control stage that operates in both x and y axes, allowing the ability to move in various directions and clean nested parts under the path of the trajectory beam path.

This allows the laser cleaning process to efficiently affect 100 per cent of all sides of the exposed parts. The Megacenter is available as a stand-alone unit or can be integrated into a production line.

“Fonon’s Flexion technology opens the door for smaller companies to adopt the most advanced laser technology for modern manufacturing,” said Dmitriy Nikitin, CEO of Fonon. “Unlike other products, which are often simplistic and sometimes not even safe, we have invested the effort, the degree of difficulty, and the vision needed to build our laser cleaning equipment with full compliance to OSHA, FDA, CDRH conforming to Class 1 laser safety ‘push a button’ industrial operation.”

Dr Nikitin continued, “We’ve already started booking orders for the first US-based line of industrial laser cleaning equipment and the applications are endless; whether it’s aerospace de-

painting, marine rust removal, automotive pre-welding ablation, or hi-tech parts cleaning for bonding applications.”

Laser Photonics’ CleanTech product line can be used for various applications across many industries, including paint and epoxy removal for items such as aviation parts; mould cleaning for the rubber and tyre industries; weld preparation; metal parts cleaning; anodising removal; surface conditioning for better adhesion; corrosion removal for items such as surgical instruments; rust removal; and degreasing. Included in the line are the CleanTech Megacenter stationary unit, and the portable CleanTech Handheld for use in the field or on the factory floor. The CleanTech systems offer Class 1 enclosures for Class 4 lasers.

Fonon Technologies, Inc – USA
Website: www.fonon.com

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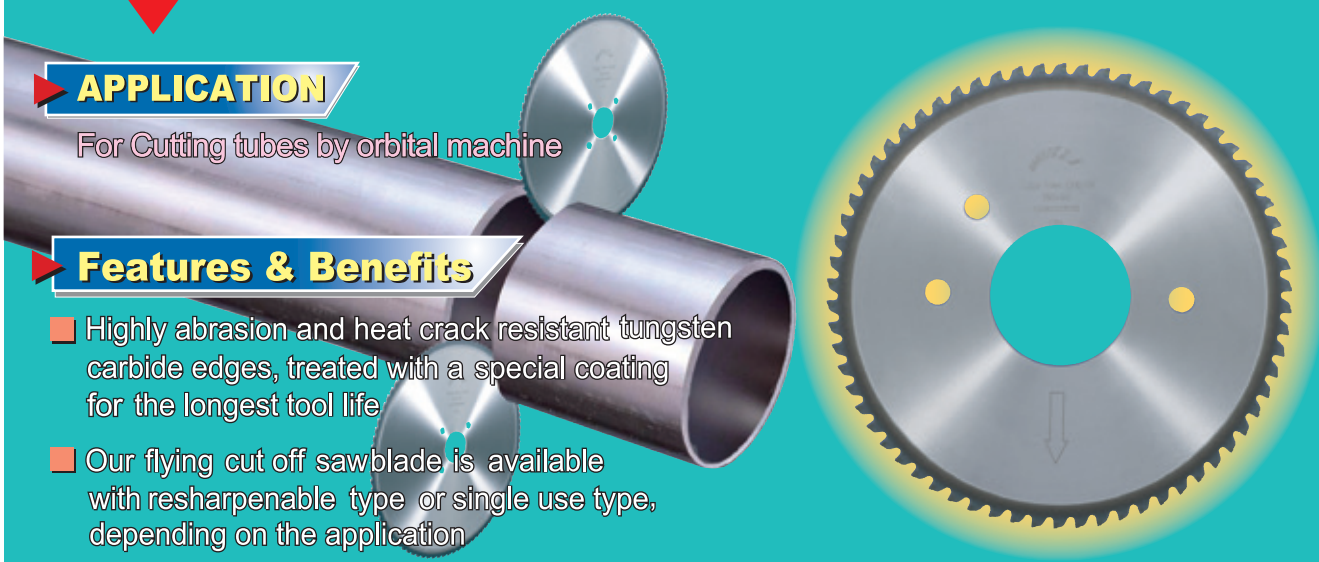
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Length and speed measurements for non-destructive testing with laser precision

By Polytec, Germany

TO provide quality testing of steel tubes, a suite of non-destructive testing techniques are combined to facilitate a fast and complete assessment of the tubes.

Where length and velocity measurements on rotating tubes are needed, laser surface velocimeters are used to provide critical position data during the testing procedure. Inspection facilities include processes suitable for non-destructive testing of seamless steel tubes such as electromagnetic inspection, magnetic powder inspection (MPI), metallurgical tests and ultrasonic testing.

Depending on the application and specifications, ultrasonic testing is applied over the whole length and perimeter of the tube for a comprehensive failure analysis. Testing of both longitudinal and transverse defects as well as the inspection of wall thickness and lamination are critical for quality control. In order to track defects through the machine the defect detection method is combined with a position measurement technique to eventually mark the defect upon exiting the machine for further processing. Laser surface velocimeters are a solution for precise and reliable

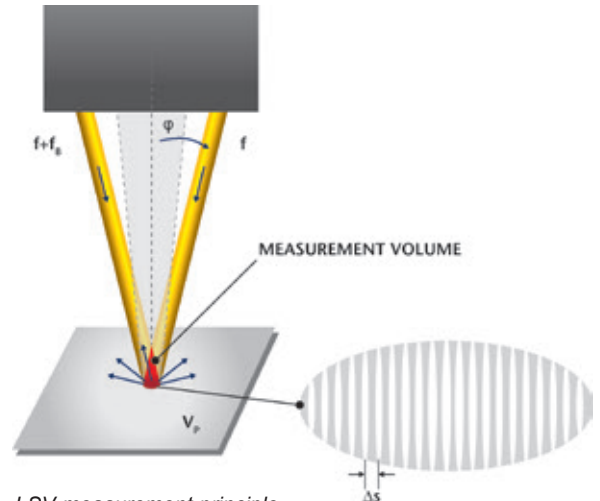
tracking of the defect position through the machine, without contacting the surface.

Laser surface velocimeters (LSVs) use the laser Doppler principle to evaluate the backscattered laser light from a moving object and to determine the exact motion and position of a tube in the test stand. The combination of methods provides a fast and complete testing of the tube.

A series of laser surface velocimeters are used at the ultrasonic test stand to measure length and velocity of the tubes. The tubes that are passing through the facility are rotating with a speed of 2m/s. Each inlet and outlet of the stand is equipped with two LSV sensor heads. Uniquely, with the LSV is its possibility to detect the speed component in the direction of its current measurement. By using two correctly aligned LSVs, the longitudinal and lateral (rotational) motion of the tubes can be distinguished and clearly derived. The paired sensors at the inlet and outlet of the ultrasonic test stand provide measurement data for determining the tube's position while travelling through the stand. The translational speed is quite low in relation to the rotational speed.

Thus, the respective sensor head must be aligned exactly parallel to the direction of motion in order to avoid any superposition with the lateral motion. Otherwise the translational speed would be influenced, causing errors in length and position measurements.

The precise alignment of each sensor is achieved by using a high precision mounting plate and by following a special adjustment procedure. With the aid of precision screws the angular position can be set precisely before starting routine operation. Non-contact and precise laser surface velocimeters, combined with suitable accessories, provide precision length and speed measurements even in the case of superimposed motions with



LSV measurement principle

very different speeds. This measuring technique allows the user to control the forward and rotational movement of tubes during non-destructive testing with maximum precision and therefore helps to optimise the overall process performance.

The LSV emits two laser beams, which overlap at a certain distance – the working distance. The volume in which both laser beams are superimposed is called the measurement volume. In the measurement volume the overlapping laser beams generate an interference pattern of bright and dark fringes. The distance between those fringes is called the fringe spacing and is a system constant for the LSV. It depends on the wavelength of the laser light and the angle between the laser beams.

If a surface moves through the fringe pattern then the intensity of the light scattered back is modulated between bright and dark. As a result of this a photo receiver in the sensor generates an AC signal. The frequency of the signal is directly proportional to the velocity component of the surface in measurement direction. This makes laser velocimetry a useful technology for a highly reliable control process leading to a cost-efficient manufacturing of tubes and pipes.

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Robust TOFD scanner from Phoenix Inspection

THE Duo scanner is a new, operator-friendly TOFD inspection solution launched by Phoenix Inspection Systems. Designed to incorporate the most popular features of existing Phoenix TOFD scanners, Duo offers fast setup and reliable, repeatable inspections of pipe welds, from 2" up

to flat plate, in a robust, site-ready scanning frame.

Constructed from durable, lightweight aluminum, Duo combines the benefits of simple, tool-less probe installation and adjustment with a sturdy frame complete with handles that ensure ease of operation and movement around pipes.

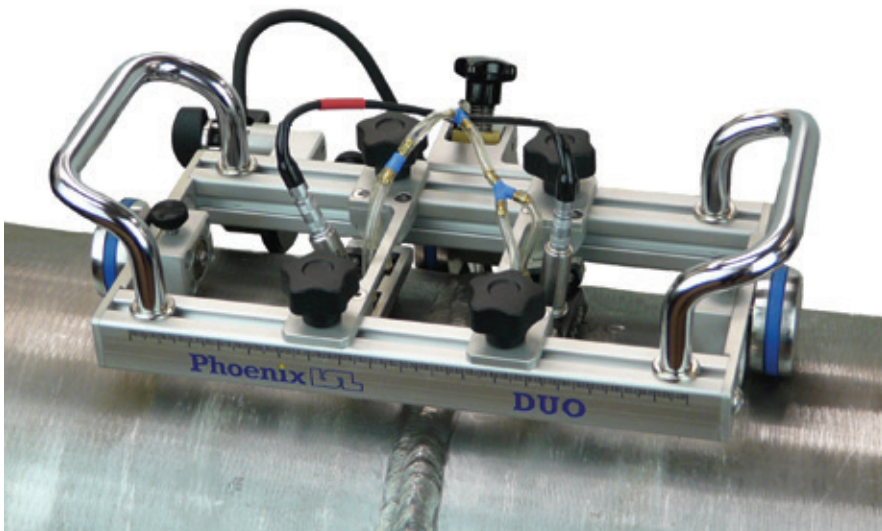
Wedges snap in and out of the Duo scanner frame without the need to unscrew any parts. Probe separation is quick and simple to adjust with a graduated scale, which allows accurate positioning whilst maintaining probe alignment.

Equipped with three strong magnetic wheels that provide adhesion and tracking, the scanner also incorporates a brake for hand repositioning, so is suitable for rope access inspections.

Andrew Brewis, sales manager at Phoenix Inspection Systems, said: "The Duo scanner has already produced very positive results amongst pilot customers. It neatly combines the benefits of our existing TOFD product range into a solid construction that is suited to all on-site conditions."

The Duo scanner is also available without wheels for a low-cost, handheld scanning solution.

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Products finished in a single operation

LT-FREE is a five-axis laser cutting machine developed by BLM Group to offer operational flexibility and simplicity of laser cutting of bent pipes, flat pipes, shaped sheets, hydroformed elements, collapsible elements and welded elements.

In its many configurations, the LT-Free machine is capable of performing a full work cycle with ease. Starting from simple off-line programming, the LT-Free machine reduces the number of semi-finished products and manufactured finished products within a short time.

The system is created with various applications in mind, from prototyping to serial production, in such sectors as automotive, aerospace, motorcycles, household appliances, HVAC, furniture and steel structures.

To meet the needs of individual clients, four different configuration options are available. Entry Level is an option created for prototyping and job shops, intended for producing small lots, when the quality of processing and simplicity



of operation are more important than production times. The unit is equipped with a single base where elements are fastened for processing.

Piece Value is a unit intended for serial production typical for the automotive sector. This configuration, with a rotating base, is designed for applications requiring frequent replacement of instrumentation and high production capacity. Mid-Flex is a solution for small elements with additional manufacturing requirements. Two moving bases operating in a divided work area allow

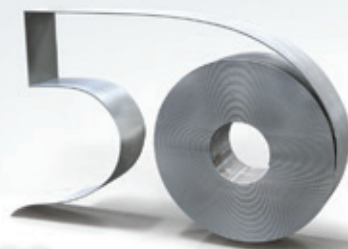
for optimisation of work cycles by quickly performing loading/unloading operations.

High Flex is the most comprehensive option, with two independent robotic bases providing maximum flexibility. Besides sheets and mechanical assemblies, this system is capable of precisely and efficiently processing bent and hydroformed pipes, which can be positioned at will during processing thanks to the robots, without the need for using complicated tools.

The application for a fibre laser with power between 1 and 2kW provides the LT-Free machine with the capability of cutting a wide range of materials, while saving energy and maintenance costs.

The active piercing function makes programming hole cutting easy, without any need to worry about the material's thickness, which is often variable from area to area in many elements processed on the LT-Free unit.

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Flexibility aids clamping force readings

FORCE Products offers the Force Gauge tool with greater flexibility for gathering actual lb/tonnage force data from many shop floor situations.

The rugged, lightweight handheld instrument features an anodised aluminium body and a hexagonal shape that allows for three-point or two-point linear force readings.

The large-diameter gauge face reads direct lb of force exerted in the situation being analysed.

For a quick and easy way to know precisely the clamping force in a three-jaw lathe chuck setup, the hydraulic pressure gauge on the machine tool will not deliver a close repeatable value immediately at the jaw/part contact point.

This feature saves time and reduces scrap, and allows quick re-setup of a repeating job where an out-of-round condition is not acceptable.

Tapped holes on each of the six faces (monitor armature included) allow for direct mounting into a static setup such as the end of a hydraulic press arbor, to give the operator an accurate direct force reading.



The Force Gauge

The gauge is available in three different psi ranges: 0 to 1,000; 0 to 5,000; and 0 to 15,000.

American Workholding Inc – USA
Email: b5678v77@gmail.com

Coil end joiners completed for USA tube producer

ROYALTON Industries has shipped two coil end joiners for a large tube and pipe producer in the USA.

The first machine was designed with dual MIG torches to reduce the overall weld time, as well as hydraulic cylinder powered edge guides, powered camber compensation, entry and exit strip clamps and an HMI with recipe storing and recall. The strip specifications for the first machine are 20.5" to 50.5" width, 0.075" to 0.375" wall thickness, and carbon steel with 90,000 psi shear strength.

The second machine was designed with a single MIG torch, hydraulic cylinder powered edge guides, powered camber compensation, entry and exit

strip clamps and an HMI with recipe storing and recall.

The strip specifications for the second machine are 10" to 40" width, 0.065" to 0.5" wall thickness, and carbon steel with 90,000 psi shear strength.

All Royalton coil end joiners are fully tested with weld samples and charts supplied to the customer to reduce start up and training time on site. All of the company's equipment is manufactured in the USA.

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Economics

President Trump's weekends away from the White House severely impact the industries and commerce of metropolitan New York and South Florida

General David Petraeus, a former head of the CIA, predicted in January that Donald J Trump would be the “disrupter-in-chief president,” and Mr Trump has amply earned the designation. As noted by *Foreign Policy*, also in January, he is not the first president of the US to upend the norms of the nation's foreign policy. But he is certainly the first whose apparent aversion to spending any more time than necessary in the White House can suppress the economies of two important regions of the country.

Kate Murphy is a commercial pilot and Texas journalist who writes frequently for the *New York Times*. Not long after the 20 January inaugural, she turned her attention to the Trump effect on the environs of Mr Trump's home city of New York; and of Palm Beach, Florida, site of the Mar-a-Lago resort which Mr Trump and his aides have taken to calling his Winter White House. She began by defining the large bubble of restricted airspace that follows the president wherever he goes: essentially a no-fly zone reaching up to 17,999 feet within a 30-nautical-mile radius of the president's aircraft. A nautical mile is just over a regular mile.

“If you fly into that ring without permission from federal authorities,” Ms Murphy wrote, “fighter jets will be on your wing before you can hum a few bars of Hail to the Chief.” (“The Secret Service of the Skies,” 18 February)

This policy – in place since the terrorist attacks of 11 September 2001 – is causing more disruption than usual because some of the busiest airspace in the nation for general aviation is in New York and South Florida. Mr Trump's current home is, of course, the White House in Washington, DC. But, when Ms Murphy's piece ran in the *Times*, he was scheduled to spend his third weekend in a row at Mar-a-Lago. At this writing, his score is four weekends out of five.

‘SIGNIFICANT, IF NOT RUINOUS, LOSSES’

Major commercial airliners and cargo carriers, such as Delta and FedEx, are unaffected by the temporary flight restrictions, or “TFRs” in aviation-speak, because their personnel and equipment undergo careful security screening whenever they fly. But Ms Murphy explained that the TFRs compel general aviation – private and corporate flights, flight instruction, sightseeing tours, aerial photography, pipeline and utility

inspections, surveying, weather and pollution monitoring, crop-dusting, banner-towing and more – to cease or curtail operations. She reported, “Aviation businesses in New York and Florida say they are facing significant, if not ruinous, losses.”

According to the Eastern Region Helicopter Council, which represents charter, medevac, news-gathering and sightseeing operators, 100,000 helicopter flights go in and out of New York City's four heliports each year, while around 200,000 helicopters and small airplanes transit the scenic Hudson River corridor. Jeff Smith, vice-president of operations for the council, told the *Times*, “It's like an Interstate [highway]”.

With a few exceptions, as for law enforcement and medical emergencies, aircraft are now prohibited within a one-nautical-mile radius of Trump Tower on Fifth Avenue in New York. That ring is expected to expand to a ten-nautical-mile radius – covering almost all of Manhattan – when the president is in town. Flights to and from airports within 20 to 30 nautical miles may continue, but only under burdensome conditions for the pilots.

If President Trump should visit New York frequently or on short notice, “the economic impact of these restrictions would be tremendous,” said Rune Duke, the director of government affairs at the Aircraft Owners and Pilots Association (AOPA).

A \$1BN LOCAL ECONOMY IMPERILLED

Because Mr Trump has been avoiding New York since his inauguration, the immediate pain is being felt by the formerly robust general aviation community around Mar-a-Lago – a flight training hub during a worldwide pilot shortage. According to the AOPA, the six South Florida airports affected by the presidential airspace restrictions “account for a local economic output exceeding \$1bn, create over 8,000 jobs and have a total payroll of \$290mn.”

Now, not so much, observed Ms Murphy. Palm Beach County Park Airport, known locally as Lantana Airport, is some six miles from Mar-a-Lago, and no departures are allowed during Mr Trump's visits. Jonathan Miller, the airport's fixed base operator, said, “We're basically on lockdown when he's here.”

Fixed base operators sell fuel, rent hangar space, manage aircraft parking, and handle arrangements for visiting crew and passengers. “You can't even run an engine for maintenance” when Mr Trump is in the area, which harms mechanic and paint shop tenants, Mr Miller told the *Times*. “We understand the president needs to be protected,” he said. “But this is going to put us out of business.”

Palm Beach Flight Training, a school for pilots at Lantana, has had to suspend training and cancel tens of thousands of dollars in flights. The owner, Marian Smith, said she feared

she would lose contracts from local colleges, endangering the business she started in 1998 and the livelihood of her 19 instructors.

Dave Kerner, a Palm Beach County commissioner who trained to get his pilot's licence at Lantana, said: "I'd love to talk to President Trump on the tarmac and show him what's going on. It's a level of devastation for my constituents that is kind of frightening."

▶ Palm Beach International Airport, less than 2.1 nautical miles from Mar-a-Lago, owes 60 per cent of its traffic to general aviation. When Mr Trump is in residence, all inbound flights must first detour to one of five so-called gateway airports, including Teterboro Airport in New Jersey and Orlando International Airport in Florida, where aircraft can undergo the security screening necessary to get clearance to fly on to Palm Beach.

Doug Carr, a security expert at the National Business Aviation Association (NBAA), called attention to the steep

drop in traffic at Palm Beach International during the president's visits. He said this indicates the planes' operators have decided to avoid the area altogether rather than deal with the hassle and expense of diverting off-course and having their aircraft, crew and passengers intrusively searched and vetted.

▶ Ms Murphy had more – much more – to say about the businesses impacted by Mr Trump's disinclination to stay put in Washington over the weekends. For example, the companies that handle cleaning, catering and maintenance for the aircraft are hurting, while flights for every purpose from sky-diving to wildlife monitoring are now "either forbidden or require going through an onerous, and often fruitless, approval process."

But one of her respondents – Ms Smith, of the flight training school at Lantana – summed up neatly. Wrote Ms Murphy, "She said it was as if a cloud had descended over the airport, similar to when it was discovered that one of the 11 September hijackers, Mohamed Atta, had rented an airplane there."



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Steel

On both sides of the Atlantic, initiatives to reduce carbon emissions engage entities beyond the “green” community

“With steel prices falling, multinational steel firms are fighting to stay alive. But the industry is a heavy user of carbon and is responsible for 5 per cent of global emissions, which is putting even more pressure on those domiciled in countries with tough carbon rules. What to do?”

The question posed by Ken Silverstein in *Environmental Leader* stemmed from the passage in early February by the European Parliament of reforms that would increase the price of carbon by cutting the emissions allowances granted to firms. The measures include the European Union’s first border tax on carbon, levied on cement imports. Reviewing responses to the EU overture, Mr Silverstein noted Europe’s steel firms, also heavy users of carbon, were saying that their exclusion from the scheme is unfair. (“Steel Firms Pressuring EU to Apply a Carbon Tax Fairly,” 17 February)

Steelmakers in Europe would reportedly pay up to \$32 to emit a ton of carbon while foreign producers selling their product to the EU would get a free ride, putting the domestic producers at a disadvantage. In their view, the EU steelmakers are simply asking their governments to tax all producers equally.

Citing a report in the *Economist* that CEO Lakshmi Mittal of ArcelorMittal, the world’s biggest steelmaker, had come out in favour of the carbon tax, Mr Silverstein wrote that “in theory”, at least, Europe’s oil industry is also on board. Companies such as BP, ExxonMobil, Royal Dutch Shell and Statoil do not, he said, generally advocate for taxes or restrictions; but they think that such measures would be more efficient than a patchwork of international laws. Moreover, they have major investments in natural gas, which is expected to continue to be the fastest-growing fuel in the US.

In the US, the Climate Leadership Council – comprising older, establishment stalwarts of President Donald Trump’s Republican party – have released a plan to begin taxing carbon at \$40 per ton. “The Conservative Case for Carbon Dividends” lays out a scenario in which that price would rise each year and carbon emissions would fall.

➤ The group, which includes former Secretaries of State James Baker and George Shultz and former Secretary of the Treasury Henry Paulson, says that revenues of \$194bn would be generated in Year One and increase to \$250bn a decade later. That money would be returned to the American people in the form of a “dividend”, although separate versions have suggested it go toward funding newer technologies to reduce emissions. “If you look at the priorities of President Trump, our plan ticks every one of his boxes,” said Ted Halstead, founder and president of the council, at a press conference in Washington, DC, reported by *Scientific American* and picked up by *Environmental Leader*. “It is pro-growth. It is pro-jobs. It is pro-competitiveness. It would balance trade. And, last but hardly least, it would be good for working-class Americans.”

➤ These ringing assertions prompted Mr Silverstein to ask another rhetorical question: how do the EU reforms announced in February compare or differ from this vision? He did not answer it with very much precision. “Imposing any tax is difficult,” he wrote. “Getting all governments everywhere around the world to impose the same tax at the same rate is even harder.”

Oil and gas

Energy companies operating in the North Sea are realising some early benefits from their reforms

“Business Outlook Report 2017”, published on 7 March by Oil & Gas UK, attests to a revival in the UK Continental Shelf (UKCS). According to the non-profit “voice of the UK offshore industry”, following an intensive two-year drive to improve efficiency, streamline costs and boost productivity, that industry is now in better shape to compete for investment. The report notes that domestic oil and gas production continues to rise and unit costs are improving, resulting in a more resilient and globally competitive basin despite ongoing lower commodity prices. The expectation is that energy companies exploring and producing in the North Sea will generate positive free cash flow in 2017 – the first time in four years.

Chockful of buoying statistics, the report points to a further 5 per cent rise in North Sea output to 1.73 million barrels of oil equivalent per day (mboepd) in 2016. Production has been rising since 2015, bucking a 15-year trend of decline, and should continue to rise over the next two years to peak at between 1.8 and 1.9 mboepd by 2018. Oil & Gas UK attributes this to recent strong investment in new development – bringing a total of 34 new fields into production since 2013 – as well as to improved productivity on existing fields. A further 13 to 18 new fields could start producing this year, building on that success. By 2018, recent start-ups are expected to constitute around one-third of UKCS production.

Efforts to bring the industry’s costs under control are also seen as effective. Average unit operating costs have improved by half within two years from \$29.70 per barrel to \$15.30/bbl. Capital efficiency is also improving. Oil & Gas UK identified a reduction in development costs for newly approved projects of over 50 per cent since 2013, and expects these costs to be lower still in 2017.

➤ Deirdre Michie, CEO of Oil & Gas UK, duly took note of the “considerable” challenges ahead for UK North Sea operators, particularly for companies in the supply chain. To address these, the trade body is appealing to the Treasury to extend the investment allowance to operational activities focused on maximising economic recovery. “Business Outlook Report 2017” also pointed out that exploration in the North Sea remains at record lows. In its view, if the UK is to unlock its remaining estimated resource of up to 20 billion barrels of oil and gas, the basin urgently needs fresh capital to stimulate activity. Even so, according to Ms Michie, “Confidence is slowly returning to the basin.”



LIFE 13 ENV/IT/000440

HFree Life Pickling Project

The project is partly funded by the EU within the LIFE programme

Sponsored by Rivit, Henkel and the Province of Vicenza, and partly funded by the European Union LIFE programme, HFreelifepickling aims to innovate the pickling process that makes large steel and alloys pipes corrosion-resistant. The project has developed a new method that employs toxics-free electrolytic solutions and reduces the environmental impacts.

A new pickling process that employs toxic-free electrolytic solutions.

A new pickling process that employs toxic-free electrolytic solutions.

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➤ Finance editor Lianna Brinded of *Business Insider* was less measured about the Oil & Gas UK report. After reviewing its contents she summarised its essential message: “Operators in the North Sea are finally going to be making money again.”

Technology

A novel catalyst holds promise for monetising wasted methane

A Washington State University (WSU) research team reported having improved upon an important catalytic reaction in common use in the oil and gas industry, an innovation that the researchers believe could lead to dramatic energy savings and reduced pollution. Their paper detailing the work appeared in the German journal *Angewandte Chemie*, which flagged it as being of special interest and importance.

Reporting on the research for *Science X*, Tina Hilding noted that methane gas is a by-product of much oil and gas production, in which its build-up can be a safety concern. Methane is also a constituent of natural gas, convertible into electricity when the strong bond between its carbon and hydrogen is broken. But this takes a tremendous amount of energy. “[Methane is] a very happy molecule,” said Jean-Sabin McEwen, co-leader, with Su Ha, of the research team at the WSU School of Chemical Engineering and Bioengineering. “It does not want to break apart.” (“WSU Research Advances Energy Savings for Oil, Gas Industries,” 27 February)

Conventional methane conversion employs a nickel-based catalyst. But it is often less expensive to simply burn the methane in giant flares on-site, adding greenhouse gases to the atmosphere, contributing to global warming, and wasting energy. In the US, burned methane accounts for as much as 25 per cent of annual natural gas consumption. The researchers determined that they can dramatically reduce the energy needed to break the bond between carbon and hydrogen by introducing a bit of carbon within the nickel-based catalyst. This creates nickel carbide, which generates a positive electrical field, weakening the methane molecule’s hydrogen-carbon bond and allowing it to break at much lower temperatures.

The researchers found that while too much carbon in the catalyst kills the reaction, a very low concentration actually enhances it. They have built a numerical model of the reaction and are exploring ways to demonstrate the work experimentally. Professor Ha said: “If we can efficiently and effectively convert methane from shale or gas fields to electric power or useful products, that would be very positive.”

Elsewhere in oil and gas . . .

➤ According to Juan Carlos Zepeda, the head of Mexico’s oil regulator CNH, a pipeline network with spare capacity could allow Mexico to export oil and gas from its flagship deepwater Trion project to the US. An exporter of crude oil,

Mexico is also a gas importer. Trion could help the country reduce its imports.

The field, with prospective reserves of almost 500 million barrels of oil in the Gulf of Mexico, was leased out in December by state-run Pemex to Australia’s BHP Billiton, which became the operator of the \$11bn project. As noted by Reuters (9 March), the Mexican oil company, which retains a 40 per cent stake, “jointly shares for the first time the risks and rewards of a potentially lucrative project with a private producer.”

The Great White Field, operated by Royal Dutch Shell, BP and Chevron, is producing around 70,000 barrels per day (bbl/d), Mr Zepeda said, leaving 50 per cent available capacity in a crude line and a gas line connected to the US. He pointed out to Reuters that it is only 24 miles from the Trion Field to the Great White’s facilities.

➤ As reported by Reem Shamseddine on the maritime and offshore website *gCaptain* (8 March), US oilfield services and equipment provider McDermott International (Houston, Texas) has said it will build a fabrication yard at the shipbuilding complex planned by national oil giant Saudi Aramco for Ras Al Khair, on the east coast of Saudi Arabia.

The two companies signed a memorandum of understanding for the first major manufacturing investment in the complex, part of Saudi Arabia’s drive to diversify its economy and create jobs in an era of cheap oil.

Saudi officials have estimated the cost of the Ras Al Khair complex at more than \$5bn. According to the *gCaptain* notice, the kingdom wants to jump-start local manufacturing industries by making more of the equipment required for its oil industry.

Corporation taxes in the US

The belief persists that the US corporate income tax rate is too high, even when billion-dollar companies pay no taxes

“Complaining that the US has one of the world’s highest corporate tax levels, President Trump and congressional Republicans have repeatedly vowed to shrink it.”

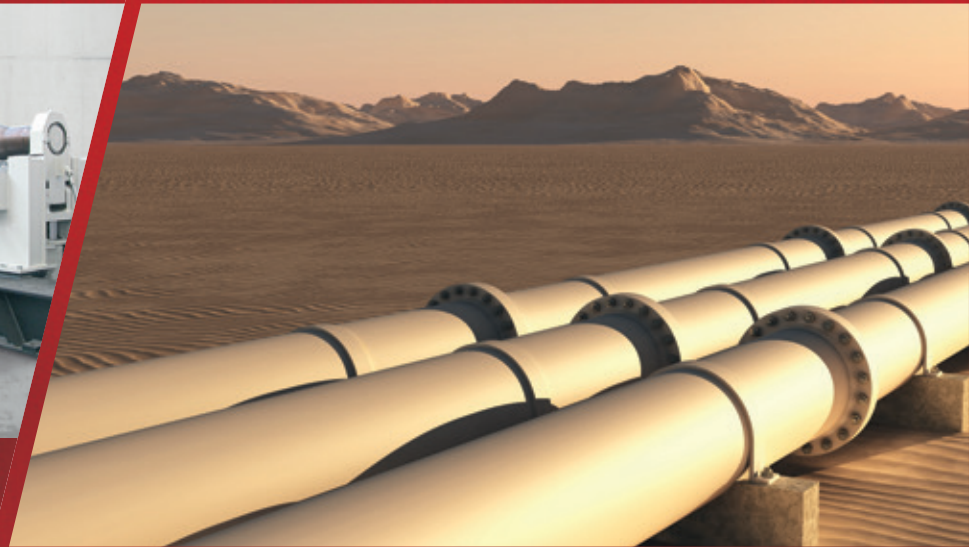
Patricia Cohen of the *New York Times* was taking note of a truism of the US political scene: that a crippling high corporate tax rate – topped out at 35 per cent – is impeding American competitiveness and penalising American initiative. She followed up with a question: why, then, if the level is so high, have so many US companies’ income tax bills added up to zero?

That is what is shown by a new analysis of 258 “Fortune 500” companies earning more than \$3.8tn in profits. The report, by the Institute on Taxation and Economic Policy, found that, exploiting loopholes and pursuing aggressive strategies, those 258 corporations paid tax at an average rate of 21.2 per cent. Ms Cohen reported the further finding that 100 of



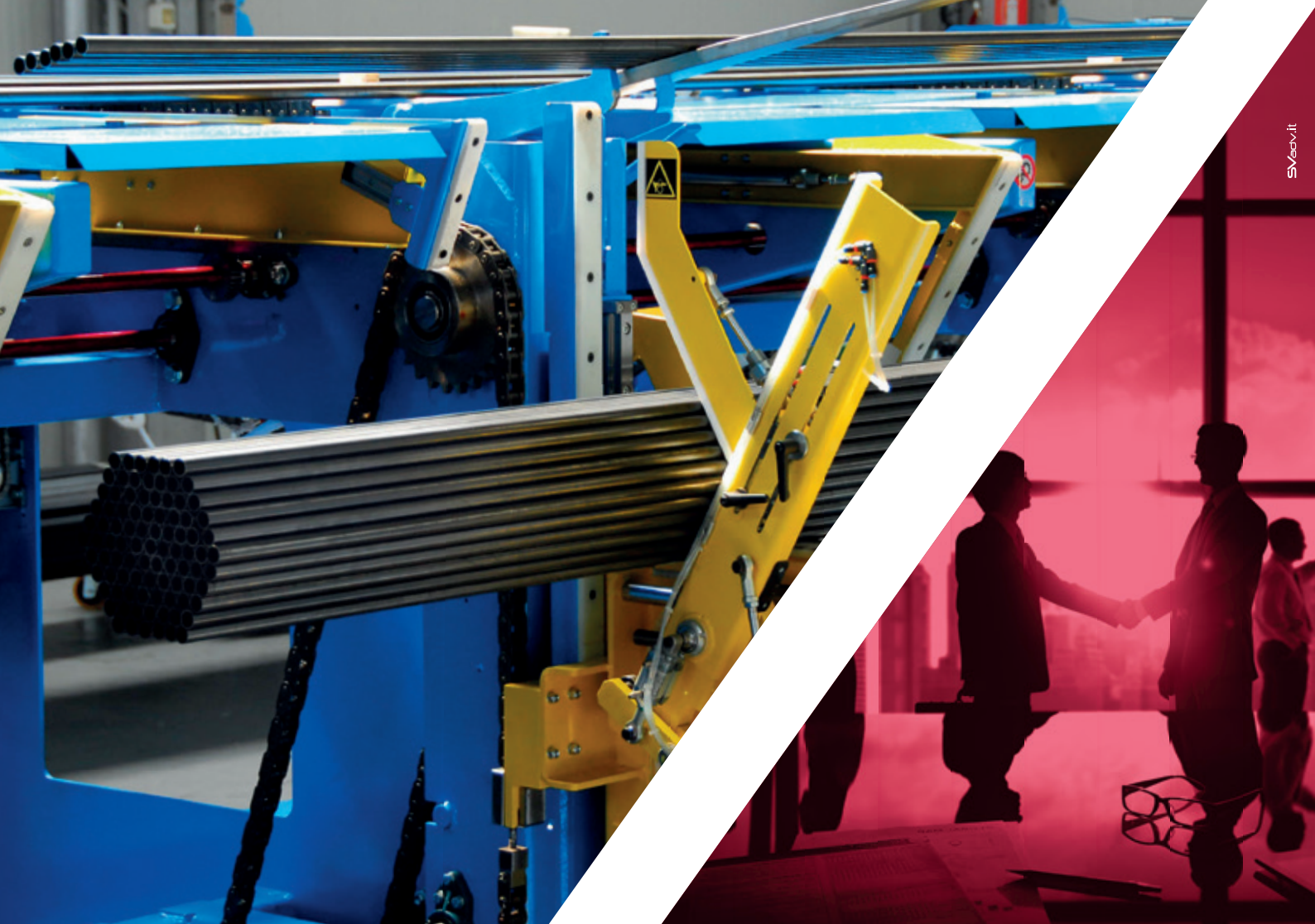
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the companies – nearly 40 per cent – paid no taxes in at least one of the years between 2008 and 2015. Eighteen of these incurred a total federal income tax bill of less than zero over the entire eight-year period – meaning that they received rebates.

The institute, a liberal-leaning research group in Washington, used the companies' own regulatory filings to compute their tax rates. Here, edited for concision, are the main points from Ms Cohen's review of methods by which companies legally avoided paying taxes. ("Profitable Companies, No Taxes: Here's How They Did It," 9 March).

- Multinational corporations have ways of booking profits overseas, out of the reach of the Internal Revenue Service.

"The truth is that we have a rigged tax code that has essentially legalised tax dodging for large corporations," said Senator Bernie Sanders, the Vermont independent, citing evidence in the Institute on Taxation and Economic Policy report. "Offshore tax haven abuse has become so absurd that one five-storey office building in the Cayman Islands is now 'home' to more than 18,000 corporations."

- Other companies qualified for accelerated depreciation, enabling them to write off most of the cost of equipment and machinery before it wore out. Some saved billions in taxes by giving options to top executives to buy stock in the future at a discount. The companies then get to deduct their huge payouts as a loss.

- Individual industries have successfully lobbied for specific tax breaks that effectively function as subsidies. Matthew Gardner, a senior fellow at the institute and a co-author of the study, told the *Times*, "One of the things that jumps out pretty starkly is there's a real gap between the tax rates paid by different industries."

Over the 2008-2015 period covered by the report, utilities logged an effective tax rate of just 3.1 per cent. Industrial machinery; telecommunications; and oil, gas and pipeline companies paid roughly 11.5 per cent. Internet services paid 15.6 per cent. In just two sectors – health care and retail – companies paid more than 30 per cent of their profits in federal income tax.

➤ Ms Cohen concluded her article where it began, with the avowal by the new US president and his party to change the corporate tax code. "Republicans say their tax overhaul will eliminate some of the biggest loopholes," she wrote. "[While] critics counter that the substitute will end up further reducing companies' tax bills."

➤ On the broader topic of tax code revision in general, some tax incentives – including those enacted by the US during the 2007-2009 recession – were meant to boost economic growth and hiring. But, according to the 7 March report from the Institute on Taxation and Economic Policy, often they did not work that way.

Dorothy Fabian, Features Editor (USA)

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TUBE MILLS & ROLLFORMING LINES

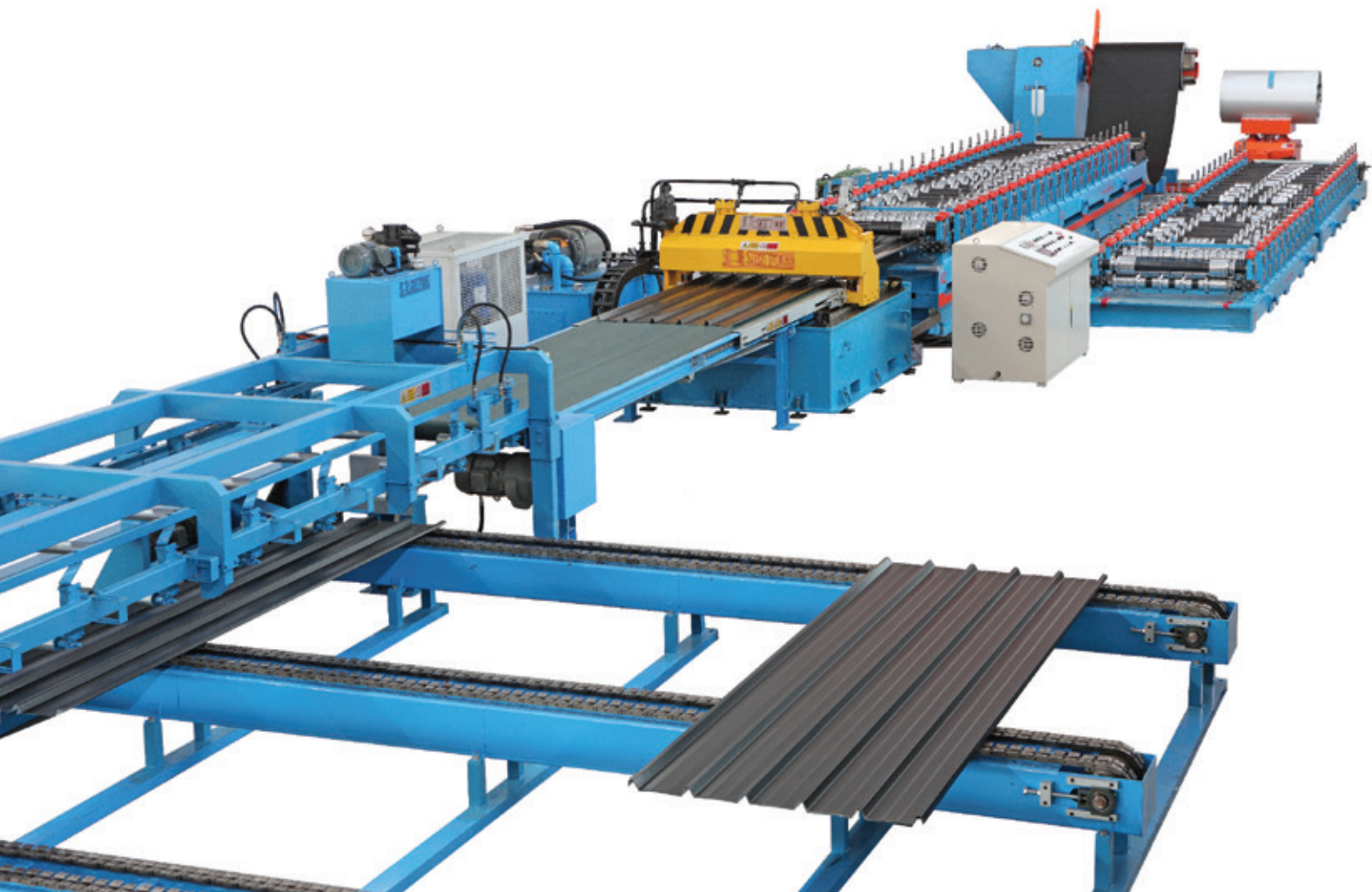


Photo: Sen Fung Rollform Machinery Corp – Taiwan

Tube mills and rollforming lines make a natural pairing. So do rollforming lines and tube mills.

The immediate result of considering these familiar topics in reverse order is a shift in emphasis: onto the sheer number and variety of rollformed products in the world – from guardrails and door frames to helicopter blades, conveyor systems and railway cars.

If there were such a thing as an endless list, rollformed products would be a leading candidate. Another sizable list could be compiled of the industries that would be hampered – indeed crippled – without them.

Of course, the same might be said of the single pre-eminent product of a state-of-the-art tube mill. But that would be to restate the obvious.

Cross section scanning for tube makers

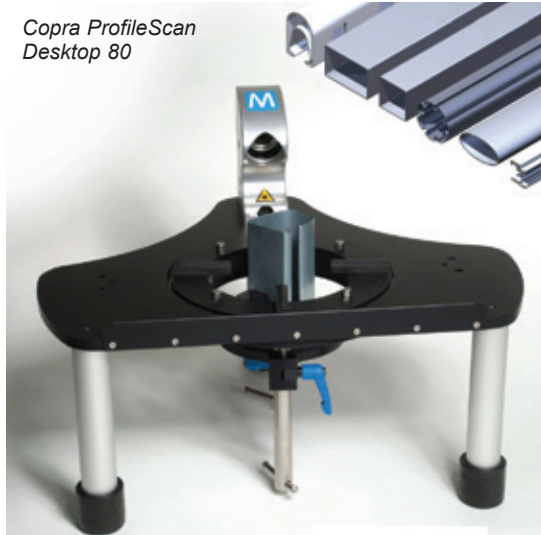
MOST optical profile measuring systems are in-line devices equipped with a sensor ring with four to six cameras. This can make quality control a costly and inflexible obligation, as camera/laser modules represent the most expensive parts of an optical measurement system. Additionally, sensor ring-based devices lack flexibility regarding the range of views.

The Copra® ProfileScan Desktop with patented 360° measuring method addresses both of these problems, using only one sensor module and a turntable.

In addition to high accuracy, Copra ProfilScan Desktop offers flexibility and mobility due to the compact build. It is quickly assembled and can be deployed in other production locations using the provided transport case. With its

high range of views and full integration into the Copra workflow, ProfileScan Desktop is also suitable as a measuring tool for reverse engineering projects.

Copra ProfileScan Desktop 80



Paired with the provided software solutions, Copra ProfileScan Desktop can be applied in various ways by tube makers. Designers can measure cross sections of roll-formed round tubes after each station and therefore both evaluate the manufacturing quality and locate deviations at different production sites. These features also make the device suitable for measuring shaped tubes with different radii.

Copra workflow integration allows the designed contour from Copra RF to be compared quickly, and visualised in the form of a deviation diagram.

data M Sheet Metal Solutions GmbH – Germany
Fax: +49 8024 640 300
Email: datam@datam.de
Website: www.datam.de

Tube mills for precision tubes made of high-strength steel

CELEBRATING over 40 years in the business, Officine MTM SpA designs and manufactures tube mills, as well as related equipment and tooling dedicated to the production of precision tubes and welded profiles. Following the market trend, the company is presenting its range of machinery designed to produce precision tubing from high-strength material.

The requirement to provide increased safety in the automotive and other industries by limiting weight and using thinner sections has led to the use of high-yield materials (100,000 psi and above), challenging tube manufacturers to the limits of current forming and welding technology. Through extensive R&D and practical experience, Officine MTM can offer solutions. The fully automatic entry line allows enhanced productivity and ensures the standards of quality and material identification required by the automotive industry.

The company states that the strong design, the use of high-quality material and components, and the precision of workmanship result in a highly stable

mill platform capable of handling high-yield materials and extreme diameter to wall ratios (eg WT/OD below 1:7 or above 1:80).

Officine MTM is also highlighting its high-performance flying cut-off and saw units, in addition to its single and double cold saw units designed for high performance and speed.

The M&K 3.5 dimple-free flying cut-off can process square and rectangular profiles in stainless steel up

to 4mm thick at a maximum speed of 180m/min.

The requirements of short-length profiles in high-strength material with high quality of cut and high speed of production are met by the features of the M&K 3.5 cut-off.

Officine MTM SpA – Italy
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Email: sales@mtmtubemills.com
Website: www.mtmtubemills.com



ERW tube mills order for FD Machinery

FD Machinery has received orders for two CNC-CFS (direct form square) ERW tube mills from APL Apollo Tubes of India.

The mills are patented by FD Machinery and are fully automated. Size changes occur in five minutes by simply entering four parameters on a touchpad screen.

The size range of the mills is 80x80 to 200x200mm square, with wall thicknesses ranging from 3 to 10mm. The tube length is 4-8m and mill speed is 20-60m/min. All adjustments, except welding and straightening, are done

automatically and only one set of tooling is required to produce the mills' entire size range.

The mills will be equipped with automated strip entry sections and automated bundling/strapping machines.

Only three operators will be required to run an entire mill. The addition of the mills will increase APL's production capability.

FD Machinery has also received an order for a dual head flying cut-off from APL Apollo Tubes of India.

This cut-off will be used for tubes with diameters of 12-50mm, and wall

thicknesses of 1-3.2mm. The cut-off will allow the mill to run at speeds up to 200m/min. FD's dual head cut-off is claimed to increase blade life by 30 per cent, give better end finishes, and reduce blade change-over time when compared to a 100m/min single head cut-off.

The company is also receiving enquiries for its direct form square mill from US and European tube producers.

FD Machinery – USA

Email: sales@fdmachinery.com

Website: www.fdmachinery.com

New and reconditioned straightener rolls

ROLL Machining Technologies and Solutions has used its extensive experience to develop new technology for the manufacture of precision made straightener roll tooling.

"RMTS uses the same proprietary Super Roll™ process for manufacturing the new rolls to the same high standards that the customers expect from us," said company vice-president Michael Strand, who has been manufacturing rolls for almost 30 years.

This experience of the practical use of rolls is critical when designing and manufacturing tools that need

to have precision parabolic radii in them. This is where RMTS's hands-on experience of running mills can give it a practical advantage in developing new technology.

RMTS's reconditioning process includes a full inspection of the tooling: rolls, shafts, seals, bearings, lock nuts, lock washers and housings.

The customer profiles are carefully examined by its engineering team, led by roll engineering expert Dr Li, to determine the appropriate action to take with the tooling. This proprietary process of straightener roll

reconditioning and manufacturing has extended roll wear, keeping customer runs longer and saving on unnecessary expenditure.

RMTS manufactures and reconditions rotary straightener rolls for tube, pipe and bar sections for Mac-Hemp, Maier, Turner, Bronx, Sutton, Taylor Wilson, 2 Roll, 3 Roll, 5 Roll, 6 Roll, and 10 Roll Burnishing.

Roll Machining Technologies & Solutions – USA

Email: rmts@rollolutions.com

Website: www.rollolutions.com

30" ODF mill line from Nakata in Japan

NAKATA Mfg Co, Japan has announced it has been ready to deliver its first orbital die forming mill for large welded pipes to a Chinese pipe manufacturer following the installation of a small pipe mill of the same type equipped with a laser welder for a Japanese customer.

The pipe size is up to OD 30" (762mm) and WT 25.4mm, and most of the products are API line pipes up to X80 grade.

The metal strip used in roll-forming is typically a coiled one and its width is usually less than 2m. Therefore, roll-forming process is only applied to the production of pipes below 26" OD and beyond that the press forming processes such as UO and JCO have to

be applied. Theoretically, it is possible to produce pipes larger than 26" OD using the roll-forming process if plates can be used as raw material instead of coil. In practice, however, it is very difficult for roll-forming to process the plate stably because of its very limited length.

In addition, irregularly deformed pipe both at both the nose and tail ends is caused by strong contact between the plate and rolls during threading results in very low material yield compared to the continuous process, which is a major obstacle to the application of roll-forming in the plate-by-plate process.

However, in this 30" ODF mill, these problems can be solved by adopting

ODF technology to both the breakdown and finpass section, resulting in a very stable and productive hybrid forming process in which both coils and plates can be used as raw material corresponding to the size and variety of product.

Besides the capability of forming large diameter pipes, this innovative technology has many other advantages in the production of ultra-thin wall pipes and pipes made of hard-to-work material, as well as excellent performance in high-speed laser welding.

Nakata Ltd – Japan

Email: sales@nakata-mfg.co.jp

Website: www.nakata-mfg.co.jp

Universal Tube & Rollform Equipment Corporation website relauches

UNIVERSAL Tube & Rollform Equipment Corporation, a worldwide supplier of industrial metalworking machinery, has announced the launch of a new responsive website, designed to provide a user-friendly experience on any PC or mobile device.

It said that it wants all visitors to utubeonline.com to have the best possible experience when browsing its online inventory. Therefore, it has rebuilt its website from the ground up to deliver a clear view of its machine inventory along with detailed information on the services it provides.

In addition to the new look, users will enjoy improved navigation and functionality throughout, streamlined inventory updates and can now leave a comment on news articles through the company blog.

Universal offers one of the largest selections of new and used tube mills, pipe mills and rollforming machinery in stock. Its entire inventory of new, used and reconditioned metalworking machinery is available on the inventory page of its new website, which is easier to navigate than before.

Customers can purchase machinery directly from its offices warehouse as it is or discuss with the company turnkey service options such as machine reconditioning, line integration, new control panels, new drive systems, new components, new accessories and a number of flexible options.

Universal Tube & Rollform will exhibit at the FABTECH trade show in Chicago, 6-9 November 2017. You are welcome to visit its booth to discuss requirements.

Universal Tube & Rollform Equipment Corporation – USA
Email: sales@utubeonline.com
Website: www.utubeonline.com

The new Universal Tube & Rollform website



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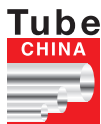
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New dual-capacity, high frequency quick-change welded tube mill

T&H Lemont has delivered a new dual-capacity quick-change tube mill system, developed to handle increasing demands for JIT deliveries of welded tubular products. The dual-capacity mill will allow for a greater range of production diameters in a minimum amount of floor space.

In effect, the dual-capacity mill gives the tubing producer the ability to produce a range of tubing normally produced on two mills. It also represents a smaller initial investment to produce a larger range of tubing diameters.

The entire entry and exit equipment remains unchanged, as does the basic mill base and drive system. The dual capacity of the mill is achieved by two sets of quick-change subplates designed to mount on a single base system and utilise one drive system.

In this instance, one set of subplates with 3.5" shafts was designed for producing tubing from 1.25" to 5", and a second set of subplates with 6" shafts was designed to produce tubing from 2.5" to 8" diameter. The distance between the stands is optimised for the diameter of tubing produced on each set of subplates.

As with all quick-change systems, one set of subplates is in production while the second set of subplates is available for change-over.

The mill, which produces standard mechanical rounds as well as hollow structural shapes, is designed to utilise the customer's overhead crane to change over the subplates. The subplates are held to the base by a hydraulic clamping system, allowing them to be connected and disconnected from the base quickly and efficiently.

T&H Lemont has provided technologies to produce products such as stainless steel hypodermic needles, communication cables, flexible tubular products, high-strength welded and roll-formed shapes and large diameter American Petroleum Institute (API) pipe.

In addition to complete production systems, the company provides a variety of components and services to the tube, pipe and roll-forming industries. Services include tube and pipe roll design and manufacturing, mill alignment and operational consulting.

Some of the many components offered by T&H Lemont include welders, cut-offs, entry equipment, accumulators, pre-punch, post-punch, seam orientation stands, weld boxes, edge conditioners, bead scarfing systems, straightening systems, single point adjustment systems, dedimplers, blades, jaws and roll shafts.

T&H Lemont Inc – USA

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Commissioning of laser tube mill in USA by Kusakabe Electric & Machinery

TUBE mill builder Kusakabe, which celebrated its 100th anniversary last year, has started the next century of operation with the successful commissioning of an automotive stainless steel laser tube mill in the USA.

The tube mill comprises strip entry, forming mill, laser welder, calibration mill, cut-off and quality control system. The Kusakabe-designed strip entry section is almost fully automated – unusual for a laser welding or TIG welding line.

The customer selected the automatic entry system to provide a safe working environment and reduce the labour and operational running costs.

The laser tube mill was designed and fully manufactured in-house, giving Kusakabe total control and

responsibility for the quality and precision of the mill, which is essential for high quality laser welding.

Each driven roll shaft on the forming and calibration mills has its own AC inverter motor.

This provides the flexibility to achieve a very stable mill speed while distributing the drive load evenly across all the rolls.

The cut-off supplied by Kusakabe is a rotary disc type, providing a swarf-free cut-off with only minor surface deformation. The company has delivered more than 20 rotary disc cut-offs around the world, mainly to the automotive industry.

Kusakabe has developed a tube mill operation data acquisition system over many years, in co-operation with its

customers. This system was installed on the mill as part of the overall quality control system.

Major operation data such as mill motor power, current, speed, ECT signals, laser inputs, cut length and defect tracking are processed by the PLCs and recorded in a PC in real time.

The system provides immediate feedback to the operators, as well as historical record tracking of the quality and inputs to each pipe, and production data to assist with managing the mill operation.

Kusakabe Electric & Machinery Co, Ltd – Japan

Fax: +81 78 992 9139

Email: sales@kusakabe.com

Website: www.kusakabe.com

Combined forging/ring rolling line for titanium alloys

VSMPO-AVISMA Corporation from Yekaterinburg, Russia, has granted SMS group the final acceptance certificate for the supplied ring rolling plant. The new plant produces jet engine rings made of titanium alloys.

With the new ring rolling plant, consisting of a PL 8000-V3 ring blank press, RAW 400/200-3500/800 DM radial-axial ring rolling machine and two RKP 500 and RKP 1350 ring expanders, the Russian company is extending its product portfolio for the aerospace industry, while increasing its competitiveness with the newly built production line. VSMPO is one of the largest producers of forgings made of titanium alloys, and a strategic partner of aircraft manufacturers such as Boeing and Airbus.

A special feature of the ring rolling line at VSMPO is the combination of the forging and the ring rolling process. With this technology developed by SMS group, VSMPO is able to produce rings with complex inside and outside profiles. The material input is lower than with the conventional forging process

that the company has employed to date. With the new production line, VSMPO can manufacture titanium rings with a diameter of up to 3,500mm and a height of up to 800mm.

SMS group GmbH – Germany

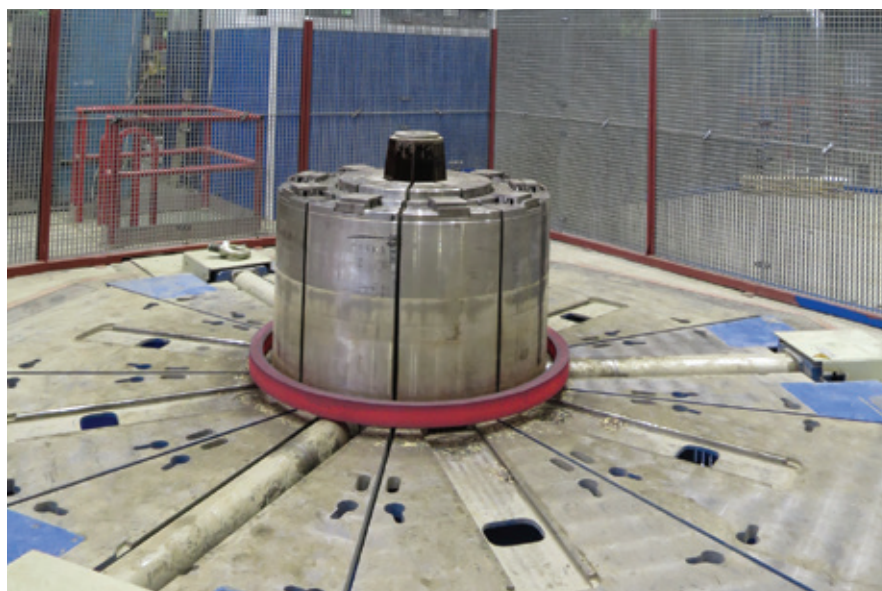
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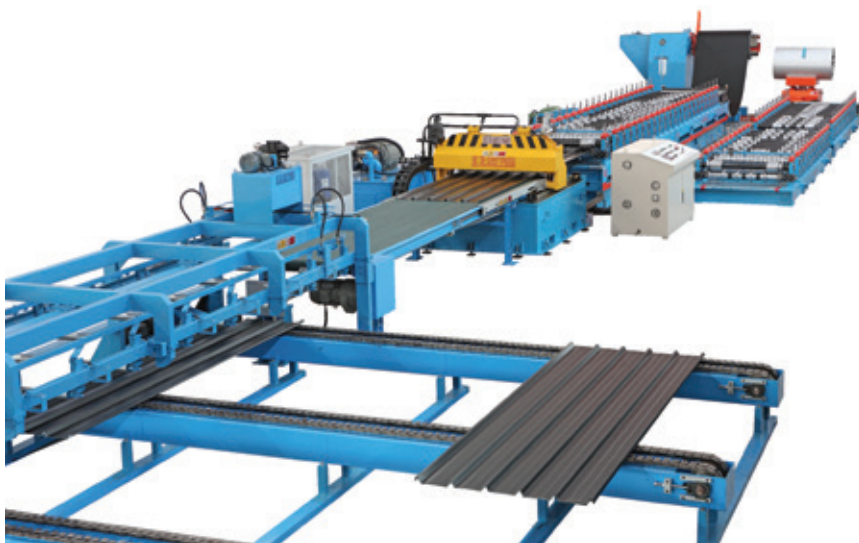
communications@sms-group.com

Website: www.sms-group.com

The line includes two ring expanders supplied by SMS group



50 years of roll-forming expertise



Sen Fung has worked in roll-forming since 1963

SEN Fung is a supplier of sheet metal roll-forming machinery in Taiwan, and has operated in the roll-forming industry since 1963.

With more than 50 years of experience, the company offers quality, durable and customer-orientated facilities worldwide. Sen Fung is also able to manufacture high-speed and automated machinery. Numerous inventions are patented in different countries. The company says that its service team is qualified and praised for its accurate and quick after-sale service reputation. Sen Fung offers technical and machine support to meet the needs of its customers.

Sen Fung Rollform Machinery Corp
– Taiwan
Email: service@senfung.com
Website: www.senfung.com

Gasparini presents the X-Press

SHEET metal is labelled according to its minimum yield strength. A36 steel corresponds to 36,000psi but will include much stronger steels. Rolling, holes and cuts create internal stresses, which means that sheet metal can be unpredictable.

During forming, upper ram bows in the centre. There, the punch will be farther from the die, so the angle will be sharper at the ends and wider in the middle. A difference as small as 0.0019" in depth leads to a 1° difference on a 0.3" V-die.

This effect is corrected by crowning: the table is raised to keep the die at a constant distance. But how much do we have to raise? Most manufacturers rely upon theoretical plate strength charts. This is often pointless because the material is unpredictable.

To solve this issue Gasparini has patented the ACSG active crowning. A sensor in the ram detects bowing. Cylinders in the table raise the die, while another sensor measures the height. When the two values are equal, punch and die are at the same distance

and the profile will have a constant angle across its length. ACSG is just one of many accessories that make X-Press one of the most advanced press brakes available.

X-Press is a tailor-made machine entirely designed and built by Gasparini, including the frame and the hydraulic circuit. More than 40 years' experience led the company to develop many exclusive custom solutions.

Gasparini – Italy
Website: www.gasparini.it/en

Rafter ships RT-3000 weld box and turkshead for profiles

RAFTER Equipment Corporation has delivered welding and straightening equipment to a major North American custom roll form parts producer. The equipment included an RT-3000 high-frequency induction (HFI) five-roll weld squeeze box and an RT-3000 double-sided turkshead straightener. The equipment will be used for the production of

HSLA welded seam profiles up to 3" square x 0.16" thick for an automotive application on the customer's existing RLM Manufacturing roll former. Rafter states that it was chosen for the project because of its reputation for providing the kind of heavy-duty mill equipment necessary for this application. Rafter is a manufacturer of tube mills, pipe

mills, roll forming machines, cut-off machines and other related tube and pipe mill machinery. Additional services include rebuilding and upgrading mill equipment.

Rafter Equipment Corp – USA
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Pipe-shop automation with full software support from 3R in Germany

PIPES and tubes are a critical component for many structures and vehicles, and are therefore indispensable to modern society. Whether in plant construction, the automotive industry, petrochemicals, ship-building or the food or pharmaceutical industries, pipes are everywhere, meaning that there will always be demand to be fulfilled.

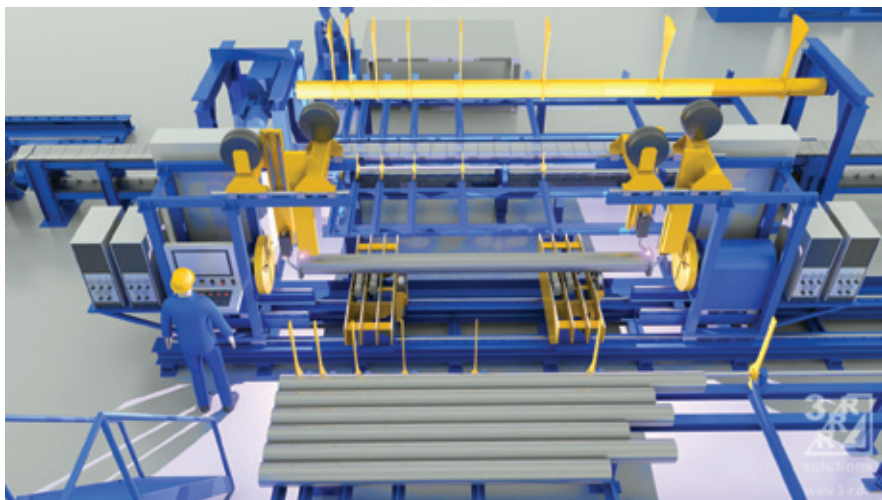
In order to meet this demand pipe-shops have become bigger, capable of fabricating high volumes of product. Machines have become more and more sophisticated and new processes are continuously being developed and refined. Whether CNC-controlled or fully robotic machines, there are many options and opportunities to increase output volumes.

The workflow inside a pipe-shop needs to be carefully planned and controlled, because it is vulnerable to a lot of factors that can affect output and productivity. Some of these factors, such as supply-chain management, are external to actual fabrication; others, such as bottlenecks caused by badly planned logistics inside the shop, are not.

Wrong decisions when first planning the pipe-shop can have significant repercussions once fabrication has actually started, so it is crucial to consider as many potential problems as possible before the first machine is purchased. Even if the fabrication part itself is perfectly organised and planned, the communication to engineering and warehousing has to be considered, as these departments are intrinsically tied to fabrication.

The company 3R solutions from Germany is an expert in the field of pipe-shop automation and optimisation. With more than 40 years of experience in planning and implementing pipe-shop projects all over the world, it has the expertise to help customers from diverse fields to identify the best way to build and operate their shop.

"The first step is an in-depth analysis," said managing director Georg Schulze-Duerr. "No two pipe-shops are the same, so you cannot have one or two simple standard solutions." Instead it is important to create a customised solution, based on input such as expected output volume, materials,



required procedures and tolerances, but most importantly a detailed breakdown of the dimensions to be processed. "A lot of customers approach us asking for a pipe-shop capable of producing a certain amount of tons or dia-inch per year, and give us a size range covering pipes from their smallest to their largest diameter," said Mr Schulze-Duerr.

"But a shop that fabricates 90 per cent stainless steel pipes from 2" to 16" will need completely different systems from a shop where 90 per cent of the fabrication are large bore carbon steel pipes of 24" and higher."

Once the breakdown of sizes and materials has been determined it is possible to select the best suited machines. Mr Schulze-Duerr said: "A pipe-shop is a little like a jigsaw puzzle. You need to select the right piece and put it in the right place, in order to get the big picture. If you just take some machines and put them into the shop without considering the effects on this big picture, you will run into trouble, because your flow of material will be a mess."

This flow of material is crucial to 3R's philosophy: "Two major cost drivers in spool fabrication are waiting times and transport costs, and the two are basically the same. My machine cannot work because it is waiting for material, and I need to pay people to bring this material from one machine or work place to the next. A machine for half a million euros may stand idle because I cannot move the pipes from another machine quickly enough. That machine

may have to reduce its output as well, to give people a chance to remove the processed material. As a result two expensive machines are running at reduced capacity, while I have to schedule additional manpower for moving material between them."

An alternative used in 3R's pipe shops are automated transport systems, using roller and plate-belt conveyors as well as buffer tables. "No machine should ever have to wait for material, and no material should be double-handled," said Mr Schulze-Duerr. "Of course that also means that sometimes a machine has to be adjusted from the standard version so we can integrate it. Usually that means making it a little higher or adding a signal exchange so our system knows that a pipe can be loaded/received. The end result is a transport system that can run mostly autonomously."

Of course there are also different levels of automation, which can sometimes lead customers to have expectations that are not feasible or realistic. "When customers think about automation they sometimes fall into one of two traps," explained Mr Schulze-Duerr.

The one mistake many make is to rule out automation outright, because they think that their product is not suitable for it. "In a lot of industries you have a wide range of products, which are all fabricated in small batches, so customers think automation is not feasible for them, because there is no mass production. But this does not have to be the case, you can selectively automate specific

TUBE MILLS & ROLLFORMING LINES

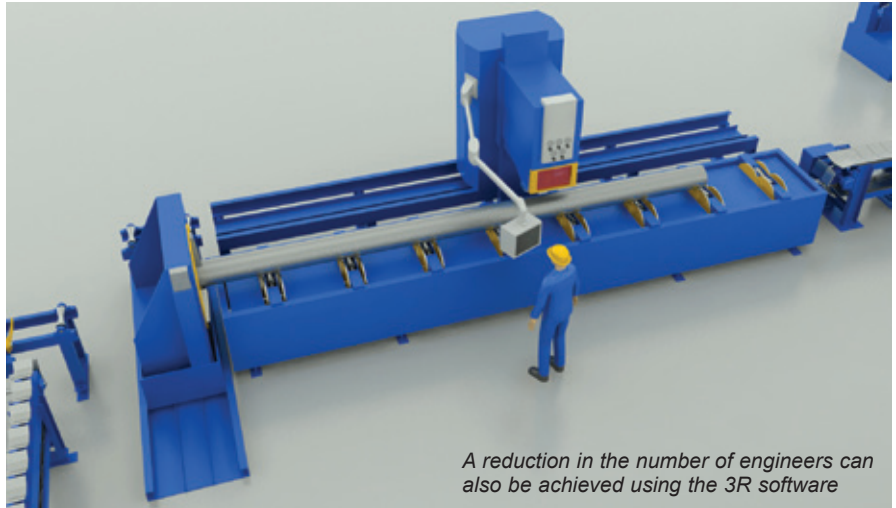
aspects of your fabrication and retain manual operations for others.”

The other mistake is to think that by automating it is possible to cut out human interaction entirely. “Of course it would be nice to say I push one button, raw length of pipe go in on one side, and finished spools come out on the other one,” said Mr Schulze-Duerr. “But this is not always possible, especially when you have the aforementioned small-batch production of thousands of different pieces. But again, by automating select processes it is possible to reduce man-power significantly, while using trained operators for those tasks that are too expensive or inconvenient to automate.”

One of 3R’s European customers said: “My product is different, so I thought that automation was not feasible for me. Then somebody introduced me to 3R and I realised that there are a lot of things that I can do to automate and improve. Now we managed to increase our capacities while spending less money and man-hours per unit.”

3R solutions always strive to look for the optimal level of automation that is economically viable, rather than automating for its own sake. Mr Schulze-Duerr said: “At some point you have diminished returns. If for every euro I invest in automation I can achieve ten euros in savings, then of course I will do it without a second thought. But at some point every additional euro I spend only saves me five, so I start thinking about it a little harder. When every additional euro I spend saves me three later on, I think a lot harder. And once every euro I spend only saves me one euro or even less, I no longer have to think about it. Our job is to find the best combination of investment and savings.”

While the actual product of each shop can vary significantly, there are some processes that are always the



A reduction in the number of engineers can also be achieved using the 3R software

same, regardless of whether the shop produces brake lines for cars, handrails for staircases or the piping for entire cruise ships. “You need to move the pipe, you need to cut the pipe, and you need to bend or weld the pipe.

“Of course there are many additional and auxiliary processes, which are important, but these are the crucial ones. If I can automate transportation, I can ensure that my machines always have material. If I can streamline and optimise the cutting process I can save man-power and material. And I may not even need to automate in order to improve welding processes. If I introduce ergonomic fit-up stations and optimise by welding boxes, while using software to allocate material to these stations already in the warehouse.”

One of 3R’s customers from South-east Asia agreed. “Originally we brought all fittings into the pipe-shop in bulk, and the fitters had to go and get the material based on their work orders. This was very inefficient. Now they get their material on a single pallet directly to their work station, and as soon as they finish one job, they can immediately

start the next one. Plus we can now track how much time they spend on each piece, giving us a great indicator of their performance.”

Of course the real secret to savings, according to Mr Schulze-Duerr, is not on the shop floor but on the administrative side. “If I can save ten people on the shop floor I have tangible, clearly apparent savings. But what if I can save three people in engineering, by introducing the right software? What if I can save a few hundred man-hours for purchasing, finance and warehousing?”

Mr Schulze-Duerr said: “I believe one of our strengths is that we can provide this full integration and with this go beyond the initial expectation of our customers. We have had the situation several times, where we had meetings with top level management which were supposed to be for thirty to sixty minutes, but which in the end ran for two to three hours, because we convinced them to look beyond the immediate savings on the shop-floor, but at the potential for improvement across the board. This allows them to contribute to the project constructively.”

It is by combining this use of software with streamlined workflow that customers of 3R solutions have managed to achieve significant savings and favourable returns on investment. “One of our customers managed to reduce the man-power by 50 per cent. Software also allowed him to also reduce his production engineers by 90 per cent. Within a few years he had recouped his initial investment and he continues to save. In a peak year he saved 1.2 million US dollars just because of the software, not even considering the savings in fabrication time and man-power on the shop floor.”



3R strives to look at the optimal level of automation that is economically viable

3R solutions – Germany
Website: www.3-r.de

中文综合

单层和多层产品X射线检测技术

制造商们为了选择性价比/性能比最高的测量和控制解决方案，必须选择合适的技术。经过多年使用X射线和超声波偏心率检测仪、直径激光检测仪以及各种产品和材料感应测量设备的经验，Zumbach公司扩大了钢管和软管X射线检测仪家族。Zumbach公司的静止x射线系统Rayex® S专门开发用于各种类型的发泡管、硬化橡胶产品和液压软管。Rayex® S系统可测量和控制单层以及多达四层的多层产品的直径、椭圆度、壁厚以及偏心率。它能够以精确的测量值以及最大的可靠性测量外径达80毫米的管道和软管。该系统采用最新的

X射线技术和软件解决方案。结合数据采集和处理系统，可实现生产线自动化控制。通过控制线速度或挤出机速度，可将参数控制到公称值。显示器可以数值和图形形式显示所有测量值以及趋势和统计数据。连接设备的生产线图形显示为操作工提供了清晰的视图。同时，系统将壁厚减少到最小值。质量的保证以及材料的减少使生产力显著增加。

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The Rayex® S 射线系统

锆核燃料壳管的矫直

核反应堆发电是由铀燃料驱动的。为了隔离铀以及防止反应堆冷却剂的污染，铀燃料必须放置在极其稳固的环境，该环境能够承受高温以及抵抗核裂变产生的强烈的中子辐射。

用来装铀的材料必须具有一些很重要的特征，如高导热性，高强度、高度防腐蚀以及极高的尺寸稳定性等。核燃料容器通常是由各种锆合金管道制成。这些管子被称为“燃料壳管”或“燃料包壳”。

每个锆燃料壳管充满了天然的或浓缩铀颗粒并密封起来。一个完整的核燃料腔体组装包括很多稳固组装的管道。在锆燃料壳管生产过程中必须极其小心，以防止管道过度的冷加工。冷加工使材料在高温环境下使用时极易受到氧化物取向的影响。在制造过程中，管道必须经过成型加工和精加工处理并且不得经过过度的冷加工。所需管道平直度的精

确性非常重要，因此管道矫直时不过度加工材料是具有挑战性的。

在要求高的核领域，Turner公司已成功成为锆燃料壳管矫直机械主要供应商。

公司为核管道行业提供的服务的历史可以追溯到四十多年前，期间公司了解到了一些问题并慢慢改进了解决方案。对于这一具有挑战性的矫直加工应用，最现代化的计算机驱动的10辊矫直机器被广泛使用，替代了旧式6辊矫直机。Turner公司一直处于精密矫直机创新和矫直应用开发的前沿，而且开发了适用于矫直这种特殊产品的重要特性。这些特性通过将管道矫直过程中对管道施加的压力保持在非常低的水平防止管道产生氢氧化物取向的可能性。

这些特性包括：特殊的加工辊拥有特殊的形状区，以减少对矫直管道的摩擦；每对辊还有具有战略性布置的称重传感器来测量施加给管道的辊压力；还有分析软件接收来称重传感器的数据并确保管道冷加工量不超过设定值，并保持辊压力处于非常低且安全的水平上。

这种非常特别的辊形可确保辊和管道之间产生的摩擦量保持绝对最低。

称重传感器可以监控辊施加给管道的直接压力。计算机辅助设置和管理



核燃料复合管道生产

(CASAM)系统内的分析软件监控每根辊施加给管道的荷载并控制矫直机。

称重传感器信号的调节和放大是由极度精确、定制设计和制造的电子电路完成。Turner的CASAM系统——已经使用第三十个年头了——增加了操作模式和计算方法，用于这个特定矫直应用。

Turner典型的10辊锆核燃料壳管矫直机可确保最终产品所有重要的特性得以实现。为防止矫直过程中对管道造成甚至最轻微的印记或污染，大多数用于核工业的Turner矫直机都提供完整的矫直生产线，包括全集成管道进、出搬运设备。Turner锆燃料壳管矫直机在世界各地使用，在中国、韩国、瑞典、加拿大和美国。

Turner Machine Company – 美国
网址: www.turnermachineco.com



创新性轨道焊接工艺带来了高质量的焊缝

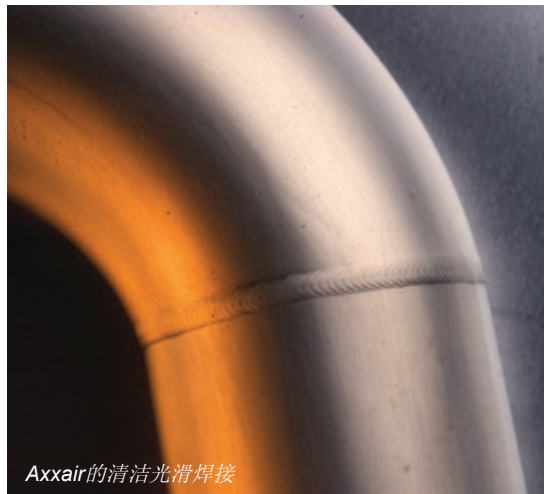
选择自动焊接工艺是有多种原因的——技术的、组织的和经济的。众所周知这是得到干净、光滑焊缝的理想技术。

一些高端工业领域，如航空航天工业、高速列车、核能或生物技术，这些领域对精度和可靠性要求是显而易见的。在其他领域，如在制药和化工以及农业领域，光滑的焊缝是不可或缺的，以免污染或焊接区域腐蚀。

自动轨道焊是焊弧绕圆柱形进行360度持续旋转。这是得到洁净焊缝的最好技术，精度非常均衡，尤其是对于宽度较窄的小直径。在焊缝设置编程的帮助下，可以对过程进行推力控制。为确保在管道内部和外部焊接的规范性，建议选择自动化以确保得到光滑的焊缝。

Axxair推出了最新一代轨道焊接电源，一种简化轨道焊过程的新技术，用于使用薄壁不锈钢管的工业。

这个易于使用的产品赋予了更广泛的可能性。用于可以使用更复杂的功能轻松完成最难的焊接工作。SAXX建议控



Axxair的清洁光滑焊接

制焊炬或焊接头的气体，以及管道内的保护气体。气体流动首次以数字化显示并可记录下来。

系统每秒都在控制和记录焊接数据。这些数据可以储存在U盘上，并通过“Weldreport”软件转移成DMOS/QMOS记录。

它还可以控制管道内部的残余ppm确保焊缝内部着色程度。Ppm的测量通过连接到Axxair到SAXX的SPPM-10来完成。软件人机界面以及通用软件可以通过USB密钥升级。一个U盘可以储存200和焊接程序。Wi-Fi功能完善了SAXX的性能。它能够使用智能手机或平板电脑进行远程管理和主动监控，通过远程控制可完全访问人机界面。也可以轻松的下应用载软件。按焊接配置（直径、厚度和焊接头类型）进行的程序分类系统可以帮你轻松地找到所需的焊接程序。

可选的适配器电缆使SAXX能与其他制造商提供的焊接头兼容，如AMI、Polysoude以及Orbitalum。这一创新可以帮你节省时间，提高工作效率和焊接质量。SAXX是半导体、制药和食品加工等行业的理想答案。

Axxair – 法国

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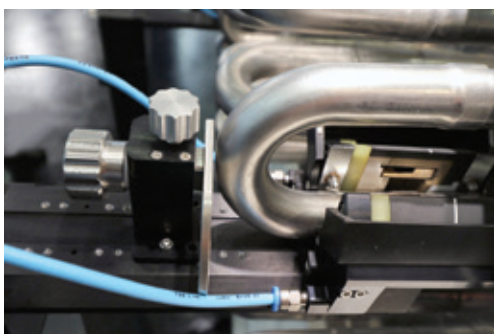
网址: www.axxair.com

只需按一个按钮就可以焊接不锈钢管弯头

ORBITALUM Tools GmbH公司进一步开发了HX 16轨道焊接头并扩展成一个系列。仅仅按一个按钮，HX 16P和HX 22P可以通过专利的气动夹紧装置夹在管道上。

通过这一创新，手持和舒适度都得到提高，焊接效率和焊缝质量一直在提

管道间距30毫米按一个按钮就足够用于HX 16的定位和夹紧



图片来源: Orbitalum Tools GmbH

高。这使得暖通行业更易从传统的铜制换热器改为不锈钢换热器，这样可以满足环境友好性制冷规定（F气体欧盟指令）。使用钨极惰性气体保护焊(TIG)结合机械化轨道焊接使不锈钢的连接非常经济、可靠而且焊接质量很高。通常常用的闭合轨道焊接头或开口对焊夹具并不使用，因为他们的结构使单个管道之间的落点不能实现。因外径仅60毫米，管道间距仅30毫米按一个按钮就足够用于HX 16的定位和夹紧。

Orbitalum表示一些新用户报告说生产力提高了6倍。这使得焊接头的对准和夹紧过程加快，每个焊接周期只要10到15秒；外径16毫米、壁厚0.5毫米的管道每个加工周期需要约1.5分钟；夹紧、惰性气体氛围的建立、焊接以及在氩气氛下的冷却，这样可以防止焊缝退火着色。

有了气动夹紧功能，焊接头可以在管道弯头处自动夹住，而不是操作工在焊接过程中用手支撑/握住焊接头。这样一个缺乏经验的操作工每个周期在同一时间可以用三个焊接头（系统）生产焊缝。

HX 16P和HX 22P轨道焊接头的另一个好处是封闭式焊室，这样在焊缝热影响区计几乎就不会形成退火着色。来自Orbitalum的所有焊接电源自动识别焊接头和他的特性，这样在开始焊接前，操作工只需要调用指定的焊接程序并开始焊接过程。HX 16P用于外径15到16.8毫米管道，HX 22P用于19到22毫米的管道。还有HX 12P用于9.52到12.7毫米的管道——将于今年晚些时候推出。

Orbitalum Tools GmbH – 德国

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三台新折边机开始提供服务

OP宣布三台新折边机面市。这些机器质量很轻、便宜而且易于搬运，这种完美的设备用于现场服务。这三种全新的机器H26 PM、Tubomatic H26 E和

Tubomatic H64 PM确保更精确、高效的服务。Tubomatic H64 PM折边机能加工尺寸为1½"的两层编织液压软管。该机器功能众多而且能用于现场服务。还提

供独立于机器的手动泵以及电动限位开关显示折边直径已达到。

Tubomatic H26 PM适用于加工尺寸达¾"的两层编织液压软管。它适用于多个应用，是户外服务的理想设备。该机器具有的技术特性是带有模具夹的软管扣管，手动泵和毫米标签显示卷边直径已达到。

Tubomatic H26 E具有和Tubomatic H26 PM相同的功能和用途。唯一的不同是它配备了一个独立于机器的手动泵。



OP – 意大利
网址: www.op-srl.it

全自动ASMAG精密钢管生产线

ASMAG GmbH公司目前为土耳其客户完成了一条完整的生产线，用于尺寸达75毫米的精密钢管制造。

新生产线增加了产量并大大提高了产品质量。这条全自动生产线由拔管机、十辊矫直机、多种锯切单元以及现有检

测装置、外观检测台以及堆码和打包单元组成。

在生产线入口端，一捆外径80毫米的管道由一台创新的爪式分离机自动分开。

在通过液压在线压尖后，管道在450kN的三列式拉拔机上拉拔到14.5米长。

ASMAG的基准十辊矫直机RRM-pro-70/10可以超越客户的矫直要求以及更具挑战性的期望。

集成的多个锯切机可根据具体要求定位每次锯切，可实现最佳切割性能、最高切割质量以及最佳的锯片

寿命。土耳其客户选择ASMAG的原因很多，包括质量信誉、高精密钢管制造设备以及ASMAG能提供全套解决方案等。

ASMAG是一家冷拔黑色金属和有色金属集成生产线制造商。

公司市场主要分布在欧洲、美国、俄罗斯和土耳其。公司由工程师Johann Vielhaber于1984年建立，公司自成立以来不断成长，在沙恩施泰因建立了总部，并于2010年收购了德国的SEUTHE以及2015年收购了意大利的OCN。ASMAG集团目前拥有200多名员工。

ASMAG GmbH – 奥地利
电子邮件: sales@asmag.at
网址: www.asmag.at



方管 and 矩形管新生产技术

FIVES公司在11月份意大利博雷托的开放日活动期间展示了新的Oto中空成型技术。开放日将CinarBoru（土耳其）、Profiltubi（意大利）、Marcegaglia

（意大利）以及其他客户和合作伙伴聚到了一起。

新技术Oto HSU轧管机（中空形多功能成型机）自2009年以来一直在开发。

专门设计用于生产建筑行业用方形和矩形管道。轧机以较低的生产成本通过直接成型来生产HSU管道，跳过了传统的制造圆形管道后再做成矩形管道的步骤。

Oto HSU生产线由一个带成型站的轧机组成，以精确的角度完成带材第一个和第二个弯曲。剩下的设备包括高频焊接站、嵌接装置、冷却和定径部分、矫直和切

割装置以及包装系统。Oto HSU技术的主要好处是能够频繁变化生产，无需更换轧辊。

在四辊轧机中加工的产品范围从最小的20x20毫米到最大的140x140毫米，最大生产速度为120米/分钟。

Oto HSU mill 的概念设计师，Fives Oto SpA 公司的运营总监Andrea Anesi表示：“这项新技术确保能够生产更大尺寸和壁厚范围中空形管道，而且无需更换轧辊；因此，这大大节省了设置时间，减少了对不同轧辊的投资成本以及轧辊所需占地空间也大大节省，同时也将操作工的微调减到最少。”

Fives – 法国
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网址: www.fivesgroup.com



板材挤出过程中的质量保证

PLANOWAVE6000是非接触式测量系统，用于塑料板材挤压过程中壁厚的无损测量。

该系统设计用于各种塑料材料的测量，如聚乙烯、高密度聚乙烯、聚丙烯、聚酰胺6以及聚氯乙烯。

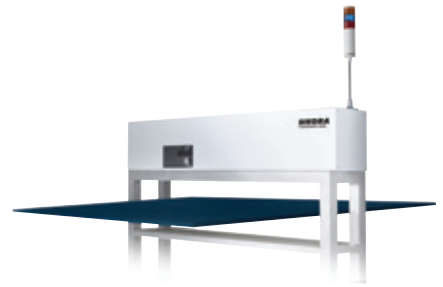
创新的毫米波技术可提供精确的壁厚测量，无需耦合剂而且不受塑料板材材质和温度的影响。也无需校准。

Planowave 6000可直接集成到生产线上也可以用于最终的检验。板材根据

调频连续波运行时法通过毫米波进行测量。一个线性移动的收发器持续发送和接收调频毫米波。板材厚度通过运行时间的不同来确定。

测量值也是实时可视化的。处理系统Ecocontrol提供测量值数字显示，以及图形显示，并提供综合趋势和统计数据。

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型材弯曲机带到了英国

Addison Saws焊接技术专业部门Addison Saws已被授权为PBT AG数控型材折弯机在英国的独家经销商。

总部位于瑞士的PBT是铝、不锈钢和钢制型材弯曲技术厂家。公司的机器用于众多领域，包括汽车制造、建筑、航空航天、窗户行业以及家具制造。

Addison集团董事长总经理Gary Knight表示：“我们非常高兴获得PBT公司得到国际认可的型材弯曲技术在英国的经销商权。PBT选择我们作为经销商是对我们来自全球市场的技术致力于帮助客户找到最好的制造解决方案，以及为客户提供最高水平的服务支持的认可。PBT的机器将和我们来自台湾领先的制造商CSM的管道弯曲和管端成型技术完美结合。”

利用高水平功能以及三辊弯曲技术，PBT机器能以节能的方式冷成型铝制和钢制型材。PBT型材弯曲技术包括Arkus 12®紧凑型弯曲机，可以将小型



Addison Tube Division可提供PBT Arkus 12型材弯曲机

铝材和钢型材弯曲到紧密半径，以及更大的重型弯曲机，如PBT35®和HELIX®，适用于更具挑战的应用，包括用于工厂和车辆制造、材料搬运、施工和建筑行业的型材。公司还制造了定制型弯曲机，以满足更高的制造需求。

Knight先生补充说：“PBT Arkus 12型材弯曲机已经引起汽车、窗户、技术

和金属制造领域Addison客户的极大兴趣。我相信它能够生产出极其精密的钢制或铝制型材，而且在可靠性、可重复性以及精确性方面也不打折扣，这将为我们许多客户开启令人振奋的新机会。

在增加了PBT机器产品范围后，Addison Tube Division部门可在英国为型材弯曲、芯轴和无心轴弯曲机器提供广泛的选择范围。Addison的CSM弯管机包括基础的三轴液压机到更复杂的11轴全电动机。CSM 100TDRE-RBE是一台五轴双轴电动混合动力弯管机，带电动起重，能在较大直径的钢管上生产出紧密半径薄壁1倍直径的弯曲，这一加工目前是第一和第二层排气装置和催化转化器制造商不断增加的需求。

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T-Drill T-35 & T-65铜管冲孔翻边机

专利型T-Drill管道冲孔翻边（三通成型或分支管）方法已在全球建立声誉。T-Drill法可生产直接从运行管道出来的分支连接管排出口，于19世纪70年代开发，接近50年历史，是业内重要的发明之一。

公司不断改进的产品几十年来使用的是同样的原理。通过这些努力带来了更大型的、自动化程度更高的管道制作



机器以及效率更高、更符合人体工学设计的便携式机床。其中的一个例子就是T-Drill T-35机器，这是一台便携式铜管三通成型机。这台机器在管工日常工作环境下非常易于携带，但动力十足，可以在极端的条件下完成工作。

更大一点的T-65或无线的T-65B也可以选择，这在加工54毫米的冲孔翻边时是一直需要的。更大的动力源以及广泛的选择范围使得这一手动工具具有高水平的生产能力和工作范围。

当管道尺寸为15-219毫米，冲孔翻边为8-114毫米时，T-Drill的便携式产品家族将为最终用户带来很多好处。在具备商业三通管件同等质量的同时，该机器还可以减少浪费，因为T-Drill法不需要切割管道，也不需要两个焊接头，而且无配件成本。T-Drill便携式机床易于使



用、属于低噪声三通成型机，适用于专业人士。

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HFree Life Pickling – a new industrial process that improves the environment and productivity

By Loris Dal Santo, R&D Department, Rivit SpA, Italy

In recent years concerns about environmental issues have increased considerably within manufacturing industries.

This is why the reduction of the environmental impact of the processes involved represents a critical goal for many companies. Interestingly, some of these environmental improvements can also bring economic benefits for the industry.

HFree Life Pickling, a project co-financed by the European community through the instrument LIFE, represents the synergy between Rivit, Henkel and the Province of Vicenza, Italy, in the search for a new process that can help pickling productivity and improve the environmental impact of the process.

In the first stages of the project, Rivit provided Henkel with various specimens of metal alloys to be heat treated. Thanks to the ability to work on realistic specimens, Henkel technicians were able to develop a new chemical solution devoid of toxic substances that has achieved reductions of more than 90 per cent in the laboratory yet still has the technical features to achieve a surface finish comparable to traditional pickling (see Figure 1).

The results achieved in this early stage confirmed the potential of the process from a production and environmental viewpoint. However, it was necessary to verify the performance during application with tubular geometries.

To this end Rivit implemented a pilot “mini-plant” in the second stage by reduced scale in order to carry out tests on specimens of tubes of a length shorter than one metre.



Figure 1: Finishing obtained through the “HFree” process – alloy UNS S32750

The tests led to excellent results, confirming in the large majority of cases the results claimed by Henkel in the first stage of testing.

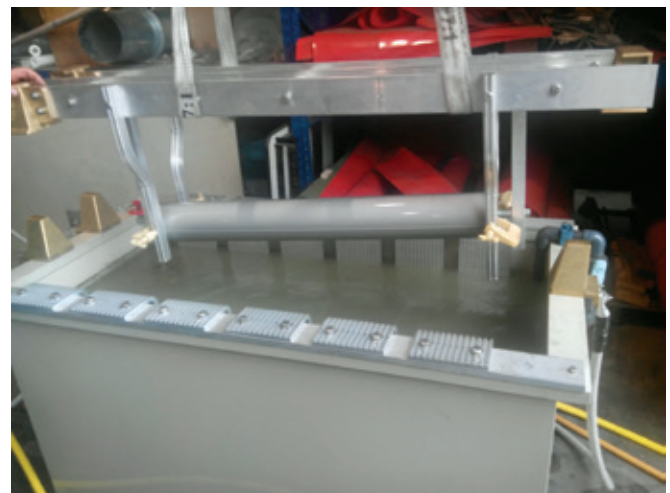
However, during this stage some criticality connected to the development of gases such as hydrogen and oxygen during the application of electric current to the electrochemical cell did emerge.

These gases in fact tend to collect on the upper inner surface of the tube, giving rise to a volume of gas that prevents the contact of the electrolyte solution with the surface to be treated. Thanks to the plant changes, however, the problem was completely solved, obtaining a complete removal of the oxidised flake from the inner surface as well as from the external surface of the tube.

During the tests, possible problems were identified connected to the dragging of the particles of the bath by the gases that develop during electrolysis.

For this reason Rivit – thanks to the support from ARPAV and the Province of Vicenza – has identified a containment system for the emissions that will be used in the industrial pilot plant that is under construction in the Caltrano plant, a long-standing production unit in the manufacturing industry that produces stainless steel tubes.

Figure 2: Specimen of the Tube UNS S31803



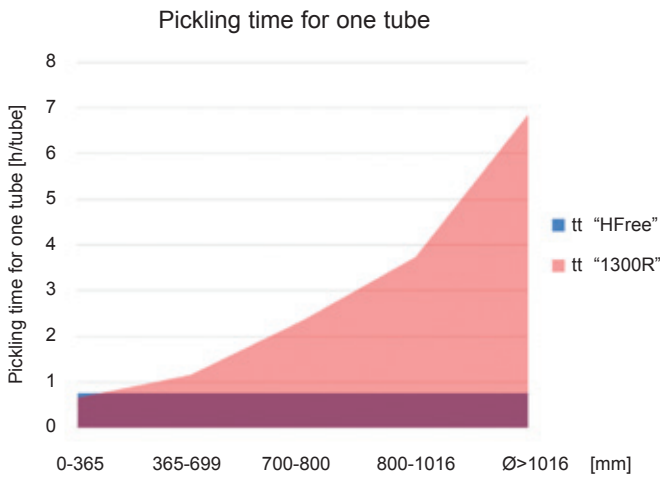


Figure 3: Time for one tube in the two processes

In order to evaluate the production potentials of HFree electro pickling it has been compared with the traditional chemical pickling process, which allows the treatment of one or more tubes simultaneously during the same dive cycle according to its size.

The production has been standardised based on the geometrical characteristics of the material that is being treated and this has helped to obtain an average pickling time for tubes and for the more critical alloys. The results are summarised in Figure 3.

As can be seen, the 'HFree' process for a single tube appears to be very convenient in its treatment of large diameters. The condition becomes critical with smaller diameters where the traditional process allows the treatment of bundles of tubes.

For this reason the second stage of the research has been directed towards the analysis of the number of tubes that can be treated in the minimum cycle in the range of diameters shorter than 365mm.

Figure 4 shows the time for small diameter tubes, assuming to treat tubes per cycle.

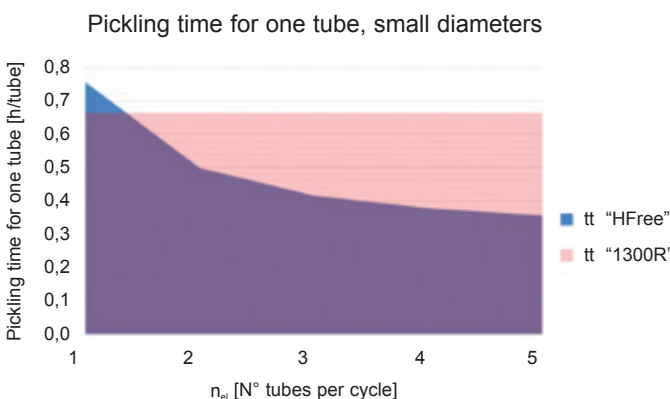


Figure 4: Time for tube of the two processes in small diameters, Ø<365mm

To obtain the diagram shown in Figure 4, certain performances have been assumed in the industrialised process that decrease with the increasing number of tubes per cycle.

In conclusion, HFree Life Pickling has developed an eco-industrial process that entailed remarkable environmental benefits with the complete elimination of the toxic substances and the consequent reduction of the environmental impact.

Moreover, the process has achieved excellent production capacities, with possible potential for improvement connected to the chosen plant engineering and a containment of the costs correlated to less energy used compared to the traditional process with consequent benefit, even from an environmental viewpoint.

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Torsional vibrations in carbide sawing

By Willy Goellner, chairman and founder – Advanced Machine & Engineering/AMSAW

Torsional vibration in carbide saws has the most damaging effect on the tool life of carbide tipped circular saw blades. It is also influenced by the blade diameter, the quality of the saw blades, the spindle gear diameter, compliance of the gear train in the saw head and feed system and the stiffness of the fixture and machine structure.

The saw blade must also be rigidly clamped to the drive hub to guarantee a stiff transmission of the maximum torque to the saw blade. This can be accomplished by friction or by using both friction and drive pins for positive transmission. A larger diameter drive hub would better stiffen the blade to resist lateral vibrations, but it would also require larger diameter saw blades, which would increase the lateral vibrations on the teeth. The gain would only be minimal.

The carbide tipped circular saw blade is just as important for cost-efficient sawing. If not properly manufactured and tensioned it will vibrate laterally and could initiate torsional vibrations. The blade body is torsionally very stiff in the cutting direction, but laterally 90° to the blade plane very weak.

The smaller a blade diameter can be, the better it will resist any vibrations because the amplitudes of the lateral vibrations increase proportionally with larger blade diameters. That means the blade will cut a wider slot, increasing the drive

torque, and might start torsional vibration if the drive train is overloaded.

Figure 1 shows the relationship of the blade and spindle gear diameters in relation to the billet diameter. It demonstrates that the maximum material diameter [MØ] which can be cut must be in the envelope of blade [BØ] and spindle gear [GØ] diameter.

$$M\text{Ø} \approx \frac{B\text{Ø} - G\text{Ø}}{2}$$

The carbide tipped circular saw blade diameter should be as small as possible because:

1. A smaller saw blade is less expensive
2. A smaller saw blade is easier to handle
3. A smaller saw blade requires less cutting torque
4. And therefore will lower any chance of torsional vibrations

The spindle gear in contrast must transmit the maximum torque to the blade and needs to be big enough to guarantee sufficient rigidity.

Therefore, an experienced design engineer will have to calculate the gear train and establish the proper cost-efficient parameters.

The gear schematics in Figure 2 show a typical four-shaft gear box.

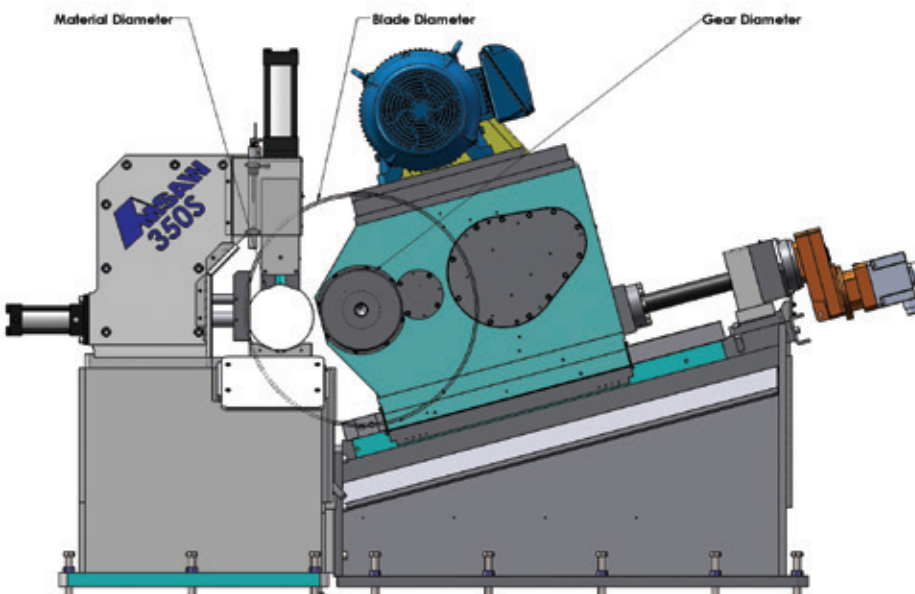


Figure 1: Blade and spindle gear diameter in relation to the material diameter

For the largest carbide billet saws, five or even six shafts might be needed to obtain the required gear reduction for large saw blades. Each matching gear set needs a minimum of about 0.05mm (0.002") backlash to transmit the torque without overheating. The backlash also increases with the number of gear shafts but only with a smaller amount, because the gear backlash of each gear set is reduced by the gear reduction of each set.

Maximum diameters of carbide tipped circular saw blades can reach 2m (80") for large carbide billet saws to saw 760mm (30") diameter max billets. In comparison, the spindle output gear diameter could be as small as 300mm (12") with a diameter ratio of 2,000/300=6.6.

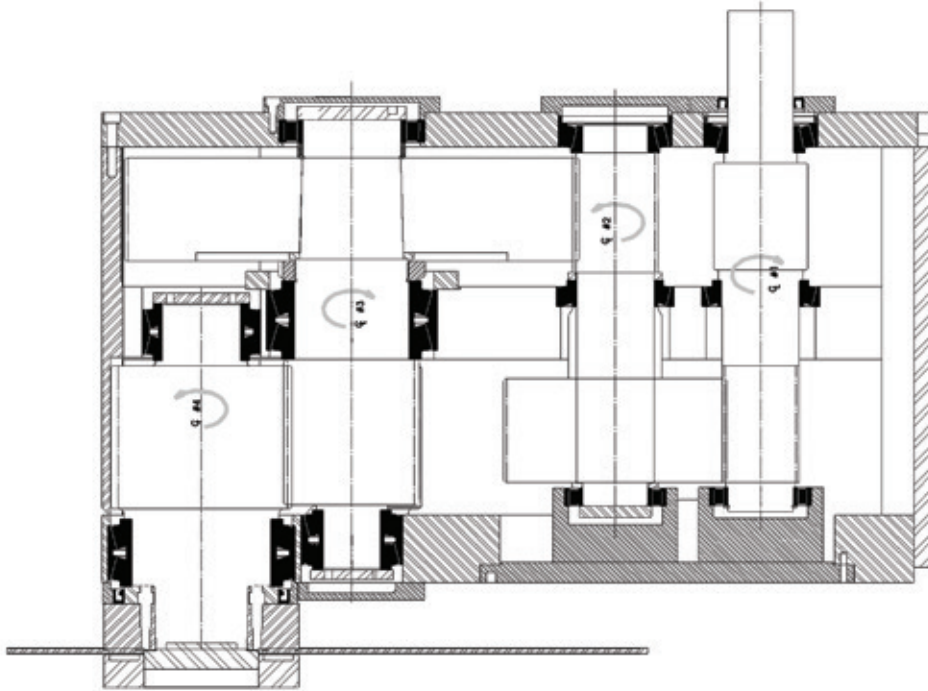


Figure 2: Typical four-shaft gear box

A 0.05mm (0.002") backlash of the spindle gear mesh alone will show a 0.33mm (0.013") backlash on the carbide tooth.

On a four-shaft gear box, the total backlash is somewhat higher because the backlash of the other two gear sets must be also added, but is reduced by the gear reduction and therefore does not add a lot more backlash.

In contrast, a typical feed rate of 0.15mm (0.006") per tooth shows the dramatic impact of the backlash. In this example, the total backlash would be more than two times higher than the feed rate per tooth.

The saw blade and its mounting shaft have relatively little inertia. During the time the total backlash is being removed, the blade tooth momentarily pauses in its rotation while the motor continues at its full speed. When the backlash is eliminated, the blade comes up to speed almost instantly.

The speed may momentarily be even higher if the compliance of the gear train is high and the cutting tooth 'springs' forward and impacts the material at full force. When the tooth exits the material, the backlash will open up again and the process repeats until some teeth will stay in the cut. This single tooth exciting frequency measured in Hz could create a maximum impact force of 1,000lb (4,448N) and become critical when its frequency matches a natural frequency of the machine structure to result in resonance.

As more teeth are engaged, the torque of the gear train will increase but the fluctuating impact force is only caused by one tooth engaging and disengaging the cut. This fluctuation of the wind-up of the gear train could create torsional vibration and is very damaging to the carbide teeth, reducing the tool life.

It is very hard to measure torsional vibration because the rotating gear shafts are inside the gear box and would require

complicated arrangements of the sensors and instruments. However, the torsional vibration can also be calculated.

What have we learned?

- The design of a carbide saw is very complex and requires much engineering know how.
- The quality of the carbide tipped circular saw blade is critical to prevent vibrations.
- The ratio between saw blade diameter and spindle gear diameter determines the max stock diameter which can be cut.
- Torsional vibration depends greatly on the total backlash of the gear box, its compliance, the carbide tipped saw blade diameter, and the stiffness of the machine sub-assemblies.

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The use of large and heavy walled pipes for the oil and gas industry

By Protem SAS, France

The selection of wall thickness is never due to chance in the industry. During the design phase, the characteristics of the wall thickness must be carefully studied and determined to avoid any complications and avoid unnecessary costs.

Why is it so important to determine wall thickness for pipelines?

Undersea pipelines are known to have wall thicknesses up to 75mm (2.953"). So why would you need that much steel for an oil and gas pipeline?

Pipes are subjected to high mechanical, thermal and chemical temperatures or pressures, depending on the type of fluid they transport, especially at depths of over 2km (1.24 miles).

The working conditions pipes are subjected to must be calculated by design engineers and the result must be in accordance with applicable codes.

If there are no codes or standards that specifically apply to the oil and gas production facilities, the design engineer may select one of the industry codes or standards as the basis of design.

The design and operation for the gathering, transmission, and distribution pipeline systems are usually governed by codes, standards and regulations. The design engineer must verify whether the particular country in which the project is located has regulations, codes and standards that apply to facilities and/or pipelines.

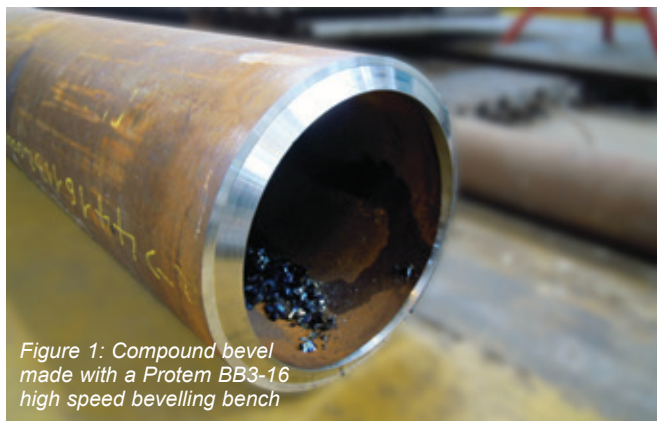


Figure 1: Compound bevel made with a Protem BB3-16 high speed bevelling bench

Once the inner diameter (ID) of the piping segment has been determined, the pipe wall thickness must be calculated.

There are many factors that affect the pipe wall thickness requirement, which include:

- Maximum and working pressures
- Maximum and working temperatures
- Chemical properties of the fluid
- Fluid velocity
- Pipe material and grade
- The safety factor or code design application

Wall thickness pipe formula

The basic formula for determining pipe wall thickness is the general hoop stress formula for thin wall cylinders, which is stated as:

$$t = \frac{Pd_o}{2(H_s + P)}$$

Where:

H_s = hoop stress in pipe wall (psi)

t = pipe wall thickness (in)

P = internal pressure of the pipe (psi)

d_o = outside diameter of pipe (in)

As an example, an undersea gas pipeline will use pipes made from 39mm (roughly 1.54") of high-quality material with additional plastic coatings. The pressure would be considerable at 2km (1.24 miles) depths (on the order of 20MPa or 200 atmospheres). The pipe would need to be thick enough to withstand these very high pressures.

We saw that the depth is an important issue to determine the wall thickness of tubes. Another parameter must be taken into account: the installation method. Different methods, such as J-lay, S-lay and reel lay, may cause fatigue in the pipe sections. Correct wall thickness must be determined in consideration of consequences.

The material grade specified for pipes with wall thickness less than 30mm (1.181") is usually X-60, or X-65 for high-pressure pipelines or deep water applications. Higher grades can be selected in special cases. Lower grades such as X-42, X-52 or X-56 can be selected in shallow water or for low-pressure, large diameter pipelines to reduce material cost.

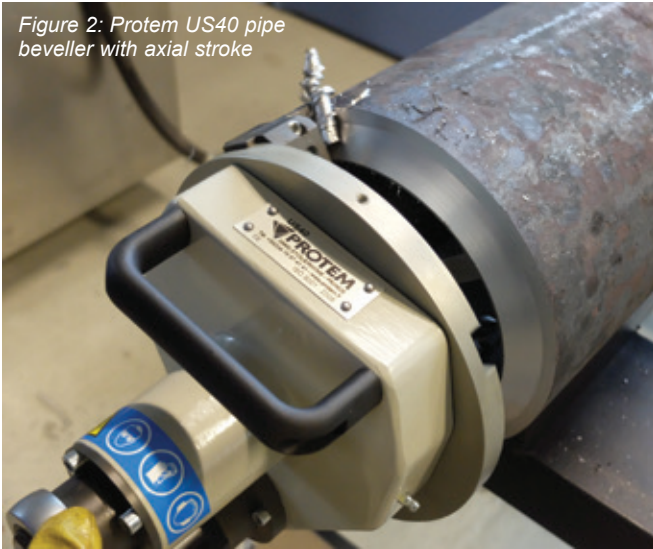


Figure 2: Protem US40 pipe beveller with axial stroke

For example, in comparison with a 30° single angle bevel (grey zone plus red zone), a V bevel with a double angle of 30°/5° (grey zone) gives an economy of about 20 per cent in terms of weld metal for a part 20mm (0.787") thick.



Figure 4: Material saving for a compound bevel on a wall thickness of 20mm

The potential savings in terms of bevel volume increase in proportion to the wall thickness of the pipe to be welded. Consequently, savings will be over 35 per cent on a 30mm (1.181") thick pipe.



Figure 5: Material saving for a compound bevel on a wall thickness of 20mm

How to bevel heavy walled pipes?

When wall thicknesses increase on the parts to be welded, the quantity of weld metal that needs to be deposited in the weld bead also increases in similar proportions.

For avoiding welding operations that are too long and too costly from a labour and consumables point of view, preparations for welding joints with thicknesses of over 20mm (0.787") are made using bevellers that enable the total volume of the bevel to be reduced.

Double angle V grooves (or compound V grooves)

The first solution for reducing the size of the bevel is to make a change in the groove angle.

An initial angle of 30° or 37.5° (up to 45°) is combined with a second angle, generally between 5° and 15°.

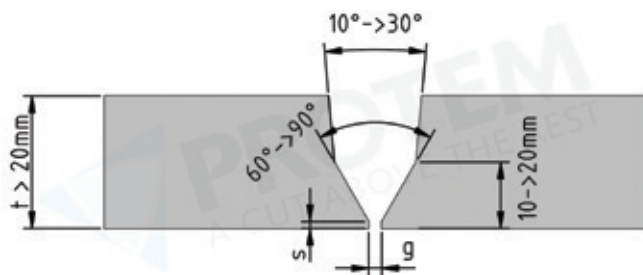


Figure 3: Compound bevel, V shaped

The first 30° or 37.5° angle must be kept to avoid the groove becoming too narrow and preventing the welder from making the root pass.

Just like single V grooves, these preparations require a land from 0.5 to 1.5mm (0.02 to 0.059") wide and an opening between the parts (g) between 0.5 and 1mm (0.02 and 0.039").

The hot pass for the land is usually done using the 141 process, and filling operations using the 13x or 111 processes.

Single and double angle J grooves

The second solution for drastically reducing the volume of the bevel and, consequently, the amount of weld metal is the 'J' groove preparation. Single angle 'J' grooves comprise an angle that is normally between 5° and 20°, a groove radius (r) and an increase in the land (e). The latter element makes the root pass easier to do by giving the welder better access to the land.

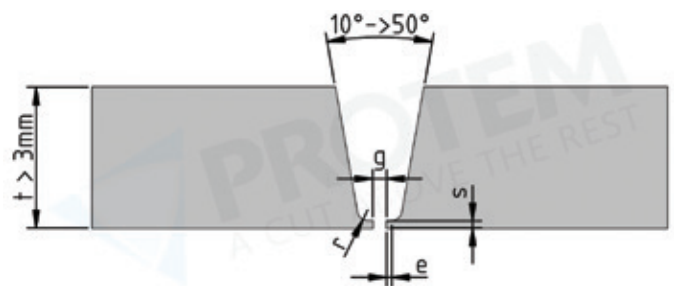


Figure 6: J bevel

For cases with very thick walls, compound angle J grooves can be made. Normally, the first angle is made at 20° and the second at 5°.

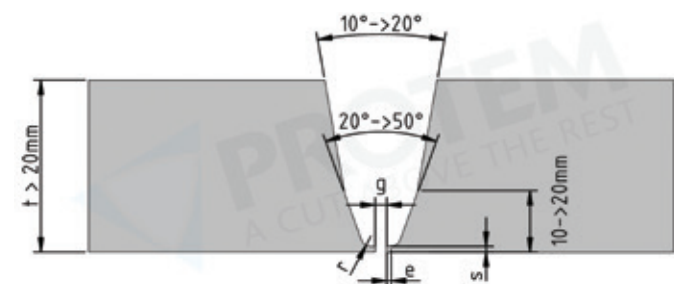


Figure 7: J compound bevel

J or compound J grooves are usually welded with either a very small or a zero opening (g) between the parts. From the point of view of geometry, bevels must be perfect to avoid cracking and other problems.

As well as providing the accuracy to be guaranteed for this type of preparation, the machine used must also be capable of machining thick-walled pipes rapidly, in order to meet the production speeds required by manufacturers.

Narrow gap preparation

A variation on this type of bevel is narrow-gap preparation, which is used more and more in the oil industry due to the increase in pipe wall thicknesses and the high production rates to be maintained.

The technique generally consists of making a single or compound angle J bevel, with an opening as narrow as possible.

This provides a very substantial reduction in the amount of weld metal used and an increase in productivity due to the decrease in welding times.

For thicknesses of over 50mm (1.968"), the productivity factor can be over five times higher than on a weld made with a traditional bevel. Even so, a large number of constraints are to be found in the use of this technique. Two of them have a direct impact on the weld preparation process.

Firstly, bevel geometry and the opening between the parts must be controlled with the utmost accuracy. This is because the opening between the parts does not give the welder access to the bevel root. As a result, the whole weld, including the root pass, must be done using an automatic process.

Automatic processes cannot accept any faults in alignment or irregularities in land width, contrary to the welder who is capable of adjusting the position of his torch for compensating any geometric faults in the groove.

The grade of the materials to be welded represents the second factor that must be taken into account. Every type

Figure 8: Application example: Producing a bevel at the end of a pipe, on-site, for an onshore pipeline



of material possesses different shrinkage characteristics. Therefore, bevel geometry (the opening angle) must be studied beforehand for each different grade.

The higher the shrinkage level of a material after welding, the more the angle has to be open, so as to prevent any cracks from appearing during solidification.

A variation of a few tenths of a degree in the angle is liable to have a direct impact on the occurrence or absence of cracking, especially when welding nickel-based alloys.

These types of constraints require long and costly preliminary studies. Therefore, they need to be accompanied by a perfectly controlled bevel machining process.

The description of the welding procedure (DMOS) resulting from preliminary studies requires lands to be accurate to one millimetre (0.039"), for angles to be accurate to one degree and for the parts to be welded to be aligned perfectly so as to avoid any possible welding defects.

Therefore, the equipment used for making the bevel must be capable of guaranteeing reliable repeat preparations under all conditions.

Different ways to perform a bevel with heavy wall thicknesses

Pipe facing machines

Several techniques exist for producing a bevel. The most often used method for wall thicknesses of less than 50mm (1.968") is a frontal facing process. For the oil and gas industry we are using pipe facing machines.

The Protem PFM – HSB can achieve perfect weld preparations on pipes with wall thickness up to 2".

For wall thicknesses over 50mm (1.968"), there is another approach to create bevels. Instead of performing the bevel with frontal machining, we create bevels or compound bevels by using a copying cam.

Radial movement is controlled by using a copying cam which allows the machinist to easily perform bevelling jobs on wall thicknesses up to 4" wall pipe. The tool holder is equipped with carbide tips.

Protem offers a high speed pipe facing machine with an outside clamping system and copying carriage.

The carriage mounted on the tool holder plate is driven with hydraulic radial movement.

With this machine you can perform end preps from 6" to 14" with wall thicknesses up to 60mm (2.362").

Another transportable machine, which performs custom bevels from 24" to 59" on wall thicknesses up to 4", is the US600-R.

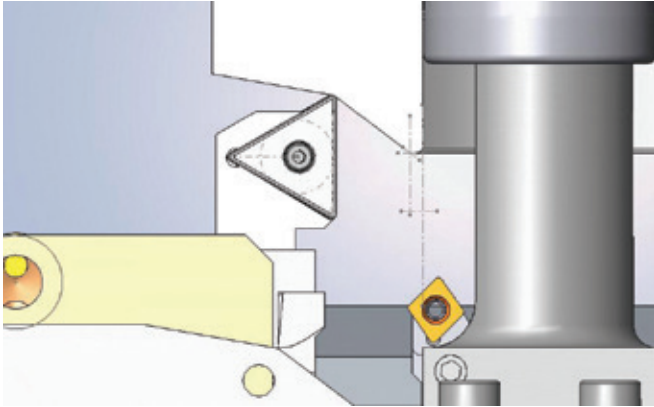


Figure 9: Cam profile copying. The carriage is provided with a copying roller that follows the profile of the internal diameter of the tube

This machine performs any type of weld preparation, such as an I-bevel, J-bevel, V-bevel, compound bevel, etc. with accuracy and repeatability, on any type of material: carbon steel, stainless steel, alloy, Inconel, duplex or super duplex.

Copying carriage technology

Protem has a full range of pipe cutting and bevelling clamshell machines from 2" to 58".

This machine is made for construction, maintenance and dismantling projects. Protem TTNG machines can perform bevels on pipes with wall thickness up to 4".

The process steps for machining extreme wall thicknesses are as follows: Make a straight cut on the pipe; and set up a copying carriage to perform J-bevels or compound bevels.

Figure 10: Protem OHSB machine performing a bevel on a pipe with a heavy wall thickness

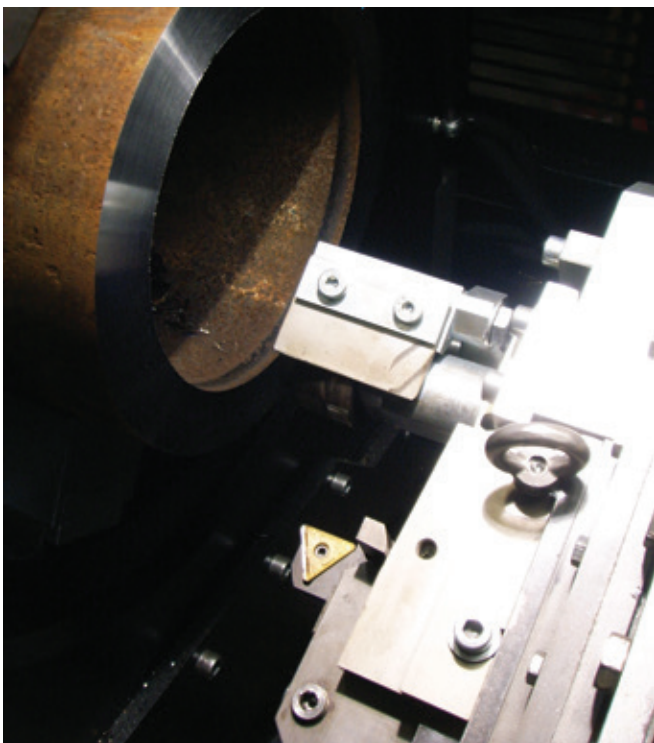


Figure 11: Protem clamshell TTNG1016. 32"-40" heavy wall thickness – Material: austenitic stainless steel

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