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MARCH 2017

管道技術 Technology

VOL 30 NO 2

US\$33



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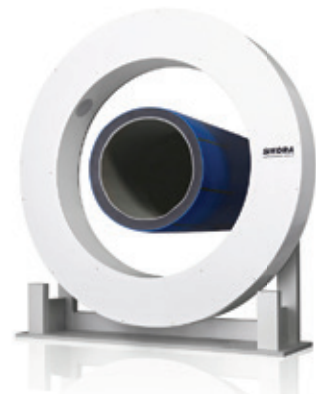


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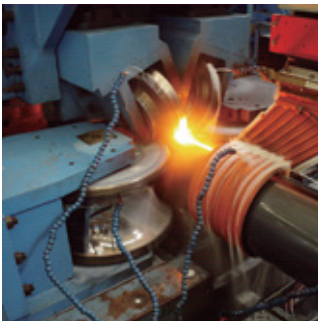
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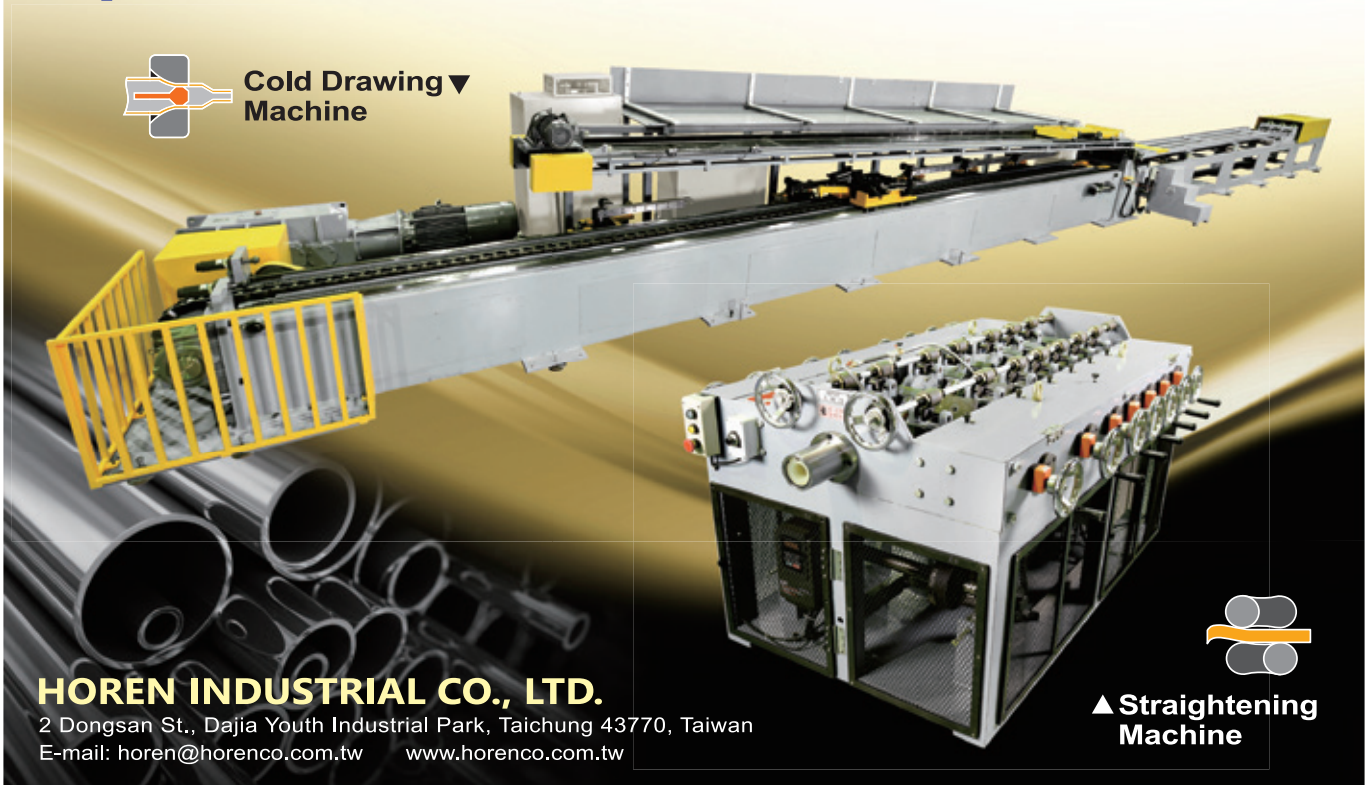
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## PRECISION COLD DRAWN SOLUTIONS FOR METAL TUBES AND RODS



Cold Drawing Machine

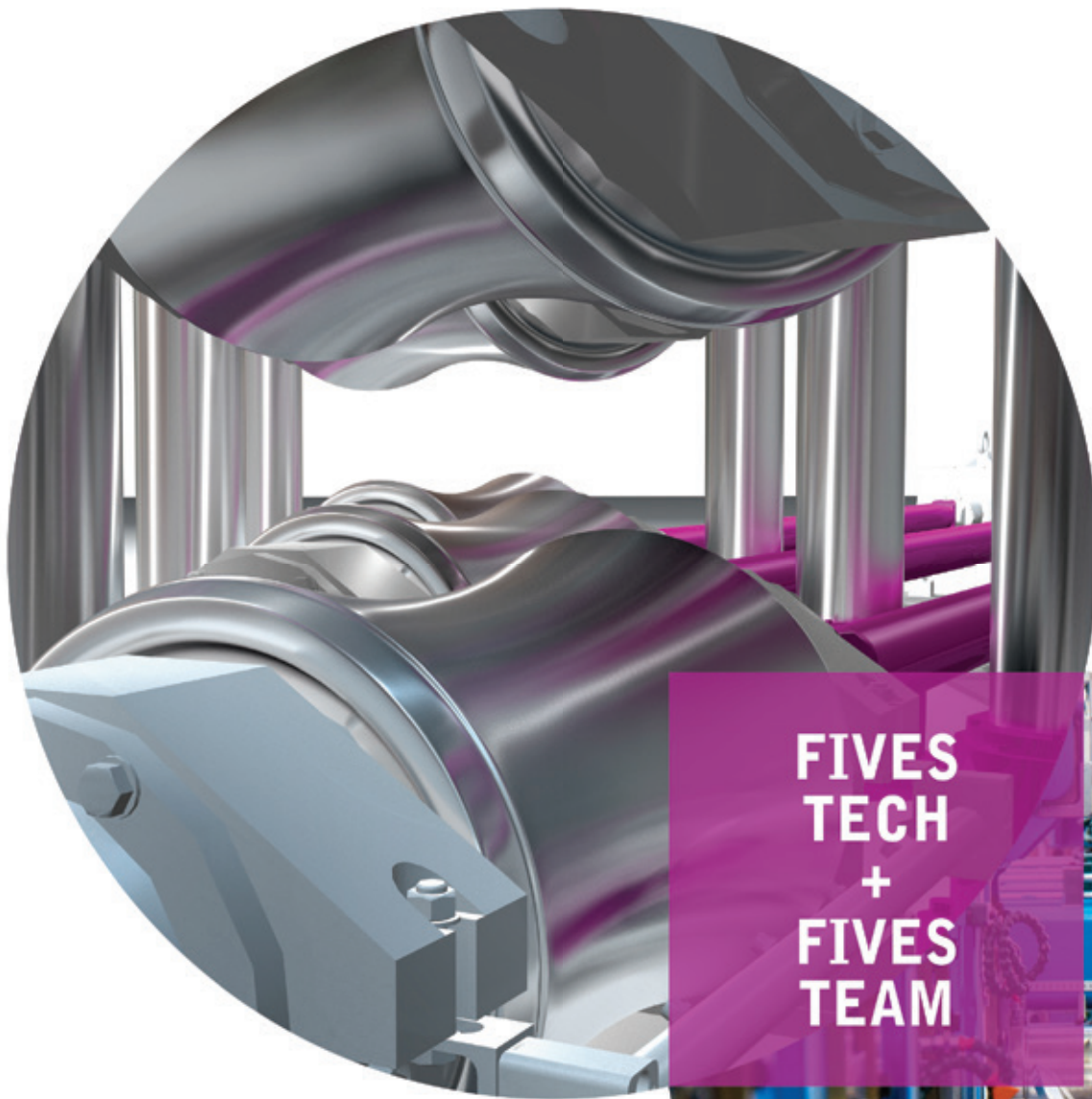


Straightening Machine

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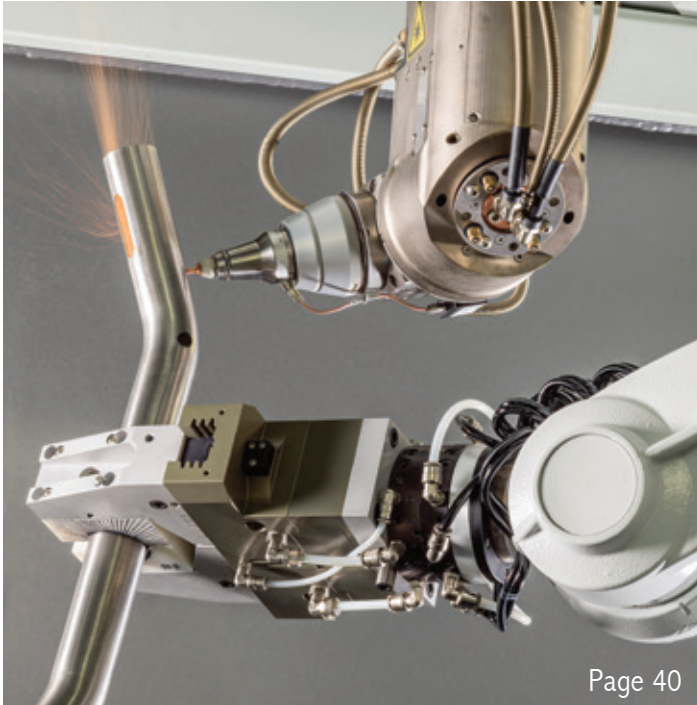
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# March/April 2017

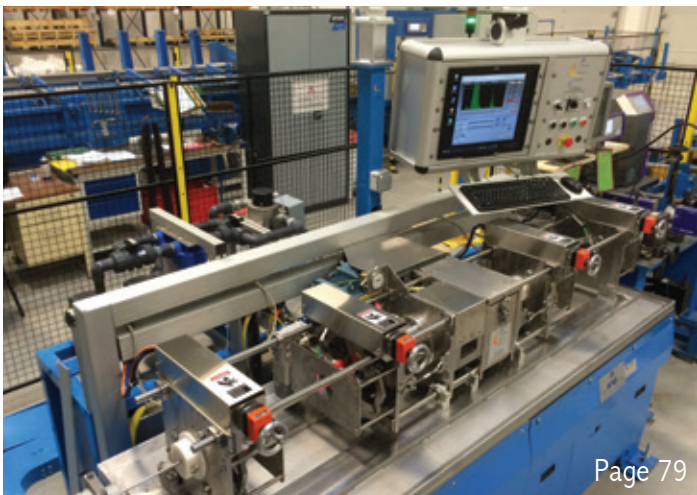
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## The March Issue



Rory McBride –  
Editor

Welcome to the latest issue of Tube & Pipe Technology magazine. This issue we have a feature on inspection, testing and quality control as well as two extended technical articles. The first is on measuring compliance and examines the weaknesses in carbide saws. It is written By Willy Goellner and Christian Mayrhofer. The second article is on X-ray weld inspection and is from Hajo Schulenburg, CEO of VisiConsult X-ray Systems & Solutions GmbH.

The March issue is being distributed at Tube Russia 2017 in Moscow. We will be at the show along with our sister wire magazines so please do come and say hello.

Exciting news this issue is that Messe Düsseldorf has announced increased involvement with FABTECH 2017, already a great event and set to be even bigger. It will also be hosting a trade show called Iran Tube 2017 at what is an exciting time for many tube-related industries in the country, so the event should prove an excellent way to help open doors in this relatively untouched but promising market.

Next issue we have features on tube mills and rollforming lines, advances in tube lubricants, and the trade show Guangzhou 2017 in China. The editorial deadline is 17 March and the advertising deadline is 7 April.

Enjoy the magazine.

## On the cover . . .

The roots of EFD Induction go back to the launch in 1950 of a universal induction hardening machine by the German company Induktionserwärmung Fritz Düsseldorf GmbH (FDF).

While FDF was expanding in the 1970s, an induction revolution was taking place in Norway, where engineers had figured out how to transistorise frequency converters for induction heating.

In 1981 three of those engineers founded ELVA Induksjon AS. In 1983 they unveiled the Minac range of mobile converters. Workpieces no longer had to be brought at great cost to a stationary induction heater – the heater could now go to the piece.

In 1991 the managing directors of FDF and ELVA met by chance. They talked and speculated. FDF was strong in stationary induction hardening machines. ELVA was the agile innovator with a track record in finding new applications for induction heating. What if the two companies got together? In January 1996 FDF and ELVA merged to create EFD Induction. And the rest is, as they say, history.



# INDUSTRY

## FD Machinery receives ERW tube mills order from APL Apollo Tubes in India

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](mailto:sales@fdmachinery.com)

Website: [www.fdmachinery.com](http://www.fdmachinery.com)

## Bronx commissioned to produce straightening machine for Turkish shipyard

MEYER Turku, Finland, one of the world's leading cruise ship builders, has contracted Fives, a global industrial engineering group, to design and supply

Bronx straightening equipment. Fives will design and deliver a fully automated and motorised Bronx 13-roll straightening machine to process bulb sections up to

220mm wide, which feature heavily in the construction of cruise ships, ferries and special vessels and will form part of a profile preservation line. The Bronx straightening machine is due to be installed and commissioned during the summer of 2017 and will represent the second straightening installation to be supplied to the Meyer Group in the last four years.

Fives provides a broad range of high performance Bronx section straighteners, including fixed centre, variable centre, multi-strand, two plane and between housing. Bronx machines can accurately and efficiently straighten the widest range of ferrous and non-ferrous sections produced.

Section straightening machines are equipped with the patented Computer Aided Setting System to automatically compute the optimum roll settings and adjust the rolls to the proper position.

**Fives Bronx – France/USA/UK**

Website: [www.fivesgroup.com](http://www.fivesgroup.com)



*The section straightening equipment*



# DIARY

## of Tube Events

# 2017

## Scott Miller joins Ambrell



Scott Miller

AMBRELL Corporation, which produces and distributes induction heating solutions worldwide, has appointed Scott Miller into a new role as Pan-European sales manager. He will be responsible for central and Eastern Europe and the southern portion of the UK and will be based in Ambrell's Cheltenham, UK, facility.

Mr Miller has a degree in engineering and over 25 years' experience in the tube, pipe and long product industries. He has extensive skills in national and international sales, contract negotiation, capital equipment sales and the management of international agents, representatives and distributors. He has also been a member of the European Management Board of the International Tube Association.

Previously, Mr Miller was a global sales manager for steel mill capital equipment and regularly travelled internationally for sales and contractual purposes. He negotiated at the board level with clients from the OCTG, automotive and international steel industries. He is looking forward to working with customers from these and other industries to help them enhance their manufacturing processes with Ambrell induction heating solutions.

**Ambrell – USA**  
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[www.read-tpt.com](http://www.read-tpt.com)

	<p><b>23-25 March</b> <b>Boru 2017</b> <i>(Istanbul, Turkey)</i> International Exhibition <a href="http://www.borufair.com">www.borufair.com</a></p>
	<p><b>17-19 May</b> <b>Made In Steel</b> <i>(Milan, Italy)</i> International Exhibition <a href="http://www.madeinsteel.it">www.madeinsteel.it</a></p>
	<p><b>5-8 June</b> <b>Tube Russia</b> <i>(Moscow, Russia)</i> International Exhibition <a href="http://www.metallurgy-tube-russia.com">www.metallurgy-tube-russia.com</a></p>
	<p><b>28-30 June</b> <b>Guangzhou Tube Fair</b> <i>(Guangzhou, China)</i> International Exhibition <a href="http://www.chinaexhibition.com">www.chinaexhibition.com</a></p>
	<p><b>18-23 September</b> <b>EMO</b> <i>(Hanover, Germany)</i> International Exhibition <a href="http://www.emo-hannover.de">www.emo-hannover.de</a></p>
	<p><b>19-21 September</b> <b>Tube Southeast Asia</b> <i>(Bangkok, Thailand)</i> International Exhibition <a href="http://www.tube-southeastasia.com">www.tube-southeastasia.com</a></p>
	<p><b>3-5 October</b> <b>TUBOTECH</b> <i>(São Paulo, Brazil)</i> International Exhibition <a href="http://www.tubotech-online.com">www.tubotech-online.com</a></p>
	<p><b>6-9 November</b> <b>FABTECH</b> <i>(Chicago, USA)</i> International Exhibition <a href="http://www.fabtech-expo.com">www.fabtech-expo.com</a></p>
	<p><b>21-24 November</b> <b>TOLexpo</b> <i>(Paris, France)</i> International Exhibition <a href="http://www.tolexpo.com">www.tolexpo.com</a></p>

## Lincoln Electric remembers 'employee of the century' Omer W Blodgett, aged 99

WELDING industry pioneer and Lincoln Electric's 'employee of the century', Omer W Blodgett passed away on 11 January, 2017. He was 99 years old.

Mr Blodgett, a world-renowned authority on the design of welded connections, spent 60 years working at Lincoln Electric, retiring as a senior design consultant. During his tenure, he authored numerous manuals and textbooks for the arc welding industry and his seminars on welding were known throughout the welding industry.

"We are indebted to Omer, who was a mentor to many," said Christopher L Mapes, Lincoln Electric's chairman, president and chief executive officer. "He left a lasting legacy in our industry and will be fondly remembered with great honour. We extend our heartfelt condolences to his family."

Mr Blodgett became involved in welding when he struck his first arc at the age of ten with his father's Lincoln Stable-Arc welding machine in Minnesota, USA. Through his high-school years Mr Blodgett worked as a welder at his father's company and became certified as a welder for high-pressure applications in 1938.

He earned a Bachelor of Science in metallurgical engineering and a Master's Degree in mechanical engineering from the University of Minnesota and then became a welding superintendent at the Globe Shipbuilding Company. Under demanding war-time production conditions Mr Blodgett learned first-hand how to solve welding-related problems, such as distortion and cracking, and



Omer W Blodgett

met James F Lincoln (known as JF), with whom he would share a lifetime friendship.

After World War II Mr Blodgett joined Lincoln Electric at JF's request, first serving as a technical representative and later as a design consultant – working in both the mechanical and structural fields. In this role, he became the primary presenter of the Lincoln Electric Welding Design Seminars, which continue today and are named in his honour. Additionally, Mr Blodgett frequently spoke on welding design at the American Welding Society (AWS) sectional and national meetings and conducted welding design seminars all over the world.

During his career he authored numerous technical articles and

handbooks on design, including 'Design of Weldments' and 'Design of Welded Structures'. He was a licensed professional engineer in the State of Ohio, and a fellow of the ASCE (American Society of Civil Engineers), ASME (American Society of Mechanical Engineers) and the AWS. Other affiliations include Tau Beta Pi and Sigma Xi.

Mr Blodgett was also a long-time member and contributor to a number of professional organisations including the AWS D1 Structural Welding Committee, the American Institute of Steel Construction (AISC) Committee on Specifications, and the Welding Research Council (WRC) Task Group on Beam-to-Column Connections.

AWS recognised his contributions in 1962, 1973, 1980 and 1983, when he was awarded the AF Davis Silver Medal for his work in structural design. From the AISC, he received the TR Higgins Lectureship Award in 1983, the Engineering Luminary Award in 1997 and AISC's Lifetime Achievement Award in 1999.

In 1995, LeTourneau University awarded Mr Blodgett an honorary Doctor of Science degree, in addition to naming the Welding Engineering chair in his honour. In 1999 he was named by *Engineering News-Record* as one of the construction industry's top 125 innovators over the past 125 years, a distinction also given to Thomas Edison, Frank Lloyd Wright and RG LeTourneau.

**Lincoln Electric – USA**  
Website: [www.lincolnelectric.com](http://www.lincolnelectric.com)

## Tubotech returns to São Paulo

THE international trade fairs Tubotech and wire South America will take place against the background of expectations for an economic recovery in the coming year. They will be held jointly at the São Paulo Expo Exhibition & Convention Center in Brazil from 3 to 5 October 2017.

Economic experts believe the Brazilian economy is set to step out of its current recession in 2017, though it is uncertain how dynamic this recovery

will be. Following the pattern of the previous event, the trade fair duo is again likely to attract around 500 exhibitors from 24 countries on an exhibition space of over 32,000m<sup>2</sup>, and more than 11,000 trade visitors.

Tubotech, the international trade fair for pipes, valves, pumps, fittings and components, will be held for the ninth time.

Since its premiere in 2001, it has developed into a leading trade fair

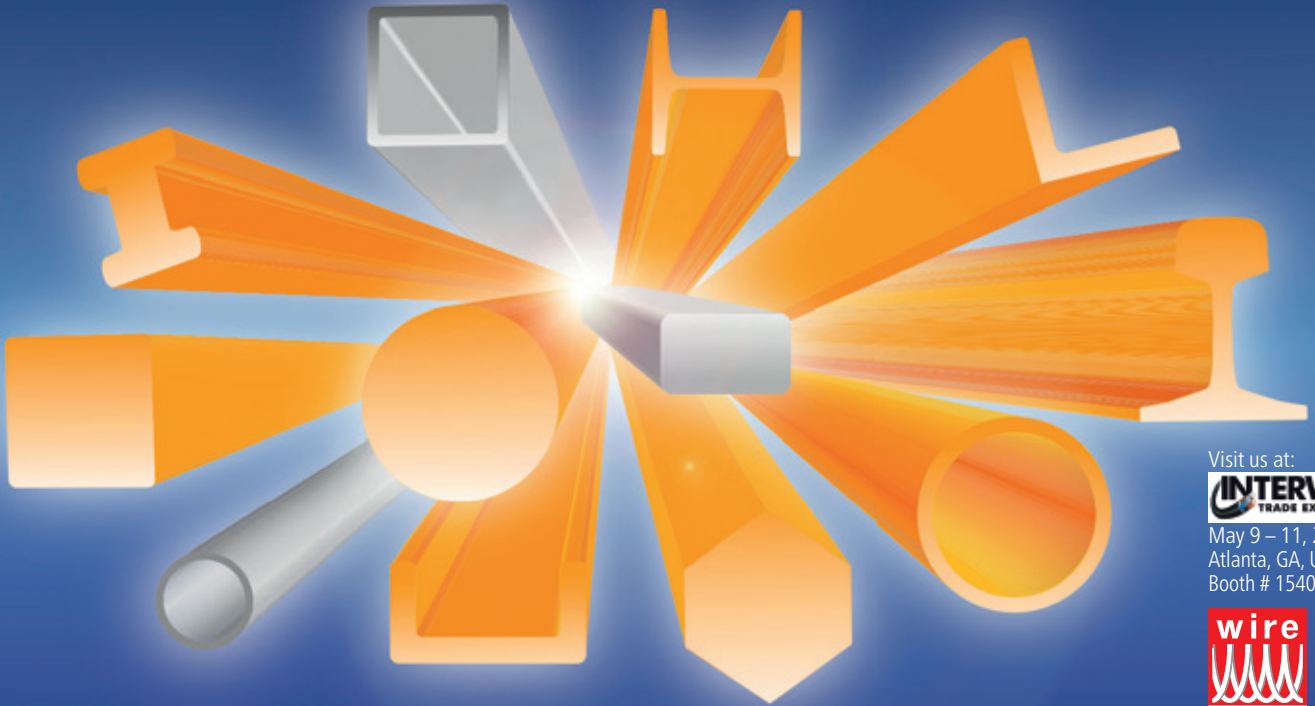
on the South American continent. The products on offer are pipes and accessories, plants and machinery for the manufacturing, processing and finishing of pipes, raw materials, used machinery, the pipe trade, process engineering tools and accessories, as well as measurement, control and test equipment.

**Messe Düsseldorf GmbH – Germany**  
Website: [www.tubotech-online.com](http://www.tubotech-online.com)



# Measure And Validate Your Profile

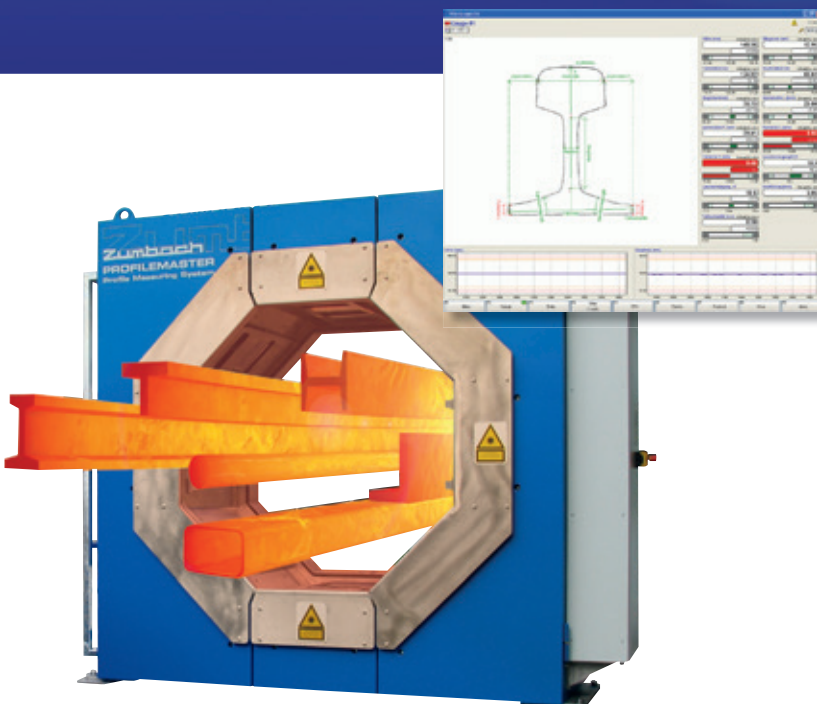
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## battenfeld-cincinnati USA appoints new president and CEO

PAUL Godwin has taken over the position of president and CEO of battenfeld-cincinnati USA. Mr Godwin brings with him experience in extrusion processes, material and equipment.

He started his career with Dow Chemical in 1979 and held professional assignments with Bayer, HPM and Maag prior to joining battenfeld-cincinnati USA, where he led sales and marketing and, most recently, the engineering department.

“Paul is an industry insider and has been with battenfeld-cincinnati USA for almost two decades. His in-depth experience ideally positions him to advance battenfeld-cincinnati’s commitment to equipping customers

with the technologies, services and expert support they need to succeed in today’s demanding marketplace,” said Gerold Schley, CEO of the battenfeld-cincinnati group.

Mr Godwin commented, “We have a highly experienced and motivated team, and I look forward to working with them in my new capacity. I am excited to continue the support of our customer base and promote battenfeld-cincinnati USA as the leader in technology and support.”

battenfeld-cincinnati USA is part of the global battenfeld-cincinnati group of companies and is based in Kansas, USA. With a workforce of 70 it produces localised extruders and tooling for the US



Paul Godwin

market as well as providing engineering and service for complete PO and PVC pipe and profile extrusion lines.

**battenfeld-cincinnati – USA**  
Website: [www.battenfeld-cincinnati.com](http://www.battenfeld-cincinnati.com)

## RSA wins innovation award in separation technology category

RSA cutting systems GmbH has won the MM Award 2016 in the ‘separation technology’ category, with the layer saw Rasacut LS 150, which was introduced in April 2016.

The award, which recognises innovations in metal processing that

benefit users, the environment and society, was presented to RSA managing director Thomas Berg and development manager Stephan Feldhoff during a ceremony at the AMB international exhibition for metal processing in Stuttgart, Germany.

RSA produces cold circular saws, de-burring systems, industrial brushes and saw blades for the global market. The products are used in the automotive and furniture industry as well as in the steel trade.

By using newly developed servo clamping, the layer saw Rasacut LS 150 can saw especially thin-walled tubes, tubes with a difficult ratio between diameter and wall thickness, and tubes with a stability higher than 1,200N/mm<sup>2</sup> in single, double and triple cut. It can replace three cold circular saws or four band saws.

It can produce workpieces that previously required complex laser processing, and after sawing production steps like de-burring, chamfering, checking, washing, drying and unloading can be executed.

**RSA cutting systems GmbH – Germany**  
Fax: +49 2304 9111 100  
Email: [rsa.d@rsa.de](mailto:rsa.d@rsa.de)  
Website: [www.rsa.de](http://www.rsa.de)

Rasacut LS 150 won the MM Award 2016





# Sanyo Seiki Co., Ltd.



## *SST Forming Roll, Inc.*

## *Forming the Future*



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**TEL: 1 847-215-6812**  
**[info@sstformingroll.com](mailto:info@sstformingroll.com)**

## Arvedi Tubi Acciaio commissions upgraded tube welding line from SMS group

ARVEDI Tubi Acciaio has successfully completed the installation of a high-frequency tube welding line (ERW) upgrade by SMS group. The line can now handle tubes of up to 14" in diameter at the factory located in Cremona, Italy.

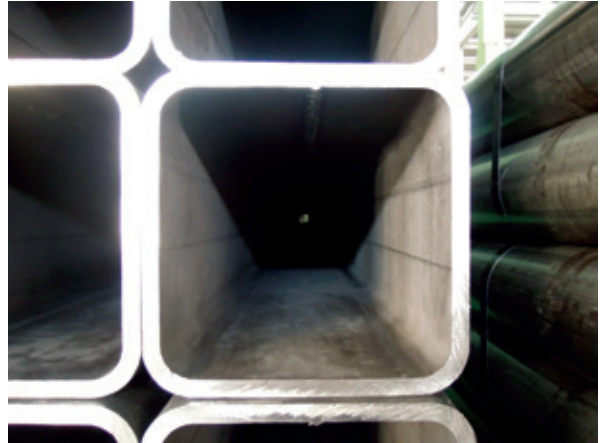
To be able to use wider strip coils, improve the rolling conditions and secure competitiveness in the long term, Arvedi has commissioned SMS group to upgrade its existing 12¾" tube welding line to a welding line for up to 14"

tubes. The upgrade also included the exchange of the cutting device in the profile tube cutting line complete with the associated controls.

After only four weeks of rebuilding, the upgraded tube welding line was handed over to the customer on time, ready for operation.

The upgraded equipment allows Arvedi Tubi Acciaio to expand its portfolio in terms of product types and dimensions. It will not only be possible to have a greater outside tube diameter of up to 14", but to also produce square tubes of up to 300 x 300mm and rectangular tubes of up to 400 x 200mm.

With this tube welding plant upgrade, Arvedi is placing the focus of production on high-grade and specialist products, mainly for use in the automotive, petrochemical, thermal and construction industries as well as in mechanical engineering.



"As we are very satisfied with the tube welding plants SMS group has supplied to us in the past, we decided to also have this recent upgrade done by SMS," said Mario Caldonazzo, CEO of Arvedi Tubi Acciaio. "Thanks to this upgrade, plant availability has become even better, allowing us to respond to specific requests of our customers even more quickly and flexibly."

**SMS group GmbH** – Germany  
Website: [www.sms-group.com](http://www.sms-group.com)

## Roll-Kraft expands technical engineering capability

ROLL-KRAFT, a supplier of tube and pipe and roll form tooling, has appointed Yervand Poghosyan as vice-president of engineering. Mr Poghosyan comes to Roll-Kraft from Dahlstrom Roll Form, where he was the vice-president of operations. He has held previous positions as CIS executive director and chief development engineer for the Harwal Group of manufacturing companies, and was also the general project manager at Ararat Group in Armenia.

Mr Poghosyan holds a Master's Degree in machine building technology, metal cutting and machine tools from State Technical University in Armenia. He also holds a Master's Degree in business administration from the

University of Liverpool in the UK. His training includes FESTO pneumatic systems, as well as roll design and advanced roll design, and he has worked with noted roll form experts George Halmos and George Dobrev.

With wide-ranging experience in the roll forming industry, Mr Poghosyan has designed and completed an estimated 100 sets of roll tooling and machines that are in use in various countries around the world. His expertise will add to Roll-Kraft's technical engineering capabilities.

**Roll-Kraft** – USA  
Fax: +1 440 205 3110  
Website: [www.roll-kraft.com](http://www.roll-kraft.com)



*Yervand Poghosyan,  
vice-president of engineering*



## Tenova Pyromet switches in India's largest SiMn furnace

HIGH capacity furnace and smelting plant specialist Tenova Pyromet has announced that the 45 MVA submerged arc furnace for the Steel Authority of India Ltd's (SAIL) Chandrapur Ferro Alloy Plant (CFP) has been successfully switched in. Ramping up and tapping of the silicomanganese (SiMn) furnace, the largest in India, is in progress.

Tenova Pyromet carried out the contract from SAIL for the expansion to the plant in a consortium agreement with locally based supplier GSPL. The scope of work awarded included design and manufacture, supply and installation of the complete furnace and auxiliary equipment, refractories and structures, followed by testing, commissioning and performance guarantees. The plant has an installed capacity of 100,000 tpa FeMn (ferromanganese), SiMn and medium/low carbon FeMn. It is the only public

sector unit engaged in the production of manganese-based ferroalloys in the country.

The fully automated furnace incorporates Tenova Pyromet's equipment, including its electrode column, and the patented AutoFurn™ furnace controller, providing an additional level of automation above the SCADA and PLC to optimise power input to the furnace and maintain furnace balance and stability.

All equipment was locally manufactured in India, to optimise local content, with the exception of the mud gun and drill, which were manufactured in South Africa.

"This project demonstrates Tenova Pyromet's extensive process experience and project execution skills," said Andre Esterhuizen, general manager, sales and marketing, Tenova Pyromet. "Despite the remote area and language

barrier, we delivered successfully on our commitments to the client who also recognised the contribution of Tenova Pyromet personnel in maintaining an exceptional safety record on site."

Tenova Pyromet designs and supplies high capacity AC and DC furnaces and complete smelting plants for production of ferroalloys, base metals, slag cleaning and refining. It also designs and supplies equipment for material handling and pre-treatment, alloy conversion and refining, granulation of metal, matte and slag, furnace off-gas fume collection and treatment, and treatment of hazardous dusts and waste.

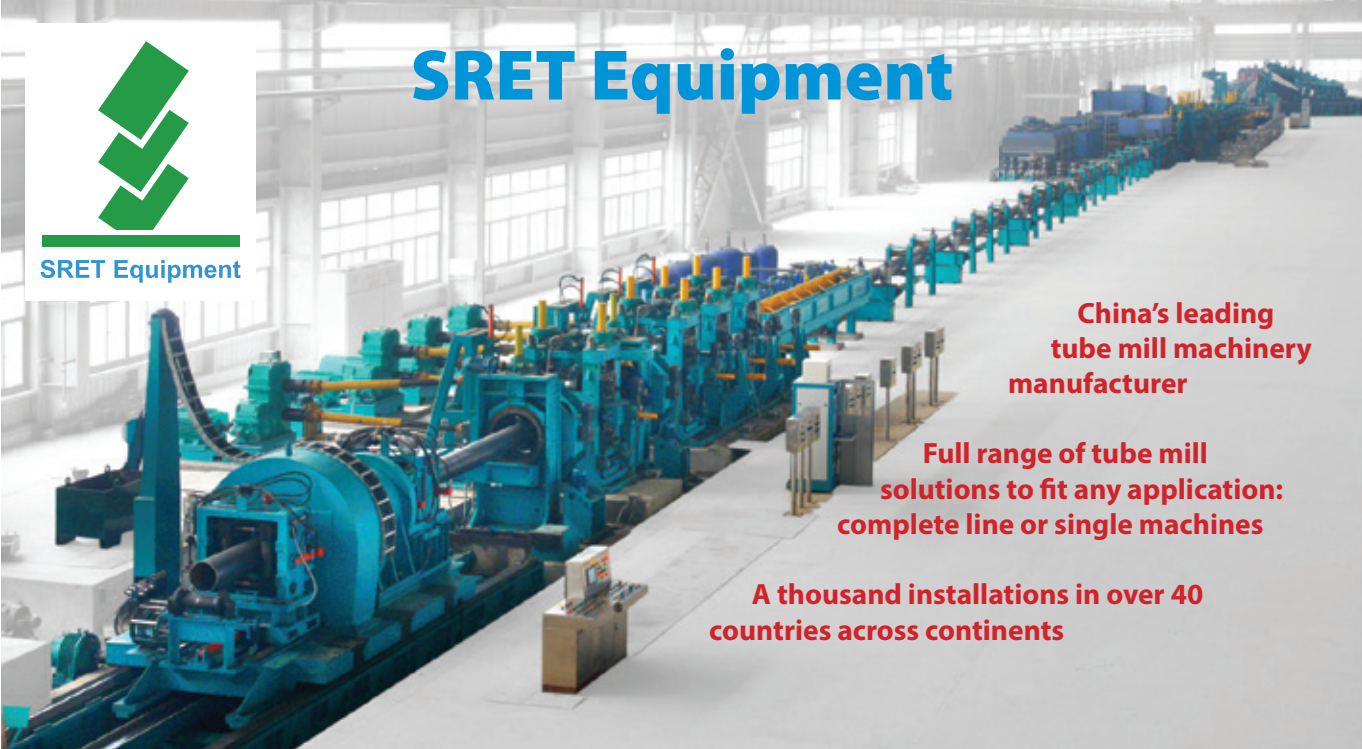
**Tenova South Africa (Pty) Ltd –**


South Africa

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## Grind Master strengthens its position in Europe

GRIND MASTER has announced the acquisition of SPMS Europe by Grind Master Group. SPMS and Grind Master are both involved in machine building and both pride themselves on a history of innovation.

SPMS is a French machine tool builder that has been in operation since 1974 and has a strong presence in technology products in the automotive industry in Europe.

With more than 500 machine installations globally, the SPMS product range includes specialised superfinishing machines for automotive transmissions, deep fillet rolling for crankshafts, specialised grinding machines for cylinder heads and cylinder blocks, centreless superfinishing machines and various deburring solutions. Over the years SPMS has been a trusted supplier to a large number of automotive OEMs

including Renault, Peugeot, Citroen, Fiat, Ford, Jaguar and Volkswagen.

The alliance strengthens the position of both partners with an expanded range of products and services to offer globally. The SPMS Supramatic range of products includes CMA gearbox superfinishing machines and DFR deep fillet rolling machines, and complements the Grind Master Nanofinish range of microfinishing and superfinishing machines. Grind Master's strong presence in India and China is also complementing SPMS's strong base in Europe.

Grind Master has become a global group of companies with this acquisition with solid operations in India, China and France and a strong collaboration in the USA. With international product and process development teams it is now ready to serve the international automotive industry.



Grind Master acquires SPMS Europe

**Grind Master Machines Pvt Ltd – India**

Fax: +91 240 2376205

Email: [sales@grindmaster.co.in](mailto:sales@grindmaster.co.in)

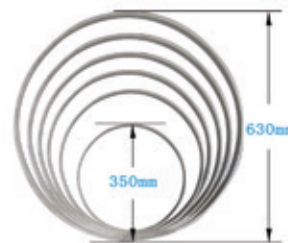
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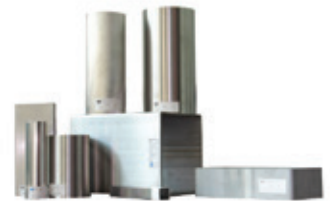
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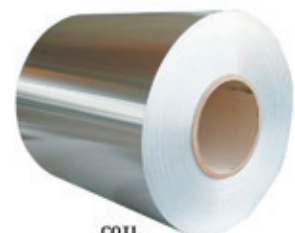
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Worldwide sales: MMS International ([www.mmsol.ru](http://www.mmsol.ru))

E-mail: [9951502@mail.ru](mailto:9951502@mail.ru)



## Addison Saws appointed as UK distributor for Simonds bandsaw blades

ADDISON Saws, a UK-based cutting and sawing technologies specialist, has been appointed as the sole UK distributor for Simonds International's bandsaw blades.

"Having sold Simonds' woodworking and metalworking blades for more

than thirty years, we are delighted to have been appointed as their official UK agent," commented Addison Saws managing director Gary Knight. "As the oldest cutting tool manufacturer in North America, Simonds enjoys an enviable reputation for the quality of

its products. Thanks to our many years spent working with the brand, we have an unrivalled knowledge of the Simonds product range – including its Bi-Metal, TCT, Carbon and 'Red Streak' wood-cutting blades."

The appointment of Addison Saws by Simonds occurred after the bandsaw blade manufacturer's previous UK distributor ceased trading.

"We are proud to be working with Simonds to ensure that UK woodworking and metalworking companies can continue to buy their superior quality bandsaw blades – blades which are manufactured to the most stringent quality standards," added Mr Knight. "We have invested in significant levels of stock to ensure continuity of supply."

**Addison Saws Ltd – UK**

Email: [sales@addisonsaws.co.uk](mailto:sales@addisonsaws.co.uk)

Website: [www.addisonsaws.co.uk](http://www.addisonsaws.co.uk)



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Available size :  
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- INSIDE BEAD REMOVING E/Q (2012)
- BEVELLING CUT IN SHEAR & WELDER (2011)
- ROLL CHANGING METHOD IN TUBE MILL (1996)

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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/m<sup>2</sup>) 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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## Poppe + Potthoff buys Plaschka

HIGH precision metal processing is a core competence of Poppe + Potthoff (P+P). The supplier to the automotive and engineering industry has now acquired Plaschka, with 120 employees at two locations.

The production capacities for precision components are thereby expanded, and competences are added that open up additional markets, for example in aviation, measurement and medical technology.

Founded in 1977, Plaschka manufactures precision machine components for fine mechanical and mechatronic systems. The production spectrum includes CNC milling and CNC turning, grinding and surface treatment with in-house electroplating, quality assurance and assembly. The locations in Traunreut, Germany, and Hořice na Šumavě, Czech Republic, are certified according to EN DIN ISO 9001: 2008.

“Plaschka has achieved an excellent reputation in the production of robust precision components,” commented Axel Weiser, director of precision parts at P+P, who is taking over the management of Plaschka together with Dr Christian Potthoff-Sewing.

“Long-term partnerships with customers, modern machines and an experienced team of employees distinguish the company.”

“Plaschka’s production focus is on aviation and medical technology, measurement and film instrumentation and mechatronics. This is a perfect addition to our strengths in the field of automotive and mechanical engineering,” said Rüdiger Faustmann, CEO of the Poppe + Potthoff Group.

Poppe + Potthoff develops and manufactures customer-specific steel tubes, common rail subsystems, high pressure tubes, precision components, line shafts and couplings, as well as specialised test stands and other machines.

**Poppe + Potthoff GmbH – Germany**  
Email: [info@poppe-potthoff.com](mailto:info@poppe-potthoff.com)  
Website: [www.poppe-potthoff.com](http://www.poppe-potthoff.com)

*Plaschka Maschinenbau in Traunreut is now part of the Poppe + Potthoff Group*





## New recruits and promotions at Metalube

AS part of its continued expansion Metalube has promoted Wayne Thornhill to product manager. The company has also recruited Dexin Luo as development chemist and Jon Dutton as technical sales manager.

Mr Thornhill, who has been with the company for three years, will now manage the Metaform range of products. Mr Dutton joins Metalube from Houghton and will be supporting Mr Thornhill in his first commercial role having started his career in the laboratory.



Ms Dexin, a chemistry graduate from Manchester University, will work closely with Metalube China, helping to develop their technical excellence. She will divide her time between the UK and China.

Metalube manufactures a range of non-ferrous drawing oils and maintenance lubricants as well as a variety of corrosion protection and forming oils.

Metalube has offices in China, India, Brazil and the UAE.

**Metalube – UK**

Website: [www.metalube.co.uk](http://www.metalube.co.uk)

## Steve Leonetti joins IMC as VP

IMC-Metals America, LLC has announced that Stephen (Steve) Leonetti has joined the company as a VP and will focus on global business development. "Steve comes to us with extensive speciality chemical management experience in surface finishing, copper and copper-alloy metalworking, and plastic recycling," said Bill Peck, IMC's president. "IMC is growing aggressively and Steve's professional background will add great strength to the team."

Mr Leonetti is a certified electro-finisher (CEF, awarded by the National Association of Surface Finishers), and earned his MBA at the University of New Haven (Connecticut, USA). He was most recently an industry manager with Enthone Inc, coordinating OEM, applicator and supplier activities to multiple industry segments, including oil and gas, building and hardware, and construction and heavy equipment.

IMC manufactures copper anodes, supplying electroplaters and other industries in more than 45 countries worldwide. The company is also a supplier of oxygen-free copper rod and related products to manufacturers of electrical conductors.

**IMC-Metals America – USA**

Fax: +1 704 482 8038

Email: [prodgrp@imc-ma.com](mailto:prodgrp@imc-ma.com)

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## Contract for three solid-state welders

SAET SpA has signed a contract for the supply of three Emmedi MosWeld solid-state welders to a major tube manufacturer located in Central America.

The welders, with output power of 200, 250 and 300kW, will be designed for the production of carbon steel tubes according to each mill production range.

The agreement is the result of collaboration between the Italian sales and technical staff together with local and American partners, and the company states that it reflects the market's positive response to the process of consolidation and expansion of the Emmedi brand that started two years ago by joining the Ajax

Tocco Magnethermic Corporation group of companies.

Emmedi is taking advantage of the new synergies with one of the oldest and most experienced manufacturers of induction heating equipment, to offer a wide range of products designed to high standards. The partnership ensures the structure to support presence on the tube and pipe market, widespread technical support and after-sales services through local offices.

**SAET SpA – Italy**  
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*MosWeld solid-state welding technology*

## A solution for high-end tube producers

DANIELI W+K (DWK) cold pilger mill 32-Q-C for zircaloy and stainless steel tubes and bars has successfully passed full scale load tests at the workshop in Buttrio, Italy, and is now under commissioning in the Nuclear Fuel Complex plant in Hyderabad, India. A subsequent order signed with the same customer last October confirmed DWK mills as a solution to the pressing requirements of this niche market.

The main advantages of the Quarto mill are a rigid mill stand design capable of resisting high separating forces; a continuous and precise shell feeding section with CNC machine solutions (profiled guide ways, a recirculating

ball screw supported on both ends, and a water cooled servomotor); and a vibration-free mass balancing system designed to reduce foundation works and to minimise the overall capex of the project.

Tooling design using 2D and 3D FEA techniques allows simulation of the rolling process and estimation of the separating forces on the rolls and retaining load on the mandrel in advance. This is a crucial aspect for the closed loop mill design. In the Quarto CPM configuration, load cells can be used to monitor separating forces on-line during production, offering DWK the possibility to close the loop even during operation with a proper mill

set up. The Q-Pilger approach avoids costly trial and error, which can have a high impact on budget and scheduling when developing new products. In a tough market characterised by over-capacity, DWK states that its mission is not only to supply new CPM mills to customers with the necessary resources for new investments, but also to help tube producers use existing mills more efficiently by installing technological packages specifically developed to revamp existing CPMs.

**Danieli W+K – Italy**  
 Email: [info@danieli.com](mailto:info@danieli.com)  
 Website: [www.danieli.com](http://www.danieli.com)

## Premium threading facility in Kazakhstan

TENARIS has established a new premium threading facility in Aktau, Kazakhstan. The plant will support the company's long-term agreement with Karachaganak Petroleum Operating (KPO), plus key operator Tengizchevroil (TCO), and will enhance the service offer to other customers operating in major Kazakhstan fields with commercial, technical and logistics expertise.

"Tenaris has been a key supplier of OCTG in Kazakhstan, and our

Aktau plant is critical to our ability to provide customised solutions with sophisticated products in a region that presents some of the most complex drilling environments," said Tenaris chairman and CEO Paolo Rocca. The facility already employs 40 people and is scheduled to hire up to 90 direct employees once at full capacity, with 95 per cent local jobs. The US\$40mn facility has the capacity to produce 45,000 tons of OCTG, and was designed according to the highest

safety standards. The facility will operate under Tenaris's global quality, health, safety and environment (QHSE) policy, ISO 9001.

From this facility, Tenaris will thread seamless pipes and gas-tight premium connections, and it is equipped to apply its proprietary Dopeless® technology, a dry, multifunctional coating that offers operational and HSE benefits.

**Tenaris SA – Luxembourg**  
 Website: [www.tenaris.com](http://www.tenaris.com)



## Second machining centre for Vale

VALE Garden Houses, a UK-based manufacturer of conservatories, bronze casement windows and bronze doors, has purchased a second Mecal CNC machining centre from Addison Saws. The four-axis Mecal MC 305 Kosmos will be used in the company's specialised bronze department to drill, mill, slot and prep architectural bronze extrusions of up to 3.5m in length and from 3.5 to 12mm in thickness.

"It was around ten years ago that we invested in our first Mecal CNC machining centre from Addison – an MC 305 four-axis model," commented Vale's operations director, Dave Cheney. "Extremely reliable and accurate, it brought significant advantages to our production schedules – and is still in everyday use.

"The expansion of our business into a new manufacturing facility just a few years ago, however, saw us place even greater demands on the Mecal. As a result, we decided the time was right to invest in a second machining centre, to

take on board 50 per cent of our bronze department's machining requirements and ensure we are well equipped for future business growth."

With a number of potentially suitable machines on the market, it was the reliability of the Mecal MC 305 model and the high levels of service provided by Addison Saws that persuaded Vale Garden Houses to again choose Addison and invest in a second Mecal machine.

"Not only has our original Mecal CNC machine more than proved its worth, with an absolute minimum of downtime, the service from Addison Saws has also been outstanding," added Mr Cheney.

The new Mecal MC 305 Kosmos offers a range of enhancements over Vale's original machine. In particular, tool changes are faster and the automatic clamping system, where the machining head positions the clamps, has made various manufacturing processes significantly quicker.

Mr Cheney said: "At Vale we are more concerned with accuracy than speed,



*The Mecal MC 305 Kosmos CNC machining centre from Addison Saws*

as virtually every job we undertake is unique."

The machining centre chosen by Vale is equipped to automatically machine, drill, mill, slot and prep aluminium and steel extrusion bars. It is also well suited to new product development, while its high levels of accuracy and repeatability ensure minimal waste.

**Addison Saws Ltd – UK**

Email: [sales@addisonsaws.co.uk](mailto:sales@addisonsaws.co.uk)

Website: [www.addisonsaws.co.uk](http://www.addisonsaws.co.uk)



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## FES supplies equipment in rapid turnaround for Atlanta project

FES International, a global producer of fluid transfer solutions, has completed a quick turnaround for the delivery of equipment to the Atlanta Field of Santos Basin, Brazil, operated by Queiroz Galvão Exploração e Produção (QGEP). The multi-million dollar contract involved the supply of nine diverless bend stiffener connectors (DBSCs), which will be used on the post-salt oil field, located 185km off the coast of Rio de Janeiro.

The FES DBSC technology has proved a success for the firm, with more than 350 units supplied around the world and more on order.

Rob Anderson, managing director of FES International, said, "We are seeing an increasing shift towards faster turnaround requirements from clients. This contract had an extremely tight schedule and it was critical to the success of the job that we were able

to meet the ambitious timescales for delivery.

"QGEP was drawn to our flexible approach from design stage to completion and our solid track record meant that they could trust that their deadline would be met. We were able to complete the quick turnaround, which involved adapting our equipment to ensure it met the specific requirements for the project.

"Our relationship with the client was a major advantage in helping us to meet the deadline by working closely with us and getting the upfront preparation work completed quickly. Brazil is an exciting market with many future opportunities for us that we look forward to progressing."

FES (Flexible Engineered Solutions International) provides fluid transfer systems and five other core product lines, and employs experts in design, including FEA analysis and modelling, draughting (on the latest 3D software), machining and manufacture, and assembly and testing, to manage every stage of a project commission.

**FES International – UK**

Email: [fes@fesltd.co.uk](mailto:fes@fesltd.co.uk)

Website: [www.fesinternational.com](http://www.fesinternational.com)

*FES supplied nine DBSCs to the Atlanta Field of Santos Basin in Brazil*



## Meridian acquires PowderCoat Services

MERIDIAN General Capital has completed the acquisition of PowderCoat Services (PCS), a production powder coater offering a diverse range of related services.

PCS is able to provide a new process called electrophoretic deposition (EDP), a liquid coating process that deposits cross-linked organic polyurethane to any metallic and select non-metallic surfaces using electrical current. The company serves a wide spectrum of industries including automotive, home improvement, consumer products, sports equipment, musical instruments, electronics, cleaning and sanitising, and the military.

Ravi Rao, founder and chairman of Meridian, said, "With this acquisition Meridian intends to build a dynamic industrial services enterprise.

"PCS provides a solid platform that has been successful in this highly specialised niche – one that is critical to its customers and environmentally a sound replacement to paint processes. Additionally, the expertise of key management staff will assure us of meeting our ambitious growth plans in this industry segment. The company's emphasis on process innovation as evidenced in their investment in the new EPD process should help us expand into new geographic territories and also address additional markets." Mr Rao will serve as the executive chairman of PCS.

Powder coatings were originally developed as an environmentally sound method of painting commercial parts, and have become one of the most common finishes. Most of these

coatings are various shades of black, though PCS carries many colours and various gloss levels and textures. Each finish can be manipulated to fit specific needs, such as UV protection or resistance to oils.

PCS offers services including tube bending, fastener installation, light manufacturing, final assembly and supply chain management. The company provides personalised service and uses its own fleet of trucks and drivers.

**Meridian General – USA**

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**PowderCoat Services, Inc – USA**

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Website: [www.powdercoat-services.com](http://www.powdercoat-services.com)



## Sandvik distribution centre opens in Singapore

SANDVIK has opened a new distribution centre in Singapore to meet increasing demand for its advanced stainless steel and special alloy products, particularly in Southeast Asia and the wider Asia-Pacific (APAC) region. The new distribution centre, which is strategically located adjacent to Changi Airport, East Singapore, is key to the company's customer service commitment as well as its expansion plans in the region.

"To improve our customer service in the Asia region, we are establishing a distribution centre in Singapore offering significantly shorter lead-times to the market," explained Pär Burefjord, logistics manager for Sandvik in APAC. "Opening the new facility means we are able to bring our products closer to our customers, cutting response times significantly and enabling quicker deliveries. Our aim is to be able to offer 24-hour delivery to all APAC markets including India, China and Australia by air, and three to ten days by vessel."

Sandvik operates two distribution centres in Singapore for its mining and machining products, but the third will provide tube, strip, wire, welding products and heating systems.

"With an expanded and consolidated stock profile and automated stock replenishment, we can provide customers with an even greater service," said Mr Burefjord. "By taking full advantage of our local material stocks and more efficient logistics, customers could actually reduce their own stock profiles, freeing up valuable manufacturing space."

The new distribution centre will accommodate tube products such as seamless high temperature tubes and furnace tubes, as well as stainless steel hollow bar for component manufacturers. The centre will also stock an extensive programme of welding consumables, precision wire and Kanthal® resistance wire and furnace products.

Magnus Brodin, regional sales director for Sandvik in APAC, tube core and standard products, added, "Inauguration of our new distribution centre in Singapore expands our presence in the market, increasing competitiveness and facilitating Sandvik's growth in the region."

**Sandvik Materials Technology** – Sweden  
Website: [www.smt.sandvik.com](http://www.smt.sandvik.com)

*John Lim, managing director for Sandvik Southeast Asia, cut the ribbon and delivered a speech at the opening of Sandvik's new distribution centre in Singapore*



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## FABTECH 2017 in Chicago: Tube Producers' and Suppliers' Pavilion added for first time

FABTECH is held in Chicago every two years and covers the entire spectrum of metalworking and processing. It will open its doors from 6 to 9 November 2017. For the first time, in 2017 it will feature an expanded pavilion showcasing tubes, tube end products and the tube trade.

The Tube Producers' and Suppliers' Pavilion will be organised and implemented by Messe Düsseldorf. The trade fair company will, therefore, be the official point of contact for any potential exhibitors from outside the US. The

Tube Producers' and Suppliers' Pavilion is Messe Düsseldorf's answer to rising demand from the tube industry and the tube trade for a separate segment covering tubes, tube end products and the tube trade at FABTECH.

The segment will also be open to pre-processing centres, modern warehousing and service providers with one-stop shopping solutions. The pavilion will be aimed at international companies outside the US wishing to export their tube products to the US and expand their tube trade

there. FABTECH 2017 in Chicago will feature around 1,700 exhibitors at the McCormick Place convention centre.

The four-day trade fair features innovative technology in welding, cutting, machine tools, manufacturing facilities, presses, tube end products, the tube trade, cutting and clamping tools, welding equipment, welding techniques and punching tools. It is expected to attract around 45,000 international trade visitors.

FABTECH is North America's largest collaboration of technology, equipment and knowledge in the metal forming, fabricating, welding and finishing industries. It provides a hands-on, face-to-face business growth experience.

The event is made possible by FABTECH's five co-sponsors. They include the American Welding Society, the Fabricators & Manufacturers Association International, SME, the Precision Metalforming Association and Chemical Coaters Association International.

**Messe Düsseldorf** – Germany  
Email: [ahrensg@messe-duesseldorf.de](mailto:ahrensg@messe-duesseldorf.de)  
Website: [www.messe-duesseldorf.com](http://www.messe-duesseldorf.com)

**FABTECH 2017** – USA  
Website: [www.fabtechexpo.com](http://www.fabtechexpo.com)



FABTECH trade show in Chicago

## Eminox Engineering award for tube project

A CLASS of budding Engineering students from Tuxford Academy in Nottinghamshire, UK, were recently set a case study challenge by STEM (Science, Technology, Engineering and Mathematics) ambassadors from Eminox.

Based on automating a tube rolling and welding operation, it was delivered to the students by Ken Hayhurst, group training manager.

The students were allocated two weeks to come up with ideas and to produce a report explaining their proposed solution, and evaluate the pros and cons of using automation. The

work formed part of their coursework in Computer Aided Manufacturing for a BTEC Level 3 Engineering qualification.

Mr Hayhurst commented: "The students have produced some excellent work and demonstrated a profound understanding of the subject when assessing the case for automation."

The top three reports were selected for an Eminox Engineering Award and the students were welcomed at Eminox with a tour of the Gainsborough factory followed by a prize ceremony.

Dave Birchall, teacher at Tuxford, an Ofsted outstanding Secondary Academy, said: "The linking of the case

study to a real company example has provided the students with a practical link to industry and an insight into the world of work."

Tuxford Academy is keen to continue the industrial collaboration and has asked Eminox to support with a design brief for their new Engineering Level 3 course.

Eminox is a European designer and manufacturer of purpose-designed exhaust and emission control systems for heavy duty vehicles and equipment.

**Eminox Engineering** – UK  
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## 4,000-tonne carbon emissions reduction wins CEMARS Gold Award

SAINT-GOBAIN PAM UK, a manufacturer of ductile iron water and sewer pipelines, access covers and gratings, has been presented with the top award from the Carbon & Energy Management and Reduction Scheme (CEMARS) by Sir Lockwood Smith at a presentation ceremony in London. The company cut its carbon emissions by 13.31 per cent in absolute emissions over five years, which equates to 4,107 tonnes.

The Gold Certificate recognises the company's achievement for year-on-year reductions over a five-year period by following a systematic carbon reduction programme. In particular,



*Saint-Gobain PAM environment manager Mark Hardy (centre) receives the CEMARS gold certificate from Achilles chief executive Jay Katzen (left) and Sir Lockwood Smith (right)*

the company has reviewed and taken targeted action at its foundries, where it believes it can make maximum impact. Several million pounds of investment at its Holwell site has led to waste heat being fed back into the process, and provided an upgraded exhaust system and a new auto pour system to improve yield.

Both the Holwell and Telford foundries have also had variable speed drives fitted to compressors and pumps. Other actions being taken by Saint-Gobain PAM UK include a replacement programme of all of its internal and external lighting to more efficient LED fittings. The results were reported and independently verified by Achilles, which holds the licence to run CEMARS in the UK.

Commenting on the award, Saint-Gobain PAM UK managing director Paul Minchin said, "We are hugely proud to be one of the few UK businesses to achieve the gold certification for CEMARS. The award is testament to the amount of work and commitment invested by various teams across our business over the last six

years. If as a country we are to achieve our carbon reduction targets, then it is about time that measures like CEMARS are made mandatory for all organisations.

"As a socially responsible business, Saint-Gobain PAM UK looks beyond our immediate commercial needs and constantly questions how we can contribute to a sustainable future for our wider community. This award is also only the start of our carbon reduction plans; we are aiming for an overall reduction of our emissions by 50 per cent by 2025."

CEMARS requires participants to measure and reduce their organisational carbon footprint in accordance with international best practice. It was the first scheme to be accredited under ISO 14065, the international standard for bodies offering certification of corporate carbon footprints. The scheme is also licensed by the Environment Agency under the Climate Change Act 2008, accredited by the CDP (Carbon Disclosure Project) and gains additional CDP points for CEMARS certified companies disclosing to the CDP.

### **Saint-Gobain PAM UK**

Email: [sales.uk.pam@saint-gobain.com](mailto:sales.uk.pam@saint-gobain.com)  
Website: [www.saint-gobain-pam.co.uk](http://www.saint-gobain-pam.co.uk)

### **Achilles – UK**

Website: [www.achilles.com](http://www.achilles.com)

## Mashex Siberia 2017 machinery trade show

MASHEX Siberia 2017, an exhibition for metalworking and welding machinery, will be held from 28 to 31 March in IEC Novosibirsk Expo Centre, Novosibirsk.

Exhibiting at Mashex Siberia gives an opportunity to demonstrate equipment for metalworking and welding to CEOs and specialists of major plants as well as small and medium Siberian manufacturing enterprises. By presenting the latest products, Mashex Siberia enables them to be used in manufacturing, helping companies increase their sales and meet new clients.

The exhibition will include metal processing machinery and equipment; tools for metal processing machinery

and equipment; and welding equipment and supplies.

For the last five years, exhibitors of the show have come from such countries as Germany, Italy, Turkey and China.

Mashex Siberia 2016 was visited by 3,381 people from the Novosibirsk, Kemerovo and Tomsk regions and Altai Krai, including CEOs and specialists of 65 major plants and small and medium companies.

According to the official statistics, 2,536 visitors were unique – they did not attend any other exhibitions of similar topics. 2,198 visitors were CEOs and specialists who were purchase decision makers; and 1,636 visitors made their purchase decisions while negotiating

with the exhibitors of Mashex Siberia 2016. 2,238 visitors were interested in metal processing machinery and equipment; 2,133 in tools for metal processing machinery and equipment; and 1,418 in welding equipment and supplies.

Exhibitors at Mashex Siberia 2017 will include such companies as Alflet Engineering, Camozzi, Roland DG, Alfa-Engineering, Pumori Engineering, Klingspor, VSM, Renishaw, Mazak, Pride-Engineering, Galika and Emuge-Franken.

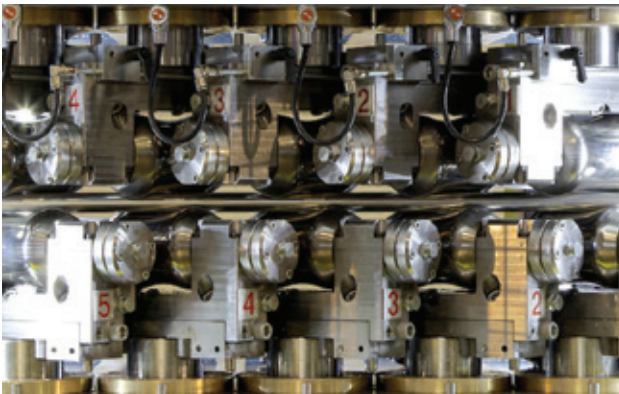
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# TECHNOLOGY

## Three new crimping machines in the service line

OP has announced three new crimping machines. They are light, inexpensive, easy to move and described as the perfect equipment for easy on-site service.

The machines – Tubomatic H26 PM, Tubomatic H26 E and Tubomatic H64 PM – guarantee an even more precise and efficient service.

The Tubomatic H64 PM is a machine that crimps hydraulic hoses up to 1 1/2" two braids.

It is versatile and able to be used for on-site service in many different locations. It is provided with a manual pump separate from the machine and an electric limit switch indicating when the crimping diameter is reached.

Tubomatic H26 PM is designed for crimping hydraulic hoses up to 3/8" two braids. It is suitable for several applications and in particular for outdoor service. The technical specifications, which make this machine unique, are

hose crimping with dies-holder, manual pump as well as millimetre label showing the reached crimping diameter.

Tubomatic H26 E has the same characteristics in terms of functions and usage as the Tubomatic H26 PM. The only difference is that it is equipped with a manual pump separate from the machine.

**OP – Italy**  
Website: [www.op-srl.it](http://www.op-srl.it)



## Quality assurance during sheet extrusion

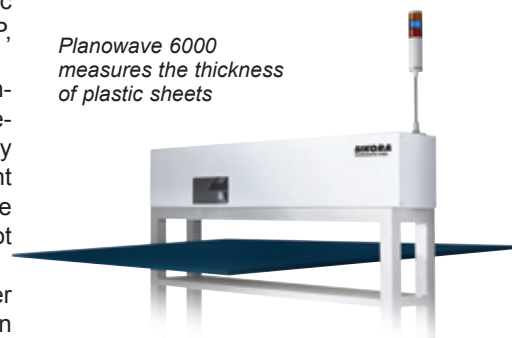
THE Planowave 6000 is a non-contact measuring system that is used for the non-destructive measurement of thickness during the extrusion of plastic sheets. The system is designed for the measurement of all plastic materials, such as PE, HDPE, PP, PA6 and PVC.

Innovative millimetre wave technology offers a precise measurement of the thickness without any coupling mediums and independent of material and temperature of the plastic sheet. Calibration is not necessary.

The Planowave 6000 can either be integrated into the production

line directly or used for final inspection. The sheet is measured via millimetre waves based on the FMCW runtime method. A linear moving transceiver continuously sends and receives

*Planowave 6000 measures the thickness of plastic sheets*



frequency modulated millimetre waves. The thickness of the sheet is defined by the runtime difference. Visualisation of the measuring values is made in real time. The processor system Ecocontrol offers a numeric display of the measuring values as well as a graphic display and comprehensive trend and statistical data.

The Planowave 6000 contributes to the reproducibility of processes as well as high quality and productivity during sheet extrusion.

**Sikora AG – Germany**  
Email: [sales@sikora.net](mailto:sales@sikora.net)  
Website: [www.sikora.net](http://www.sikora.net)



# Bringing profile benders to the UK

ADDISON Tube Division, the specialist tube bending technologies arm of Addison Saws, has been appointed as the sole UK distributor of PBT AG's CNC profile bending machines.

Swiss-based PBT manufactures profile bending technologies for aluminium, stainless steel and steel profiles. Its machines are used across a large number of sectors, including automotive manufacturing, construction, aerospace, the windows industry, and furniture making.

"We are extremely pleased to have secured the UK distributor rights for PBT's internationally recognised profile bending technologies," commented Addison Group managing director Gary Knight. "In appointing us, PBT identified closely with our ethos of helping customers find the very best solutions to their manufacturing challenges, through technologies sourced from the global market place, and all supported by the highest levels of customer service. PBT's machines will dovetail perfectly with our tube bending and end forming technologies from leading Taiwanese manufacturer CSM."

Employing high levels of functionality and triple-roller bending technology, PBT machines cold-form both aluminium and steel profiles in an energy-efficient manner. PBT profile bending technologies range from the Arkus 12<sup>®</sup> compact machine that bends even small aluminium and steel profiles to tight radii, to larger, heavy duty machines such as the PBT35<sup>®</sup> and Helix<sup>®</sup> models, which are suited to more challenging applications, including profiles for use in plant and vehicle manufacturing, materials handling, construction and architectural needs. The company also builds bespoke profile bending machines to meet demanding manufacturing requirements.

"The PBT Arkus 12 profile bender has already generated considerable interest from Addison customers across the automotive, windows, technology and metal manufacturing sectors,"



The PBT Arkus 12 profile bender is available from Addison Tube Division

added Mr Knight. "Its ability to produce particularly delicate profiles using either steel or aluminium, combined with uncompromising reliability, repeatability and accuracy, will open up exciting

new opportunities for many of our customers."

With the addition of PBT machines to its range, Addison Tube Division now offers an extensive choice of profile bending, mandrel and non-mandrel tube bending machines in the UK. Addison's CSM tube benders include basic three-axis hydraulic models through to highly sophisticated, 11-axis, all-electric machines. The CSM 100TDRE-RBE is able to produce tight radius thin-wall 1xd bends on larger diameter stainless steel tube.

**Addison Saws Ltd – UK**

Email: [sales@addisonsaws.co.uk](mailto:sales@addisonsaws.co.uk)

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## Welding stainless steel pipe elbows at the push of a button

ORBITALUM Tools GmbH has further developed its HX 16 orbital weld head and has extended it into a series. At the push of a button the HX 16P and HX 22P clamp themselves on the pipe by means of a patented pneumatic clamping mechanism.

Through this innovation, both handling and comfort have been improved, and efficiency and quality of the weld result have been increased. This makes it possible for the HVAC industry to more easily change over from traditional heat exchangers made of copper to stainless steel, which fulfils the regulations (to F-gases directive) up to climate-friendly refrigerants.

Stainless steel can only be joined particularly economically, reliably and with high quality using tungsten inert gas (TIG) welding in conjunction with mechanised orbital welding. Commonly available closed orbital weld heads or open weld tongs are not suitable, as their

construction makes placement between the individual pipes impossible. With its outer diameter of only 60mm, a pipe spacing of only 30mm is sufficient for the HX 16 for positioning and clamping at the push of a button.

Orbitalum states that some new users report a six-fold increase in productivity. This makes it possible to accelerate the procedure of aligning the weld head and clamping the head by 10 to 15 seconds per welding cycle; around 1.5 minutes pass per working cycle at a pipe with 16mm outer dimension and 0.5mm wall thickness: clamping, establishment of the inert gas atmosphere, welding, and cooling down in the argon atmosphere, which prevents annealing colouring of the weld seam.

With pneumatic clamping, the head holds its position at the pipe elbow by itself, rather than the operator having to support/hold the weld head by hand during the welding process. This makes it possible for a less experienced operator to produce welds with up to three weld heads (systems) at the same time per cycle.

A further benefit of the HX 16P and HX 22P orbital weld heads is the closed welding chamber, which



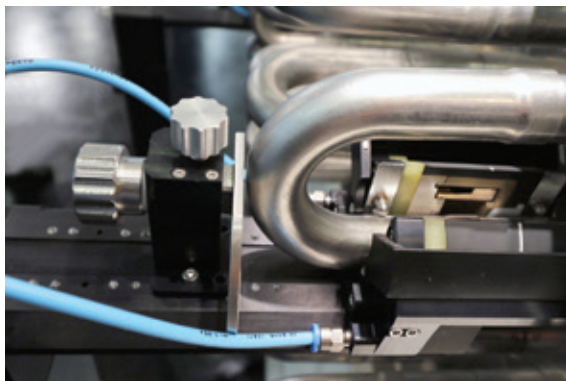
*The HX 16P features pneumatic clamping of the head*

means that almost no annealing colours can form in the heat-affected zone of the weld seam.

All welding power sources from Orbitalum automatically recognise the heads and their properties, so the operator only has to call up the specified welding program and start the process before beginning to weld.

The HX 16P is designed for pipe outer diameters from 15 to 16.8mm, and the HX 22P is for 19 to 22mm. An additional model – HX 12P, for 9.52 to 12.7mm diameters – will be launched later this year.

**Orbitalum Tools GmbH – Germany**  
 Fax: +49 7731 792 500  
 Email: [tools@orbitalum.com](mailto:tools@orbitalum.com)  
 Website: [www.orbitalum.com](http://www.orbitalum.com)



*A pipe spacing of 30mm is sufficient for positioning and clamping of the orbital weld head at the push of a button*

## A new method to treat steel pipes with respect

OBTAINING the correct mix between experience and innovation is the main aim of ASED, an Italian-based brand dedicated to steel tube finishing solutions. The company has developed a new method to meet the needs of those who want to focus on their business without hassle and annoyances.

Maximising the efficiency of mills means minimising waste and reducing

the total cost of ownership, but also good organisation of working time. This is possible in a concrete and immediate way, guaranteeing customised solutions.

Among the highlights of ASED's range are modularity for easy adaptability to different kinds of production, delicacy of movement and absence of crawling on tubes already put into the bundle,

good functioning and maintenance optimisation. Space saving, attention to procedures and strong output targets can become reality with a suitable project plan and a wide and efficient range of accessories to help employees.

**ASED – Italy**  
 Email: [info@asedtubes.com](mailto:info@asedtubes.com)  
 Website: [www.asedtubes.com](http://www.asedtubes.com)



## X-ray measurement technology for single and multi-layer products

IN order for a manufacturer to select a measurement and control solution with the best price/performance ratio, suitable technology must be chosen.

After many years of experience in using eccentricity gauges with X-rays and ultrasonic, laser diameter and inductive measurement devices for different products and materials, Zumbach has expanded the X-ray family for dedicated tube and hose applications.

Zumbach's static X-ray system Rayex® S has been specially developed for use with any kind of foamed pipe, vulcanised products and hydraulic hoses.

Rayex® S measures and controls diameter, ovality, wall thickness and eccentricity of single and multi-layer products with up to four layers.

It provides precise measuring values and high reliability for pipe and hoses

with an outside diameter of up to 80mm. The system features the latest X-ray technology and software solutions.

In combination with the data acquisition and processor system, an automatic control of the line is possible. By controlling line speed or extruder speed the parameters are controlled to the nominal value. The display shows all measurement values numerically and graphically, as well as trends and statistical data. A line presentation with pictograms of the connected devices provides a clear overview to the operator. At the same time the system reduces the wall thickness to a minimum value.



The Rayex® S X-ray




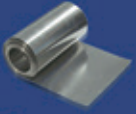
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## Straightening of zirconium nuclear fuel clad tubing

NUCLEAR electrical power generation reactors are powered by uranium fuel. To separate the uranium and prevent contamination of the reactor coolant, the uranium fuel must be contained in a robust environment that can withstand the high temperatures and the intense neutron radiation as nuclear fission takes place.

The material used to contain the uranium must have important characteristics such as high thermal conductivity, high strength, high resistance against corrosion and high dimensional stability. The containment of the nuclear fuel is normally a tube made from various zirconium alloys. These tubes are referred to as 'fuel clad tubing' or 'fuel cladding'.

Each zirconium fuel clad tube is filled with natural or enriched uranium pellets and sealed. A complete nuclear fuel cell assembly consists of a number of tubes contained in a rigid assembly.

Extreme care has to be taken during the manufacture of zirconium fuel clad tubing to prevent any excessive cold working of the tube. Cold working causes the material to be susceptible to hydride orientation within the high temperature water environment in which they operate.

During manufacture the tubes have to be formed, finished and, at the same time, not be subjected to excessive cold working. The desired accuracy of tube straightness is of particular importance and, therefore, straightening the tube without excessive working of the material is challenging.

It is in this difficult nuclear arena that Turner has succeeded in becoming a foremost supplier of zirconium fuel clad tube straightening machinery.



*Nuclear fuel clad tubing production*

Its history in serving the nuclear tubing industry stretches back more than four decades, during which its understanding of the problems and their solution have slowly evolved.

For this challenging straightening application the most modern ten-roll computer driven machinery is now normal, replacing older six-roll machines.

Turner has long been at the forefront in precision straightening machine innovation and specialised straightening applications and has developed important features applicable to straightening this particular product.

These features prevent the possibility of resulting hydride orientation in the tube by ensuring that the amount of pressure applied to the tube during straightening is kept to a very low level.

Some of these features include: special rolls which feature specific profiled regions that reduce the amount of friction applied to the tube as it is straightened; load cells positioned strategically within each roll pair, which measure the amount of roll pressure being applied to the tube; and analytical software, which receives the data from the load cells and ensures that the amount of cold working applied to the tube does not exceed set points, maintaining roll pressure at a very low, safe level.

The special roll profiles ensure that the amount of friction generated between the roll and the tube is kept to the absolute minimum.

The load cells monitor the direct

pressure applied by the rolls to the tube during straightening. Analytical software within the computer aided setting and management (CASAM) system monitors the load applied by each roll on the tube and provides control of the machine.

The load cell signal conditioning and amplification is carried out by highly accurate, custom designed and built electronic circuits.

The Turner CASAM system – now in its third decade of operation around the globe – has additional operational modes and calculating algorithms for use on this specific straightening application.

A typical Turner ten-roll CASAM machine for straightening zirconium nuclear fuel clad tubing guarantees performance on all the important characteristics required in the final product.

Because of the need to prevent even the slightest marking or contamination of the tube during straightening, the majority of Turner machines for the nuclear industry are supplied as complete straightening lines including fully integrated entry and exit tube handling equipment.

Turner zirconium fuel clad tube straightening machines are in use throughout the world including China, Korea, Sweden, Canada and the USA.

**Turner Machine Company – USA**  
Website: [www.turnermachineco.com](http://www.turnermachineco.com)






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### SMS group GmbH

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**SMS**  **group**

## Barnshaws extends structural expertise to aluminium louvres

ALUMINIUM louvres have become a mainstay of modern architecture, ensuring that excessive sunlight does not adversely affect the interior environment of a structure.

However, as architectural design has become more freeform, increased demand has been placed on louvres to seamlessly integrate with these new aesthetics.

As a result, increased intricacies have seen the advent of bending aluminium louvre profiles, a demanding process that is familiar to Barnshaws Section Benders.

Barnshaws claims to have the largest specialist aluminium bending machine currently in the UK. Its facility can cater for one-off sections to orders of thousands, enabled by an expert aluminium engineering team and large machine capacity.

To ensure that the internal profile of the extruded section is consistent, Barnshaws uses a specialist technique that is a closely guarded company secret, allowing consistent profiles to be attained almost regardless of the required radii. Offering short lead times and adaptability to client requirements,

Barnshaws can ensure that any project can benefit from modern and specialised solutions.

Established in 1969, Barnshaws supplies market sectors such as construction, power generation, mining, transport and general manufacturing with shaped beams, tubes, plate and other profile section materials.

**Barnshaw Section Benders Ltd – UK**

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Email: [info@barnshaws.com](mailto:info@barnshaws.com)

Website: [www.barnshaws.com](http://www.barnshaws.com)

## Automatic tool detection in tube forming

WORKPIECES with special end form geometry are in demand. Whether for initial production or repeated precision, ensuring exact parameters is necessary for efficient implementation. transfluid has developed a solution with automatic tool detection for tube forming. The new REB 645 axial tube forming machine allows tube end forming with fast tool changes for complex geometries and extreme degrees of forming.

Using a barcode scanning system, the operation data of a tube with individual barcode can be easily read, eg for end forming. For this purpose, all tools of the machine, which is equipped with six



*Prior to end forming, the operation parameters are read via a barcode*

forming stations, have RFID sensors, ensuring the right program and the appropriate tools are available. If the automatic inspection unit detects a wrong tool, the operating panel with data memory displays this information immediately. The identification for the correct tool for the change is also indicated.

Using the convenient quick-connecting system of the transfluid solution with fork for fixing and locking bolt for securing the mount, the machine operator can directly change the tool and then precisely perform the tube end forming.

The REB 645 allows the axial forming of tubes with diameters from 6 to 45mm. By means of a servomotor, the tool



*All tools of the REB 645 are equipped with RFID sensors*

sequence is positioned horizontally and vertically. In addition, rolling stations for specific forming processes can be integrated. Upon request, the machine can be equipped with electric or hydraulic numeric drives. In the case of extremely short cycle times, the forming procedures can be carried out gradually in transfer systems.

**transfluid Maschinenbau GmbH – Germany**

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*The new REB 645 tube forming machine with automatic tool detection*

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## Data logger with increased features

'IN process' temperature monitoring refers to the technology of sending a thermally protected data logger through a furnace, together with the products being heat treated, to obtain true temperature data. In this field, increased industry requirements specifically in furnace surveying and temperature profiling have led to the development of a new range of data loggers from PhoenixTM.

Based on the PTM1000 series data loggers, the new PTM1200 generation with six, ten and 20 thermocouple channel variations, has new features that include two-way RF communications, which allow reset and download while the system is in the furnace, and auto data retrieval ('catch-up') if there is a loss of RF signal, for example if the logging system is in a water quench, or if the PC is not available for the entire trial.

The sampling rate is now faster, down to 0.2 seconds over the full 20-channel selection without any loss of accuracy, and memory has been increased to 3.8mn data points, allowing high sampling rates even in long processes.

In addition to the standard USB connection, Bluetooth allows remote system set-up check, even if the logger is sealed in a thermal barrier.

The data logger memory contains the latest calibration correction data as well as a signed copy of the original calibration certificate, which can be printed if required. The data can be transferred with a click into Thermal View software, saving manual input of the correction factors. The new PTM1200 series data logger retains the qualities of the PTM1000 family: robustness, a waterproof case (up to IP 67) and fast and reliable service.



The new PhoenixTM PTM1220 data logger in various thermocouple types

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Prestar delivered and put into operation several automatic production lines for tube producers in 2016. It put into operation a device for straightening titan tubes of diameter up to 80mm in Russia. The 10-roller straightening machine meets the highest demands on diagnostics thrust roll, automatic adjustment and visualization of the straightening process.

The equipment uses an Allen-Bradley control system, and the machine includes automatic separating and feeding of tubes into the input channel and collecting pocket. The required tube straightness accuracy of only 0.2mm/m was achieved.

The next sizable project of Prestar for a Russian customer is the automatic transport of tubes with a diameter of 168-426mm and net weight up to 3.8 tons per tube.



Special automatic handling equipment is included as part of the whole production line of Prestar, such as a machine for packaging tubes in a bundle, a manipulator for unloading the tube layer from the wagon, non-destructive inspection equipment, automated internal cleaning, etc.

The automated production line includes the integration of other devices, which Prestar connected to its control system. The whole production line, with a length over 130m, was delivered in a shortened term of 10 months from the contract signing.

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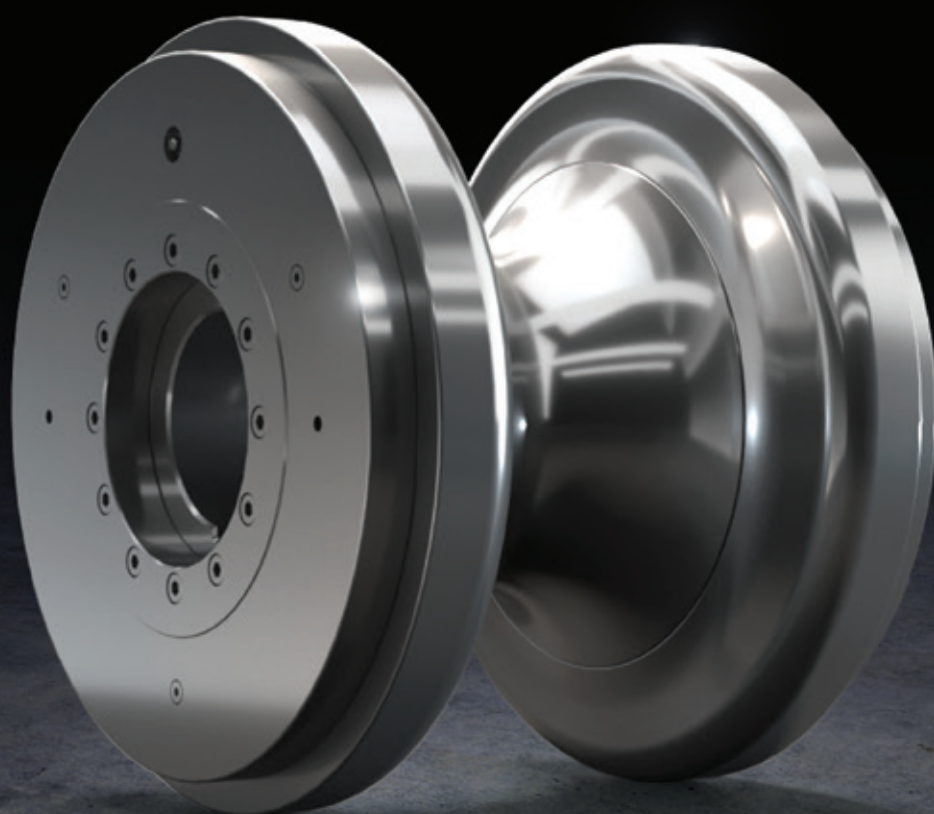
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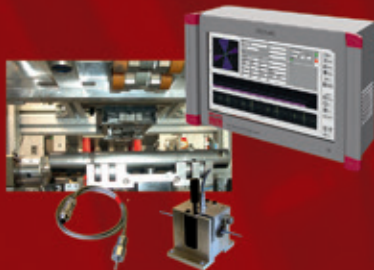
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## Pipe bending systems – more than just a pipe bending machine

TRACTO-Technik, an expert in integrated customised piping and pipe prefabrication, has revised its Tubobend line of semi-automatic pipe bending machines, and presented two new developments during the Euroblech fair in Hanover, Germany.

The new machine types available are characterised by a new modular structure and modern industrial design and are optionally available as a right-hand bender or left-hand bender to suit different users. With a compact and exposed bending head that allows for large bending space, the Tubobend machines are able to bend highly complex pipe figures.

The bending capabilities of the new machine types have been adapted to market requirements.

The Tubobend 16 is for bending steel pipes up to Ø 16x2mm, while the Tubobend 42 can bend pipes up to Ø 42x3mm. Further Tubobend machine types are also planned.

Increased efficiency is not only achieved by more automation or improved axis speeds in machine technology. It is also important to integrate related quality assurance measures and to ensure smooth and continuous information flow for the whole production. These aspects are implemented within Tracto-Technik's Pipe Bending Systems strategy by means of the Pipefab integrating software solution.

The software acts as a central component of the 'networked pipe fabrication', providing seamless interaction between machinery and measuring technology, and supplying



*The Tubobend 42 semi-automatic pipe bending machine is available as a right- or left-hand bender*



*Tubomat for customised piping in hydraulic tasks*

all manufacture-relevant information and data to the individual workstations. Various combinations and expansion stages of the involved components (machinery, measuring and software) allow each user to find the optimum pipe bending system.

Tracto-Technik's product range covers all-electric and electro-hydraulic CNC tube bending machines, semi-automatic tube bending machines, machines for pipe end processing and hydraulic joining technology, tube measuring systems, and special solutions and software solutions for pipe processing.

**Tracto-Technik GmbH & Co KG –**

Germany

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## Products finished in a single operation

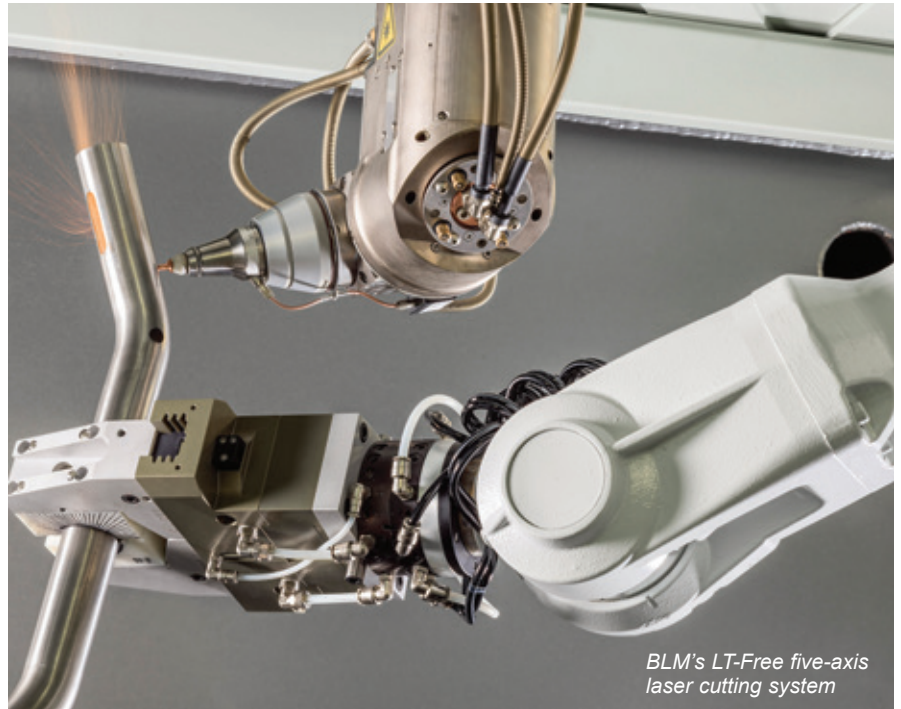
LT-FREE is a five-axis laser cutting machine developed by BLM Group to offer operational flexibility and simplicity of laser cutting of bent pipes, flat pipes, shaped sheets, hydroformed elements, collapsible elements and welded elements.

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



*BLM's LT-Free five-axis laser cutting system*

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 of 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. This function also manages hole cutting within the shortest possible time, without damaging the wall of the pipe resting on the processed wall.

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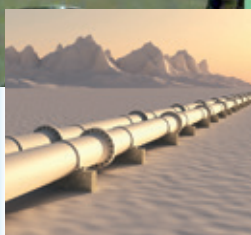




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## Ten-roll tube straightening machines

BÜLTMANN has been awarded an order for a straightening machine by an Indian manufacturer of precision tubes.

The machine, equipped with modern straightening technology, will be used for the production of precision tubes for the automotive industry. The tube specifications are diameter 45 to 175mm, wall thickness 3 to 15mm, length 4 to

12m, and material strength up to 1,000 MPa. The machine will also meet the requirement of straightening accuracy of < 0.3mm/m.

The straightening machine is equipped with charging and discharging devices which have been partially tailored to the customer's demands. The specific design has been elaborated in the

project phase, in close collaboration with the customer. The fully automatic tube bundle separation, for example, ensures high manufacturing flexibility in-line with the customer's existing tube production line.

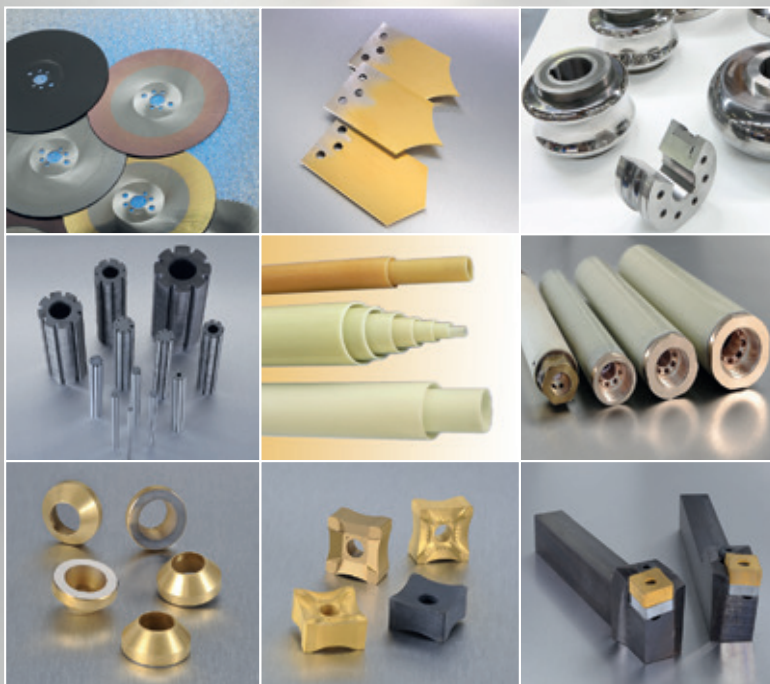
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## Cutting heavy ID scarf

GEBRUBER Lennartz GmbH & Co KG, Germany, is a manufacturer and supplier of carbide-tipped circular saw blades for the ferrous and non-ferrous industry. It has announced a new product from the ECOMax family. The ECOMax circular saw blade is a new development and is customised for cutting tubes and profiles with heavy ID scarf on flying cut-off units.

Previously, conventional blades were damaged after only a few cuts because they cut the high strength weld bead inside the bottom of the tube. The service life of the blades was poor and the cost per cut was high, resulting in a cutting application that is not economical.

Because of its special tooth form and cutting geometry, and in combination with a new proprietary coating, the ECOMax saw blade is suitable for this application. This new design works successfully on single head machines as well as on twin saws with the simultaneous operation of two saw blades, to meet the customer's requirements and decrease the cost per cut.

Successful trials and on-going production usage, together with target customers and machine manufacturers, have shown the ECOMax blades achieve 7m of material removal on welded tubes with wall thickness up to 14mm.

Further wear life tests and enhancements are planned to improve the performance further. Using the ECOMax blade is an advantage for every application with heavy ID scarf.

**Gebr Lennartz GmbH & Co KG** – Germany  
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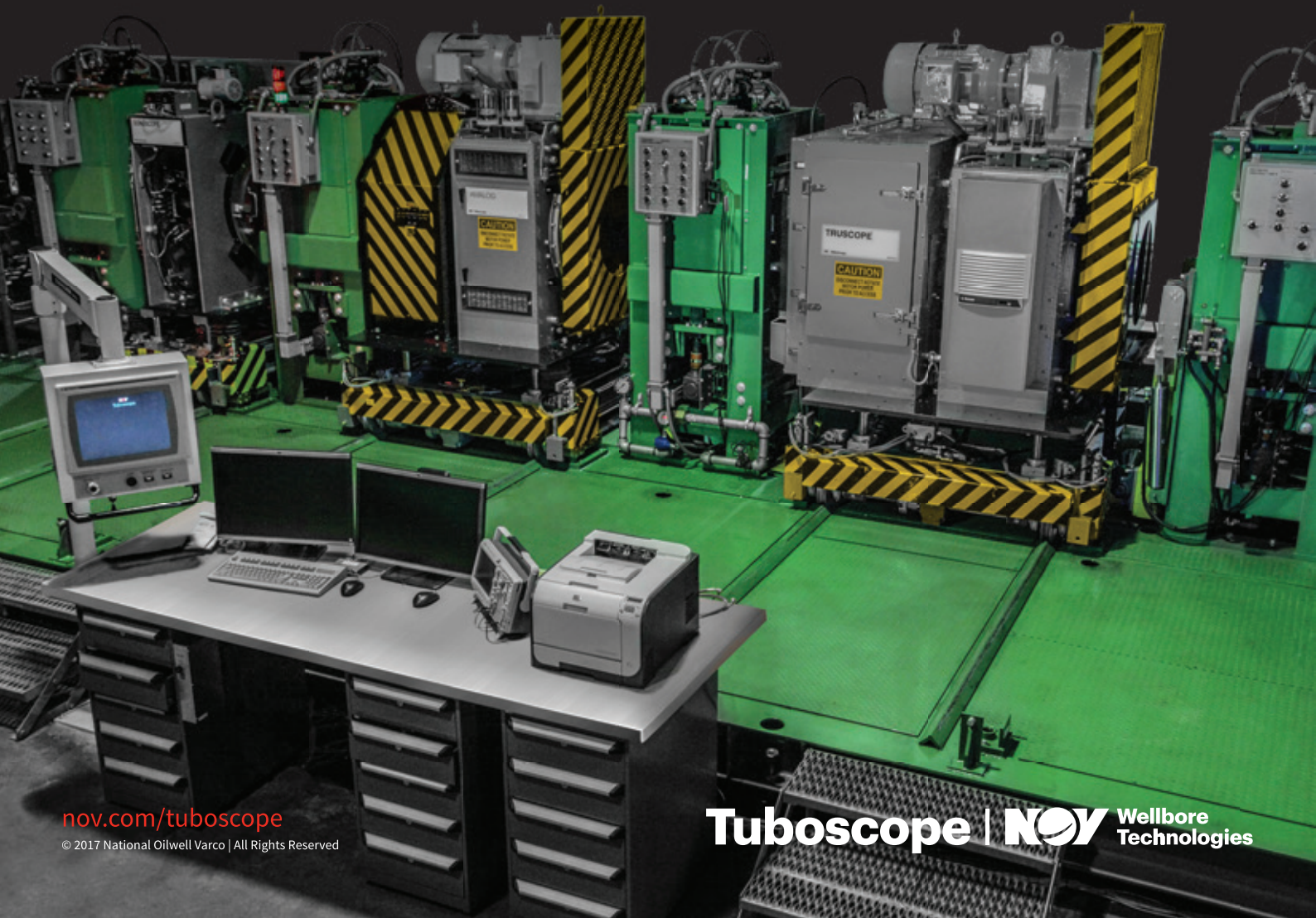
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## Pulsed fibre laser welding system

AMADA Miyachi America Inc has announced the availability of the LMF70-HP, an addition to its LMF series of lasers.

The 70-watt LMF70-HP is suitable for welding small components and thin metals up to 0.25mm (0.01") thick. In addition to welding, the unit is capable of

engraving, deep engraving and cutting of metal, plastic welding and general-purpose high speed marking.

The laser is offered as an OEM product with galvo scanning beam delivery and controller or integrated into the LMWS platform, a CDRH Class 1 laser workstation offering a wide range of integration flexibility, depending on processing and facility requirements.

The LMF series lasers combine cutting-edge technology with industrial robustness. This versatile series has numerous performance features to match the right laser to the right application. The system is designed with multiple integration options to suit stand-alone operation, full production automation,

or low-volume prototype development. The air-cooled, sealed industrial package has been designed for operation in harsh environments and comes with powerful control software with user-friendly interface. The unit complies with IEC13849-1 category 3 Performance Level d (PL d) safety circuitry with proper integration. It is equipped with a Marker Motion™ unit with integrated stage controllers for up to four axes.

Amada Miyachi America manufactures equipment and systems for resistance welding, laser welding, laser marking, laser cutting, hermetic sealing and hot bar reflow soldering and bonding. The company serves a wide range of markets including medical devices, battery, aerospace, automotive and electronic components.

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Amada Miyachi's LMF70-HP welding system

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### Applications



## Fully automated ASMAG line for precision steel tubes

ASMAG GmbH is currently finalising a complete line for the manufacturing of precision steel tubes up to 75mm for a customer located in Turkey.

The new line allows an increase of output and a significant improvement in product quality. The fully automated line consists of draw bench, ten-roll straightener, multiple sawing unit and existing testing unit, visual testing table and stacking-and-bundling unit.

At the line entering side, incoming bundles with tubes up to OD 80mm are separated automatically by an innovative finger separator.

After passing the hydraulic in-line pointing press the tubes are drawn with high speed on a 450kN triple draw bench up to a length of 14.5m.

With the benchmarking ASMAG ten-roll straightening machine RRM-pro-70/10 the customer's straightness

demands and even more challenging expectations can be exceeded.

The integrated multiple saw allows automated positioning of each saw depending on specific requirements, highest cutting performance and best cutting quality together with

best saw blade life-time. The Turkish customer decided to choose ASMAG for a number of reasons, including reputation for quality, high precision tube manufacturing equipment and the fact that ASMAG provides a complete solution.

ASMAG is a manufacturer of integrated lines for production of cold drawn ferrous and non-ferrous metals.

Its markets are mainly Europe, USA, Russia and Turkey. Founded in 1984 by the engineer Johann Vielhaber, it has grown since then in the factory headquarters of Scharnstein and with the acquisition of SEUTHE, Germany, in 2010 and OCN, Italy, in 2015. The ASMAG group now totals more than 200 employees.

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## New technology to produce square and rectangular tubes

FIVES presented its new Oto hollow shape forming technology during an open house in November, in Boretto, Italy. The open house assembled Çınar Boru (Turkey), Profiltubi (Italy), Marcegaglia (Italy) and other clients and partners.

The new technology Oto HSU tube mill (hollow shape universal forming

mill) has been in development since 2009. It is specifically designed to produce square and rectangular tubes for the construction industry. The mill will produce HSU tubes at a lower production cost through direct forming, skipping the traditional step of constructing round tubes and then squaring them.

The Oto HSU line is composed of a mill with forming stands that allow for strip bending at precise angles for the first and second bends. The remaining equipment consists of a high-frequency welding stand, a scarfing unit, cooling and sizing sections, straightening and cut-off units, and a packaging system.

The main benefit of the Oto HSU technology

is the capability of frequent production changes without a roll change. The range of products can vary from a minimum size of 20x20mm to a maximum size of 140x140mm within a range of four mills, with a maximum production speed of 120m/min.

"This new technology guarantees the possibility to produce hollow shape tubes within a large range of dimensions and thickness without changing rolls," said Andrea Anesi, operation director of Fives Oto SpA, a concept designer of the Oto HSU mill.

"Therefore, it substantially saves set-up time, reduces investment cost in different types of rolls and required floor space for rolls, as well as it minimises operator tuning."

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## Weld purge monitor suitable for aerospace tube welding

WHEN welding metals such as titanium, it is essential to measure the oxygen level before, during and after welding using a weld purge monitor (oxygen analyser). Weld purging expert Huntingdon Fusion Techniques (HFT) has launched an updated handheld PurgEye® 200 weld purge monitor, now with PurgeNet™.

Georgia Gascoyne, CEO for HFT, said, "PurgeNet allows networking to standard accessories. Typically, one accessory allows direct interface to an orbital welder or any other automatic welding machine, so that the oxygen level in the vicinity of the weld can be monitored and the welding machine can be switched on or off according to pre-set oxygen levels. A second accessory is a warning lamp that can signal when oxygen levels are low and high according to pre-set levels."

The portable PurgEye 200 is now manufactured with a new OLED

(organic light emitting diode) display, which will give brighter, clearer and sharper readings for viewing at greater distances than before and at wider angles. These OLED displays are mainly symbol based, not text based, so menus are easily understandable, no matter what language the user speaks.

This latest PurgEye 200 will operate either on batteries or mains power. Charging can also be carried out from an optional dock, and battery life will be longer than its predecessor. Along with louder, pre-settable audio alarms for rising or falling oxygen levels, the PurgEye 200 features a faster response long-life sensor and language options.

The updated model has an integral electro mechanical pump so that it can be used to extract samples from a weld purge zone, where there is insufficient flow rate or positive pressure to activate the sensor correctly.



PurgEye 200

The PurgEye 200 weld purge monitor reads down to 1 ppm (very accurate to 10 ppm). The monitor is IP65 rated, which means it can be used in demanding areas where instruments are used on site, such as in desert or tropical conditions.

PurgeLog™ software gives weld purging results to give quality control documents for each weld. The monitor also has the capability to switch between percentage oxygen and parts per million shown on the display.

**Huntingdon Fusion Techniques – UK**

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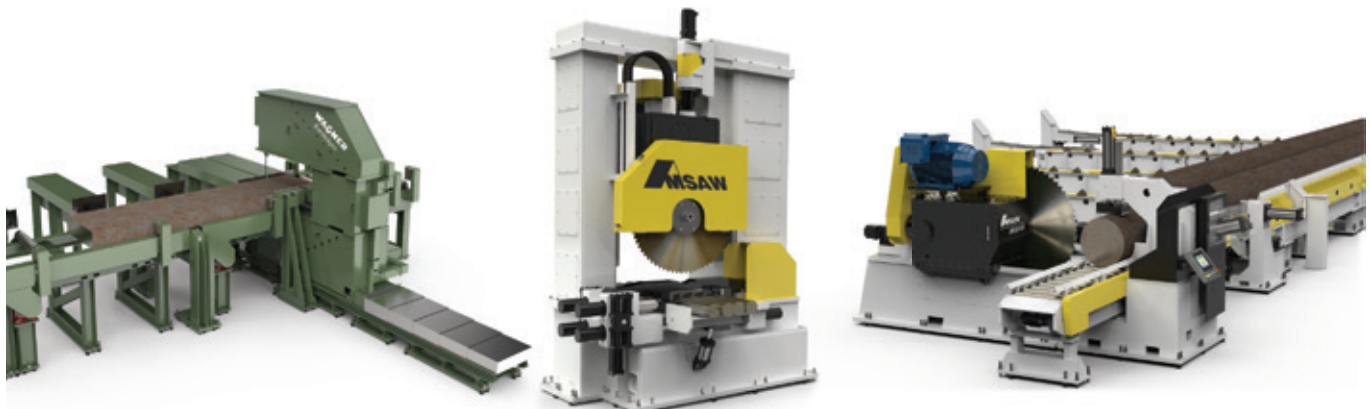
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## T-Drill T-35 & T-65 collaring machines for copper

THE patented T-Drill tube collaring (tee forming or branching) method has established its reputation globally. This T-Drill method of producing outlets to branch connections directly from run



pipe material was developed in the 1970s and is still – nearly 50 years later – one of the major inventions in the field.

The same important principle has been used for decades and has seen continuous improvements to the product range. These efforts have resulted in larger, highly automated tube fabrication machinery and more efficient and ergonomically designed portable machine tools.

An example of this kind of machine is the T-Drill T-35, a portable tee forming machine for copper tubes.

It is easy to carry within a plumber's daily on-site environment, but powerful enough to get the job done in extreme conditions.

The larger T-65 or cordless T-65B is the choice when collaring capacity up to 54mm is needed. With greater power source and wide option range this



hand tool has high level capacity and operating range.

T-Drill's product family of portable machines offer a number of benefits for end-users when the run tube sizes of copper tubes are 15 and 219mm and the collars are between 8 to 114mm. While giving comparable quality to commercial tee fittings, the machines also reduce waste because the T-Drill method eliminates the cutting of the pipe, two brazed joints and fitting costs. T-Drill portable machine tools are easy to use, low-noise tee forming machines for professionals.

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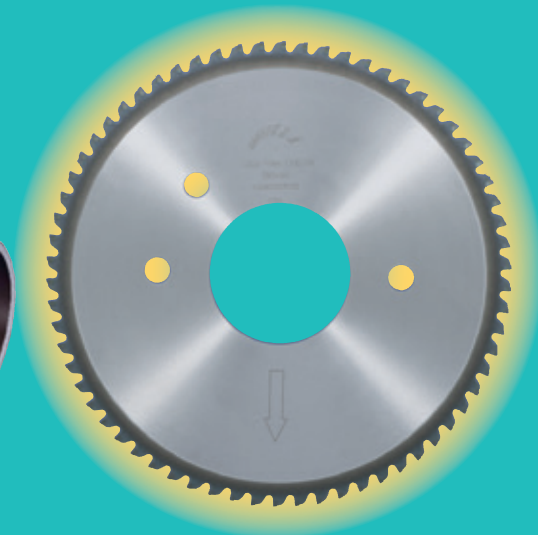
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## Versatile saws for the workshop

A NEW range of swing-frame, pivoting-bow bandsaws for use in workshops has been launched by the German manufacturer Kasto. The versatile KASTOmicut machines are designed for high-accuracy cutting to length and mitre cutting of tubes, sections and solid materials.

Four model variants are available: manual (P 2.6), manual clamping with hydraulic downfeed (E 2.6), hydraulically actuated clamping and downfeed (U 2.6), and fully automatic (A 2.6) with ballscrew-driven material feed, carbide blade guides and an optional chip conveyor.

The saws supersede six machine models in the KASTOpractical and KASTOfunctional series, compared with which they have higher power motors and greater band tension, allowing a 50 per cent increase in cutting force. Feed rate is constant throughout, avoiding lost productivity due to the blade slowing

towards the centre of the cut. Blade speed is infinitely variable from 20 to 120m/min, allowing a range of different materials to be processed.

KASTOmicut saws have a cutting range of 260mm for rounds and 310 x 260mm for flat stock. Mitre cuts are possible at continuously adjustable angles from -45° to +60°. A torsionally rigid, vibration-damped, cast iron frame provides support for the saw blade, ensuring cutting quality, even in difficult-to-cut materials. Available accessories include a rotary table to support the material.

The shortest cut length is 6mm, with a residual length of 15mm for manually cut pieces or 40mm in automatic operation, so users can make maximum use of material. Cutting accuracy is 0.1mm per 100mm of height.



*Kasto has launched the KASTOmicut range of swing-frame, pivoting-bow bandsaws*

**Kasto GmbH & Co KG** – Germany

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## All-terrain welding machine for HDPE pipe

RITMO's Delta 355 All Terrain welds HDPE, PP pipes and fittings for the transportation of gas, water and other fluids under pressure from 125 to 355mm or from 4" IPS to 14" IPS. It is designed to work according to welding standard ISO 21307 High Pressure, and can be equipped with diesel low vibration and petrol engines. The engine, like an electrical generator, independently gives the necessary power supply to the machine during all its working and movement phases.

The machine has a removable control panel with data logging, memory for up to 4,000 welding reports and GPS traceability; a USB port provides welding report/data download and firmware upgrades.

The hardware and software have been developed to interact with each other, sharing data during the entire workflow. Once the welding parameters are set up, the system ensures the repetition of



Ritmo Delta 355 All Terrain

the welding cycle, avoiding errors. The operator only has to confirm the work phases by pushing a button.

The chassis is equipped with front steering wheels and rear traction, parking brake, and a machine frame design for forklift lifting. The removable machine body can work in tight spaces with a shavings collection tray. The dragging bar is designed to weld between the third and fourth clamp,

and the machine also features the Ritmo-patented insert quick release Smartlock System.

Additional features include an on-board electrical milling cutter with integrated locking handle system, safety switch-off device, motor thermic protection and gas spring to easily lift/lower the facer; an on-board heating plate with protection frame and insulated protection bag; gas-spring for easy lifting/lowering of the heating plate; heating plate and facer locking system for safe transportation; two hydraulic rollers for pipe loading and unloading; and a kit for network power supply connection (upon request), excluding the machine engine and weld in closed environments. The 25l capacity tank allows an operating time of more than 12 working hours.

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## Industrial multi- process welding

KEMPPI has launched the X8 MIG Welder, a multi-process welding solution for future-proof industrial welding, using the latest IoT-based technologies and connectivity.

“The X8 MIG Welder is the ultimate choice for demanding welding,” said Dr Petteri Jernström, Kemppi’s director of product management and technology services. “With its focused and intense arc, groundbreaking user experience, upgradeable power source, Digital WPS feature, and full integration with the WeldEye welding management software, the X8 MIG Welder lets you perform, control and manage welding production in a way that was not possible before.”

The X8 MIG Welder is a multi-process system for MIG/MAG welding, stick (MMA) welding, MIG brazing, cladding, and heavy-duty gouging. The solution consists of Kemppi’s high-duty and upgradeable power source with an all-in-one wire feeder, ergonomic welding guns, intelligent software, and a wireless control pad for total welding control.

The powerful and precise welding arc allows for welding efficiency and quality, and the intelligent power source and control technology form the basis for the new Pulse and Wise processes and functions, which are optimised for demanding welding applications. In addition to high speed welding (WiseFusion), the arc characteristics include, for example, narrow gap welding (RGT), pipe root welding (WiseRoot+), and low spatter welding in the globular transfer area (WiseSteel). It has power and accuracy up to 600A, using the most common electrical network voltages.

The wireless control pad allows the welder to easily find the relevant WPS, view the content on the large 5.7" display and activate it to start welding. The system has well balanced welding guns with ergonomic handles, a user-friendly, all-in-one wire feeder, and a serviceable power source.

The X8 MIG Welder is compatible with the universal WeldEye management software. Digital WPS is a feature that ensures the welder always has the latest version of WPS by providing detailed WPS information on the control pad’s display. The welder is designed to grow with the changing needs of manufacturers. It can be easily upgraded with software to work with new materials, applications and welding management demands; even the welding power is upgradeable.

**Kemppi Oy – Finland**

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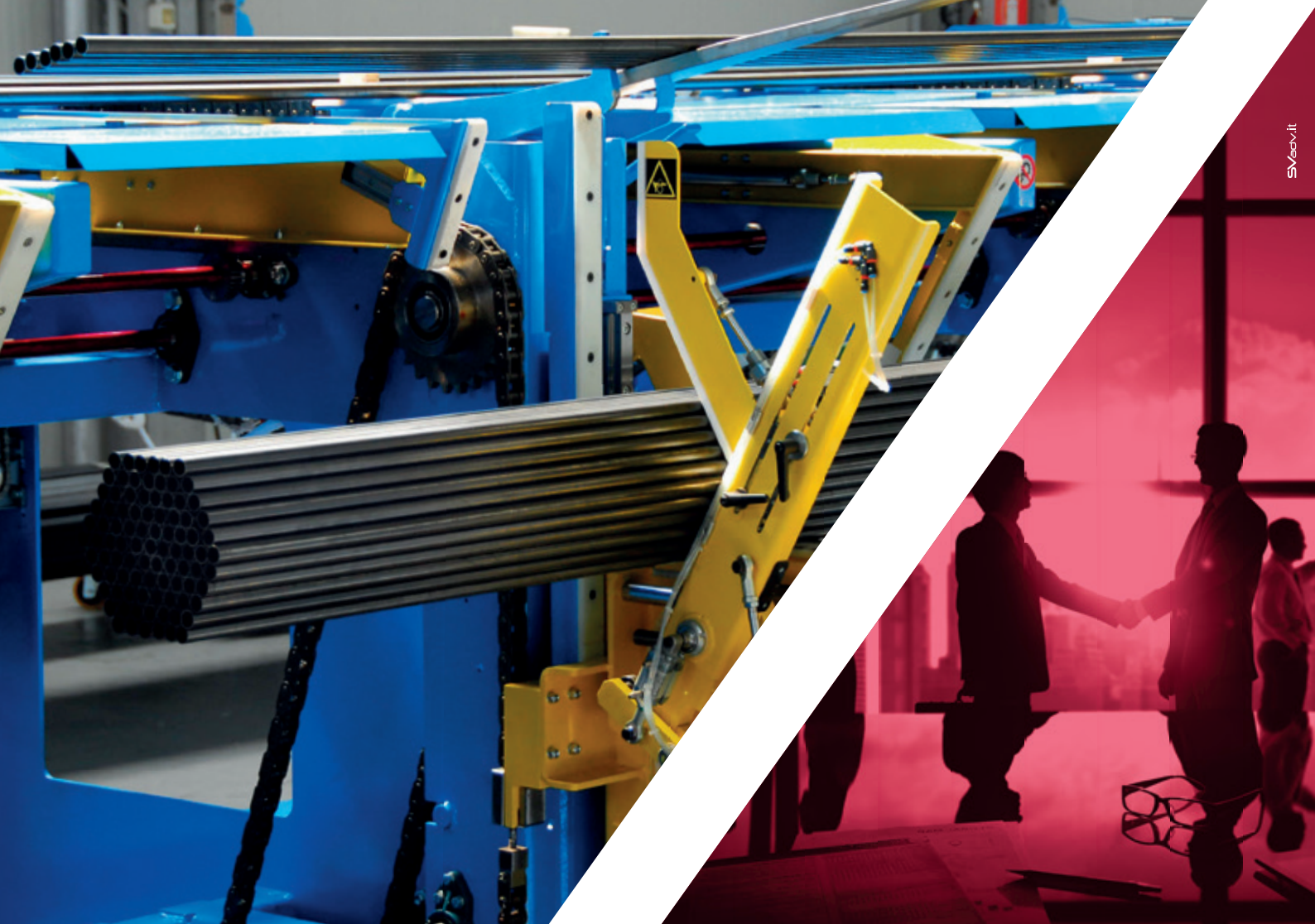


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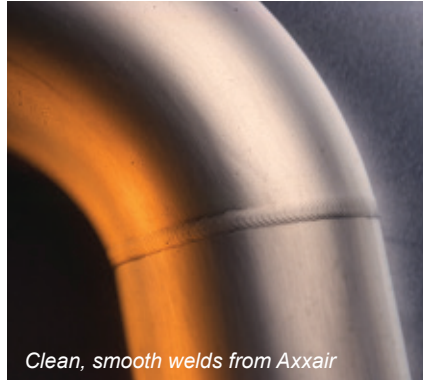
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## Innovative orbital welding process

THE choice to automate the welding process occurs for various reasons – technical, organisational and economical. Many agree that this is the ideal technique for obtaining clean and smooth welds.

High-end industrial sectors like the aerospace industry, high-speed trains, nuclear or biotechnology lean towards it for obvious reasons of precision and dependability. In other areas, like in the pharmaceutical and chemical industries and in agribusiness, smooth welds are indispensable so as to avoid all risk of contamination or the possibility of corrosion in the area of the weld.

Automated orbital welding involves rotating continuously at 360° in an arc around a cylindrical shaped form. This is the best technical means to get clean welds, with uniform precision particularly for small diameters of thin widths. It allows for thrust control of the process with the help of the programming of the welding settings. To ensure work without irregularities, both on the inside and the



Clean, smooth welds from Axxair

outside of the tubes, it is advisable to choose automation for smooth welds.

Axxair has launched its latest generation of orbital welding power sources – a new technology to simplify the orbital welding process for applications in industries working with thin walled stainless steel tubes. The easy-to-use product is endowed with an extensive range of possibilities. Users have access to sophisticated functions allowing them to perform

the most difficult welds with ease. The SAXX suggests the control of the gas of the torch or weld head, but also of the internal shielding gas of the tubes. The gas flows are, for the first time, displayed digitally and are recordable. The system controls and records welding data every second. This data is stored on a USB stick and can be transferred to DMOS/QMOS records via the 'Weldreport' software.

It also allows the management of the residual ppm inside the tubes to guarantee a level of colouring of the interior of the weld. The measurement of ppm is carried out by connecting the SPPM-10 from Axxair to the SAXX.

The software HMI as well as the general software can be updated by USB key. One USB stick can store up to 200 welding programs.

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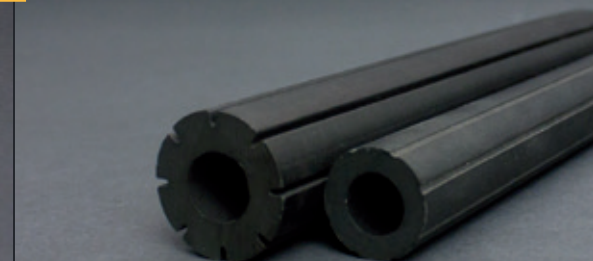
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## Production line for pipe cutting and bevelling

COPIER has launched its first CNC controlled stationary pipe cutting and bevelling machine for length measuring, cutting and bevelling metal pipes in one production line. The cutting and bevelling is combined in one machine, which is time efficient and saves space in the factory. It also saves on staff costs because one worker can operate the complete Beaver CB.

The Beaver CB is CNC controlled and has radial and axial feeding. It cuts and bevels with a cutting bit and can machine the ID and the OD of the metal pipe without changing tools by hand. The operator only enters the correct parameters using the touchscreen of the machine and the machine then operates automatically.

With the radial and axial feeding the wall thickness of the metal pipe is not an issue; even 60mm pipes are able to be cut and bevelled when required. Using



the Beaver CB it is possible to work with starting lengths of 12m that are automatically cut to the required lengths with the right bevel.

Copier offers models of the machine up to 4", 8", 16", 24" and 30" outside diameter. It can custom design a machine range when required.

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## Vacuum tube welding

HUNTINGDON Fusion Techniques (HFT) has introduced PurgElite®, a range of tube and pipe purging systems to achieve a clean, oxide-free, zero-colour weld in tubes and pipes. As well as vacuum tube and piping, PurgElite can be used in any industry where stainless steel or titanium is used.

To save welders the expense of completely filling tubes and pipes with an inert gas, PurgElite Systems with double inflatable dams are available to suit pipe diameters from 25 to 600mm (1" to 24").

PurgElite is manufactured with a special spinal tube, joining the two dams, that is resistant to hot metal up to 300°C (572°F) and is flexible enough to allow movement around 90° bends.

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## Ajax Tocco supplies bright annealing induction furnace

AJAX Tocco Magnethermic has shipped a bright annealing induction furnace to a major stainless steel tube manufacturer in the northeast USA.

The bright annealing system progressively heats the stainless steel tube to high temperatures in an atmosphere of inert gases, and then anneals the tube in a cooling chamber to reduce the hardness of the steel, in order to achieve ductility for further processing. Special

features include the ability to produce a high quality product with a ready-to-ship surface finish.

The equipment supplied consisted of a hydrogen atmosphere heating and cooling system, utilising an Ajax Tocco 75kW Pacer T IGBT induction power supply.

Ajax Tocco Magnethermic designs and manufactures induction heating and melting equipment for various

industries and applications around the world. It also provides a range of services that include laboratory process development, preventive maintenance, equipment repair and parts, coil repair facilities and installation services.

**Ajax Tocco Magnethermic Corp – USA**

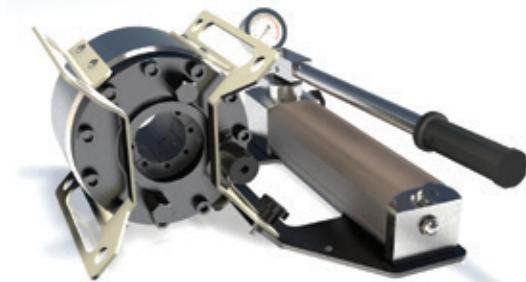
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## Portable crimper

TECHMAFLEX, a French manufacturer of assembly machines, has developed a hose crimping solution for the forestry



*H Crimp 110 portable hose crimper for the forestry market*

industry. Forestry machines such as forwarders, skidders, harvesters and cranes consume a lot of hydraulic hoses.

With numerous constraints due to the challenging environment, the hydraulic hoses need to be changed regularly. Most forest sites have restricted accessibility, but on-site maintenance can be carried out using a mobile workshop.

Techmaflex's H Crimp 110 can crimp hoses up to 1" 4SP. It is lightweight (21kg)

and robust thanks to protective wings surrounding the head. The narrow head (220 x 222 x 240mm) delivers a 110-ton crimping force, combining flexibility with high power. A removable plate improves the operator's comfort and makes carrying more convenient.

H Crimp 110 is available via a distributor network, both in France and internationally.

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FOR decades, Haven's Model 801 and 803 dual-blade shear cut-offs have been used by automotive brake line and fuel line manufacturers for their cut-to-length operations.

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Haven offers complete turnkey integrated lines that include uncoilers, loop accumulators, tube straighteners, fallout conveyance systems and exit accumulation tables.

Working together, an uncoiler and a loop accumulator allow the Haven

cut-off to operate at the fastest speed possible, especially for longer lengths. The accumulator compensates for the cut-off start and stop cycle, making sure there is always material available to the cut-off for any length. The uncoiler simply unwinds the material to fill the accumulator. This sequence creates an uninterrupted flow of material to the cut-off operation.

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*Uncoiler and loop accumulator*

# GLOBAL MARKETPLACE

## The United Kingdom

### On the eve of a key speech on moving forward on Brexit, the UK is identified by the IMF as the fastest-growing G7 economy

The International Monetary Fund had predicted that the economy of the United Kingdom would grow by 1.1 per cent in 2017. On 16 January, however, IMF economists revised that assessment, predicting instead 1.5 per cent UK growth this year. The 0.4 percentage point upgrade is the largest upward revision the Washington-based international body made in its latest report. The change was attributed mainly to “a stronger than expected [British] performance during the latter part of 2016.”

Preliminary IMF findings for the full year 2016 indicate that the UK economy grew by 2 per cent, making it the fastest-expanding of the major advanced economies: ahead of Germany at 1.7 per cent, the US at 1.6 per cent, Canada and France at 1.3 per cent, and Italy and Japan – both at 0.9 per cent. The European Union bloc as a whole was expected by the IMF to record growth of 1.6 per cent for 2016; global growth, 3.1 per cent – consonant with earlier IMF projections.

In her eagerly awaited 17 January landmark speech on Brexit, British Prime Minister Theresa May gave the clearest indication to date of Britain’s plans for departure from the European Union, which were set in motion by last June’s referendum on the nation’s EU ties. Coming just a day before, the revision upward of the IMF’s outlook for the UK in 2017 would have helped confirm Mrs May in her vision of Britain as “a great global trading nation.”

### Optimistic British CEOs are set to capitalise on the attraction the UK holds for the rest of the world

It seems that the upbeat frame of mind of mid-January was not confined to the higher echelons of British government. The publication of the latest PricewaterhouseCoopers (PwC) annual poll of global executives found that British bosses are more optimistic about their business prospects this year than their counterparts in almost every other major advanced economy. Only executives in Canada reported having a sunnier outlook. Some 89 per cent of the 126 UK chief executives surveyed by PwC said they were confident about the business outlook for 2017. This is the highest result for that cohort since 2013, and up from 85 per cent in 2016.

As noted by business reporter Szu Ping Chan of the *Telegraph*, the British results compare with a global average of 85 per cent and are higher than those in five advanced economies including the US, Germany and Japan – where 88 per cent, 77 per cent and 66 per cent of chief executives, respectively, expressed confidence about the ensuing year. (“British Bosses Are More Upbeat About Business Prospects This Year Than Almost Every Other Major Advanced Economy,” 16 January)

PwC’s survey of 1,379 global CEOs showed that the British bosses remain “in hiring mode.” Sixty-three per cent said they expected to take on more staff over the coming year while just ten per cent expect their workforces to shrink, down from 20 per cent in 2016.

The *Telegraph* pointed out that, according to PwC, Britain also punches above its weight in terms of its global business standing. The London-based multinational professional services firm said the UK was the fourth most important country for world growth, behind the US, China and Germany.

Wrote Ms Szu, “In a further sign that UK companies will continue to drive economic growth through hiring and investment, the global accountancy firm said 95 per cent of CEOs were optimistic about business prospects over the next three years.” This is unchanged from the PwC polling results from 2016, and is also above the 2017 global average of 91 per cent. In still another encouraging note, PwC observed that CEOs in the top three global growth engines – the US, China and Germany – were among the most enthusiastic about investing in the UK.

### In a steel magnate’s vision, volume manufacturing of bicycles returns to Britain

As well as large parts of Tata Steel and the Caparo niche engineering business, Sanjeev Gupta, founder and chairman of the London-based steel products group Liberty House, has also acquired Birmingham-based Trillion Cycles and plans to launch a new range of bicycles. The venture (for which the headquarters staff of *Tube & Pipe Technology* publisher Intrac Ltd will have a ringside seat) has a double thrust: the restoration of the bicycle manufacturing industry in Britain, considered by Mr Gupta to be its rightful home; and, more broadly, the re-energisation of British manufacturing. “We have an engineering plant at Leamington Spa to make the bikes,” Mr Gupta told industry editor Alan Tovey of the *Telegraph*. “And we will increase [their] UK content as our manufacturing businesses expand the capability to produce the parts.”

The industrialist described by the *Telegraph* as “a cheerleader for UK engineering” said he is encouraged by the Government’s efforts to boost manufacturing and believes that Brexit will strengthen the sector. The presentation of the first



of the Liberty-Trillion line of bikes at the London Bike Show in February also marked the 25<sup>th</sup> anniversary of the parent company, which pursues what Mr Gupta calls an “end-to-end strategy.”

He sees the new bicycle initiative as an example of that strategy in action: competitive British manufacturing supported by an integrated supply chain. “We are producing the steel from which components can be manufactured,” he told the *Telegraph*. “And then taking them all the way to the finished product.” (“Gupta Puts New Steel in UK Bike Production,” 31 December)

One of the first bicycles to be introduced will be a single-speed “commuter model” with a frame of steel tubing produced by Liberty Steel Group – to be followed by aluminium and composite bicycles and, in time, a high-end carbon-fibre bike priced at around \$12,250. Liberty Engineering Group will likely be heavily involved in the development of these and all other models in the range. “This is not a vanity project,” Mr Gupta told the *Telegraph*, while also acknowledging a long-time attachment to the two-wheeler. His first job, in his pre-Cambridge “gap year” of 1990, was selling Victor bikes, made by his father’s company.

➤ Writing in *BikeBiz* (1 January), Carlton Reid took note of another Liberty House strategy: Green Steel, produced by Green Power. The agenda here calls for steel produced in the UK from UK-sourced materials, promoting a competitive, low-carbon steel sector based on renewable energy and remelted domestic scrap. The effort is in chime with a national policy of increasing the use of low-carbon energy sources toward the total phase-out of coal-fired power plants by 2025. A combination of renewable energy sources in fact enabled the United Kingdom to hit a significant milestone in the third quarter of last year. According to the late December release of figures from the Department for Business, Energy & Industrial Strategy, between July and September 2016 half of the UK’s electricity was generated by wind and solar farms and nuclear and wood-fired power plants.

## Technology

### A ‘crazy DIY project in an Australian backyard’ has serious military potential as a joint tactical aerial resupply vehicle

The Trillion Cycles initiative reported above (“In a steel magnate’s vision”) may have a retro tone, but in fact the humble bicycle is the inspiration for what *New Atlas* has called “a cutting-edge aircraft for the US Army.”

The Australia-based technology blog reported that the US Department of Defense has tested a military version of the Malloy Hoverbike – the creation of mechanical engineer Chris Malloy, of Melbourne – and that Pentagon officials envision using the “Amazon on the battlefield” for resupply missions.

Having tracked the various iterations of the oversized, electric-powered, rectangular-shaped quadcopter since Mr Malloy demonstrated the prototype in 2011, *New Atlas* (formerly *Gizmag*) noted that the latest version is identified in military jargon as the JTARV (joint tactical aerial resupply vehicle). But, even to the preparers of the US Army press release, it is better known as the hoverbike. It hovers; but that is not the full story of its military potential. (“US Army’s Hoverbike Takes Flight,” 18 January)

According to Melbourne-based *New Atlas* reporter Nick Lavars, the hoverbike in its current form can carry up to 300 pounds. But the US Army Research Laboratory (ARL) has expectations of an eventual payload of 800 pounds and a reach of up to 125 miles. “We’re also looking to integrate advanced intelligent navigation and mission planning,” said Tim Vong, the associate chief of ARL (Adelphi, Maryland). “We’re looking to end up with a modular, stable platform that can be used for even more dynamic and challenging missions.”

There are indications that ambitions for the hoverbike are even more vaulting than that. Mr Lavars noted that, on 10 January, Department of Defense officials paid the ARL researchers a visit “to see the JTARV in flight and up close.”

He reported that the researchers are hoping to amplify the skills set of the hoverbike – “what started as a crazy DIY project in an Australian backyard six years ago” – by way of a hybrid propulsion system. That objective could one day see a modified bicycle flying along at altitudes of thousands of feet and speeds of 60 miles per hour.

### Elsewhere in technology . . .

➤ For some time, difficulties in imparting its two-dimensional strength to three-dimensional applications have prevented graphene from fulfilling its promise as the material of the future. But now Massachusetts Institute of Technology (MIT) researchers have announced their discovery of how graphene can be shaped into a sponge-like form that resists forces ten times greater than steel. As noted by Patrick Lynch on the architecture website *ArchDaily* (19 January), the new accessibility of its lightweight, high-strength properties could commend graphene for building projects from long-span bridges to ultra-efficient water filtration systems.

The advance grew out of 3D printing in a polymer of two similar forms – one thinner and one with thicker walls and

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folds – which were then subjected to compression testing. The thinner-walled object was unexpectedly found to be able to withstand greater pressures, the likely result of the incremental deformation of the structure. Thicker walls hold higher deformation energy.

MIT believes that using heat-and-pressure treatment to coat metal or polymer particles with graphene would leave the lightweight, super-strong structure of the graphene intact. “You can replace the material itself with anything,” Markus Buehler, MIT’s head of Civil and Environmental Engineering, told *ArchDaily*. “The geometry is the dominant factor.”

## Automotive

### Mr Trump extracted conciliatory gestures from Ford and Toyota, but the German carmakers may be made of sterner stuff

Days before Donald J Trump’s inauguration as the 45<sup>th</sup> president of the United States, German carmakers responded to Mr Trump’s threats of import duties on the autos they make in Mexico for sale in the US by pointing to the extensive expansion of their US production facilities in recent years.

BMW AG, which the president-elect singled out in the course of an hour-long interview with the German newspaper *Bild* and the *Times* of London, published on 15 January, noted that its largest factory is in South Carolina and that cars made at a planned smaller factory in Mexico will be exported globally. Mr Trump had said that BMW will face a 35 per cent duty on vehicles it exports to the US from Mexico.

As noted by *Bloomberg* reporters Elisabeth Behrmann and Christoph Rauwald, Mr Trump’s comments were the first

aimed at a European carmaker after he issued similar warnings to two domestic carmakers, prompting conciliatory gestures by the targeted companies. Ford Motor Co cancelled plans for a \$1.6 billion factory in Mexico and will instead expand an existing site in Michigan. Toyota Motor Corp, which is set to start producing cars at a new plant in Mexico starting in 2019, has said it would take Mr Trump’s views into account in its planning beyond that point.

Despite what has been called, in the *New York Times*, Mr Trump’s “penchant for unpredictable disruption,” there were signs that the German carmakers were taking his Mexico-themed threats in stride. Peter Schwarzenbauer, who heads BMW’s Mini and Rolls-Royce brands as well as BMW’s car-sharing business, told reporters on the sidelines of a conference in Munich that the company sees no reason to change its plans in Mexico. He added, “Trump’s comments aren’t really a surprise.”

#### PREDICTABLE UNPREDICTABILITY

“We take the comments seriously, but it remains to be seen if and how the announcements will be implemented by the US administration,” Matthias Wissmann, president of the German auto industry association VDA, said in an emailed statement to *Bloomberg*. The US Congress will, he said, probably show “substantial resistance” against the duty proposals. (“German Automakers Push Back Trump’s Warning Over Mexican Plants,” 16 January)

That may be, and the proofs mount that Mr Trump’s unpredictability is his most predictable characteristic. But the German carmakers are likely hoping that the new president’s fixation on Mexico-as-menace passes – and soon. While Mr Trump referred only to BMW by name, they all have built or are building capacity in Mexico to supply the US as well as South American markets.

Volkswagen’s plant in Puebla is the biggest German auto factory in Mexico. Mercedes-Benz parent Daimler plans to

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start making compact cars at a facility jointly operated with Nissan Motor Co in Aguascalientes next year.

➤ If Mr Trump does succeed in penalising the German carmakers, they will be affected unequally. *Bloomberg's* Ms Behrmann and Mr Rauwald noted that BMW's annual capacity of 150,000 deliveries out of Mexico is a small share of its two million car sales last year. Volkswagen's Audi luxury unit is the most vulnerable to threats of import duties because it, too, makes about 150,000 vehicles in Mexico annually but has no US facilities "that it could use as a bargaining chip."

Perhaps the most salient datum of all: the US is the second-largest export market for German automakers.

➤ While carmakers have particular issues with the new occupant of the White House, German companies generally are charting their American paths without evident concern about the changeover. As noted by Natascha Divac of the *Wall Street Journal*, German firms in several sectors – energised by low interest rates and rebounding markets – are boosting their stateside expansion plans and ramping up their dealmaking, in which Mr Trump famously claims unique expertise.

On the day before the inaugural Ms Divac wrote, from Frankfurt, "German companies are accelerating their expansion in the US, undaunted by President-elect Donald Trump's threats to limit international trade and uncertainty surrounding his future stance on foreign takeovers." ("German Companies on a Tear in US," 19 January)

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## Oil and gas

A 19-million-acre Alaskan wildlife refuge, coveted for its untapped oil, attracts new attention. But that may be all

"Far above the Arctic Circle, one of the longest-running controversies in US oil drilling is about to reignite."

Markets reporter Alex Nussbaum of *Bloomberg Businessweek* was referring to the expected push by Republicans, buoyed by the election of President Donald Trump, to allow oil exploration in the US Arctic National Wildlife Refuge (ANWR). The future of the frigid wilderness in northeastern Alaska, placed off-limits by Congress in 1980, has been a source of pitched battle between drillers and conservationists for decades. Given Mr Trump's pledge to raise US energy production, and with his party in control of Congress, the outlook for commercial development of the refuge is looking very much better. But, even apart from unremitting opposition from conservationists, factors identified by Mr Nussbaum could curb enthusiasm for exploiting the reserve any time soon. ("Big Oil May Finally Get to Drill in the Arctic – But Is It Worth It?," 20 January)

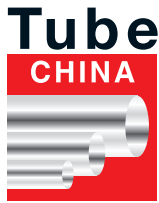
For one, he noted, while the US government estimates that the area could hold 12 billion barrels of crude, placing it among the biggest untapped oilfields in the nation, "no one's

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sunk a well there since the 1980s.” With cheap oil from Texas to offshore Africa in plentiful supply, it is questionable how much attraction the unverified reserves hold for producers like Exxon Mobil Corp and ConocoPhillips. “Its value is hard to gauge because it’s always been a bit theoretical,” Mr Nussbaum was told by Andrew Slaughter, executive director of the Deloitte Center for Energy Solutions in Houston, Texas. “No administration has really wanted to take on the challenge of going for ANWR.”

➤ Of course, that could change under a president who has also promised to create 25 million jobs. Mr Nussbaum pointed out that the ageing Trans-Alaska Pipeline, “once the symbol of energy independence for an oil-strapped nation,” is now nearly obsolescent. As oilfields become depleted and supplies from shale oil in the Lower 48 states grow, throughput of the 800-mile system linking northern Alaska to the rest of the world has fallen. While it might take a decade for ANWR to start producing oil, the two US senators from Alaska – both Republicans – are aware that the new supply would go far toward ensuring the survival of the pipeline and the jobs that go with it. In January they introduced legislation to allow development of up to 2,000 acres in the refuge.

➤ According to energy industry researcher IHS Markit Inc, subzero weather and remote distances mean that drilling in Alaska typically costs three times as much as in the Lower 48. By *Bloomberg’s* reckoning oil would have to sell at about \$70 a barrel to make recovery from ANWR economical. Today’s prices hover around \$55.

## Energy

### Phase-out of coal in Ontario delivered no appreciable improvement in air quality

The Fraser Institute, the leading think tank in Canada, released its 17 January report on a major environmental initiative under the heading “Did the Coal Phase-out Reduce Ontario Air Pollution?” The Canadian business daily *Financial Post* was more declarative: “It’s Official – Ontario’s Coal Phase-Out Was All For Nothing.”

The reference is to the process, begun by the province of Ontario in 2005, that would eventually lead to the phasing-out of its coal-fired power plants, the largest of which were the Lambton and Nanticoke facilities in southern Ontario. The rationale for shuttering the plants was a 2005 cost-benefit analysis that projected an estimated \$3bn in annual savings to the health care system from the reduction of smog-related air contaminants. The optimistic cost savings estimate derived from the assumption that very small changes in air pollution are associated with very large health effects.

However, the Fraser Institute noted this January, that analysis, and another one done for the province the same year on the effects of cross-border air pollution, found that a phase-out of coal would have only very modest effects on air quality in Ontario. This was consistent with emissions inventory data showing electric power generation to be a minor contributor

to particulate and ozone pollution at the time. Even so, the coal phase-out – requiring extremely costly changes to the electricity system – went forward. A decade later, the Fraser Institute reported on its study of “whether the removal of coal from the grid explains changes in air pollution levels since 2002.” The disappointing conclusion: it did not. The elimination of coal produced only a statistically insignificant reduction in average urban levels of PM2.5, or particulate matter smaller than 2.5 microns, in the cities of Toronto or Hamilton. No evidence was found that the coal phase-out reduced nitrogen oxides (NOx) levels, which were instead strongly affected by reduction in US NOx emissions.

➤ Overall, the Fraser Institute concluded that the Ontario coal phase-out yielded small improvements in air quality in some locations, “comparable in size to projected . . . improvements that could have been achieved through installation of new pollution control systems rather than closing the plants.” The report, by Professors Ross R McKittrick and Elmira Aliakbari of the University of Guelph (Ontario), was issued with a recommendation: “This has implications for understanding the costs and benefits of a coal phase-out such as the one being contemplated in Alberta.”

### President Trump reaffirmed his intention to revive the American coal industry

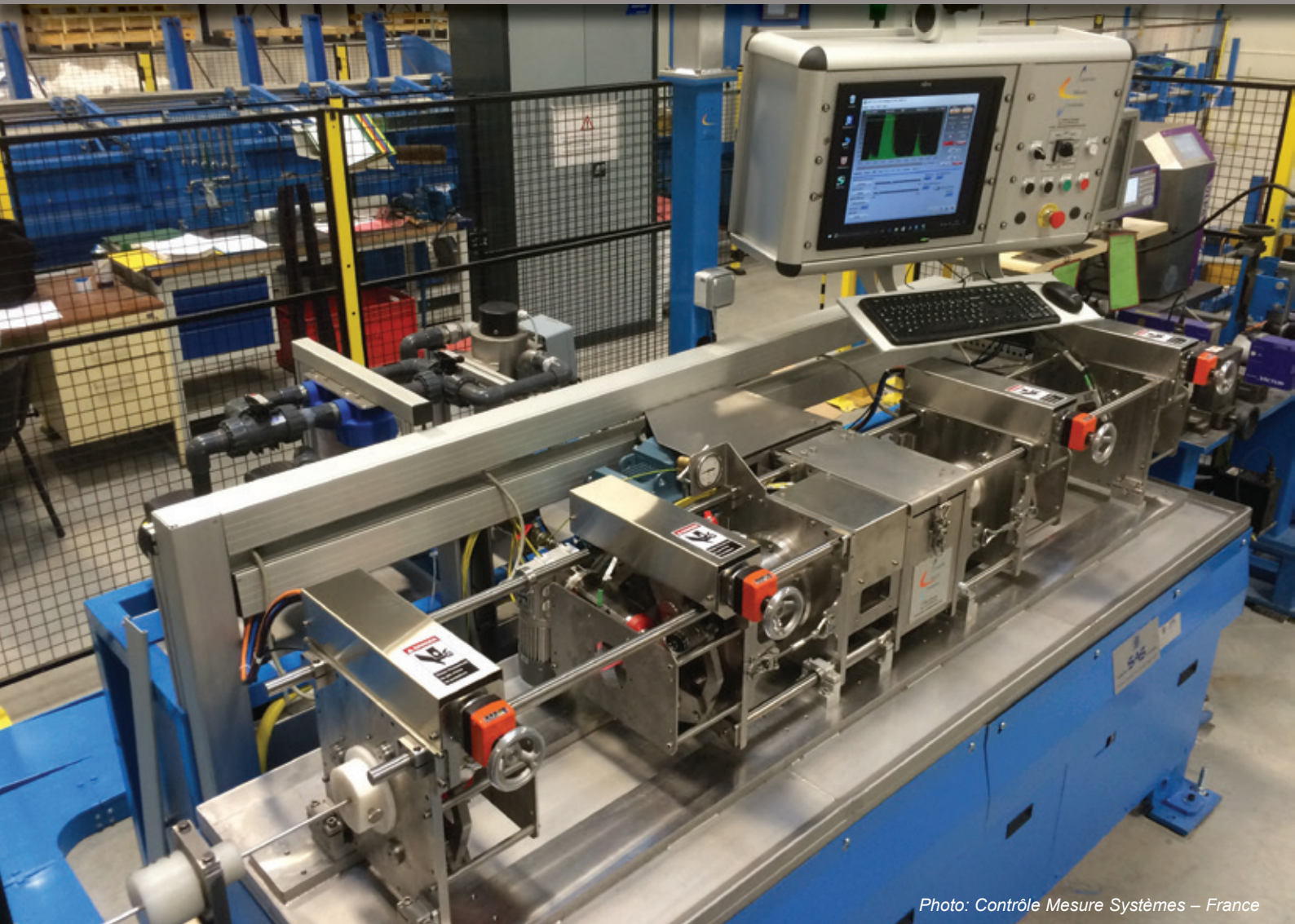
“No evidence was found that the coal phase-out reduced nitrogen oxides (NOx) levels, *which were instead strongly affected by reduction in US NOx emissions.*” [Italics ours.] Taken from the above account of a Canadian environmental initiative, this drives home the fact that air pollution is no respecter of international borders; nor are steps to control it taken in isolation. The line might profitably be considered in connection with the environmental views of US President Donald Trump.

As noted by Mark Gollom of CBC/Radio-Canada (20 January), less than an hour after Mr Trump’s installation the new administration set out its energy policy on the White House website. The focus was on gas and oil, but also declared an intention to make good on a presidential candidate’s pledge to American coal miners: “The Trump administration is . . . committed to clean coal technology, and to reviving America’s coal industry, which has been hurting for too long.” Mr Gollom described clean coal technology as a collection of methods whereby the dirtiest constituents of coal are eliminated. However, he wrote, “[The technology] is not entirely without pollution and also increases the cost of getting that energy.”

➤ President Trump also has said he will scrap two important environmental policies of the Obama administration: the Climate Action Plan, which focuses on cutting carbon pollution – preparing the US for climate change and leading an international push on the issue; and the Waters of the US rule, enacted to protect waterways, including lakes, rivers and streams, through the Environmental Protection Agency (EPA). During the election campaign, Mr Trump said he wanted to eliminate the EPA. Sceptical of global warming, he once mused that climate change might be a hoax perpetrated by the Chinese.

**Dorothy Fabian, Features Editor (USA)**

# INSPECTION, TESTING & QUALITY CONTROL



*Photo: Contrôle Mesure Systèmes – France*

What would constitute a very strong challenge to this trio of closely allied techniques? A likely candidate might be the making of on-line corrections to a machine imposing multiple and complex bends in a tube intended for long, hard use in a hostile environment. Information supplied to the system would need to be accurate not only about the bend points but as to the entire complex tube contour. The workpiece

would at all times require direct comparison with a master tube or a CAD model, with super-sensitive alerts to any area out of tolerance. Correlation, conformation, correction: all would be instantaneous and to standards well beyond the norm and very little short of absolute ideal. In fact, to the professionals whose products and services are reviewed here, this is not a counsel of perfection.



## Multi-test system for automotive shock absorber tubing and OCTG

MAGNETIC Analysis Corp (MAC) has supplied a combined ultrasonic/eddy current test system to inspect cold drawn welded tube to be used in manufacturing shock absorbers at a new plant in Monterrey, Mexico, built by Prosankin, formerly known as A-4C-Sankin.

A-4C-Sankin was formed in 2015 as a joint venture of Grupo Prolamsa, a steel pipe manufacturer in Mexico; the Sankin Corporation, a manufacturer of cold drawn steel tube; and JFE Shoji Trade Corporation, the trading arm of Japan's second largest steel company.

The new plant's focus is production and sales of cold drawn tubes primarily for automotive use, although the test system is also designed to provide the future capability of meeting API 5CT testing requirement for oil country tubular goods.

Shock absorbers are a critical component of automotive chassis. While they are commonly called 'shock' absorbers, their function is actually not to absorb shock but to reduce and decelerate the vibrations of vehicle springs that are contained within the shock absorber tube – in effect, acting as a vibration dampener.

Working together, the springs and the shock absorbers provide the link between wheel suspension and car body, compensating for uneven road surfaces. Most cars currently in mass production feature gas-filled shock absorbers. Accurate and thorough testing of the tube during its production is essential in order to prevent leaking gas.

The test system supplied by Magnetic Analysis Corp to the tube producer utilises two technologies for inspecting the cold drawn welded tubes during production – ultrasonic and eddy current.

The 100mm Echomac® rotary ultrasonic system uses four test channels to detect transverse defects, four channels for longitudinal defects, and four for measuring wall thickness. In addition, a MultiMac® eddy current encircling coil test fulfils the API requirement for detecting a through wall drilled hole, representing a transverse defect, required for some grades.



*The multi-test system for automotive shock absorber tubing and OCTG features 100mm ultrasonic Echomac rotary test and a MultiMac eddy current tester*

The system is designed to run in an automatic mode, performing both the ultrasonic and eddy current tests, marking any defects and creating a record (chart, defect list, test parameters, etc) of each tube and batch, while keeping pace with the production line. Data from the tests is stored locally and can be transferred to the customer's network.

The tubes range from 12 to 100mm diameter with wall thickness of 1.5 to 7mm. A new Water Package, designed by MAC, features a counter weight that

allows the water box cover, including the attached heavy copper heat exchanger coil, to be easily raised and remain in the open position for access during maintenance.

The system includes automated drive mechanisms on a V-roll bench and a demagnetiser for any residual magnetism created by the eddy current test saturation coil.

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## Elcometer opens new sales office in Dubai

ELCOMETER is a manufacturer of inspection equipment, with specialised divisions dedicated to coating inspection, ultrasonic NDT inspection, concrete inspection and metal detection.

The company's new subsidiary, EL Inspection & Blasting Equipment LLC, based in Dubai, is now open for business. The new operation is responsible for sales, after sales and training support for the United Arab Emirates for Elcometer's complete range of coating, concrete and ultrasonic NDT inspection equipment.

EL Inspection & Blasting Equipment LLC is the tenth Elcometer International facility.

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## Pipe deposition scanning technology secures investment

ROCSOLE Ltd has successfully completed an additional funding round that was led by Shell Technology Ventures (STV).

The Finnish company, with offices in Kuopio, Finland, and Houston, Texas, provides electrical and ultrasound tomographic industrial process monitoring systems.

The company's current products include a pipe sensor for both topside and subsea pipes, providing real-time information on the flow and, in particular, deposition build-up in a pipe through probe sensor technology that can be used in separators when extracting oil and water.

The additional funding injection from STV allows Rocsole to expand its product portfolio with a smart deposition pig sensor that enables efficient deposition monitoring of a customer's entire pipe network from the inside.

Once the deposition has been located, a measuring device for monitoring and identifying deposits from the current product family may be permanently installed in the areas discovered during the inspection. With detailed information on pipe deposits, operators can prevent pipe clogging that can lead to lost production. Efficient deposition monitoring can also reduce the number of pigging runs.

"Rosco's smart pig sensor could change the way we inspect subsea pipelines by allowing us to quickly obtain flow and deposition insights using their non-invasive and accurate analytics," said STV managing director Geert van de Wouw.

"Their tomographic imaging techniques mean that measurements can be conducted from inside the actual pipe without damaging or disturbing it. Technology that can reduce down time

and optimise production is critical for Shell operations, both for on- and off-shore."

Rocsole chairman Anssi Lehtikainen commented, "We are excited to work with a strategic investor who understands the business value and competitive advantage of a tomographic approach in industrial imaging. STV recognises the need of preventive maintenance enabled by accurate pipe deposition monitoring and identification that Rocsole offers through its solutions based on a patented electrical tomography platform."

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## Non-contact gauge measures length and speed with high accuracy

NDC Technologies, a global provider of precision measurement and control solutions, indicates that its Beta LaserMike LaserSpeed® non-contact gauge has helped numerous pipe and tube manufacturers to accurately measure the length and speed of products during production, to avoid

product overages and shortages as well as reduce product scrap and rework.

"Manufacturers of pipe and tube require the accurate length and speed measurements of products," said Jay Luis, global marketing communications manager for NDC Technologies.

"For example, accurate length and speed measurements control cutting systems that produce products to exact production and customer size specifications.

"Accurate length measurements also enable manufacturers to properly position pipe and tubes to mark them with important product information. However, many manufacturers still use mechanical contact encoders to perform these measurements, not realising they are getting one per cent or greater accuracy at best due to slippage and mechanical issues. Length discrepancies can directly affect product quality and create waste, costing the manufacturer significantly."

The LaserSpeed non-contact gauge is a replacement for contact measurement devices. It uses a laser-based technique that does not contact the product, to directly measure the length and speed of moving surfaces with better than  $\pm 0.03$  per cent accuracy and  $\pm 0.02$  per cent repeatability.

LaserSpeed is permanently calibrated and has no moving parts to wear out.

NDC can provide a complete range of Beta LaserMike LaserSpeed gauges in a variety of protective enclosures to operate in harsh production environments.

The company also offers a European certified length measurement system that meets MID (Measuring Instruments Directive) 2014/32/EU requirements.

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non-contact gauge*



## Keeping an Eye on weld purging

WHEN welding metals such as stainless steel, titanium and nickel alloy, where a high quality weld is required, weld purge monitors can help obtain non-oxidised, zero-colour welds by monitoring the oxygen content.

Huntingdon Fusion Techniques' (HFT) PurgEye® 100 can help to eliminate post-weld cleaning costs.

According to the company, a customer recently said, "The PurgEye 100 is one of the best, if not the best residual oxygen detector instruments on the market

today, with its digital residual oxygen level, LCD screen readouts measuring as low as 100 ppm and its large, user-friendly viewing screen making it easier for me to read. The PurgEye 100 also has a great accuracy of residual oxygen, with speedy measurements being displayed within seconds."

The PurgEye 100 is IP65 rated and features leak-tight push buttons, auto-calibration features, vacuum-sealed leak-tight probe assembly, wrist/neck strap and tripod mount. The extra long-life sensor provides approximately 18 months life before it requires changing. A low-sensor indicator will appear on the screen, warning that a new sensor is required. Once that icon appears, it provides the user with adequate time to obtain a new sensor, which can be fitted like changing a battery, and the monitor can be re-calibrated easily by the user.

The PurgEye 100 has a clear, easy-to-read LCD screen, with a



*PurgEye 100 with probe*

24mm-high display, which also shows a low-battery icon. When the monitor is not in use, an automatic sleep mode activates to conserve battery life.

HFT has a range of PurgEye weld purge monitors to measure oxygen levels from atmospheric content (20.94 per cent) down to 1 ppm (accurate to 10 ppm).

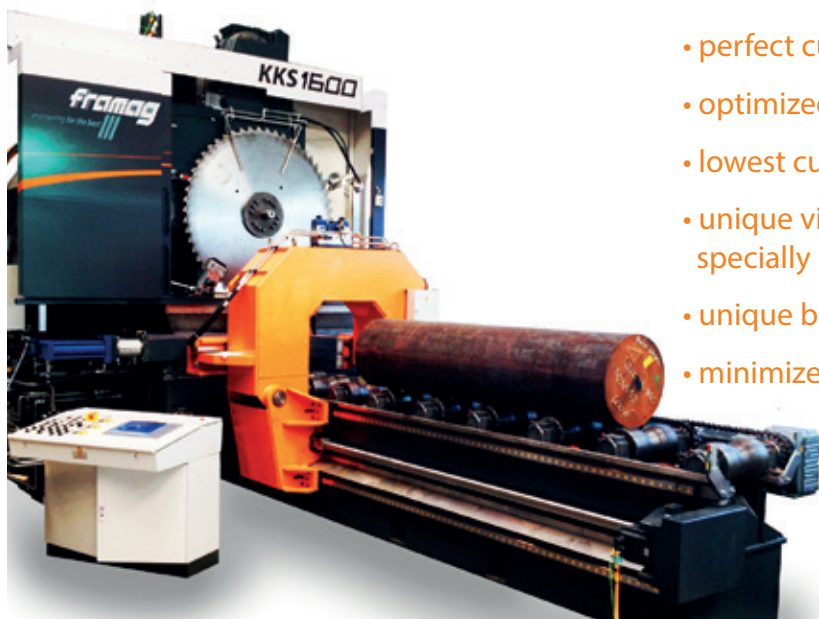
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*HFT's PurgEye 100 weld purge monitor*

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## Sandvik inaugurates fully automated OCTG ultrasonic testing facility

SANDVIK has inaugurated a new fully automated ultrasonic testing facility for pipes for the oil and gas industry.

“Seeing this major investment come on-line is a substantial achievement for all involved, and a key milestone in Sandvik’s enhanced strategic focus on demanding applications within the oil and gas industry, such as OCTG,” said Per Olsson Artberger, Sandvik global product manager for OCTG. “This new ultrasonic testing facility allows us to increase our capabilities and capacity significantly. Despite the current downturn in the oil and gas market, we see continued good business

opportunities for Sandvik material grades, especially in the Middle East and Caspian Sea regions. What the new, automated facility provides us with is a much speedier throughput and greatly enhanced testing capabilities which meet the toughest requirements from customers in this segment.”

Sandvik took the decision to invest in the new facility as the energy sector, including oil and gas, is a key focus in the company’s strategic direction.

Ultrasonic testing was the limiting factor in achieving maximum output with the existing facility. To solve this, Sandvik has invested not only in capacity but also in technology to meet the industry’s requirements for defect detection.

*Michael Andersson, head of product area tube, and Petra Einarsson, president of Sandvik Materials Technology, attend the inauguration of the new facility*



*Sandvik has inaugurated a new ultrasonic testing facility*

“The new facility allows us to meet and exceed all customer requirements and puts Sandvik in a world-leading position as a manufacturer of OCTG,” said Mr Olsson Artberger. “It also builds on the strategic alliance between Sandvik and Tenaris on the exclusive joint supply of corrosion-resistant alloy OCTG materials and technology to the oil and gas industry.”

Sandvik Materials Technology develops and manufactures products in advanced stainless steels and special alloys for demanding environments, as well as products and systems for industrial heating.

**Sandvik Materials Technology – Sweden**  
Website: [www.smt.sandvik.com](http://www.smt.sandvik.com)

## Entering new depths with Aasta Hansteen

MEASUREMENT and inspection technology specialist Optical Metrology Services (OMS) has completed the remote measurement and inspection of a number of 230m-long pull tubes for Statoil’s deep-water Aasta Hansteen SPAR project.

The project is at 1,300m below sea level in the Norwegian Sea. Manufactured by Hyundai Heavy Industries, the SPAR platform is the largest structure of its kind to date, measuring 195m in height and capable of producing 23mn cubic metres of oil and gas per day.

Due to the adverse and remote location of the platform, there were a number of considerations regarding

the steel catenary risers connecting the subsea pipelines to the topside platform. This required OMS to perform a detailed and accurate inspection of the pull tubes, which provide the mechanism to connect production risers, product export lines and pump caissons.

Any defects or obstructions within the pull tubes could create major issues once the platform was positioned at sea, where they could not be rectified. Through OMS’s ranged inspection, Aasta Hansteen was able to go ahead with the next development phase without the likelihood of failure and considerable additional project costs. OMS operator Tim Green commented,

“The SPAR project proved a major task for OMS, being one of the largest we have undertaken. Through our agile, robust and versatile service, Aasta Hansteen were able to go ahead with the next stage of the development with confidence in completing the project both on time and in budget. This is further evidence of the innovative measurement and bespoke inspection solutions OMS can offer in addressing challenges faced by businesses on a global scale.”

**OMS – UK**  
Email: [info@omsmeasure.com](mailto:info@omsmeasure.com)  
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## Tubular inspection services and equipment

TUBOSCOPE, a division of National Oilwell Varco, LP (NOV), is a supplier of tubular inspection services and equipment to the petroleum and pipe manufacturing industry. Its technologies are used for inspecting new and used tubular goods to demanding industry and customer specifications, and include Amalog® and Sonoscope® electromagnetic inspection (EMI) technologies, and Truscope®, TruWall® and TruScan® ultrasonic (UT) inspection systems.

An example of the capability within the Tuboscope product line is the Truscope A/S (Amalog-Sonoscope). This inspection system combines the non-destructive techniques of EMI and UT principles to detect, evaluate and classify, in a single pass of the pipe through the system, transverse and longitudinal, internal and external flaws as well as wall thickness variations and laminations.

The Truscope A/S system provides full-body inspection across a large range of pipe diameters. The pipes can be seamless or ERW; manufactured of ferrous or non-ferrous alloy materials; and with a variety of end conditions – saw-cut or cropped, plain-end, threaded, coupled, and upset or non-upset.

With its combination of EMI (Amalog and Sonoscope) and UT (Truscope) techniques, the Truscope A/S satisfies the latest editions of API 5CT, 5L and 5D, as well as numerous other international specifications for non-destructive inspection of tubular products for the energy industry.

The inspection system comprises two main sections – the inspection platform and the computerised inspection electronics. Placed within a pipe conveyor line, the pipes are advanced to the inspection platform. Mounted on this platform are pinch rolls that contain the pipe and provide the driving power to move it at a constant speed through the three individual inspection heads, or positioners. The testing sequence is the Sonoscope first, followed by the Amalog and ending with the Truscope. All three positioners are mounted on track roller systems to allow them to be moved in or out of the conveyor line for pipe size change-over or maintenance.

Pipe to be inspected is first conveyed through the Sonoscope inspection unit, where a high-strength active magnetic field orientated longitudinally

is introduced into the pipe. Multiple stationary detector assemblies, or 'shoes', are brought into contact with the outside diameter pipe surface. Flaws such as transversely orientated cracks, rolled-in slugs and pits are detected by this inspection method.

The pipe is next conveyed through the Amalog inspection unit, which is equipped with a dual-shoe detection system integrated into a rotating magnetiser assembly. As the pipe enters the

Amalog inspection unit, a high-strength active magnetic flux field, circumferentially orientated, is introduced into the pipe. The rotating detector shoes then scan the outside surface area of the pipe circumferentially in a helical path. Flaws such as longitudinally orientated seams, cracks and overlaps are detected by this inspection method.

**Tuboscope – USA**  
Website: [www.nov.com](http://www.nov.com)



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## Creaform and Sonatest in global distribution partnership

SONATEST, a manufacturer of ultrasonic non-destructive testing (NDT) solutions, is now an official reseller of Creaform's Pipecheck Analyze pipeline integrity assessment software.

Fully compatible with Sonatest's ultrasonic testing instruments, Pipecheck enables the identification of potential issues on both the inner and outer surfaces of pipes, whether those issues are corrosion, dents or gouges.

Combined with the strengths of the NDT equipment, Pipecheck's single software solution gives accurate and realistic damage evaluation of a pipeline.

Sonatest's entire sales network is now able to distribute Pipecheck to the company's pipeline corrosion assessment market.

With Pipecheck, Sonatest will continue its expansion into other sectors, including nuclear plants and geothermal facilities, where corrosion and erosion caused by water vapour travelling at high speeds have become a major problem.

"We were very impressed by Pipecheck's performance and accuracy, as well as its amazing simplicity and ease of use," explained Sonatest product manager Jonathan Turcotte. "Thanks to a basic three-step workflow – scan, analyse, report – our clients' field technicians can quickly gain access to the vital information they need to make critical decisions and ensure both compliance and community safety."

Jérôme-Alexandre Lavoie, product

manager at Creaform, added, "Pipecheck is an excellent complement to Sonatest's current ultrasonic data acquisition solutions, helping clients to increase their assessment efficiency in the field."

"With Sonatest's powerful flaw detectors and Creaform's comprehensive and intuitive Pipecheck software, operators and inspectors need look no further than this joint solution for all their pipeline assessment needs."

**Sonatest – UK**

Email: [sales@sonatest.com](mailto:sales@sonatest.com)

Website: [www.sonatest.com](http://www.sonatest.com)

**Creaform – Canada**

Website: [www.creaform3d.com](http://www.creaform3d.com)

## Non-destructive testing for industrial applications

CONTRÔLE Mesure Systèmes (CMS) is a specialist in non-destructive testing and, with a complete range of products in eddy current and ultrasonic methods, can supply solutions for most industrial applications. The company's product line is designed to meet inspection, testing and quality control on both ferrous and non-ferrous products, including steel, copper, alloys, carbon steel, stainless steel and aluminium.

Applications in tube, bar, pipe and wire inspection can include surface flaw detection by eddy current rotating head; internal and dimensional flaw detection by ultrasonic rotating head; tube inspection with product in rotation; full body and/or weld of welded tube

inspection; full body and/or ends of non-welded tube inspection; defect detection on double wall tubes; heat treatment, hardness, coating verification and measurement; supra conductor wire inspection; multiple line inspection; hot rod inspection; material sorting; and exchanger tube inspection.

All the systems (on- and off-line) meet quality standards such as API, ASTM and DIN.

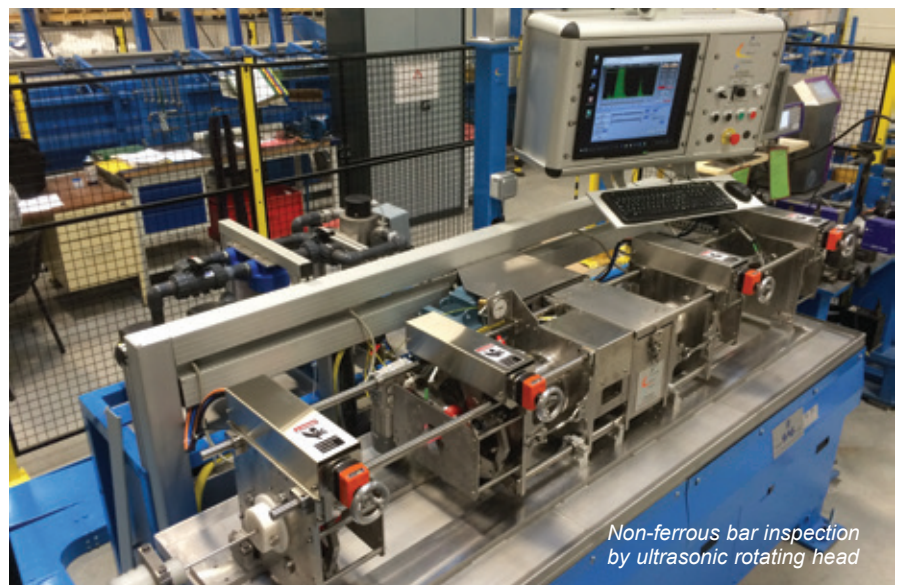
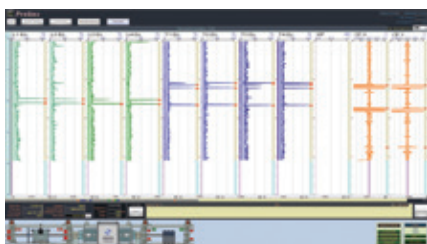
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*Supervision software for non-ferrous tubes and bars*



*Non-ferrous bar inspection by ultrasonic rotating head*

## Non-destructive testing leads plastic pipes conference

THE newest session to be added to the Plastic Pipes Conference Association (PPCA) meeting was devoted to non-destructive testing (NDT) and was attended by a record number of industry professionals from around the world.

Held in a different country each time, the Plastic Pipes Conference and Exhibition is described as the largest event of its kind. The 2016 conference, PPXVIII, held in Berlin, Germany, had 450 attendees from 43 countries. The conference is organised in collaboration



At Plastic Pipes XVIII, the new workshop on non-destructive testing featured presentations about technology and methods, and a one-hour panel discussion

with the Plastics Pipe Institute, Inc (PPI), The European Plastic Pipes and Fittings Association (TEPPFA), PE 100+ Association and PVC4Pipes.

“The action was non-stop in Berlin,” stated conference organising co-chair Sarah Patterson of the Plastics Pipe Institute, Inc.

“Because of the great number of people, plenty of networking opportunities were created and the sessions were full. The new workshop on non-destructive testing was nearly standing room only. More than 100 participated and there were seven papers from firms located in six countries plus a one-hour panel discussion.

“The reason the NDT session was so exciting is because for nearly 25 years NDT was done by individual firms who set their own criteria. Now, the technology has made its way into the standards organisation for the inspection of plastic pipe.

“This session provided a forum for the two industries, NDT and plastic pipe, to discuss the technologies as well as methodology being proposed for acceptance criteria.”

Presentations examined NDT technologies, inspection methods, detection of any indications in butt fusion and electrofusion joints and ways to determine if an indication is actually a defect. The discussions from the NDT session were also of interest to the organising associations.

Plastic Pipes Conference and Exhibition XIX will take place in Las Vegas, Nevada, USA, from 24 to 26 September 2018.

**Plastic Pipes Conference Association – Hungary**

Website:

[www.plasticpipesconference.com](http://www.plasticpipesconference.com)



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# 中文综合

## 全自动、集成化全面加工

RSA cutting systems GmbH公司以及sema systemtechnik GmbH & Co KG公司开发了高性能集成加工中心并投入运行，用于著名的脚手架和框架结构制造商PERI GmbH对方形和矩形钢管进行切割、去毛刺、冲孔、成穹、压扁加工以及卸载。

挑战是使锯切和加工中心能比以前更快地加工单个脚手架部件以及模板钢支柱。之前每个过程都有单独的加工站，设置时间需要30分钟。新生产线的目标是将所有加工过程连接到一个系统中并将切换时间减少到5分钟以下，现在PERI公司在每天的生产中都能实现。

项目经理Günter Reif表示：“我们对生产周期以及设置时间的减短全部实现。为此我们能够机器经济地快速处理大规模的使用频率较低而且数量需求较少的单个部件。”

模块化、适应性强且可扩展的锯切加工中心拥有RSA公司开发的标准化的用于友好型操作理念，通过单个控制系统能对所有加工站进行编程，包括来自sema公司的冲孔、成穹以及压扁加工。一般来说，加工中心的特点是不同加工过程有效的链接到一个系统里，使加工时间变短。比如，对一根48.3 x 3.25毫米的钢管从棒材进料到锯切、去毛刺以及两边冲8个孔等包括所有加工过程的整个加工周期仅需6秒。同样在相同的短循环周期内，38 x 3.2毫米的管道可以从一边冲孔以及成拱。

这不是用高价特殊工具完成的，而是通过完全优化整个过程使加工步骤能同时进行来完成的。例如，RSA锯使用标准的高速钢锯片，该锯片能够重新研磨15次，而冲孔装置也使用的是标准工

具。新系统的关键组件是来自RSA公司的单切高性能锯Rasacut SC，辅以全自动去毛刺系统Rasaplan以及来自sema的定制冲孔和成穹装置，以及RSA的Rasaport卸载单元。

冲孔和成穹装置可选择在不同位置从一边或两边对每根管道进行冲孔，可以加工四个穿通孔，而且能对管端进行变形加工。还可以冲盲孔。现代化编程和控制系统能满足不同的孔型加工。

RSA生产高水平的专用系统控制，用户友好型操作理念包括所有设备模块，而且也有自己的控制系统。

锯切和加工中心的另一个特点是使不需要冲孔的圆形、方形和矩形钢管导向通过冲压装置时不会减少输出。为此，冲孔区域使用的是皮带传输。

锯切和加工中心模块化整体概念允许集成更多的模块，如测量、清洗、干燥以及标识。

锯切和加工中心可以完全与EDP/BDE系统联网，进行管理，如客户产品，以及可以报告设备状况、提醒维护、以及请求原材料或报告成品料的发展。

Rasacut SC单切锯可加工各种直径大小的管道，产量高而且设置时间减少。长度的切换以及锯片的更换不到一分钟就能完成，格式转换不到五分钟就可完成。限位器和锯片的定位也是全自动化的。

可同时进行内外去毛刺的Rasaplan全自动刷式去毛刺系统也是为高产设计的。当直径或长度部分变化时，不需要设置时间，所需设置可自动完成。

在开发sema冲孔和成穹装置时，重点是缩短生产周期和增加灵活性。为实现以最少的设置时间实现管道加工长度的



锯切、去毛刺、冲孔、成穹、压扁和卸载集中在一台机器内



可同时双面冲八个孔

灵活性，工具端可由伺服驱动器驱动和定位。所有数据储存在总体控制里，而且可在控制面板轻松选择。

**RSA cutting systems GmbH – 德国**

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网址: [www.rsa.de](http://www.rsa.de)

**sema systemtechnik GmbH & Co**

**KG – 德国**

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MasterDraw® B4626无油润滑剂由合成无机添加剂配制而成，为厚壁碳钢管道以及不锈钢和合金管道成型加工提供极高的承载性。

MasterDraw® B4626无油润滑剂配方中不含任何矿物油，不含任何氯和硫极压添加剂。

**Etna Products Inc – 美国**

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## 三维光纤激光切割

THE LT8.10是新型Lasertube激光切割系统，该系统增加了LT8.10系统的性能范围，是LT8.10系统概念和技术上的衍生。

3D切割利用激光源的可能性，经历了一段历程，包括新的Tube Cutter聚焦头的开发，是在阿迪杰专为3D切割管道设计的。新型LT8.10切割系统超越了这一目标，在可加工管道的尺寸，可实现的性能以及系统的利用方面提供了重要的新功能。

LT8.10利用在阿迪杰专为管道和型材3D切割设计的带光纤激光源的新型‘Tube Cutter’聚焦头，可实现系统可加工管道尺寸范围内切割性能都能达到最好。可加工管道尺寸和重量都已

扩大。LT8.10系统能切割直径10到240毫米，重达40千克/米的管道。

加工尺寸和重量的扩大满足了3D加工的需要，尤其是需要坡口加工或焊接准备的大直径厚壁管道。

‘Tube Cutter’切割头的锥形外观以及易于搬运增加了高质量精确加工开环型材或非对称截面的功能。

LT8.10也受益于用户界面和编程CAD/CAM软件上的软件修改。第一个改变是新的用户界面，现用于所有激光系统，而且更简单、更直观和有效。新界面在工作周期不同操作阶段提供适当的编程参数建议引导操作者。

在CAD/CAM编程方面，引入Artube3包的最新创新能更好更简单地加工开口截面的管材和型材以及普通的管道切割。LT8.10具有可处理整个Lasertube可加工范围的能力。

‘ActiveScan’是测量管道实际截面与管道

理论形状/尺寸之间偏差的测量系统，并在最短的时间内自动调整到最好的部件精度。你可以‘ActiveScan’测量管道的位置，以及将形状集中到实际的管道位置处。

‘ActiveSpeed’可根据实际的工作条件调整切割参数，以确保实现最好的结果。之前需要专家来制作复杂的部件，但现在可用于所有Adige系统的ActiveSpeed是加工更简单更实惠。

LT8.10保持了前一代机器的装卸特点和灵活性特征。管道装载区仍有两个不同的站——前和后站——可以根据不同的生产要求连接模块化装载方案。部件卸载区进行了优化，考虑到了待加工管道尺寸和形状的变化。定中系统提高了长件加工的精确度，可以快速清理工作区域便于卸载短件，实现系统生产力最大化。T8.10具有全自动调节功能以及能快速装/卸，为用户提供了极大的灵活性。

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## TracStar系列新型创新

MCELROY公司TracStar生产线发布了新系列产品。用于中等直径管道加工的TracStar Series系列2产品目前共享了一台可与焊接外径IPS2英寸到18英寸热塑性塑料管道的28、250、412以及618熔接机互换的机器。

还重新设计了整流罩以便提供更好地



McElroy TracStar 28 Series 2系列

气流和散热，而且可以方便地访问发动机，为维护提供了方便。更新的电气系统增加了电路保护，还有标准的电池断开已包括在内，方便停工。

McElroy产品开发主管 Jason Lawrence表示：“TracStar已被依靠多年，其独立的、自推进的、且坚固的全地面系统使其在任何工作场地都便于操纵。它的一部分成功是源于我们不断听取客户的意见并根据他们的经验融合了很多机器的优点。”

TracStars由柴油机驱动，还拥有专利的中心线导向系统，以便力可以绕连接点均匀分布。小车可以由四个夹具转换成三个，使结构更紧凑，而且易于移动，便于沟槽内熔接。机载发电机驱动



TracStar 618

液压装置和加热器，双液压管道提升机帮助运输管道。

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## 满足个别需求的切割装置

在精加工领域商用标准切割机可能无法完全满足不断增加的需求以及一些特殊要求。

用于精加工的Bültmann切割设备是根据客户要求单独定制的。通过使用标准切割模块和搬运设备，使生产线和设备可以定制以及单独的解决方案得以增加。

对于切割技术，根据不同应用，Bültmann公司使用自己的产品或知

名供应商提供的组件并结合Bültmann的搬运设备来完成。

Bültmann公司提供的锯切机包括热锯(固定锯和飞切锯)、多层锯(固定锯和飞切锯)、定长用多头锯、用于难加工材料的圆盘冷锯/砂轮切割装置组合锯、增加产量的双头锯、灵活的定长切割锯，拥有进给系统用于材料搬运，无机械闭锁装置；有色金属材料专用切割锯，确保高速切割；集成定长锯，包括管端加

加工机和清理装置，设计紧凑且节省空间。对于无屑切割技术，Bültmann使用无屑切割装置，并与Bültmann搬运设备互联。Bültmann机器不仅可以作为独立的生产装置，还可以作为完整生产线其中一部分交钥匙解决方案。还可以在现有生产线中进行改造。

**Bültmann GmbH – 德国**  
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## 差压变送器

YOKOGAWA Electric Corporation公司宣布在欧洲销售EJXC40A数字遥感器，一款新开发的DPharp EJX®系列差压变送器。

EJXC40A配有两只压力传感器，与一根电缆连接，可测量大型储罐液位以及高压液体的大压差。DPharp EJX系列新增成员将满足客户各种需求。

压差/压力变送器用于石油、石化和化学工业，如石油和天然气井。通过测量储罐或管道内两点的压力差，变送器就可计算出液位、流量、液体、气体以及蒸汽的密度。在储罐液体或气体或者管道液体不能引入变送器的压力吸收装置(隔膜)的应用中，则使用隔膜密封式压差变送器。

这种变送器通过填充硅油或气体液体的毛细管连接到两个独立的压力接收装置。尽管这种变送器能以高分辨率精



Yokogawa的EJXC40A有两个压力传感器，由一根电缆连接

确测量高压液体，但他们不适用于大型储罐，因为受到毛细管可容许长度的限制。此外，也不适用于精密压差测量，因为毛细管道内的液体易受环境温度变化的影响。EJXC40A由两个单独的压力传感器通过电缆相互连接起来。根据每

个传感器测得的压力差，EJXC40A可以确定液位、流量、液体气体和蒸汽的压力。

连接两个压力传感器的电缆可达45米长，可以测量较大型储罐以及较高的蒸馏塔的液位。

两个压力传感器仅由一个电缆连接，他们的测量不会受到环境温度变化的影响。在气体储罐和其他应用中进行精密压差测量时不需要校正温度的变化。这可以确保测量稳定。

两个压力传感器可以设置测量不同范围压差，使EJXC40A数字遥感器测量高达70 MPa的高压差——这是单个传感器装置难以实现的。

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## 轮廓和形状在线测量

作为专注于研发的在线测量先锋，Zumbach Electronic公司已成为全球领先的在线测量和控制系统制造商。Zumbach的首要任务仍是通过当地办公机构结合久经考验的高质量产品、服务、个人咨询以及支持来维持客户关系。

Zumbach的Profilemaster®系统是由一组核心的百万像素专业摄像机/激光模块和一些软件技术开发而来。这些技术的应用适用于挤压塑料和橡胶管道、软管、型材、线材、电缆以及木塑复合材料特定的测量、监控以及缺陷检测。

系统提供100%的检测，可减少启动时间，增加最终产品精度，提高过程控制，减少废料，节省原材料和后续加工成本，并提高产品质量。还可以无缝集成网络已有的电脑操作系统。根据Profilemaster®不同的型号，有多达八个

激光/摄像模块可在线持续检测移动中的轮廓横截面。强大的电脑处理器将单个摄像头获取的直线和半径结合起来，从而产生轮廓的横截面。

所有相关的尺寸，如宽度、高度、角度和半径或其他几何量被计算出来描述完整的横截面图片。轮廓的公称值可直接从CAD设计文件导入，可以方便无故障配置该装置。

这个程序有三种工作模式：  
操作模式——用于生产过程中测量。所有操作步骤都已简化。所需的产品测量功能，如开始/结束条件和记录只录入一次，然后和测量数据一起存储到内存区。

录入产品数据——输入测量要求并定义如何处理测量数据。软件程序功能的灵活性使其能够按客户要求配置以便精确地测量产品。服务和系统配置——在



系统的初始安装时程序功能可根据操作者要求选择。此外，用于预处理的默认值可根据每个产品进行改变。

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## 混凝土基材上的涂层厚度检测

使用新型Elcometer 500混凝土涂层厚度检测仪使混凝土干膜厚度无损检测更精确、更快速而且更简单。

Elcometer 500具有易于使用、坚固、设计符合人体工学，菜单驱动的彩色显示器、用户可选统计、内存、USB以及蓝牙传输到个人电脑或移动设备等特点，可以精确地检测混凝土干膜厚度以及10毫米厚的水泥基底。

Elcometer 500据说比其他技术快三倍，标准模式下每分钟可提供60+的读数，而在扫描模式下每分钟可提供140多个读数。检测仪只在信号强度显示器变绿后显示读数。

测量仪和探头适用于极端环境，防尘防水设计相当于IP54防护等级，还有现场可换的探头耐磨损技巧。

用户只需简单地选择涂层材料开始检测：无需设置关口或范围值，或者知道涂层厚度。

Elcometer 500 涂层测厚仪可按照ASTM 06132、SSPC PA9以及ISO 2808标准使用。

**Elcometer Ltd – 英国**

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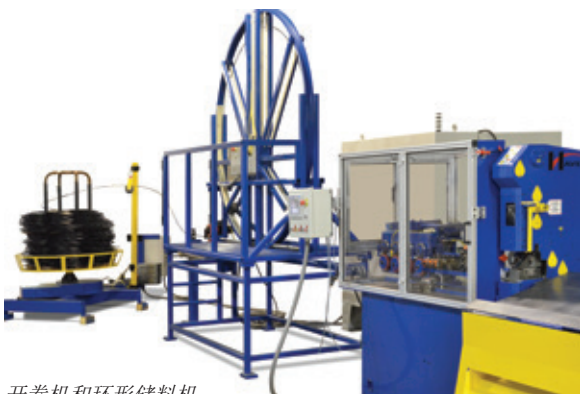
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Elcometer 500的信号强度指示器防止错误的读数

## 用于刹车油管和燃料管线的集成生产线



开卷机和环形储料机

HAVEN公司的801和803型双锯片剪切装置被汽车刹车油管和燃料管线制造商用于定长切割。这种单轴和双轴机的特点是快速、精确而且可靠。然而，这种剪切机只是Haven公司为该行业提供的一部分产品。公司还可以提供完整的交钥匙集成生产线，包括开卷机、环形储存器、管道矫直机、辐射传输系统以及出口储料台。

一个开卷机和一个环形储存器一起工作使Haven剪切机能以最快的速度操作，尤其是对于更长的长度。储料机为剪切的开始和停止周期进行补给，确保进行任何长度的切割时总有材料提供。开卷机只需打开材料对储料机进行填补。这种顺序作业可为切割操作不间断的提供材料流。

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## 伺服驱动的圆盘冷锯，可精确切割铝和有色金属材料

带锯、圆盘锯和板锯解决方案供应商Behringer Saws, Inc公司为高性能圆盘冷锯系列新添了产品VA-L 500。

Behringer Eisele GmbH公司设计的VA-L 500锯切系统专用于切割铝和有色金属材料。

VA-L 500拥有调频主驱动系统，以及可调节切割速度，可高效切割全系列铝合金以及其他有色金属固体材料、薄壁管道和型材。

VA-L 500锯标准配备是32高频调频驱动电机，转速为800 - 3400转每分，伺服驱动向下进刀，速度在0.39到19.6英寸每秒之间可调，确保切割速度快。全自动圆盘冷锯使用直径500毫米的硬质合金圆盘锯片90度切割152毫米（6英寸）的圆形材料以及152\*152毫米（6英寸\*6英寸）的方形材料。

Behringer Saws 公司内部销售和营销经理Joe Suydam 表示：“VA-L系列采用重型设计，送料轴和主驱动系统采用最先进的驱动技术，而且还有极其坚固和超精密的主轴轴承。这使得该切割工艺最佳化而且振动低，产量最大，表面光洁度极佳，不管是固体材料还是具有复杂截面形状的管道和型材。”

锯片/材料自动分离特点确保锯片能自由返回，减少锯片的磨损，而且带来高质量的材料表面光洁度。数控夹持进料单元由伺服电机驱动，滚珠螺杆轴以及编码器，单冲程为39.3"，确保材料可以快速精确的移动。一个进料提升和移动装置——VA-L 500锯的标准特点——确保材料轻轻地从材料支撑台提起，使材料不接触材料台以及夹爪就可以自由进料，不会损伤材料表面。



Behringer公司的VA-L 500锯切系统

为减少碎屑堆积以及材料刮伤，有一个吹扫设备将碎屑从夹料区域快速清除，提供一个干净的夹料区域以及畅通的材料流，从而增加使用寿命。VA-L 500的标准配置还有一个材料清理/卸料装置，有一个支撑板和分类槽将边角料/料头以及部件等移入两个单独的区域。

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# Measuring compliance – the weakness in your carbide saw

By Willy Goellner and Christian Mayrhofer

Compliance is defined as the measure of the ability of a mechanical system to respond to an applied vibrating force, expressed as the reciprocal of the system stiffness. In short, it measures the weakness of the system. In a carbide saw, the most critical component subject to torsional and lateral vibration of the saw blade is the gearbox, commonly called the head. The basic understanding of this effect is outlined in a technical article in the July 2016 issue of Tube & Pipe Technology magazine entitled 'Effect and prevention of vibration in carbide sawing'.

When the blade tooth first contacts the material, the reaction force 'winds up' the gear train. First the backlash is removed and then the additional loading will increase the torsional displacement. If there is any backlash in the feed mechanism, it will also act the same way as the power train backlash.

The saw blade and its mounting shaft have relatively little inertia. During the time the 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 is high and the cutting tooth 'springs' forward. If this happens 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 exciting frequency measured in Hz could become critical when its frequency matches a natural frequency to result in resonance. For further information see the AME technical article in the September 2016 issue of TPT magazine – 'Resonance – the destructive force behind carbide saw breakdowns'.

Figure 1: Locked input shaft of the gearbox to prevent rotation



Figure 2: Hydraulic cylinder applied tangential force on the blade and the displacement was measured with a dial indicator

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

The compliance can be measured statically. In this case, we measured a head mounted on our AMSAW pivot saw. A rigid steel bar was clamped with a 'c' clamp to the flanged bushing of the motor shaft. The steel bar at the toothed pulley was locked between two screws to prevent the pulley from turning.

The dial indicator on the pulley measures any small movement (Figure 1). This value, corrected by the ratio, will be subtracted from the indicator in Figure 2 to obtain a true compliance. On the blade side of the head a steel bar was locked between the tooth gullet and the blade lift hole, and a hydraulic cylinder was used to apply a gradual force to put a torque load on the gear train. The displacement value between a fixed point of the head and the tooth of the saw blade was measured with a dial indicator (Figure 2).

The torque was calculated by the relationship:

$$T = F \cdot r \quad \text{where } T: \text{Torque (N.m)}, F: \text{applied force (N)} \text{ and } r: \text{Blade radius (m)}$$

During the test a dial indicator was used and a linear displacement obtained.



COMPLIANCE CALCULATIONS							
AXES	Torque [Nm]	Circumferential deformation [mm]	Radius [mm]	Angular deformation [rad]	Compliance [rad/Nm]	Gear ratio [1]	Compliance ref to spindle axis Compl./Gear Ratio <sup>2</sup> [rad/Nm]
CL# Spindle	11.2985	1.52E-04	61.976	2.46E-06	2.18E-07	1	2.17641E-07
C#3	11.2985	2.54E-04	83.16	3.05E-06	2.70E-07	1.367	1.44665E-07
C#2	11.2985	6.20E-04	52.324	1.18E-05	1.05E-06	8.014	1.63231E-08
C#1 Input	11.2985	8.89E-04	40.005	2.22E-05	1.97E-06	24.966	3.1555E-09
TOTAL							3.81785E-07
TOTAL STIFFNESS [Nm/rad]							2.62E+06

Figure 4: Theoretical calculation of the gear train stiffness

Since the arc length ( $S$ ) is a very small value compared to the blade radius ( $r$ ) it can be assumed that the linear displacement and arc length ( $S$ ) is the same and the following equation can be used.

$S = \theta \cdot r$  where:  $S$ : Arc length (m),  
 $\theta$ : Angular displacement (rad)

The backlash for the gearbox is designed with a range of 0.030° to 0.047°. This is the total backlash of the gearbox reflected to the spindle. The backlash was 0.035°, which is within the expected total backlash range.

The measured values are shown in the graph. The X axis expresses the gradual increase of the torque calculated by multiplying the forces obtained by increasing the hydraulic pressure in the cylinder with the radius of the blade where the force is applied. The Y axis shows the angular displacement of the carbide tooth on the blade, representing the actual wind up of the gear train (in degrees).

The slope of this line is the compliance and the stiffness is the reciprocal of this value. Any unevenness of such a graph would show a problem within the gear train.

To make a sanity check the torsional compliance of the single transmission shafts was analysed with FEA. The compliance has been reflected to the blade spindle and compared to the measurement.

To simplify the complexity of a system, simple models can be created by reducing mechanical quantities such as stiffness, inertia or damping to one shaft. The reduced system is equivalent to the original system from an energy point of view.

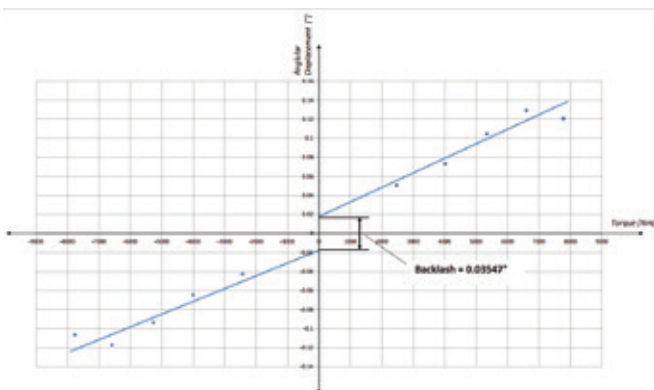


Figure 3: Compliance measurement

The potential energy  $E$  stored in a shaft with the torsional stiffness  $c$  can be calculated with the acting torque  $M$  and the twisting angle  $\phi$ .

$$E = \frac{1}{2} M\phi = \frac{1}{2} c\phi^2$$

Since the energy stored in a shaft has to be the same as the reduced one:

$$E = \frac{1}{2} c_{an} \phi_{an}^2 = \frac{1}{2} c_{an, red} \phi_{ab}^2$$

With  $\phi_{an} / \phi_{ab} = i$  being the gear ratio.

$$c_{an, red} = i^2 c_{an}$$

When reducing the stiffness to a slow running shaft such as the saw blade spindle and  $|i| > 1$  then

$$c_{an, red} > c_{an}$$

The complete gear train is essentially a series connection of shafts in which the total stiffness is  $c_{ges} = 1/(1/c_1 + 1/c_2 + \dots)$ .  $1/c$  is equal to the compliance, which can be easily added up and expressed as the reciprocal at the end.

## Conclusion

Compliance data could also help solving problems in the field. If a head is acting up in the field or if the tool life suddenly drops, a compliance test can easily be conducted at the machine. The graph can be compared to the original graph and the irregularity will give indications of the problems. Every carbide saw has a certain compliance. This compliance must be held low to obtain an acceptable tool life. However, decreasing compliance will increase the machine cost by making the machine stiffer. The secret is to find the golden balance resulting in the most cost-efficient carbide saw.

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# X-ray weld inspection – High-tech meets heavy industry

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During the production of safety relevant pipes, tanks or high pressure vessels, a comprehensive quality control is mandatory. Especially welding lines have to be inspected complying to highest quality standards. A failure can lead to severe consequences and liability charges for manufacturers.

Modern Digital Radiography helps to achieve the quality control and archiving requirements while providing cost reduction through a high degree of automation.

## Introduction

During the welding process a broad variety of defects like porosities or cracks can occur. Therefore, it is necessary to inspect welding lines on pipes and tanks through extensive non-destructive testing (NDT). To achieve this, ultrasonic testing (UT) and radiography (RT) are the most common methods.

Typically, UT is the upstream test as it can be performed very quickly. In most cases, even comprehensive ultrasonic scans are not sufficient to detect all defects and to comply to archiving standards. Depending on the production quality specification and standard there are a variety of common procedures:

1. X-ray inspection only at UT indications
2. Random inspection of a certain percentage of the welding line
3. Inspection of both ends of the welding line
4. Inspection of the complete welding line

In times of increasing quality standards more and more manufacturers move to option 4. From a quality standpoint, this makes a lot of sense as it is the only way to ensure no critical defect remains undetected. It also guarantees a full archiving of results in case of potential liability claims.

Over decades these tests have been done by analogue technique by exposing X-ray films. The change to digital technology opens new chances to increase the inspection efficiency and to reduce costs. In order to achieve a smooth and efficient transition from analogue to digital inspection quality managers and decision makers have to take a couple of important points into consideration.

## The old approach

Looking at potential setups, the basic setup of an X-ray inspection system was always the same: a long boom matching the length of the pipe, a boom holder and a stand for the tube or image intensifier. Looking at the component arrangement there are basically two options:



Figure 2a: X-ray tube inside the pipe

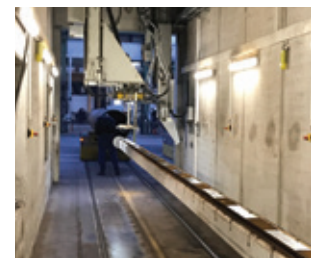


Figure 2b: X-ray tube outside the pipe

The first option is to mount the X-ray tube at the end of the boom (Figure 2a). The complete boom/tube unit is placed inside the pipe. The film can be placed directly on the outer surface of the pipe. This leads to a number of disadvantages:

- Long high voltage cables necessary
- Very limited minimum inner diameter of pipes
- Limited exposed weld area, because of the cone beam angle (40°)
- High weight of the tube needs a more stable boom

This setup is also used for real-time inspection (inspection in movement) of welds with image intensifiers leading to the same disadvantages.

The second option to mount the X-ray tube is on an external tube stand (Figure 2b). The film is placed on the boom, which is inside the pipe. The film placement is always accompanied with the placement of lead letters, lead yardstick and the required image quality indicators. This is the most common setup for pipe inspection.

After positioning the pipe in a way that the desired area is inside the X-ray beam, the operator has to leave the X-ray room, close the door, expose the film, open the door, take the film and take it to the development station. After development, the film has to be interpreted on film viewer and an error classification can be performed. During the whole process the bunker and personnel are occupied until a final decision is made. This process is very time consuming, and significant



human errors can occur at any time. The X-ray film has to be archived and stored for up to 30 years and end-customers may demand copies of the film as well. This results in the necessity of a film archive.

## Transition to digital radiography

In the last ten to 15 years, digital flat panel detectors have found their way from medical applications into the industrial X-ray environment. Especially in the last three to four years a wide range of new flat panels have been developed and successfully used in several industries. A digital flat panel – or digital diode array (DDA) – works like a camera, but instead of using a lens and a very small sensor chip with small pixel sizes, the flat panel has a large active area without any lens.

A special scintillator is used to transform X-ray photons to light. All discrete pixels are converted to a holistic image. This image will be acquired by special image processing software running on a PC.

In reality the whole process is a lot more complicated but this sketch provides a rough overview. The exact choice of the X-ray components depends on several parameters, which have to be determined by the manufacturer at an early project state:

- Wall thickness: minimum, maximum
- Form factor: inner and outer diameter
- Frame rate: real time or static
- Applying inspection standards
- Shielding of components

## International quality standards

Most pipes manufactured worldwide have to meet the API 5L quality standard. In past revisions of the API 5L the only parameter describing the image quality was the contrast resolution. Therefore, inspectors only had to verify the number of the resolved wire type image quality indicator (IQI) placed directly on the material.

The 45<sup>th</sup> revision of API 5L on the other hand refers to the ISO 10893-7 standard in case of digital radiography. This small change has dramatic consequences on the required image quality.

ISO 10893-7 and ISO 17636-2 are looking for contrast, spatial resolution and signal to noise ratio (SNR) to determine the image quality. The ISO standards differentiate between test

class A and B. API 5L typically refers to class A, which is the lower test class. In any case, most of the renowned pipe manufacturers work with class B because their pipes have to comply to the pressure vessel standard.

Now looking at a selection of digital flat panels, which are widely used in the pipe industry, we have the following pixel sizes and the resulting resolutions:

Brand	Pixel Size	Double Wire IQI
PerkinElmer XRD 0822	200 µm	D7
Varian Paxscan 2520DX	127 µm	D9
Dexela 1512	75 µm	D12
VisiConsult Filmdetector	48 µm	D13

Fig 3.1.b: Sample resolution of flat panels

The bottom-line of these tables is pretty simple: Thinner wall thicknesses require a higher resolution and therefore also a smaller detector pixel size. In some cases, the compensation principle is a valid tool to allow inspection with less resolution.

This means in case the demanded spatial resolution (Double Wire IQI) is not reached, it can be compensated through a single wire exceeding the requirement. The maximum to compensate are three stages and it must be agreed by the end user. Please note that this principle has some serious risk, when being abused. Therefore, many responsible level III inspectors do not allow compensation on their products. A compensation has to be justified and documented.

### Example: Standard requires: 8mm wall thickness: D11 and Wire W15

1. System Delivers: D9 and Wire W17 → Standard fulfilled
2. System Delivers: D9 and Wire W16 → Standard not fulfilled

## Form factor, frames per second and shielding

The form factor of the detector is another important parameter for the use in pipe inspection. The active area of the detector compared to the overall size and the general outline of the detector is the key for the choice of the right detector for pipe inspection. The ideal detector will be very thin with a high length and minimum thickness. This means around 6 x 48cm is the “dream detector”. Unfortunately, such a detector is not available on the market for technical reasons.

Fig 3.1.a: API 5L and ISO 10893-7 in comparison

Wall thickness [mm]	API 5L Single Wire	10893-7 Class A Single Wire	10893-7 Class A Double Wire IQI	10893-7 Class B Single Wire	10893-7 Class B Double Wire IQI
4	W14	W15	D10	W17	D13
8	W14	W14	D9	W15	D11
15	W11	W12	D8	W13	D10
25	W10	W11	D8	W12	D10

Brand	Active Area cm x cm	Overall Area cm x cm	Frames/ Second	Shielding
PerkinElmer XRD 0822	20 x 20	36 x 29.5	15/30	Up to 15 MeV
Varian Paxscan 2520DX	25 x 20	26 x 22	10/30	225 kV
Dexela 1512	15 x 12	22 x 15	25	160 kV
VisiConsult Detector	17 x 5	30 x 9	4	225 kV

Experience shows that for most cases (down to 6mm single wall thickness) the Varian 2520DX is the best choice. The large active area and only a small surrounding guarantee the use of the detector also in pipes with small inner diameters. An acceptable high frame rate guarantees a positioning of the pipe in real-time mode. If always covered by pipe the panel can also easily be used for up to 450kV.

## New setup with digital flat panel

Pipe systems with digital flat panels have existed for more than ten years on the world market. These systems look more or less similar. The boom is made out of steel and carries the flat panel and its manipulator. The weight of this unit is around 1,000kg. Carrying 1,000kg in a stable and accurate way needs a very stable and massive lifting device. The flat panel is more or less protected against dust and dirt.



Fig. 4.1 System with flat panel on a steel boom

Fig. 4.2: New system with carbon fibre boom

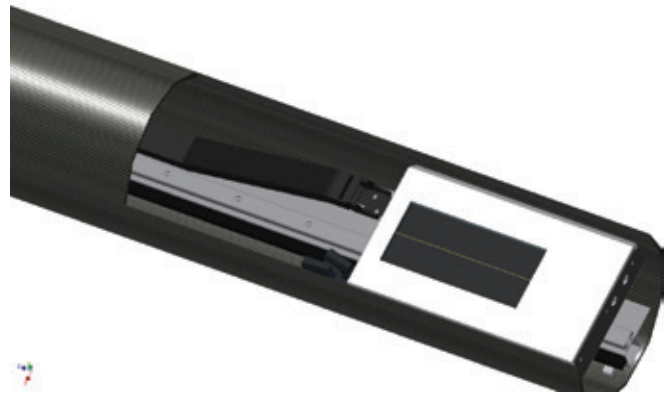


Fig. 4.3: Cross section flat panel inside the boom

VisiConsult X-ray Systems & Solutions GmbH has developed a completely new setup incorporating new high-tech materials. Instead of using a massive steel boom, a carbon fibre tube is used. The weight of this tube is less than 100kg. The flat panel does not move on top of the boom, but is encapsulated inside the boom. The panel is optimally protected against dirt, dust, water and collision.

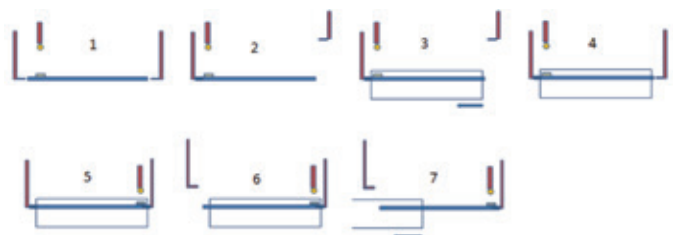
The reduced weight of the boom results in a non-massive boom lifting device. It also allows innovative cooling systems to operate on the inside. All this results in a lighter setup, longer detector lifetime and faster operation principle.

The next stage is to optimise the material flow and to move to an inline setup. Nowadays, nearly all manufacturing steps are already more or less designed as in a single line. Only the X-ray testing is designed as an off-line station. This results in a significant loss of cycle time and waste of space.

With the new carbon design, VisiConsult is able to build a conveying through system. A special boom lift strategy allows gripping and holding the boom from both sides, so that the system can be fed from one side and the pipe is dispatched to the other side.

This concept reduces the transport time by a significant amount. Figure 4.4 shows the general process.

Fig 4.4: Workflow convey through system





Step	Film 6* 48cm	Digital Radiography: Off-line	Digital Radiography: In-line
Move pipe in	60 sec	60 sec	60 sec
Close Gate	25 sec	25 sec	25 sec
Placing the film	120 sec	-	-
X-ray On	3 sec	3 sec	3 sec
Total exposure time	900 sec (30 shots, 30 sec)	208 sec (52 shots, 4 sec)	208 sec (52 shots, 4 sec)
Move to Position	90 sec (30 shots, 3 sec)	104 sec (52 shots, 2 sec)	104 sec (52 shots, 2 sec)
X-ray Off	3 sec	3 sec	3 sec
Open Gate	25 sec	25 sec	25 sec
Move pipe Out	60 sec	60 sec	60 sec
Move pipe to Wait position	60	60 sec	-
Cycle time	22 min	9 min	8 min
Throughput	2.5 pipes / hour <b>20 pipes / shift</b>	6 pipes / hour <b>48 pipes / shift</b>	7-8 pipes / hour <b>60 pipes / shift</b>
Costs for consumables	$(1,200/40) \times 20 \times 5 = \text{€}3,000$	€0	€0
Costs for labour	$2 \times 8\text{h} \times \text{€}50 = \text{€}800$	$1 \times 8\text{h} \times \text{€}50 = \text{€}400$	$1 \times 8\text{h} \times \text{€}50 = \text{€}400$
Costs per shift	<b>€3800</b>	<b>€400</b>	<b>€400</b>
Costs per year (single shift)	€1,140,000 / year	€120,000 / year	€120,000 / year
Raw costs per pipe	<b>€190</b>	<b>€8.33</b>	<b>€6.66</b>
Investment costs	€0	€1,500,000	€2,000,000
Return of Investment	-	<b>1.5 years</b>	<b>2 years (more throughput!)</b>

## Commercial view

The change from film to digital technique is mainly driven by the aim to reduce the cycle time and labour costs, while eliminating the film consumables and chemicals. The sum of higher throughput, less labour costs and less consumables is a significant cost factor.

The above table provides a sample calculation of three different setups. Assumption: 12m LSAW pipe with 15mm wall thickness. The gate is open and the bunker is empty. Quality standards require a 100 per cent test of the weld. 300 working days per year. €50 per hour labour costs and €5 per 48cm film including development.

## Conclusion

The simplified example calculation shows clearly the benefit of moving from film to a digital solution. A brand-new pipe inspection system including bunker and doors poses an investment of around €1,500,000. Compared to the costs for the film and the necessary manpower the user can estimate a return on investment (ROI) in less than two years of operation. Beside the cost savings, the manufacturer gets many other benefits:

- Higher inspection quality
- Faster feedback of identified defect inside the weld
- Protection of the environment
- Better reputation on the market because of better results
- Access to "high-end demanding" customers, because of improved inspection quality
- Increased process safety and inspection coverage

- Easier archiving and delivery of inspection results
- Scalable and automated setup
- Reduction of required manpower
- Easy certification of inspection process
- Higher prices for sold products

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# High capacity production line brings survival



Picture 1 Super speed double-cart cutting machine

## Features of high capacity production line :

In addition to the well known Alfa cutting machine, only FD double cart flying cutter can meet the speed requirements of the high-speed mill. We take  $\phi 50$ mm mill as an example, FD double cart flying cutter can run at 200 meters per minute with no reduction of blade life and cut quality.



Picture 2 Automatically rapid packing machine with water dumping, pipe bundle weighing and stacking



Picture 3 Automatic roll change robot for  $\phi 127$ mm pipe mill with inline automatic roll change and adjustment, size changed in 60 minutes

We remind you that loading unit and packing unit of the production line should also keep up with mill speed accordingly. Since man's physical strength is limited, loading and packing must be done automatically unless you don't really mean the high speed production.

> Quick size change: since production capacity is improved, shortening the time of size change is extremely important. Here are a few good options: online manually quick roll change with intelligent adjustment; online automatic roll change with automatic adjustment; off line automatic roll change with automatic adjustment.

> High speed production + quick roll change + automatic loading system & packing system, such kind of one line will have capacity as much as two normal lines, which will let you have a strong competitiveness no matter on reducing equipment investment, decreasing labor and shortening delivery time and so on.



Picture 4 Changing base for offline automatic roll change, size changed in 30 minutes

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