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TUBE & PIPE Technology

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JANUARY 2017

VOL 30 NO 1 US$33

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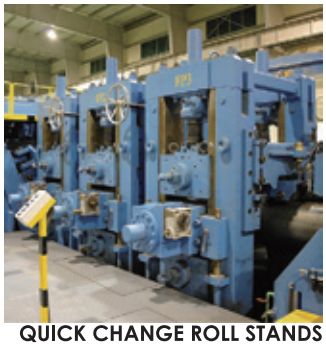
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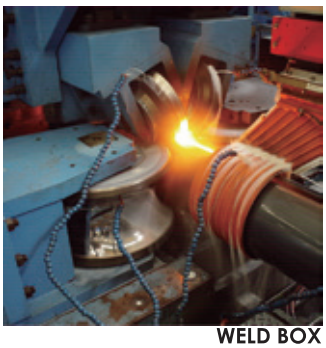
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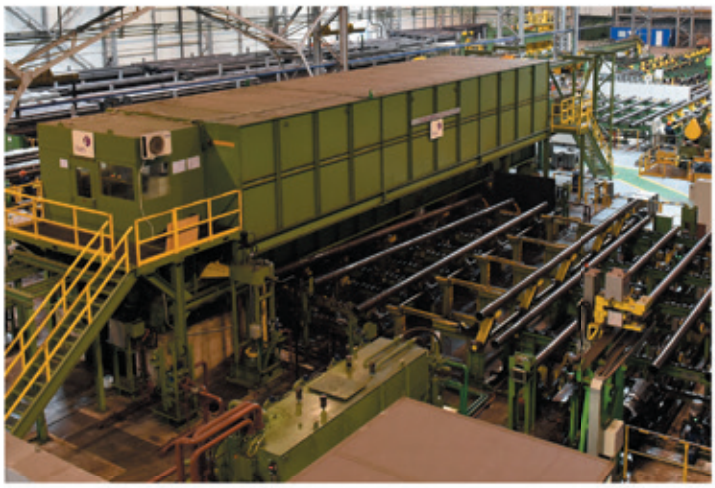
BRONX TUBE STRAIGHTENERS

TAYLOR-WILSON HYDROSTATIC TESTERS



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www.fivesgroup.com

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Editor — Rory McBride

Features editor (USA) — Dorothy Fabian

Editorial assistant — Christian Bradley

Production — Lisa Wright

Sales & marketing — Catherine Sayers
English speaking sales
catherine@intras.co.uk

Giuliana Benedetto
Vendite & Marketing (Italia)
giuliana@intras.co.uk

Verkauf & Marketing (Deutschland, Österreich, Schweiz)
germansales@intras.co.uk

Linda Li
中国大陆，台湾，
香港以及远东地区销售代表
linda@intras.co.uk

Advertising co-ordinators — Liz Hughes, Andrea McIntosh

Subscriptions — Julie Case

Accounts manager — Julie Case

Publisher — Caroline Sullens

Founder — John C Hogg

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46 Holly Walk, Leamington Spa, CV32 4HY, UK
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Intras USA
Danbury Corporate Center, 107 Mill Plain Road,
Danbury CT 06811, USA
Tel: +1 203 794 0444 • Email: doug@intras.co.uk

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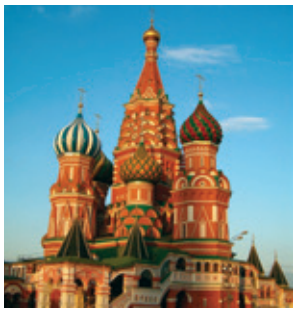


January/February 2017
Vol 30 No 1

The January Issue

Rory McBride – Editor

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

This issue we have a feature on welding and a show feature on the BORU Tube Fair in Turkey. We also have in-depth articles on Deco Automotive's investment in high-performance pipe bending cells (page 67) and technologies for the measurement of diameter, wall thickness, eccentricity and sagging during hose and tube extrusion from Sikora (page 69).

I will be travelling to SteelFab 2017 in sunny Sharjah, UAE, in January so please do come and say hello if you are also visiting. Our stand is number 3541 and is situated in hall 5. I have heard nothing but positive reviews of the show so I look forward to visiting and exhibiting at the event for the first time.

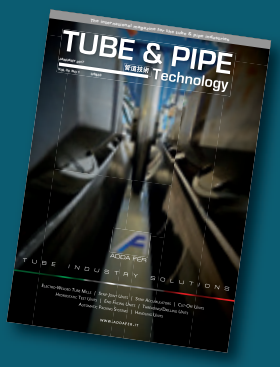
Next issue we have features on straightening technology and equipment; and inspection, testing and quality control. The magazine will be distributed at Tube Russia.

I would like to wish all of our readers a very happy festive season and a prosperous New Year.

If you would like to submit news or articles for the March issue then send them to me by the editorial deadline of 9 January 2017. Contact me at rory@intras.co.uk

Enjoy the magazine.

On the cover . . .



Adda Fer Meccanica, established in 1990, is a leading Italian company specialising in the engineering and manufacturing of plants for the production of electro welded tubes and coil processing equipment.

Its business was initially based on second-hand equipment sales but soon expanded into servicing, repair and the overhaul of machinery and lines sold in order to guarantee customers a complete and reliable experience. The implementation of a full technical department followed this, which was allowed to develop new machinery and to adapt and improve second-hand lines in order to offer a more high quality product at a competitive price.

The results achieved by the company during recent years confirm that the choice, made just a few years ago, to focus its activity on engineering and manufacturing of brand-new equipment, instead of overhauling and servicing second-hand lines, was a successful and important step.

With expert know-how and a clear orientation towards the international market, Adda Fer Meccanica has supplied several production plants around the world, increasing the popularity of the brand, which is now synonymous with quality and reliability.

Termomacchine appoints new worldwide sales co-ordinator as it celebrates 40 years in the induction heating industry

TERMOMACCHINE Srl is an important worldwide company in the induction heating sector and was founded 40 years ago by Bruno Gili, who is also the president and owner.

The new generation of the family, Mr Gili's sons, are helping the company to innovate even further and work with experienced managers and the owner, working hard to remember the basic values of the family business.

Termomacchine recently acquired a second production site, close to the first one, because the company philosophy aspires to keep production entirely in Italy.

The company's philosophy also includes improvement of the internal organisation and the coordination of the different construction phases.

With the increase of demand from customers the company wishes to ensure the highest quality products, maintain on-time delivery and add value to the original factory brand.

Termomacchine is known worldwide for the realisation of complex and customised machinery for heat induction treatment and is a supplier partner to many multinational companies, mainly in the automotive sector.

It also produces high-frequency generators for the welding of metal tubes, originally with the technology of the triode and in the last 15 years with the evolution of new solid state MOSFET.

In the face of growing commitments, and with the aim of improving products and services to end-users, the owners have decided to establish a tube division specifically for this sector.

In order to develop the tube division Termomacchine has established a direct working relationship with Luca Briganti, who has vast experience after years in the industry in a Japanese multinational of ferrites, as well as being engaged in the distribution of quality consumables for the production of metal tube lines for over 23 years.

The Gili family continues to run the company

Luca Briganti

Mr Briganti will take on the role of worldwide sales co-ordinator HF welded tube division to ensure that all customers receive the highest technical and commercial support in order to guarantee the best design for the system and welding accessories, which are sold under the Termomacchine brand.

The new division will be operational from January 2017 and will take care of the reshaping, distribution and supply of the following products/services: generators for welding using solid state induction; welding line pipe normalising heat treatment; stainless steel pipe bright annealing equipment; and accessories for pipe lines, such as inductors, impeders and ferrites.

The company said: "We are confident that it is the beginning of a fruitful collaboration and we wish him the best for the start of his new business activity."

Termomacchine Srl – Italy
Fax: +39 011 9034066
Email: info@termomacchine.com
Website: www.termomacchine.com

HMT and Omni-X MX form strategic alliance in Mexico

HORN Machine Tools (HMT) and Omni-X have entered into an exclusive sales and service alliance for Mexico and South America. Omni-X MX, located in Querétaro, Mexico, manufactures tooling for tube bending and tube end-forming applications.

"Omni-X Mexico, with its proven bender tooling manufacturing expertise and short lead time delivery of tooling, will bring a whole new level of expertise and service for our customers with operations in Mexico," stated HMT president Kent Horn. "Our customers will now have local application engineers and technical support for all aspects of their tube bending needs from conception, through install and ongoing production needs for all HMT products."

Nora Guerra, president of Omni-X MX added, "We are very pleased to form this strategic alliance with HMT, whose product line fits with the market we serve. We have built our reputation and gained our customers' trust providing high quality products and service in Mexico. We are engaged and looking forward to working together with HMT for the benefit of the Latin American market."

Horn Machine Tools, Inc – USA
Fax: +1 559 431 4431
Email: sales@hornmachinetools.com
Website: www.hornmachinetools.com

Omni-X MX S de RL de CV – Mexico
Fax: +52 442 224 0577
Email: nguerra@omnibend.com
Website: www.omnibend.com

DIARY of Tube Events 2017

23-25 March
Boru 2017
(Istanbul, Turkey)
International Exhibition
www.borufair.com

17-19 May
Made In Steel
(Milan, Italy)
International Exhibition
www.madeinsteel.it

5-8 June
Tube Russia
(Moscow, Russia)
International Exhibition
www.metallurgy-tube-russia.com

28-30 June
Guangzhou Tube Fair
(Guangzhou, China)
International Exhibition
www.chinaexhibition.com

18-23 September
EMO
(Hanover, Germany)
International Exhibition
www.emo-hannover.de

19-21 September
Tube Southeast Asia
(Bangkok, Thailand)
International Exhibition
www.tube-southeastasia.com

3-5 October
TUBOTECH
(São Paulo, Brazil)
International Exhibition
www.tubotech-online.com

6-9 November
FABTECH
(Chicago, USA)
International Exhibition
www.fabtech-expo.com

21-24 November
TOLexpo
(Paris, France)
International Exhibition
www.tolexpo.com

New OTO hollow shape forming mill for construction industry

FIVES recently presented its new OTO hollow shape forming technology during an open house in November 2016 in Boretto, Italy. The open house assembled Çinar 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. This 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 the mill with forming stands that allow for strip bending at precise angles for the first and second bend. The remaining equipment consists of a high-frequency welding stand, a scarfing unit, cooling and sizing sections, as well as straightening and cut-off units, and a packaging system.

The open house in Boretto, Italy

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. 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," said Andrea Anesi, operation director of Fives OTO SpA, a concept designer of the OTO HSU mill.

Fives Group – France
Website: www.fivesgroup.com

Adda Fer enters into deal with Fimi SpA

ADDA Fer Meccanica has linked up with Fimi SpA, a company in the design and construction of metal coil slitting and cut-to-length lines. The operation is part of a strategic expansion of products and markets.

Adda Fer designs, constructs and installs lines and machines for the production of welded pipe and sheet metal working.

With extensive knowledge and experience in the international market Adda Fer Meccanica has installed several lines worldwide and established a reputation for quality and reliability.

Fimi SpA operates in the field of metal strip and sheet processing lines. Since 1963, Fimi has successfully designed, manufactured and installed lines for levelling and cutting of metal coils.

FIMI SpA is well established in international markets such as China, India and Russia and sells 80 per cent of its products abroad, mainly in Europe but with significant percentages in Asia and Latin America. The number of lines delivered to customers around the world is approaching 1,000 units.

The operation creates an added value that will employ 150 people, 20 of which will be dedicated to research and development.

Through a combination of technical and technological skills and experience the cooperation offers a wide range of products and solutions able to meet demanding and diverse applications.

Antonio Pensotti, CEO of Adda Fer and Fimi SpA, said: "The entrance into Fimi by Adda Fer represents an opportunity for a unique development in this market field with positive effects for the whole market segment.

Adda Fer and Fimi share their own heritage in terms of know-how, experiences and skills for innovations and make all this available at the service of their prestigious customers in tight cooperation with them to fulfil the business development.

"The business plan envisages an administrative reorganisation process as well as the continuity and consolidation of the technical branch but first of all growth, both in terms of turnover and investments. Special impulse will be given to service with the aim to guarantee speed, competence and responsiveness in a vital segment for the customers.

International development will also occur through the strengthening of the commercial network, which already operates in several countries in the world."

Adda Fer Meccanica – Italy
Website:
www.addafer.it
www.fimimachinery.com

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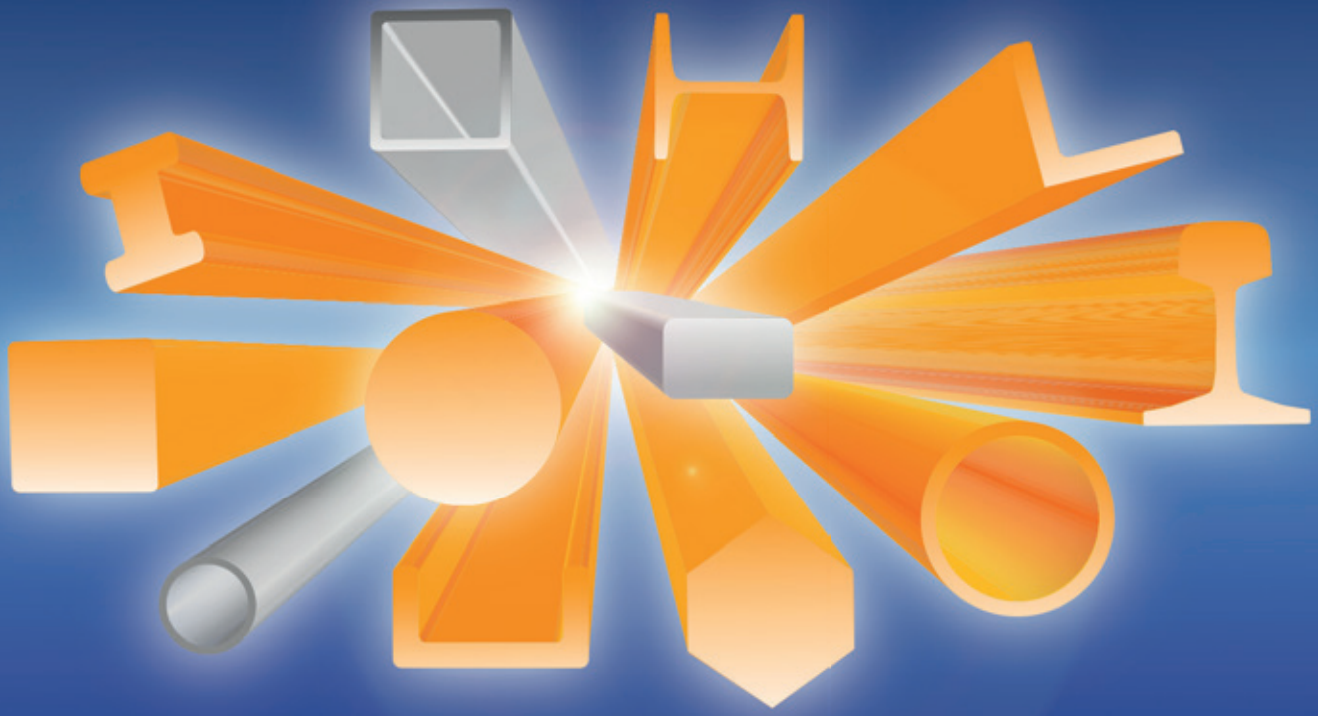

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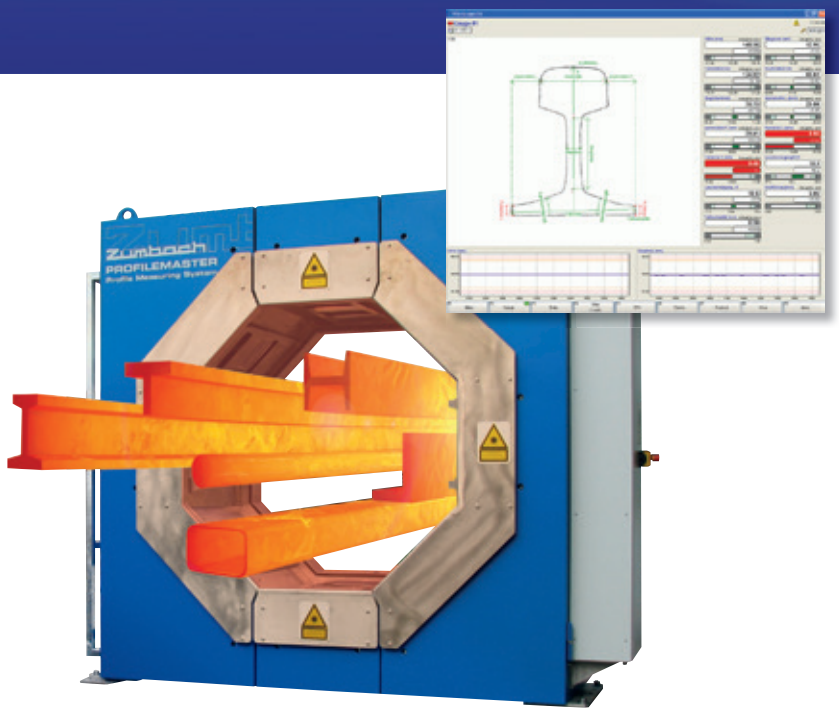

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Modernisation of flat rolling block

PRIMETALS Technologies has won an order from Böhler Edelstahl, a company of the special steel division of voestalpine, to modernise the flat rolling block at its Kapfenberg plant in Austria. The plant will be equipped with new drives and automation system. The project is designed to increase plant availability, improve product quality, boost energy efficiency and cut maintenance costs. Modernisation work is scheduled to take place during a one-month plant shutdown mid-2017.

The flat rolling block consists of three horizontal and two vertical stands, and produces flat bars in widths ranging from 43 to 205mm and in thicknesses from 4.5 to 86mm. A hydraulic drive system and a now-obsolete proprietary automation system have been in use since commissioning in 1988. Spare parts supply and adequate servicing can no longer be ensured. Böhler Edelstahl therefore decided to ask Primetals Technologies to completely modernise the automation and drives system.

Primetals will equip Böhler Edelstahl's plant with new automation and drive technology
Photo credit: Böhler Edelstahl GmbH & Co KG

In previous years, Primetals Technologies has equipped the continuous rolling mill in the multi-line rolling mill and the roughing stand of the blooming mill with new automation and drives technology, and supplied new drives for the six-stand HV-combination mill. Primetals Technologies will be supplying new main and auxiliary drives with Sinamics S120 frequency converters, a new operator control and monitoring system based on Simatic PCS7, and new main gearboxes. The elimination of the hydraulic systems will reduce maintenance costs and increase plant availability, which will boost the productivity of the rolling line. Energy requirements and consumption of hydraulic oil and cooling water will fall.

RollMaster, specially designed for long product rolling mills, will handle the generation and management of the pass schedules. This software is the link between the production planning system and the plant automation. Primetals Technologies will also handle engineering, manufacturing, commissioning and customer training.

Böhler Edelstahl specialises in the production of long products and open-die forgings made of tool steel, high-speed steel, special materials and nickel-based alloys.

Primetals Technologies Ltd – UK
Website: www.primetals.com

Rofin-Baasel Lasertech moves into new HQ

INDUSTRIAL laser specialist Rofin-Baasel Lasertech and its more than 260 employees have moved to a business park in Gilching, Germany. With an area of 17,000m², the new site offers considerable room for growth.

The new company building has a 140kWp (annual) photovoltaic plant

The new premises feature an 8,000m² production area, including a 1,000m² clean room. This will help the laser manufacturer to unite and streamline its production, which used to be distributed among three different sites.

Additionally, the new facilities meet the increasingly important requirements of environmentally friendly production.

A photovoltaic system with an annual yield of 140kWp, a ground water heat pump and a wood chip heating system partly cover the energy demand from renewable sources.

The new location also features an application lab for joint process evaluation and development with customers and partners. 4,000m² of office area for research and administration will allow short communication channels, faster response times and streamlined internal logistics.

Rofin-Baasel Lasertech GmbH & Co KG – Germany
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Email: sales-micro@rofin.de
Website: www.rofin.com

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Manufacturing Day at Formtek 2016

FORMTEK Group Inc recently hosted over 200 students and 19 exhibitors for its annual Manufacturing Day. Across the USA, the day is celebrated to bring light to the exciting diversity of the manufacturing industry and the many careers that can be found within it. It is meant to encourage young people to explore jobs in manufacturing and inspire a passion for the field in the next generation. Held annually, this was the company's fifth year participating in the celebration.

This year Formtek hosted nine schools from surrounding counties. For the day it also had an on-site Formtek Snapchat filter available to students and participants who were documenting their time at Manufacturing Day through the app.

The event began at 10am with an introductory speech given by Judy Muehlbauer, HR manager of the Formtek Group. Then the students were assigned to a member of the Formtek team for a tour of the shop and explanation of the jobs of the machines and workers. After the tour was over, the students were allowed to explore the exhibitors' booths.

One of the most exciting of the exhibitors was Lakeland Community College and their robots with the ability to throw a ball to students and receive it through sweeping it up off the ground.

Sawyer, a product of the Proud Company of Pittsburgh, was among the exhibits that offered a hands-on experience in how manufacturing and technology are becoming one and the same through industrial automation and robotics.

Mark Proud, president of the Proud Company, was at the event, demonstrating how Sawyer can be programmed by anyone, even without previous knowledge of computer or machine programming.

3D printing was also on display via the booth put on by Excel Tecc's Computer Aided Design and Drafting Engineering Technologies program. On display was a prosthetic hand, made by the program with 3D printers. Students were able to try out copies of one that was donated to a local boy who now uses it functionally. This gave students a first-hand opportunity to see how manufacturing technology is changing lives.

The event was a success due to the many exhibitors and participants. A spokesman for the Formtek Group said: "We committed to the future of manufacturing. We believe that by investing in the education of the youth today we will be able to secure a capable workforce for tomorrow. We look forward to hosting annual events for the many Manufacturing Days to come."

Formtek – USA
Website: www.formtekgroup.com

The transparent press plant of the future

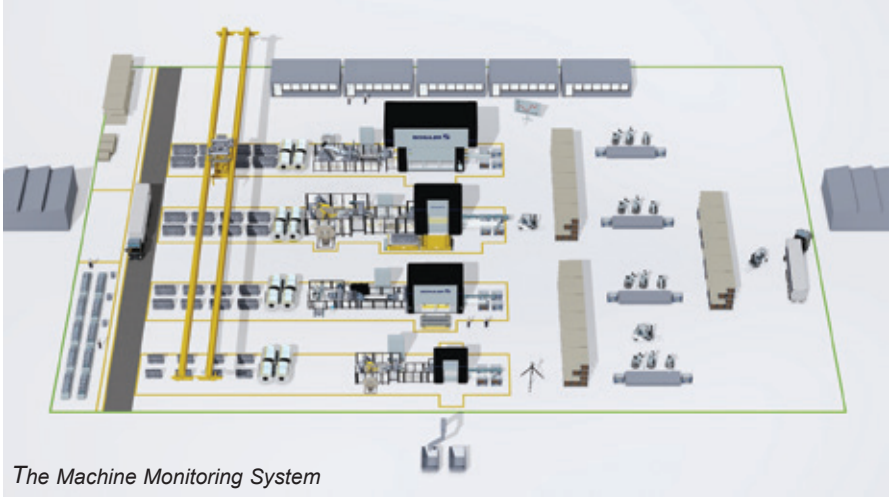
IF it were possible to see the inside of a press it would be possible to avoid many unplanned downtimes because a faulty part could be identified sooner.

The Machine Monitoring System (MMS) of the future, which Schuler presented a model of at the recent EuroBLECH trade fair, provides new insights into presses. With the aid of comprehensive system monitoring availability can be increased, production and parts quality can be improved and energy consumption can be lowered. The MMS is part of the Smart Press Shop, a collection of Schuler solutions for networking in the field of forming technology.

Schuler's model for system monitoring combines a variety of existing solutions. An integral part of the MMS is the intelligent diagnostics, which automatically archives and evaluates physical variables and control states when specific events occur. This enables rapid fault analysis.

The state monitoring function monitors the system at regular intervals for damage and wear, using torque curves and structure-borne noise analyses, for example. Thanks to this state-based maintenance, components only need to be replaced when they have actually reached the end of their life and not just because they have been in operation for a specific amount of time.

When it comes to process monitoring the focus is on machine protection. Permanent logging of parameters such as press force or vibration progression enables a cycle-accurate response in real time, where necessary. Process reliability is thereby also improved.



The Machine Monitoring System

Energy monitoring involves recording and evaluating all measured variables that are relevant for energy efficiency and network quality, such as power consumption, voltage dips or harmonics. This means that system operators can not only save energy costs, but in some circumstances they can also obtain investment grants and favourable loans.

The production data acquired includes all planned and unplanned downtimes including their causes, fault messages, target/actual production and the quality of the parts. In this way, the system operators gain an overview of the production status and a basis for calculating the overall equipment efficiency.

All quality-relevant data is also recorded and archived for each part produced. This enables the manufacturer to provide the necessary proof for items such as safety parts.

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

Schuler is also a supplier of minting presses, and supplies system solutions for aerospace, rail transport, and large pipe manufacturing.

Schuler Group – Germany
Website: www.schulergroup.com

Curved steel raises the roof

AS part of the £70 million redevelopment of Longbridge town centre, in the UK, the developer has constructed a new superstore for Marks & Spencer that is to be one of the largest in the country. The adjoining car park has been constructed from steel, with the roof and floor sections being curved by Barnshaws to ensure sufficient strength and controlled water run-off. The work was carried out for specialist steelwork contractor James Killelea Ltd.

Redeveloping industrial sites such as that at Longbridge forms an important part of council strategy to create business and employment opportunities, and optimise investment. In this case the new store alone is expected to generate up to 350 new jobs, while the additional retail, restaurant and cafe areas will further enhance the development and its potential to attract shoppers. In addition to the retail areas, an underground car park has been constructed from steel. The 'roof' of the car park is at ground level and the designers needed it to be strong enough to carry the weight of the roof sections as well as providing a sufficient camber to ensure any rainwater is directed to the surface drains.

Greg North, commercial director at Barnshaws, commented, "We have a long-standing relationship with the steelwork contractor and they appreciate our ability to deliver large tonnages of curved steel on time. In this case it was very nearly 500 tonnes of universal beams that required a camber of between 50 and 100mm."

A large number of different specifications in terms of section size, length and camber were used to create the 15m square lattice formation that forms the roof.

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Rattunde hosts technology open house and ten-year anniversary celebration

RATTUNDE Corporation, a builder of metal tube and bar processing machinery, celebrated its ten-year anniversary in September with a technology open house. The celebration attracted a large crowd of customers and business associates.

On display were several live machine demonstrations featuring the newest technology and a fully operational production system for metal tubing. On-site technical discussions were held, and personal meetings with Rattunde technology experts were available. Ulrich Rattunde and Martin Proksch, owner of Rattunde & Co GmbH (the German parent company) gave welcoming speeches.

Rick Stadler, president of Rattunde Corp, said, "Rattunde Corporation is excited to celebrate ten years of growth. These milestone events give us the opportunity to come together with the many companies and individuals that have been critical to our survival and growth. We take this time to not only reflect on where we have been, but more importantly to share the plans for where we are going."

Rick Stadler (right) receives signed picture of staff in Germany

Mr Stadler received a signed picture of the staff in Germany as a commemorative gift. Guests enjoyed a catered lunch and were given customised travel mugs as a parting gift. Rattunde designs and builds solutions for tube and bar sawing, and post-cut-off, value-added processes. Rattunde ACS production systems are fully automatic and suited to re-cut mill length tube and bar, re-cut and brush, re-cut and end-finish or re-cut and machine complex features, including threading.

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Higher cutting speed and more throughput

SMS GROUP has received the go-ahead from Daehan Steel for the modernisation of an existing shear no 3 in the VCC®-line (Vertical Compact Coiler) of a rebar mill in Pyeongtaek, South Korea.

The modernisation project involved the replacement of the switch and the scrap guiding system of the existing shear no 3 by new equipment. Thanks to a newly developed high-speed switch and the upgrade of the automation system it was possible to implement head and tail end cropping at speeds of up to 35m per second without any major modification to the adjacent plant parts.

The mill in South Korea

The rolling mill supplied in 2011 was originally designed for maximum cropping speeds of 15m per second. Due to the modernisation of the VCC®-line, Daehan Steel is now able to increase the throughput to 70 tons per hour.

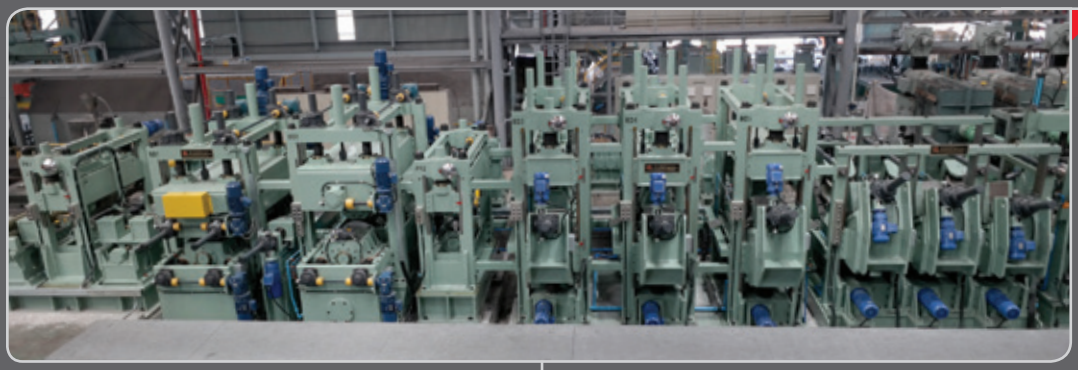
For this plant the new switch was constructed and delivered in just five weeks, and only three days were needed for subsequent assembly and commissioning. The solution is based on the plug-and-work principle with reduced investment costs and a short delivery time, which were decisive factors in the implementation of the project.

SMS Group GmbH – Germany
Fax: +49 211 881 4902
Email:
communications@sms-group.com
Website: www.sms-group.com

BAEKCHUN Since 1978
Tube & Pipe Mill Line Technology

BAEKCHUN PRECISION CO., LTD.
252, beoman-ro, Sosa-gu, Bucheon-si, Gyeonggi-do, Korea.
E-mail: sales@bcpre.com Homepage: www.bcpre.com
Tel: +82 31 313 7151~3 Fax: +82 31 313 2305

Tube mill & finishing line capable of producing **API 3" to 12" OD x 18t & API 8" to 24" OD x 20t** pipes, developed with advanced technology and verified through continuous R&D based on extensive field experience accumulated **over 40 years in the tube mill & finishing line sector.**



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

Available size : 4"~12" x 14t, API X70
8"~20" x 16t & 12"~24" x 20t, API X70

V-Shear & Welder connects the ends of two coils. As it connects the two ends on an improved 40° groove by bevel cutting, this results in excellent strength of the joint, maintaining the welded surface beautifully as the ends are welded. It also boasts a short welding cycle time, and a longer life of the Z-shape cutting blade.

Available size :
3"~12" x 16t & 8"~24" x 20t

Milling Cutter boasts a precise control system, excellent design, optimum cycle time, a high quality cutting face, and long life of the cutting blade.

Available size :
3"~12" x 16t & 8"~24" x 20t

End Facer & Hydrostatic Tester
2"~6" x 500bar Four Head
4"~12" x 700bar Double Head
8"~24" x 500bar Single Head
16"~62" x 350bar Single Head

GLOBAL PATENT

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

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

Available size :
3"~12" x 16t & 8"~24" x 20t

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^2) and End facing to HISTEEL 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)

We provide API, high-strength and high-end tube mill line and an advanced finishing line alongside the latest technology on a turnkey basis.

- Tube Mill Line Capable of Manufacturing up to 24"
- 6-Roll, 7-Roll, and 10-Roll Straightening Line
- Max. 2-Head Automatic End Facing & Bevelling M/C
- Max. 5-Head, 700bar Hydrostatic Tester
- Automatic and Semi-automatic Bundling M/C
- Related Equipment and Facilities to Comply with API Standard

BORU 2017 trade show in Turkey

DUE to the strong need for construction, infrastructure and energy projects, the market size has grown in both value and volume in Turkey. According to statistics published by Turkish Statistical Institute, the local tube and pipe market has been growing steadily.

4.2 million tons of steel tubes were produced in Turkey in 2015. 60 per cent of the production was sold in Turkey, with the rest exported to the USA, Iraq, UK, Romania, Egypt and other countries. In addition, 0.4 million tons of steel tubes were imported by Turkey.

Turkey is a large market that has a wide range of tube application demands. When tubes other than steel (iron, copper, nickel, aluminium, etc) are taken into consideration, the volume of all tubes becomes at least double that of steel tubes. Turkey is also an important supplier for Middle East and North African countries, among others.

The tenth edition of the BORU Istanbul Tube Fair will be held from 23 to 25 March 2017. The venue, Istanbul Expo Center, is next to International Istanbul Ataturk Airport, offering convenient access to the fair. The event provides a platform for both exhibitors and visitors to reach their target audience. Companies will have the opportunity to present new products to the industry.

Major product groups that will be exhibited at the fair are tubes, profiles, fittings, flanges and other accessories made of ferrous or non-ferrous metal for all applications; line pipes and fittings; tube manufacturing machinery; profile manufacturing machinery; tube processing equipment; dies, tools, lubricants and auxiliaries; and testing, measuring, software, logistics and other services. Although the fair is focused on the metal tube industry, plastic tube manufacturing machinery will also be exhibited in this tenth edition. It will be an opportunity for plastic tube machinery suppliers to present their new technology to plastic tube manufacturers.

Two other fairs are concurrently organised with the Istanbul Tube Fair: TEL 2017 Istanbul Wire Fair, and RULO 2017 Istanbul Coil Fair. The three fairs are presented under the name 'Istanbul Metal Fairs Trio'.

Voli Fuar AS – Turkey
Email: info@voli.com.tr
Website: www.borufair.com

Rafter ships RT-3000 weld box

RAFTER Equipment Corporation has delivered welding and straightening equipment to a major North American custom roll form parts producer. The equipment included an RT-3000 high-frequency induction (HFI) five-roll weld squeeze box and an RT-3000 double-sided turkshead straightener. The equipment will be used for the production of HSLA welded seam profiles up to 3" square x 0.16" thick for an automotive application on the customer's existing RLM Manufacturing roll former.

Rafter states that it was chosen for the project because of its reputation for providing the kind of heavy-duty mill equipment necessary for this application.

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

Rafter Equipment Corp – USA
Website: www.rafterequipment.com

Pipe production facility commissioned

RUSSIAN pipe manufacturer Gazpromtrubinvest and Swiss company SYTCO AG have commissioned a complete automatic technological process line for production and processing of casing, gas/oil, shaped electric-welded straight-seam pipes in Volgorechensk, Russia.

Gazpromtrubinvest commenced the project in 2012. The new facility, able to produce pipes with a range of diameters from 127 to 426mm (and up to 451mm for the heat treatment plant), has a total production capacity of 350,000 tons per year.

The process includes slitting line, tube welding line, finishing line, casing finishing, coupling shop, heat treatment plant, straightening machine, hydraulic tester, and weighing, measuring, marking area and bundling line.

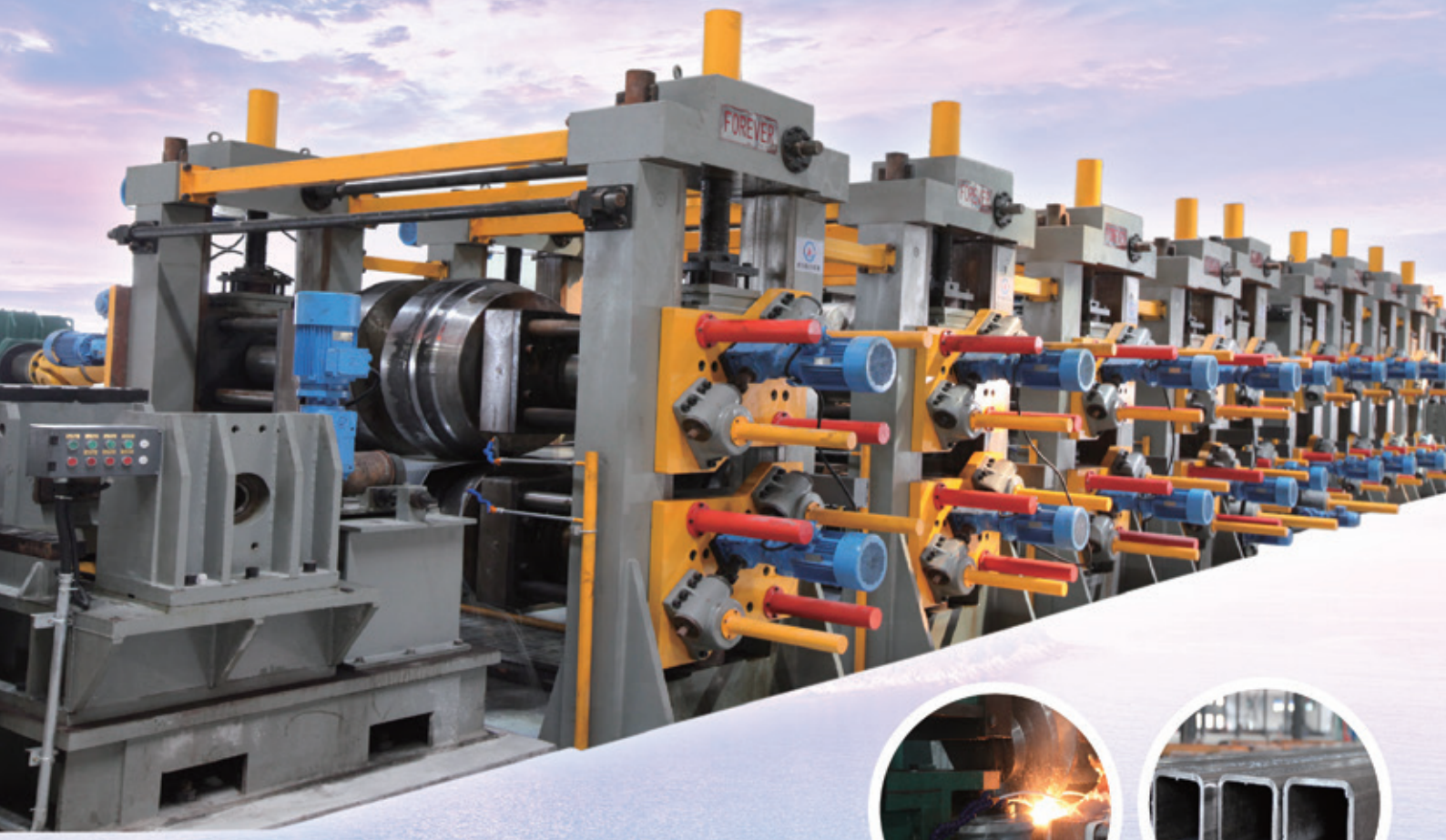
The total value of the turnkey contract was €130mn, and equipment was supplied by Fives Bronx, Emag, Ultrakraft, MAC and others.

In the last 12 years, Gazpromtrubinvest and SYTCO have successfully commissioned four other plants, involving the engineering, procurement, construction and work, and commissioning of: heat treatment of tubes of diameter 63 to 168mm; water treatment equipment for heat treatment of tubes; equipment for external isolation of steel tubes of diameter 60 to 530mm; and equipment for finishing of casing and tubing, diameter 63 to 168mm.

SYTCO AG – Switzerland
Email: dir@sytco.ch
Website: www.sytco.ch

FOREVER

Shijiazhuang Forever Machinery Co., Ltd.



H.F Tube/Pipe Mill Line
Cold Roll Forming Machine
Slitting Line and Cut–to–length Line
Directly Forming to Square and Rectangular Tube Mill Line

Shijiazhuang Forever Machinery Co., Ltd.

• Add: Shijiazhuang,China
• Tel: +86-311-83839996
• Fax: +86-311-83839990
• Email: user@frv.cn daisyli@frv.cn
• Web: www.frv.cn

Order for reversing cold rolling mill

TALLERES y Aceros SA de CV (Tyasa), a Mexican steel producer, has awarded Primetals Technologies an order to supply a new reversing cold rolling mill for its production plant in Ixtaczoquitlan. The cold rolling mill is an element in Tyasa's strategy of extending its portfolio to include flat products, and will roll 200,000 metric tons of high-strength and low-carbon steels per year. It is designed to handle a wide range of end products, and is particularly suitable for small batches.

The process equipment and technology packages not only maintain tight flatness and thickness tolerances but also ensure a good quality surface, and the compact design minimises the proportion of out-of-gauge strip. The project is due for completion by early 2018.

The reversing cold rolling mill is designed as a single, four-high stand. Primetals will supply the complete process equipment, electrics and automation from a single source, and will also be responsible for supervising the installation and start-up of the plant. The mill has a maximum roll separating force of 1,800 metric tons, and will roll strips with an entry thickness ranging from 0.7 to 2mm down to exit thicknesses of between 0.3 and 1mm. The strip widths range from 900 to 1,650mm, and the maximum coil weight is 32 metric tons.

Reversing cold mill from Primetals Technologies. A comparable mill will be installed in the Ixtaczoquitlan production plant of Tyasa

The scope of supply from Primetals Technologies includes the rolling force cylinders – with integrated high-resolution position transducers, low-friction seal and guiding rod assembly – which form the key element in achieving precise thickness control. The cylinders and other core components are manufactured in the company's own workshops, and are thoroughly tested before delivery.

The production of very flats strips is ensured by advanced work roll bending, multi-zone cooling of the work rolls and continuous flatness measurements, combined with special technology packages such as automatic flatness control. For strip blow-off, a special air-nozzle arrangement is used. The design ensures efficient blow-off at all rolling speeds, contributing to a high surface quality of the rolled strip.

The surface quality is further improved by using a coil eccentricity compensator (CECO) model. CECO stabilises the strip tension and ensures a consistent strip thickness by compensating for any eccentricities in the coil that may have been caused by the clamped head ends of the strips.

Primetals Technologies Ltd – UK
Website: www.primetals.com

Growth at UK steel tube specialist

HUB Le Bas is aiming to re-establish itself as a leading UK precision steel tube supplier as it enters a new phase of expansion and capital investment, building on major client gains over recent months.

The company, whose roots go back over a century, has already regained more than 75 per cent of its client base since being acquired in December 2015 by global steel and engineering business Liberty House Group. It expects to complete this rapid recovery over the coming months. At present the company is welcoming almost 50 new clients per month and has increased its workforce numbers.

Buoyed by the strength of the comeback under new management, Hub Le Bas, which supplies industries as diverse as automotive, defence, construction and medical, is now planning to add two new sites to its existing five-strong UK network and to invest nearly £2mn in advanced laser cutting equipment to further boost quality and productivity.

Rob Sweetnam, managing director of Hub Le Bas, said, "We are experiencing a rapid growth in the demand for precision cut tube components and are taking the necessary steps to respond to customer needs. The use of fully programmed laser cutting equipment provides clients with improvements in accuracy and quality while also reducing downstream assembly costs."

The new laser cutting machines will be located in the company's London, Manchester and Leicester branches, supplementing existing capacity at the firm's Bilston site in the Midlands.

Hub Le Bas has a portfolio of 8,000 product lines and maintains high stock levels to meet demand from clients of all sizes. Staff are equipped to deliver in-depth product and technical knowledge as well as high levels of customer service.

Hub Le Bas – UK
Website: www.hublebas.co.uk

Tubacex agrees joint Thailand venture with Japanese company Awaji

TUBACEX has reached an agreement to create a joint venture with the Japanese company Awaji Materia to manufacture special stainless steel components at its factory in Thailand. This operation, which follows a previously signed statement of intent, implies a capital increase of US$3.3mn subscribed by Tubacex Group through the Italian firm IBF, which accounts for 60 per cent of the new company's stake. As compensation for the remaining 40 per cent, Awaji Materia will provide the assets for the stainless steel special fittings factory.

Awaji Materia, founded in 1944 and dedicated to the manufacture of stainless steel and carbon fittings, has a high level of market penetration in Southeast Asia, as well as in North America and Japan.

It is expected that the new company, Tubacex Awaji Thailand, will invoice €20-25mn in three years with the manufacture of stainless steel elbows, reductions, tees and caps. These are standard small diameter products that complement the fittings range that Tubacex has been offering through TTA (Spain) and IBF (Italy), allowing for industrial synergies with its tube plant located in India.

With this operation, Tubacex maintains its commitment to the Asian continent – one of the fastest growing markets – with its first venture within Southeast Asia in conjunction with a Japanese partner with experience in the fittings manufacturing sector.

Jesús Esmorís, CEO of Tubacex, commented, "The crisis in the sector has hit the fitting sector particularly hard, but we have reacted with a plan for the specialisation of our plants and a strategic acquisition in Thailand that will help us to reach our goals of diversification, better positioning in the value chain and proximity to the final user. We currently have a full range of fittings, from the standard, smaller diameter product to more complex products and bigger diameters, which complements our portfolio and allows for the creation of industrial synergies with other plants of the group."

In addition to the manufacture of stainless steel and high-alloyed tubular products, Tubacex offers a wide range of services, from the design of tailored solutions to installation and maintenance operations. The company has production plants in Spain, Austria, China, Italy, USA, India and Thailand, and worldwide service centres and sales offices in 38 countries.

Tubacex – Spain
Website: www.tubacex.com

Made in Steel: exchanging ideas

THE steel industry is changing at high speed, working to emerge from a crisis that has lasted almost ten years, setting new targets and finding new means to meet them. Made in Steel 2017 conference and exhibition, dedicated to steel producers, traders, manufacturers and users, will take place in Milan, Italy, from 17 to 19 May in the headquarters of Fieramilano, Halls 22 and 24. Many of the leading companies in the industry have already confirmed their participation in this seventh edition of Made in Steel. Six months ahead of the opening, 70 per cent of the exhibition space had been sold. Compared to the 2013 edition, the exhibition area of Made in Steel 2015 was up by 16 per cent, with a 17 per cent increase in the number of visitors, totalling almost 13,000.

The title of the May 2017 conference is 'Stronger together'. "This refers to the importance of working in synergy and the need to review the system, looking at the future of the companies that work in the steel industry," said Emanuele Morandi, CEO of Made in Steel. "Therefore, I believe that Made in Steel is a strategic appointment for the international steel value chain."

Made in Steel will foster the exchange of information with focus meetings dedicated to the hot topics of the international steel industry.

The three-day event will not only be an opportunity to do business, but will also feature conferences, events and seminars with a cast of experts and leaders from the international economic and steel scene.

Made in Steel Srl – Italy
Fax: +39 030 2549833
Email: info@madeinsteel.it
Website: www.madeinsteel.it

New USA tube manufacturing facility

ADVANCED Drainage Systems, Inc (ADS), a manufacturer of water management solutions, hosted community leaders, elected officials and prospective employees at the site of its in-construction manufacturing facility in Harrisonville, Missouri, USA.

This will be the company's 62nd manufacturing plant, and its first in Missouri.

The event featured remarks from ADS CEO Joe Chlapaty, US Rep Vicky Hartzler, State Senator Ed Emery, and Brian Hasek, mayor of Harrisonville.

The new 72,650ft^2 manufacturing facility is expected to open in the first half of 2017, bringing new employment opportunities to the region. The plant represents a significant capital investment for ADS, whose growth is a result of favourable policies enacted by the Missouri Department of Transportation (MoDOT).

In 2011, and again in 2014, MoDOT updated its standards specification to allow plastic pipe to be used in statewide infrastructure projects for storm water management. The alternative pipe policies enable engineer choice among technically equivalent options.

"MoDOT's policy improvements contributed significantly to ADS's decision to invest in Missouri," said Mr Chlapaty.

"We are delighted to join the community of committed Harrisonville advocates, and welcomed the participation in today's event by Representative Hartzler, Senator Emery, Mayor Hasek and many community advocates and leaders.

"This facility will help meet growing demand for our water management solutions, and we are excited about our increasing contributions to the state of Missouri and this wonderful community."

The company intends to employ approximately 50 people at the facility when fully staffed, and will hire locally for employment opportunities in management, machine operation and transportation, among others.

ADS provides a comprehensive suite of water management products and drainage solutions for use in the construction and infrastructure marketplace.

Its products are used across a broad range of end markets and applications, including non-residential, residential, agriculture and infrastructure applications.

Founded in 1966, the company operates a global network of 61 manufacturing plants and 31 distribution centres.

At the ground breaking for the new ADS plant (from left): Greg Bohn, Bill Shaffer, Joe Chlapaty, Kevin Kish, Rep Vicky Hartzler, Brian Hasek, Gary Ashley, Tom Fussner and Sen Ed Emery

Advanced Drainage Systems, Inc – USA
Website: www.ads-pipe.com

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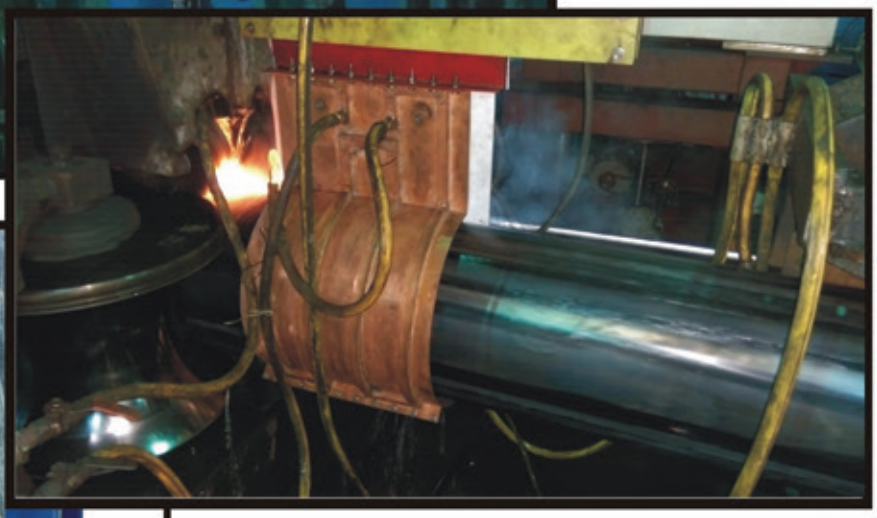

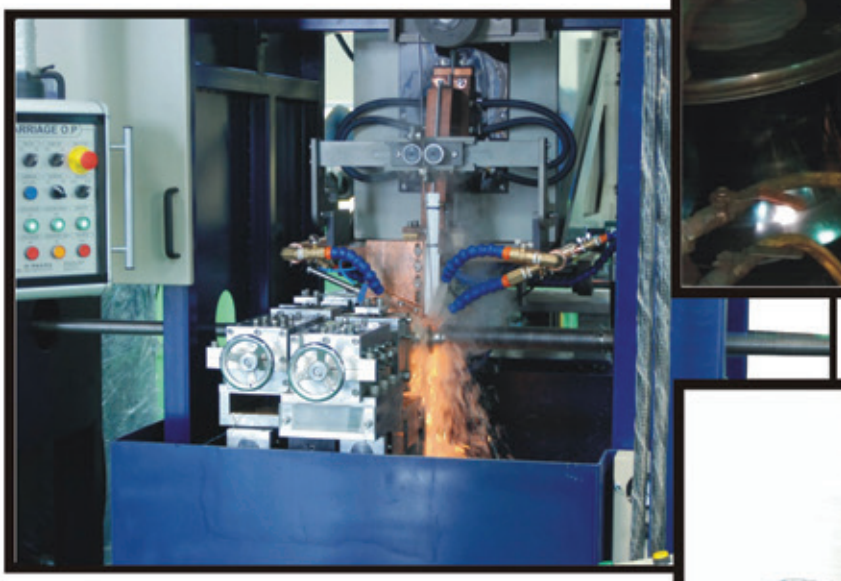

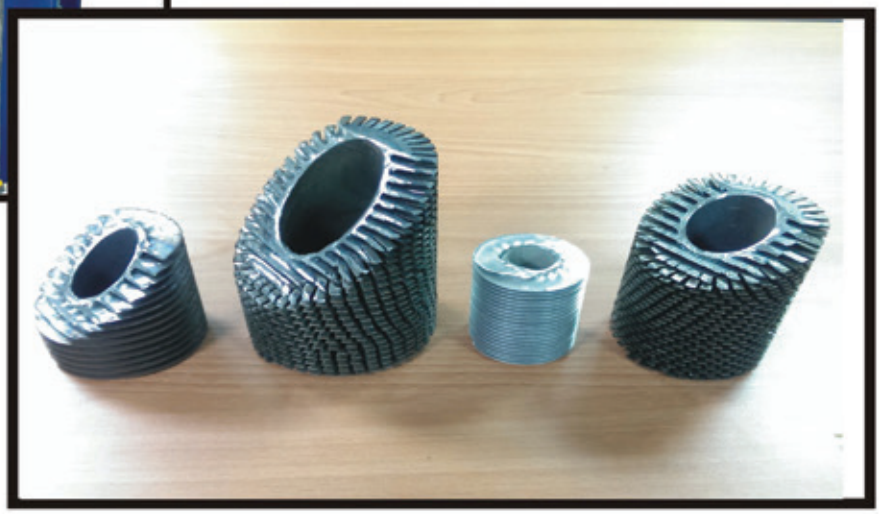

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SINCE 1967

Alcomet ready for expansion

BULGARIAN aluminium product manufacturer Alcomet AD has awarded SMS Group an order to supply a flexible, modern cold rolling mill for the production of a wide range of high-quality aluminium strips.

Alcomet is a supplier of rolled and extruded aluminium products with 35 years of experience in non-ferrous metallurgy. The current portfolio of rolled products comprises foil stock for containers and household use, technological foils, and sheet and strips for coolers, heat exchangers and for construction. The company uses in-house cast strip of alloy series 1xxx, 3xxx and 8xxx as input material.

The new cold rolling mill from SMS group, which will be of the CVCplus® six-high design will offer Alcomet the possibility to diversify the product range and enhance product quality.

Quality of the up to 2.2m-wide and 0.15mm-thin strip will be ensured by the interaction between CVC and a comprehensive range of further actuators, all of which are coordinated by the SMS group's automation and control system AluControl®. A Multi-Plate® filter, one of the SMS group's ecoplants modules, will provide ecological and economical treatment of the rolling oil.

"Our project started out with the plan to revamp an existing cold rolling mill and evolved into building a new rolling mill of the latest design, which allows us to meet our customers' future demands," said Huseyin Yorucu, Alcomet AD chairman of the management board.

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

Awards ceremony for 2016 laser prizes

THE ninth awards ceremony for the honours for applied laser technology of the Berthold Leibinger Foundation took place in September. The jury awarded four innovation prizes, and Professor Gérard Mourou received the Berthold Leibinger Zukunftspreis (future prize).

The event was opened by foundation founder and former managing partner of the Trumpf Group Professor Berthold Leibinger. Following his speech, Elizabeth Rogan, chief executive officer of OSA (The Optical Society), gave a history of the innovations that have been made in optics and photonics over the last 100 years. Professor Friedemann Schrenk, head of the paleoanthropology section of the Senckenberg Gesellschaft für Naturforschung (Senckenberg Society for Nature Research) in Frankfurt, Germany, held the ceremonial address.

The awards presentation itself began with film portraits of the prizewinners and their work, followed by a laudation held by a jury member.

Since 2006, the Berthold Leibinger Zukunftspreis has honoured one scientist for outstanding contributions to applied laser technology.

In 2016, this honour was awarded to Professor Gérard Mourou of the École Polytechnique. Due to his invention of chirped pulse amplification (CPA) at the University of Rochester, New York, USA, in collaboration with his student Donna Strickland, Prof Mourou is considered the 'father' of electromagnetic fields of high and ultra-high intensity fields, as Ursula Keller said while explaining the jury's choice. This technology enables the amplification of short laser pulses to extremely high peak power. With CPA, Prof Mourou pioneered the field of femtosecond ophthalmology with more than one million patients a year today, and revolutionised the field of high intensity lasers. Most recently, he initiated Europe's Extreme Light Infrastructure (ELI) in the Czech Republic, Hungary and Romania.

The first prize of the innovation award was presented to Swiss physicist Dr Balthasar Fischer by Professor Wolfgang Marquardt. Dr Fischer developed a membrane-free microphone at Vienna University of Technology that can hear through light.

Marketed through his company, Xarion Laser Acoustics, the microphone is now finding applications in non-destructive metrology and the process control of machine tools.

One of the second prizes was awarded to the founder of the company Crystal Mirror Solutions, Dr Garret Cole, and Dr Markus Aspelmeyer, professor at the University of Vienna. They developed crystalline semiconductor coatings for mirrors. Their mirrors have revolutionised the world of optical high precision measurement.

A further second prize was awarded to a total of twelve scientists from Saarbrücken and Dresden led by Professor Frank Mücklich and Professor Andrés-Fabián Lasagni.

Prof Mücklich's working groups at Saarland University as well as the Steinbeis Forschungszentrum Material Engineering Center Saarland, and Prof Lasagni's working groups at the Fraunhofer Institute for Materials and Beam Technology and at the Dresden University of Technology, researched and developed the processes and laser systems to quickly and economically generate tiny micro-patterns and nano-patterns using the effect of laser interference. Surfaces created in this manner can reduce friction to a large extent, or they can kill bacteria and reduce the transmission of germs. The technology will also be used to increase the reliability of electrical plug-in connections.

A total of 33 developers of the Laser Guide Star Alliance were the winners of the third prize. Their high-power laser system is one of the key elements used in the construction of contemporary large telescopes. Based on earlier patented work and prototypes by ESO, the international industrial consortium of TOPTICA in Garching and MPB Communications in Montreal, Canada, jointly developed a novel laser system. This technology offers advantages for the tracking of satellites and the detection of space debris as well as further applications.

The next awards ceremony will take place in 2018. Applications for the innovation award may be submitted until the end of 2017.

Berthold Leibinger Stiftung GmbH – Germany
Fax: +49 7156 303 935205
Website: www.leibinger-stiftung.de

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3D fibre laser tube cutting

THE LT8.10 is a new Lasertube system that significantly enhances the performance of the system from which it is derived both conceptually and technically.

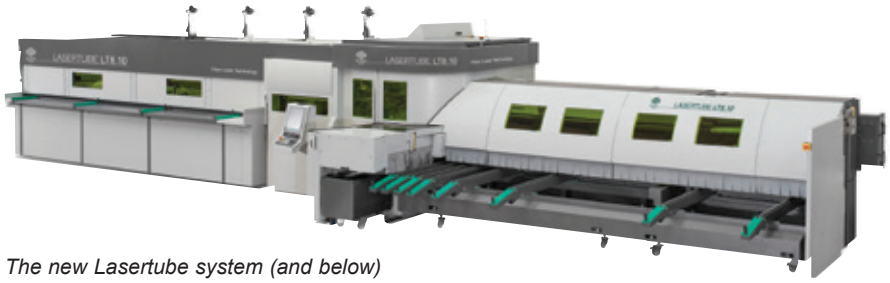
The possibility of 3D cutting using a fibre laser source followed a development path that included the use of a new 'Tube Cutter' focusing head, designed at Adige especially for the 3D cutting of tubes.

The new LT8.10 goes beyond this goal by offering other important abilities including increasing the size of workable tubes, the achievable performance and the usability of the system.

LT8.10 makes use of the 'Tube Cutter' focusing head to achieve performance throughout the wide size range that it allows. The range has been expanded in both tube size and weight capacity. LT8.10 is able to cut tubes with diameters between 10 and 240mm with a weight capacity of up to 40kg/m.

This expansion in capabilities meets the needs of 3D machining that is often necessary in larger and thicker tubes that require bevels or weld preps.

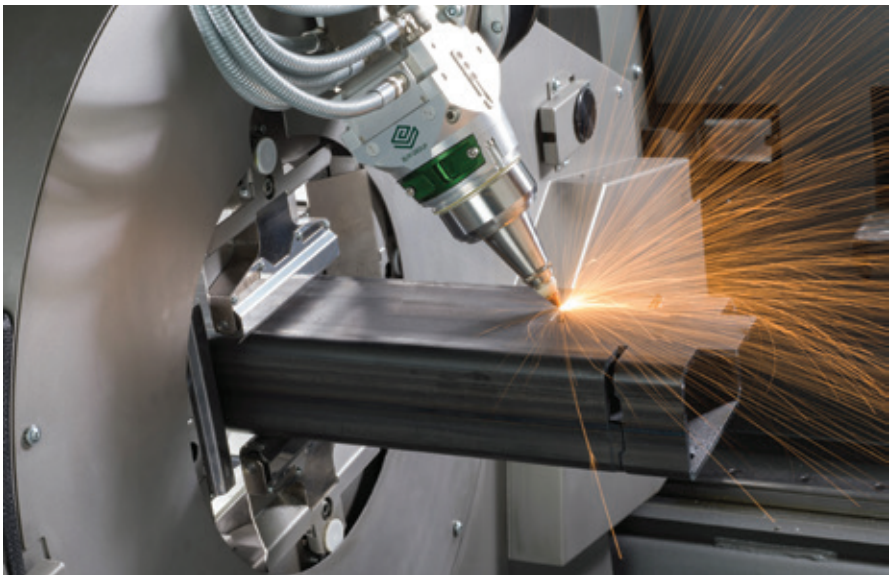
The 'Tube Cutter' head, thanks to its tapered geometry and easy handling, has increased the capabilities for processing open profiles or asymmetrical sections with both quality and precision. LT8.10 also benefits from software modifications both in the user interface and in the programming CAD/CAM software.



The new Lasertube system (and below)

The first major change is the new user interface, now used on all laser systems, which is easier, more intuitive and efficient. The interface guides the operator during the different operating phases of the work cycle and with appropriate suggestions regarding the programming parameters.

In terms of CAD/CAM programming the latest innovations introduced into the Artube 3 package allow for a better and easier handling of tubes and profiles with 'open' sections and the cutting of common of tubes. The LT8.10 features all the same capabilities available across the Lasertube range.



'ActiveScan' is a system that measures the deviations of the actual section of the tube with respect to the theoretical tube shape/size and automatically adjusts to achieve the highest part accuracy in the shortest time. ActiveScan can measure the position of the tube and centre the geometry to the actual tube location.

'ActiveSpeed' is a function that modulates the cutting parameters according to the real working conditions to ensure the best results. Where previously an expert was needed to make complicated parts, now ActiveSpeed, available on all the Adige systems, makes the process more simple and affordable.

LT8.10 keeps all the loading and unloading features and flexibility features of the previous generation of machine. The loading area for tubes still has two distinct stations – front and rear – to which you can connect modular loading solutions for different production requirements.

The part unloading is optimised to take into account the variability of size and geometry of the tubes to be machined. The centring system, which is used provide accuracy on long pieces, quickly clears the working area for downloading short pieces and enables maximum productivity.

LT8.10, with its fully automatic adjustments and high load/unload speed, offers users an impressive degree of flexibility.

BLM – Germany
Website: www.blmgroup.com

MasterDraw B4626 – oil-free tube forming lubricant

MASTERDRAW® B4626 was developed for push pointing, bending stretch forming and flaring of tubular products.

The versatile lubricant is usually used in its neat form (not diluted with water) but can be diluted for less demanding jobs.

Typical applications include push pointing of oil country tubular goods as well as bending, flaring, pointing and tapering of copper, aluminium, carbon steel, stainless steel and titanium type tubing.

The product is a smooth, tan and opaque fluid that is soluble in water, so the residues can be easily cleaned from the tube following the forming operation.

MasterDraw® B4626 is formulated with synthetic and inorganic additives that are designed to deliver the high load carrying properties required for heavy wall carbon steel pipe as well as for stainless and alloy tube forming operations. MasterDraw® B4626 does not contain any mineral oil in the formulation and does not contain chlorine or sulphur extreme pressure additives.

Etna Products Inc – USA
Email: etna@etna.com
Website: www.etna.com

Coating thickness inspection on concrete substrates

THE non-destructive measurement of dry film thickness on concrete is said to be more accurate, faster and easier, thanks to the new Elcometer 500 coating thickness gauge for coatings on concrete.

With features including ease of use, robust and ergonomic design, menu-driven colour display, user-selectable statistics, memory, USB and Bluetooth data transfer to PC or mobile devices, the Elcometer 500 accurately measures the thickness of dry film on concrete and other cementitious substrates up to 10mm thick.

The Elcometer 500's signal strength indicator prevents incorrect readings

The Elcometer 500 is claimed to be three times faster than other technologies, providing 60+ readings per minute in standard mode and over 140 readings per minute in scan mode. The gauge only displays a reading when the signal strength indicator goes green.

The gauges and probes are suitable for harsh environments, with a dust- and water-proof design equivalent to IP54, and field-replaceable probe wear tips.

The user can simply select the coating material and start measuring: there is no need to set up gates or range values, or know the thickness of the coating.

The Elcometer 500 coating thickness gauge can be used in accordance with ASTM 06132, SSPC PA9 and ISO 2808.

Elcometer Ltd – UK
Fax: +44 161 371 6010
Email: sales@elcometer.com
Website: www.elcometer.com

Ergonomic probes with user-replaceable probe wear tips

Data can be transferred to PC or mobile devices via Bluetooth or USB

In-line profile and shape measurement

AS a pioneer of online measurement committed to research and development activities, Zumbach Electronic has grown into a global manufacturer of online measuring and control systems. A top priority at Zumbach remains customer relationships through local presence combined with proven products, services, personal consulting and support.

Zumbach's Profilemaster® systems are developed from a core set of proprietary mega pixel camera/laser modules and software technologies. The application of these technologies has been adapted to serve the specific measurement, monitoring and flaw detection needs of extruded plastic and rubber tubes, hoses, profiles, wire and cable and wood plastic composites.

The system provides 100 per cent inspection, reduces start-up time, increases the accuracy of the end product, improves process control, reduces scrap, saves raw material and post processing costs and increases product quality. It also integrates seamlessly with PC-based systems already in a network.

Depending on the Profilemaster® model, up to eight laser/camera modules measure the cross section of the moving profile on-line and continuously. All relevant dimensions such as width, height, angle and radius or other geometric quantities are computed to characterise the full cross-sectional picture.

The program has three working modes:

Operation – for measurements during production. The desired functions for the measurement of a product, eg conditions for Start/End and records, are only entered once and stored in the memory together with the measured data.

Entering product data – enter the measurement requirement and define how the measured data should be processed. The flexible functions in the software program can be configured to allow products to be measured exactly as the customer requires.

The Profilemaster® system

Service and system configuration – the functions in the program can be selected according to the operator's requirements. Moreover, the default values used for pre-processing can be changed to suit each product.

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Fully automatic, integrated, complete machining

THE companies RSA cutting systems GmbH and sema Systemtechnik GmbH & Co KG have developed and brought into operation an integrated high performance machining centre for sawing, de-burring, punching, doming, flattening and unloading of tubes made of steel and square and rectangular tubes for PERI GmbH, a major manufacturer in the areas of scaffolding technology and formwork.

The challenge was to be able to produce individual scaffolding parts as well as shuttering props with the sawing and machining centre faster than before. There were previously individual processing stations for each process, with set-up times of up to 30 minutes. The aim of the new line was to connect all processes in one system and to reduce the changeover time to less than five minutes, which is now being successfully implemented in daily operations at PERI.

Project manager Günter Reif confirmed, "Our ambitious demands for very short cycle and set-up time are already fully met. For this reason we are able to handle extremely economical both large series and fast and individual parts, that are less frequently used and required in lower quantities."

Sawing, de-burring, punching, doming, flattening and unloading in one machine

Photo credit: RSA/sema

Double-side punching of up to eight holes simultaneously

Photo credit: RSA/sema

The modular and therefore adaptable and extensible sawing machining centre has an RSA-developed, standardised and user-friendly operating concept that allows programming of all stations, including punching, doming and flattening unit from sema, via a single control system. In general, the machining centre is characterised by an efficient chaining of different processes in a single system with short processing times. For example, the cycle time including all single processes like rod feeding from the magazine, sawing, de-burring and double-side punching of up to eight holes for a steel tube 48.3 x 3.25mm is only six seconds. Alternatively, in the same low cycle time a tube of 38 x 3.2mm can be punched and domed from one side.

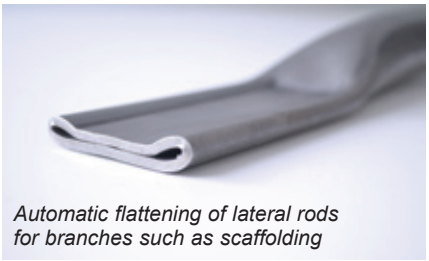
This is not achieved by high-priced special tools, but by a fully optimised overall process that allows parallel processing steps. For instance, the RSA saw uses standard HSS saw blades that can be reground up to 15 times, and the punching units use standard tools.

A key component of the new system is the single-cut high-performance saw Rasacut SC from RSA, supplemented by the fully automatic de-burring system Rasaplan, a custom-built punching and doming unit from sema, and RSA's Rasaport unloading unit.

The punching and doming unit can optionally punch each tube on one or both sides at different tube positions with up to four clearance holes and can deform the end of the tube. The punching of blind holes is also possible. The modern programming and control system allows different hole patterns.

RSA produced a higher-level control for the special system, with a user-friendly operating concept that includes all plant modules. Another feature of the sawing and machining centre is that round, square and rectangular tubes that should not be punched are guided through the punching unit without a reduced output. For this purpose, belt transports are used in the area of the punching unit.

The modular overall concept of the sawing and machining centre also allows the integration of further modules, eg for measuring, washing, drying and marking. The sawing and machining centre can be fully networked with EDP/BDE systems to manage, for example, customer products, to report plant conditions, to remind maintenance, to request raw materials or to report the finished material development. The single-cut Rasacut SC saw covers a wide tube diameter spectrum with high output and minimal set-up times. Changes in length and blade change can be carried out in less than one minute, with format changes in less than five minutes. The stopper and saw blade are positioned fully automatically.



Automatic flattening of lateral rods for branches such as scaffolding

Photo credit: RSA/sema

Punching and doming of tubes

Photo credit: RSA/sema

The Rasaplan fully automatic brush de-burring system for simultaneous inside and outside de-burring is also designed for a high output. When changing a diameter or length section, set-up time is omitted because the necessary settings are made automatically. When developing the sema punching and doming unit, the focus was also on the shortest possible cycle times. To achieve flexibility of the tube length with minimum set-up time, a tool side can be driven and positioned via a servo drive.

RSA cutting systems GmbH – Germany
Email: rsa.d@rsa.de
Website: www.rsa.de

sema systemtechnik GmbH & Co KG – Germany
Email: info@sema-systemtechnik.de
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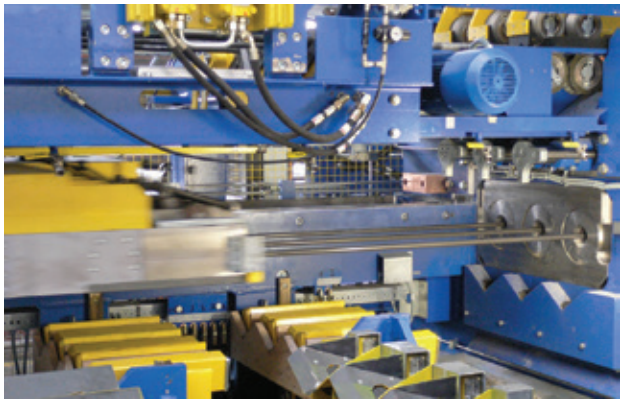

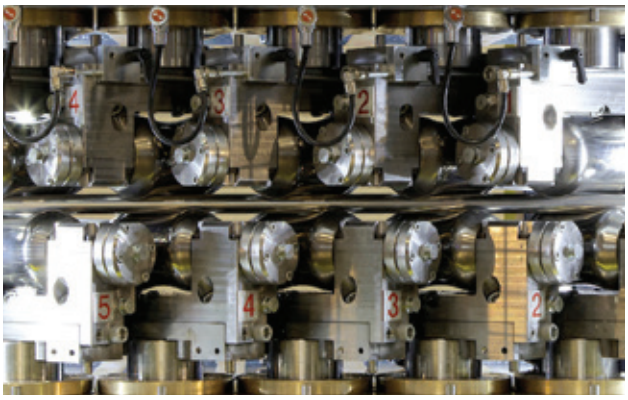

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Fast, flexible production of coupling stations for pipe conveyor systems

HS-UMFORMTECHNIK produces coupling stations at its location in Grünsfeld-Paimar, Germany. The stations are used to supply injection moulding machines with plastic granules in centralised pneumatic pipe conveyor systems.

From the silo or dryer, the granules are directed to the relevant production lines via the flexibly extensible multi-branch devices.

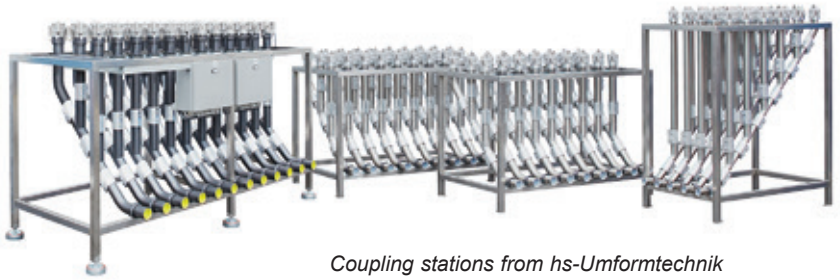
The distributor elements consist of branch pipes, pipe bends and pipe elements. These are connected to DVK-6 pipe couplings so that they are pressure- and vacuum-proof, and are fastened to and exactly aligned with the robust stainless steel frame construction using pipe clamps.

With conventional stainless steel branch pipes and bends, granules with a high glass fibre content can quickly cause wear and tear. The flexible design allows the distributor elements to be upgraded with highly wear-resistant components. For such applications, individual elements such as stainless steel bends, branch pipes and pieces of piping made of special glass or HVA non-rust stainless steel, specially developed by hs-Umformtechnik, can be installed.

The latter is claimed to provide 20 times the service life. The flexible design also makes the subsequent replacement of standard parts easier.

The coupling stations are delivered fully assembled, and material distributors by hs-Umformtechnik are ready for use immediately on delivery.

With an in-house CAD department, hs-Umformtechnik can offer not only coupling stations using the modular system, but also individual solutions for all applications, pipe dimensions and space requirements.



Coupling stations from hs-Umformtechnik

hs-Umformtechnik GmbH – Germany
Email: kontakt@hs-umformtechnik.de
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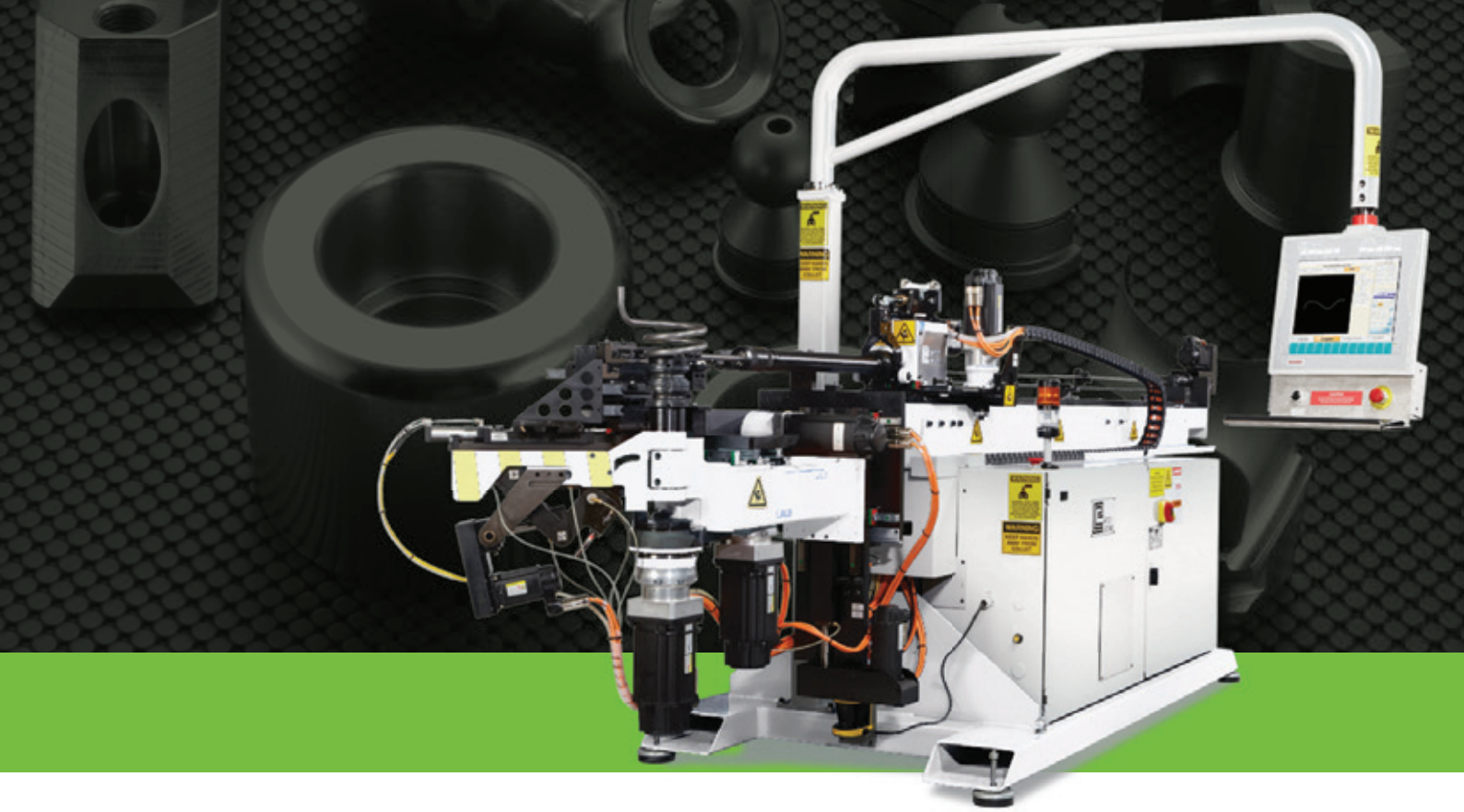

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Extending equipment performance with 360° service from Alfa Laval

ALFA Laval is a provider of specialised products and engineering solutions based particularly on the key technologies of heat transfer, separation and fluid handling.

The company's genuine spare parts are designed and manufactured for durability, reliability, productivity, less environmental impact and long life. Fast, easy access to a broad range of long-lasting high-quality parts can enable users to boost productivity and maximise uptime.

Alfa Laval and its authorised service partners aim to ensure maximum output of Alfa Laval hygienic equipment throughout its life cycle. Working with a committed network of global service partners secures equipment uptime and optimisation, plus the availability of parts and expertise.

The genuine spare parts are perfectly matched to the equipment and carefully manufactured to ensure reliable long-term performance.

The experts who service the equipment have the skills and experience to minimise service time, and the knowledge to spot problems before they occur.

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Alfa Laval also has a specialist logistics team whose sole focus is getting the right parts where you need them, in the right number and in as little time as possible.

Services and solutions are available to help adapt equipment, whether to new media and capacities or to changing regulations and business drivers. The company strives to make new technology available retroactively, so that existing equipment can benefit from the latest R&D.

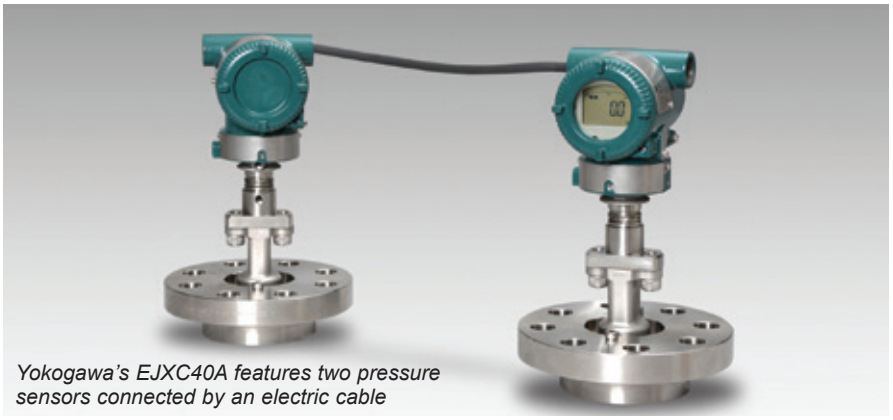
Alfa Laval – Sweden
Email: info@alfalaval.com
Website: www.alfalaval.com

Differential pressure transmitter

YOKOGAWA Electric Corporation has announced the release for sale in Europe of the EJXC40A digital remote sensor, a newly developed DPharp EJX® series differential pressure transmitter. Equipped with two pressure sensors, connected with an electric cable, the EJXC40A offers performance in the measurement of liquid levels in large tanks and large differential pressure with high-pressure fluids. The new addition to the DPharp EJX series will meet a wide range of customer needs.

Differential pressure/pressure transmitters are used in the oil, petrochemical and chemical industries in applications such as oil and gas wells. By measuring the difference in pressure at two points in a tank or pipe, the transmitters can calculate the level, flow rate and density of liquids, gases and steam. In applications where a tank liquid or gas or a pipe fluid cannot be introduced into the pressure-receiving unit (diaphragm) of a transmitter, diaphragm-sealed differential pressure transmitters are used.

A transmitter of this type is connected to two separate pressure-receiving units by a capillary tube that is filled with silicone oil or some other fluid. Although such transmitters are capable of precisely measuring high-pressure fluids with a high resolution, they are not suitable for use with large tanks because of limitations in the allowable length of the capillary tubes. In addition, they are not ideal for fine differential pressure measurement because the fluids in the capillary tubes are susceptible to changes in the ambient temperature.



Yokogawa's EJXC40A features two pressure sensors connected by an electric cable

The EJXC40A consists of two separate pressure sensors that are connected to each other by an electric cable. Based on the difference in pressures measured by each sensor, the EJXC40A determines the liquid level, flow rate and pressure of liquids, gases and steam.

The electric cable connecting the two pressure sensors can be up to 45m in length, enabling the measurement of liquid levels with very large tanks and tall distillation columns.

Since the two pressure sensors are connected only by an electric cable, their measurements are not influenced by changes in the ambient temperature. There is no need to correct for changes in temperature when performing fine differential pressure measurements with gas tanks and other applications. This ensures stable measurements.

The two pressure sensors can be set to measure different pressure ranges, allowing the EJXC40A digital remote sensor to measure high differential pressures of up to 70 MPa – something that is difficult to achieve with a single-sensor unit.

Yokogawa Europe BV – Netherlands
Email: info@nl.yokogawa.com
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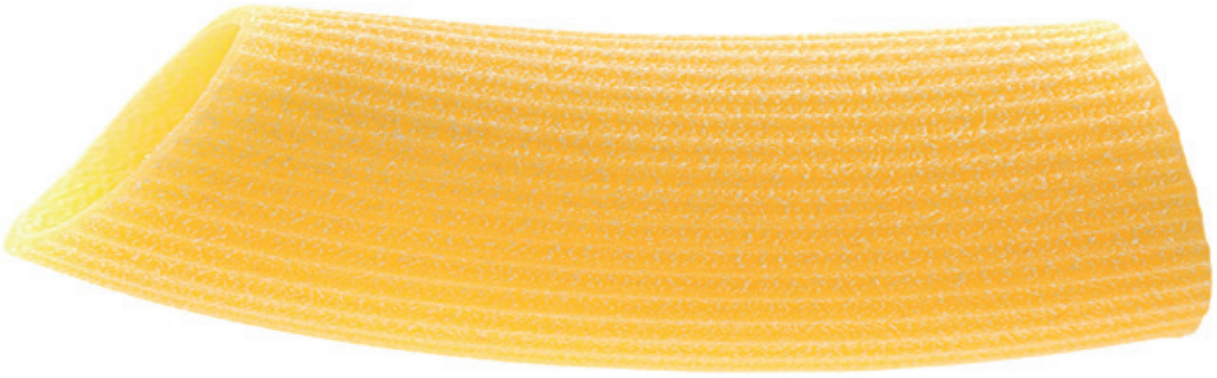

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Borescopes add speed and efficiency to tube and pipe inspection

MANUFACTURERS of tubes and pipes are increasingly utilising borescopes in their visual inspection processes, according to Dr Douglas S Kindred, president and chief scientist of Gradient Lens Corporation, manufacturer of Hawkeye® precision borescopes. “Fast, reliable, cost-effective visual inspection inside even long, narrow or bent tubes and pipes is easy using a Hawkeye,” commented Dr Kindred.

Gradient Lens manufactures more than 80 models of patented Hawkeye Rigid, Flexible and Video Borescopes. With diameters ranging from 0.5 to 8mm, and lengths from 2" to 20ft, Hawkeyes are suitable for internal inspection of seam welds, orbital welds, and internal surface finish.

Made in the USA, Gradient Lens’s patented endoGRINS® gradient-index lens technology is built into its line of Hawkeye Rigid borescopes.

The latest borescopes display high-quality inspection images on portable or desktop video monitors, and laptop or desktop computers. The images can also be saved, documented and emailed. The newest addition to the Hawkeye line – the Hawkeye V2 Video Borescope – represents the next generation of fully portable, articulating video borescopes manufactured by Gradient Lens.

For more than 20 years, Gradient Lens has designed, engineered and manufactured precision optics and optical instruments. In addition to its Hawkeye borescopes and accessories, the company offers Hawkeye and Luxxor® Light Sources, which work seamlessly with Hawkeye borescopes.

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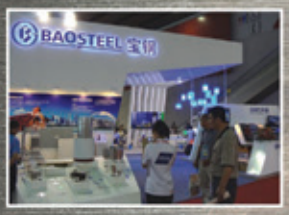

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New innovations in TracStar range

MCELROY has launched a new series in its TracStar line. The TracStar Series 2 for medium-diameter pipe now shares a common vehicle that is interchangeable with the 28, 250, 412 and 618 fusion machines for 2" IPS to 18" OD thermoplastic pipe.

The cowling was redesigned to provide better airflow and heat dissipation, and there is also easier access to the engine when maintenance is required.

An updated electrical system increases the circuit protection, and a standard battery disconnect is now incorporated for easy lockout.

"The TracStar has been depended on for years because it manoeuvres so easily on any job site with its self-contained, self-propelled and rugged all-terrain system," said McElroy director of product development Jason Lawrence.

"Part of its success is the fact that we continue to listen to our customers and incorporate many machine advances based on their experiences."

The TracStars are powered by a diesel engine and feature a patented centreline guidance system for equal distribution of force around the joint.

TracStar 618

The carriage can be converted from four to three jaws for a more compact unit and is easily removable for in-ditch fusion.

An on-board generator powers the hydraulics and heater, and dual hydraulic pipe lifts aid in transferring pipe.

McElroy – USA
Fax: +1 918 831 9285
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Website: www.mcelroy.com

McElroy TracStar 28 Series 2

Hydraulic OD weld-seam chopper for increased operator protection

OD bead scarfing is essential in welded steel tube production for meeting high standard norms, according to Alpha Metall, Germany.

The well-known winding technology for scarfed OD bead does not comply with most factories' safety rules, because there has not been an adequate solution for this issue.

An easier solution, provided by Alpha Metall, is a compact combination of proper OD bead scarfing and immediately making small chips of the OD bead.

The hydraulic-driven OD chopper is available for tube OD up to 24".

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Twin screw extruder for masterbatch production

Photo credit: Coperion, Stuttgart, Germany

The STS Mc11 enhancements improve operating reliability and make working at the machine easier

COPERION GmbH has introduced the STS Mc11 extruder, designed for masterbatch production. The twin screw extruder features a specific torque of 11.3Nm/cm^3 and has a series of improvements that include a new manifold with coaxial solenoid valves, improved heat covers, quick-release clamps for simple replacement of the feed hopper, and the CSpro basic control system.

The company presented an STS Mc11 with a screw diameter of 35mm at its stand at the K 2016 trade fair. The model on display featured a die head specifically developed for masterbatch applications, and was equipped with a volumetric twin screw feeder from Coperion K-Tron.

Coperion has equipped the STS Mc11 with a new manifold with coaxial solenoid valves. The heat covers have been revised in a way that enables easy access to the processing section and easy cleaning. To prevent vibrations during operation, the STS Mc11 series has been equipped with a torsion-resistant base frame that supports smooth operation and increased reliability.

Colour masterbatch processing makes great demands on the compounding process. The pigment and additive parts must be mixed into the base polymer 100 per cent homogeneously to yield optimal product quality. Because of their mixing properties, an operating mode that conserves the product, and easy-clean properties, the co-rotating twin screw extruders from Coperion are claimed to be particularly suitable for this compounding task.

The user-friendly CSpro basic control system has been used with Coperion ZSK high-performance extruders since 2010.

In order to feed the pigments simply and precisely, the STS 35 Mc11 has been equipped with a T35 volumetric twin screw feeder from Coperion K-Tron. It yields feeding rates up to 2,500dm³/h, which are suitable for powder and materials that are sticky or difficult to feed. The feeder is mounted on a turntable above the gearbox for simple, flexible handling, easy accessibility and quick cleaning.

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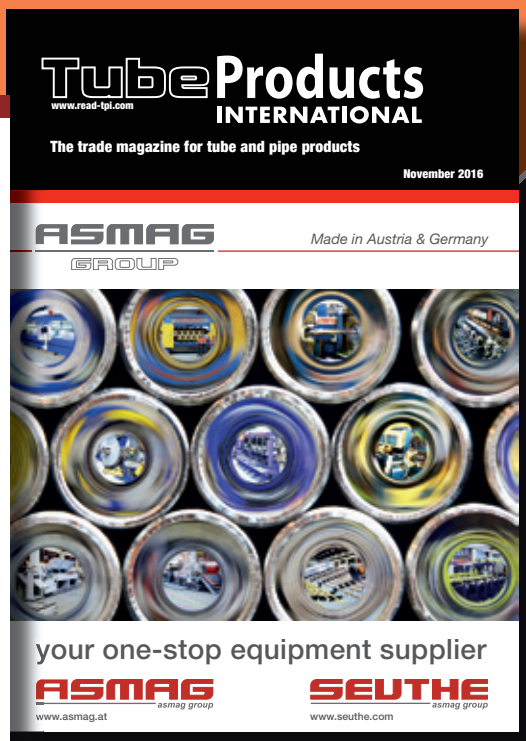

LEADING MAGAZINES

for the tube and pipe industries

Integrated machinery for brake line and fuel line production

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. The single- and double-axis machines are said to be fast, accurate and reliable. However, the cut-offs are only a portion of what Haven provides to this industry. It also offers complete turnkey integrated lines that include uncoilers, loop accumulators, tube straighteners, fallout conveyance systems and exit accumulation tables.

Uncoiler and loop accumulator

Working together, an uncoiler and 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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Servo-driven circular cold saw

BEHRINGER Saws, Inc, a manufacturer of bandsaw, circular and plate sawing solutions, has added the VA-L 500 to its line of high performance circular cold saws. Behringer Eisele GmbH designed the VA-L 500 sawing system specifically for production cutting of aluminium and non-ferrous materials.

With a frequency-controlled main drive system and adjustable cutting speeds, the VA-L 500 can efficiently saw the full range of aluminium alloys and other non-ferrous materials in solids, thin-walled pipe and profiles.

The VA-L 500 saw comes as standard with a 32 HP, frequency-controlled drive motor with 800-3,400rpm speed range, and a servo-driven downfeed with an adjustable rate from 0.39" to 19.6"/sec, to ensure fast cut times. The fully automatic circular cold saw has a cutting range of 152mm (6") for round materials or 152 x 152mm (6" x 6") for square materials at 90° using a carbide-tipped circular saw blade with a diameter of 500mm (19.6").

Behringer's VA-L 500 sawing system

"Our VA-L series features a heavy-duty design, state-of-the-art drive technology used in the feed axis and main drive system, and an extremely rigid, ultra-precise saw spindle bearing," commented Joe Suydam, inside sales and marketing manager at Behringer Saws. "The result is an optimised, low-vibration cutting process that provides maximum cutting output and excellent surface finish quality in both solid materials as well as in pipe and profiles with sophisticated cross-sectional geometry."

An automatic blade/material separation feature guarantees a free return of the saw blade, reducing blade damage and resulting in high-quality material finishes.

An NC-controlled gripper feed unit, driven by a servomotor, ball screw spindle and encoder with a single stroke capacity of 39.3", ensures quick and precise movement of material.

A lift-and-shift device for material feed – a standard feature of the VA-L 500 saw – ensures the material is lifted slightly over the material support table, enabling the material to be 'freely' fed without touching the material table and clamping jaws, and eliminating damage to the surface of the material.

To reduce build-up of chips and scratching of material, a blowing device rapidly removes chips from the clamping area, providing a clean material clamping surface area and unobstructed material flow for increased service life. Also standard on the VA-L 500 is a material disposal/discharge unit featuring a support plate and a sorting chute that moves trim/remnants and parts into two separate areas.

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Automatic cold saw pipe/bar cutting machine

JET Machines, India, has been manufacturing cold saw pipe/bar cutting machines for ten years. The company's JE-485 AT-S automatic cold saw pipe/bar cutting machine features auto feed (bunch cutting), auto clamping, auto cut piece ejecting, PLC and servo control. It is programmable up to five different lengths, with length accuracy within ±0.1mm. The clamping source and cutting feeding source are both hydraulic.

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

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

Jet Machines – India
Website: www.jetmachines.in

Cutting units

COMMERCIALLY available standard cutting machines may not be able to entirely cope with increased demands and special requirements within finishing applications. Bültmann cutting equipment for finishing applications is individually tailored to customer requirements. By using standard cutting modules and handling equipment, the lines and machines are customised and individual solutions are created.

For the sawing technology Bültmann will use its own products or proven components from notable suppliers, and combine them with Bültmann handling equipment. Sawing machines available from Bültmann include hot saws (stationary and flying); layer saws (stationary and flying); multi-head saws for fixed lengths; and combined circular cold saws/abrasive cutting units for difficult-to-machine materials.

Bültmann GmbH – Germany
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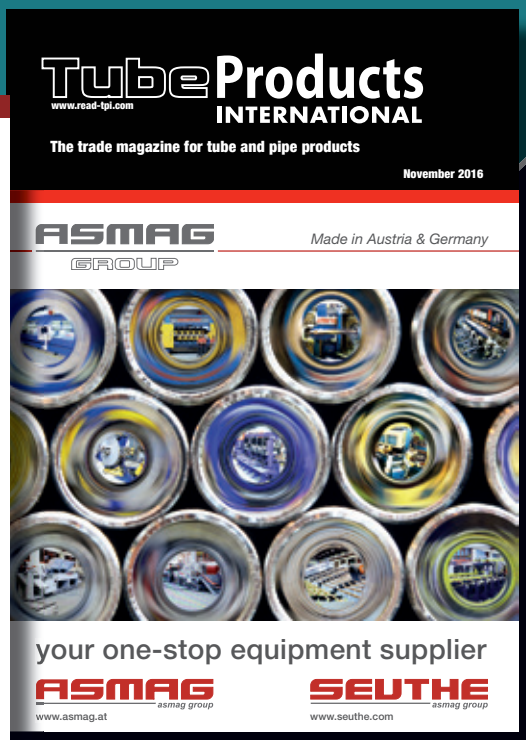

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GLOBAL MARKETPLACE

The new US administration

The election of President Donald Trump stirs more uncertainty in an area with little tolerance for it: global trade

"Donald Trump, the newly elected leader of the world's largest trading economy, has vowed to upend global trade."

On the day after the US presidential election, William Mauldin (in Washington) and John Lyons (in Hong Kong) of *Dow Jones Business News* came to grips with one of the few issues on which it was possible to assign firm views to the president-elect: trade policy. One of the largest business and financial news companies in the world, Dow Jones is well placed to canvass expert opinion. Its early sampling was not reassuring.

Mr Trump's victory may begin an era of US combativeness with trade partners such as China and Mexico, which he says benefit in a global system that has cost American jobs. If implemented, Messrs Mauldin and Lyons warned, Mr Trump's campaign promises could spark trade wars, drive up the price of imports to the US, and rattle a global economy that has relied on the expansion of international trade to drive growth.

"First and foremost the election result implies more uncertainty, on policies, and politics, and therefore on the global economy," said Louis Kuijs, a former International Monetary Fund official who studies Asia as senior economist at Oxford Economics in Hong Kong. ("Donald Trump Win to Upend Trade Policy," 9 November)

While it is far from certain that Mr Trump will follow through on his threats to go after major US trading partners, the Dow Jones reporters noted that American presidents have a large measure of authority over trade policy, even without congressional approval. In light of this, they offered a few considerations with relevance for the period just ahead. Here, much abridged and lightly edited, are some highlights:

› US officials could act quickly on allegations of dumping of goods such as steel by Chinese companies by introducing tariffs. Declaring China a currency manipulator could also allow the US to introduce anti-subsidy tariffs on Chinese goods under current US law. China, meantime, would likely consider some kind of retaliatory measures. "It is a guaranteed trade war" with China, said Gary Hufbauer, senior trade expert at the Peterson Institute for International Economics, which advocates freer trade. Mr Hufbauer said he expected Mr Trump to signal he is mulling ending the North American Free Trade Agreement (NAFTA), the framework for Canadian/US/Mexican trade for more than two decades, within days of taking office.

› Aides to Mr Trump have played down the likelihood of a damaging trade war, saying that the 70-year-old reality TV star and real-estate tycoon's negotiating ability, plus the threat of tariffs, will probably be enough to get big trading partners including China, Japan and Mexico to end alleged subsidies and lower barriers to American goods. But economists and trade lawyers say that Mr Trump could, if he chose, use emergency powers delegated to the president by Congress to slap tariffs on a top trading partner.

Risk of US recession, job losses

› Proponents of freer trade expressed concern that such a move could hurt US profits, slow the economy by reducing markets for US exports, and make imports more costly. Economists said, further, that economic uncertainty might cause banks to restrict lending.

According to a study by the non-partisan Peterson Institute for International Economics (Washington, DC), if large tariffs are imposed on China and Mexico, and those countries retaliate in kind, the US could go into a recession and lose five million jobs.

"We hope President Trump is more nuanced than candidate Trump," said Jake Parker, vice-president of China operations of the US-China Business Council. "Rather than build protectionist walls, we should boost American exports."

› Mr Trump has said his policies will bring jobs back to the US, a message with strong resonance among voters who believe that globalisation has left much of the country behind. But companies ranging from Ford Motor Co to the Carrier Corp unit of United Technologies Corp could suffer if Mr Trump follows through on a threat to tax products of theirs imported from Mexico. On the campaign trail, Mr Trump said he would target companies "offshoring" their production.

› *Dow Jones Newswires* pointed out that the rewriting of the rules of global trade by the Trump administration could have enormous implications for the manufacturing economies of the developing world that have benefited from expansion of global trade. No country has gained more than China, now the world's second-largest economy, and even small tariff hikes could have a big impact. According to Daiwa Securities in Hong Kong, a 15 per cent tariff on Chinese goods could shave a full percentage point off China's economy.

"Any slowdown by China would reverberate through the economies of Asia that now have China, not the US as their chief trade partners," wrote Mr Mauldin and Mr Lyons. "That includes US allies such as Korea, Japan, and Taiwan."

› While the prospective changes leave much of the Asia region on tenterhooks, Junichi Sugawara, senior

research officer at Mizuho Research Institute in Japan, said, “It still remains to be seen how much of [Mr Trump’s] remarks would be made into actual policies.” One item, at least, seems a sure thing. Mr Trump’s win almost certainly seals the fate of President Barack Obama’s 12-nation trade agreement, the Trans-Pacific Partnership, or TPP. As a candidate for the highest office in the US, Mr Trump excoriated the TPP as the brainchild of special interests intent on “raping” his country.

A New Delhi-based observer lays out a plus-and-minus schema of India’s relationship with a reconfigured Washington

From the campaign trail, presidential candidate Donald Trump railed against outsourcing and pledged to remedy trade imbalances of the kind that India currently runs with the United States. With Mr Trump set for the Oval Office, the *Economic Times* (Mumbai) considered how India should “open up to an American president who mimicked an Indian call center worker in one of his campaign speeches”.

First noting that Indo-US relations have remained broadly steady throughout the past three presidential administrations, both Republican and Democratic, New Delhi-based reporter Satyam Sharma tackled the question head-on. (“Here’s How Donald Trump’s Win Will Impact India,” 9 November)

Mr Sharma’s first category, “What India Stands to Lose”, leads off with Mr Trump’s avowedly “America first” mind-set on matters of international trade.

› The new US president plans to review and perhaps renegotiate all trade deals, including US treaties with India, with all the attendant uncertainty as to outcome.

› The H-1B is a non-immigrant US visa programme which, under the Immigration and Nationality Act, authorises US employers to temporarily employ foreign workers in speciality occupations. Mr Trump has termed the H1B visa programme unfair to American workers and stated his purpose of scrapping it. If he succeeds, Indian information technology stocks and IT companies like TCS and Infosys are likely first victims of the new policy.

› Mr Trump is on record as favouring a reduction of the US corporate tax rate from 35 per cent to 15 per cent. Implementation could result in the withdrawal of companies like Ford, General Motors and Microsoft – with their deep Indian roots – back to the US. The exodus of these American firms would be a setback for Prime Minister Narendra Modi’s “Make in India” initiative. As to “What India May Gain” in a Trump administration, Mr Sharma noted these indications:

› Although Mr Trump favours stricter immigration rules, he also has said he wants to woo Indian entrepreneurs and students to the US.

› To Mr Sharma, ruptures in Sino-US relations could “make for an advantage to India.” Candidate Trump roundly criticised China, describing it as a top adversary of the US. He said he would label China a currency manipulator and impose heavy tariffs if it did not agree to revisit trade agreements.

› Mr Trump has labelled Pakistan semi-stable and a safe haven for terrorists. This might presage an extension of President Barack Obama’s “pivot to Asia” policy, which sees India as a counterbalance to China. A hard American stance on terrorism could also result in stronger Indo-US defence and strategic ties.

› Finally, closer defence ties might provide a boost to Indo-US business relations.

Solutions

A beer pipeline – the world’s first – carries ‘the lifeblood of Belgium’ under the streets of Bruges

“Halve Maan Brewery lies in the center of Bruges, Belgium, but its bottling plant is on the city’s outskirts. Trucks became expensive and impractical, so the owners built an underground pipeline to carry the beer.”

Russell Goldman and Milan Schreuer of the *New York Times* went on to report that the two-mile pipeline, visible in one spot through a transparent manhole cover set into the cobblestoned street, carries beer from one of the oldest Belgian breweries still in operation. What they termed “the lifeblood of Belgium” flows at more than 1,000 gallons an hour – the equivalent of 12,000 bottles of beer. “As far as we know, this is the first time ever that such a thing has been done,” Xavier Vanneste, the director of De Halve Maan (“The Half Moon”) brewery, said in an interview with the *Times*. “It’s an old product, but an innovative project.”

The *Times* reporters noted that Bruges, a medieval city and a UNESCO World Heritage Site, is a congested warren of narrow streets. Mr Vanneste said that heavy tourist traffic – nearly two million visitors annually – had made the daily transport of the beer by tanker truck tedious and expensive, and threatened to force the 500-year-old brewery out of its home.

The idea for what European news media have dubbed "a pipe dream" was prompted by the city's existing infrastructure. "We [looked at] other life provisions that run through pipes," said Mr Vanneste. "Water pipes, electricity pipes, cable distribution, et cetera. So why wouldn't that be possible for beer?"

Why, indeed? The city of Bruges had not previously permitted a private company to run pipes beneath the streets, but the potential obstacle was overcome when Mayor Renaat Landuyt approved the brewery's plan.

Financing for the pipeline, estimated to cost $4.5 million, could also be said to be innovative: an Internet crowdsourcing campaign sought 500 donors, promising free beer for life in proportion to their response. A small investor might receive a six-pack every year on his or her birthday, while the maximum contributor scores a bottle of beer a day for a lifetime.

The last truck visited the brewery on 14 September. The next day, direct transport to the bottling room, on the edge of the city, commenced. Halve Maan plans to operate its beer pipeline 24 hours a day. ("A Two-Mile Beer Pipeline Carries Belgium's Lifeblood to Be Bottled," 16 September)

Automotive

As Volkswagen braces for buy-backs, Hyundai perceives hundreds of thousands of shoppers for new cars

On 25 October, a judge of the United States District Court in San Francisco gave final approval to an agreement calling for Volkswagen to spend $10bn to buy back or fix nearly half a million cars on American roads. Their diesel engines had been equipped with software enabling the vehicles to pass tests while emitting far more pollutants than allowed in real-world driving conditions. The cheating was disclosed in September 2015 by the US Environmental Protection Agency (EPA).

Volkswagen dealers were expected to begin buying back the cars in early November. Owners who chose the retrofit would have to wait at least several weeks beyond that, until the EPA approved a software solution workable for most of the vehicles. Some owners, however, whose cars required more than a software upgrade, faced a wait of a year or more.

In light of the drawn-out time frame, most affected owners were expected to sell their cars back to the German automaker rather than wait for modifications to bring their cars into compliance with emissions standards. As noted by Stephen Edelstein in *GreenCarReports,* this means that a good portion of the 475,000 owners covered by the settlement will be in the market for new cars. And, he wrote, "One clever set of auto marketers hopes to take advantage of that." ("Hyundai Targets VW Diesel Buyback Owners with Special Prices," 27 October)

Citing CarsDirect, the California-based online automotive research and car buying service, Mr Edelstein reported that, under the Hyundai Circle V-Plan, Korean automaker Hyundai was quietly rolling out special "Friends & Family Plus" pricing for owners of one of the qualifying Volkswagen or Audi 2.0-litre TDI models. The car must have been purchased or leased before 18 September 2015, when VW's emissions cheating was revealed by the EPA.

According to CarsDirect, the Hyundai offer included a flat discount plus incentives on selected models. As an example, on a 2017 Hyundai Elantra SE compact sedan, the Circle V-Plan offered a choice between $2,000 in cash or 0.9 per cent financing for 60 months plus $1,000 in cash. But the company apparently was hedging against a runaway success: the programme, which was not widely advertised, was set to run only through 3 January, with no notice (at least not initially) of a possible extension.

Mr Edelstein of *GreenCarReports* observed that, while Hyundai seemed to be the only automaker to target VW diesel owners specifically, it is not alone in viewing the diesel scandal as an opportunity. General Motors intends to pitch an upcoming diesel version of its Chevrolet Cruze compact as a substitute for Volkswagen TDI cars. "The previous-generation Cruze diesel was never a strong seller," Mr Edelstein wrote. "But, with Volkswagen not selling new TDI models in the US, the Chevy will have significantly less competition."

Airlines

The Civil Aviation Administration of China said on 11 October on its website that China and the United Kingdom had agreed to double the number of passenger flights per week between the two countries to 100, with no limit on cargo flights. The *Financial Times* (London) reported that restrictions were to be lifted on the Chinese destinations of the flights originating in Britain. According to Song Guoyou, a professor at Fudan University's Center for American Studies, the increased air traffic between the two countries will likely lead to more Chinese investment in the UK. Dr Song also told the Beijing-based *Global Times* that the agreement demonstrates an intention in the UK to deepen Sino-British economic and trade relations.

British Airways, already the European carrier with the most service to the US, is adding more American destinations. In the two weeks to mid-November, the carrier announced a Heathrow-New Orleans flight with a Boeing 787-8 ("Dreamliner") seating 214 passengers, as well as Gatwick service to Oakland, California, and Fort Lauderdale, Florida, both with Boeing 777-200s seating 275 passengers. The new runs mean that BA will be serving all three Bay Area airports as well as four cities in Florida including Miami, Orlando and Tampa.

Ted Reed, who covers the airline industry for *The Street*, noted (17 November) that British Airways has a transatlantic joint venture with American Air Lines (AAL), enabling the two carriers to coordinate scheduling and share revenue on the flights. But with its new services BA is branching out, flying into cities where American is not the dominant carrier.

Simon Brooks, senior vice president-sales for BA, said New Orleans was a natural choice for the company "for a whole

raft of compelling reasons," notably the availability of the Dreamliner. Besides convention opportunities, Mr Brooks told *The Street*, the New Orleans region of the Louisiana economy features sizable oil and gas and health care sectors. In his view, he said, "It is a city on the rise."

Oil and gas

Climate scientists estimate there could be as many as 750,000 methane-leaking abandoned wells in Pennsylvania alone

As reported by UK-based Hannah Osborne in the *International Business Times,* abandoned oil and gas wells across the US are a huge source of methane emissions currently not accounted for in America's greenhouse gas emissions inventories. Researchers have now found that these wells have been leaking methane for decades, with unplugged gas wells being the biggest emitters. Previous estimates placed the number of abandoned wells in the US at a minimum of three million, but the true total is now believed to be much higher. Ms Osborne noted that oil and gas development over a period of 150 years, poorly documented by individual states, precluded an accurate tally.

What is known is that methane – "the other important greenhouse gas" – has about 20 times the global warming effect as carbon dioxide. But until the extent of methane leakage from abandoned oil and gas wells is fairly well established, the threat is difficult to assess.

Making a start on gathering the pertinent data, scientists led by Mary Kang of Stanford University (Palo Alto, California) estimated the number of abandoned wells in Pennsylvania and worked out which ones produce the most methane. They clocked methane flow rates from 163 wells, noting the type of well – plugged or unplugged, gas or oil, and whether the site lay in coal country. Their results were published in *Proceedings of the National Academy of Sciences* (PNAS).

Methane emissions remained steady for the two years over which measurements were taken, indicating release into the atmosphere for decades. The highest emitters were found to be unplugged gas wells in non-coal areas, and plugged but vented gas wells in coal areas. In total, the team estimated that there are between 470,000 and 750,000 abandoned wells in Pennsylvania, producing 0.04 to 0.07 million metric tons of methane per year. The conclusion: "This represents 5 to 8 per cent of annual anthropogenic [nature-changing] methane emissions in Pennsylvania."

On *ibtimes.co.uk,* Ms Osborne posed the question what use President Donald Trump might make of this information. Stanford's Dr Kang was not optimistic. She said, "It appears that he will be against policies aimed at reducing greenhouse gas emissions. If [this] is no longer a priority, methane emissions from abandoned oil and gas wells will be less likely to be addressed." ("America's Abandoned Gas and Oil Wells Are Spewing Out Methane – and Donald Trump Is Unlikely to Help," 14 November)

More on leaking methane: if it is on federal lands, the US deems it a public resource that must be collected and monetised

America's 45th president will confront methane issues sooner rather than later. In mid-November, the US Department of the Interior (DOI) issued a regulation requiring the oil and gas industry to capture flared natural gas and "fugitive" emissions of methane from drilling operations on public and Native American lands – so-called Indian reservations. ("Obama's Government Just Released a New Oil and Gas Rule – and Trump's May Not Like It Much," 15 November)

As reported by Chris Mooney of the *Washington Post*, the DOI asserts that large volumes of gas are being lost through practices such as venting and flaring – burning off some of the gas as it arises from a well – as well as inadvertent leaks. When these fossil fuel resources lie in public lands, the department says, it is incumbent on the companies involved to take precautions not to lose them. The DOI and its Bureau of Land Management (BLM), which will implement the policy, said that such waste deprives taxpayers of royalty revenue derived from oil and gas operations. As detailed by Mr Mooney, the agency believes that the new rule – which calls for cutbacks in gas flaring; more frequent inspections for leaks; and, in some cases, installation of new equipment – will reduce methane emissions by 175,000 to 180,000 tons annually.

"Not only will we save more natural gas to power our nation," said department Secretary of the Interior Sally Jewell in a statement. "But we will modernise decades-old standards to keep pace with industry and to ensure a fair return to the American taxpayers for use of a valuable resource that belongs to all of us."

Issued in the final weeks of the Obama administration, the rule runs counter to the stated plans of Mr Obama's successor for deregulating much of the energy industry. "We will lift the restrictions on American energy, and allow this wealth to pour into our communities," trumpeted an ebullient Trump transition website. "It's all upside: more jobs, more revenues, more wealth, higher wages, and lower energy prices."

A vocal critic of the new regulation is the American Petroleum Institute (API), which responded to the earlier release of a draft version by charging that the BLM's "unnecessary proposed rules for venting and flaring" could stifle energy development on federal lands, with few benefits to show for it. The group, which represents the interests of the oil and gas industry, condemned the final rules as overkill, saying they ignore the industry's independent efforts to reduce greenhouse gas leaks. Erik Milito, the director of upstream and industry operations for the API, said in a statement, "The BLM's rush to regulate something already being regulated at the state and federal level is an example of poor government policy and a left hand not knowing what the right hand is doing."

As reported by the *Post*, Mr Milito said that new technologies and increased industry focus on the problem have led to lower overall methane emissions, even as the US leads the world in oil and natural gas production.

Dorothy Fabian, Features Editor (USA)

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Established in 2005, Istanbul BORU Fair is an influential industry trading platform that connects suppliers in the Middle East and North Africa with decision-makers from around the world who represent a wide range of industries.

The fair will feature an array of product zones to address ever-increasing industry demand in the region. The aim is to assist suppliers, distributors and exporters to reach their target customers as well as to cultivate new business relationships in a single location. The fair provides an excellent platform for both exhibitors and visitors to reach their target audience. Companies will have the opportunity to present their new products to the industry and connect with industry experts.

The BORU Tube Istanbul Fair is an important event for tube and pipe producers and machinery manufacturers and is held every two years. The tenth edition of the event will be held from 23 to 25 March 2017.

The show location in Istanbul, Turkey, offers an ideal central destination for visitors from the many neighbouring countries to conduct trade with Turkey, Western Europe and the Middle East.

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Welding machines & technology

When the hydraulic and fuel lines on a single jetliner can total 700 assemblies, the golden ideal of welding and of tube making is identical: a faster weld at no sacrifice in quality. Even orbital welding is continually fine-tuned to deliver its benefits at ever-higher speeds.

Tube makers have mastered welding set-ups for rotation, dwell and penetration parameters, different for each size of tubing. They know how to regulate a power supply for welding current, primary and background amperes, weld bead overlap, and for delay of rotation at the start of the weld and current downslope at the end. They share with welders a zeal amounting to passion for a clean cut-off operation with smooth surfaces. For as long as welding is the method by which tube and pipe are joined, the advances that lie ahead for the two already highly developed technologies will be made in tandem. In the meantime, this partnership of equals acknowledges a common obligation: to provide perfect leak-tight joints having uniform circumferential weld strength to the automotive, defence, aerospace, biomedical and machine tool industries of the world.

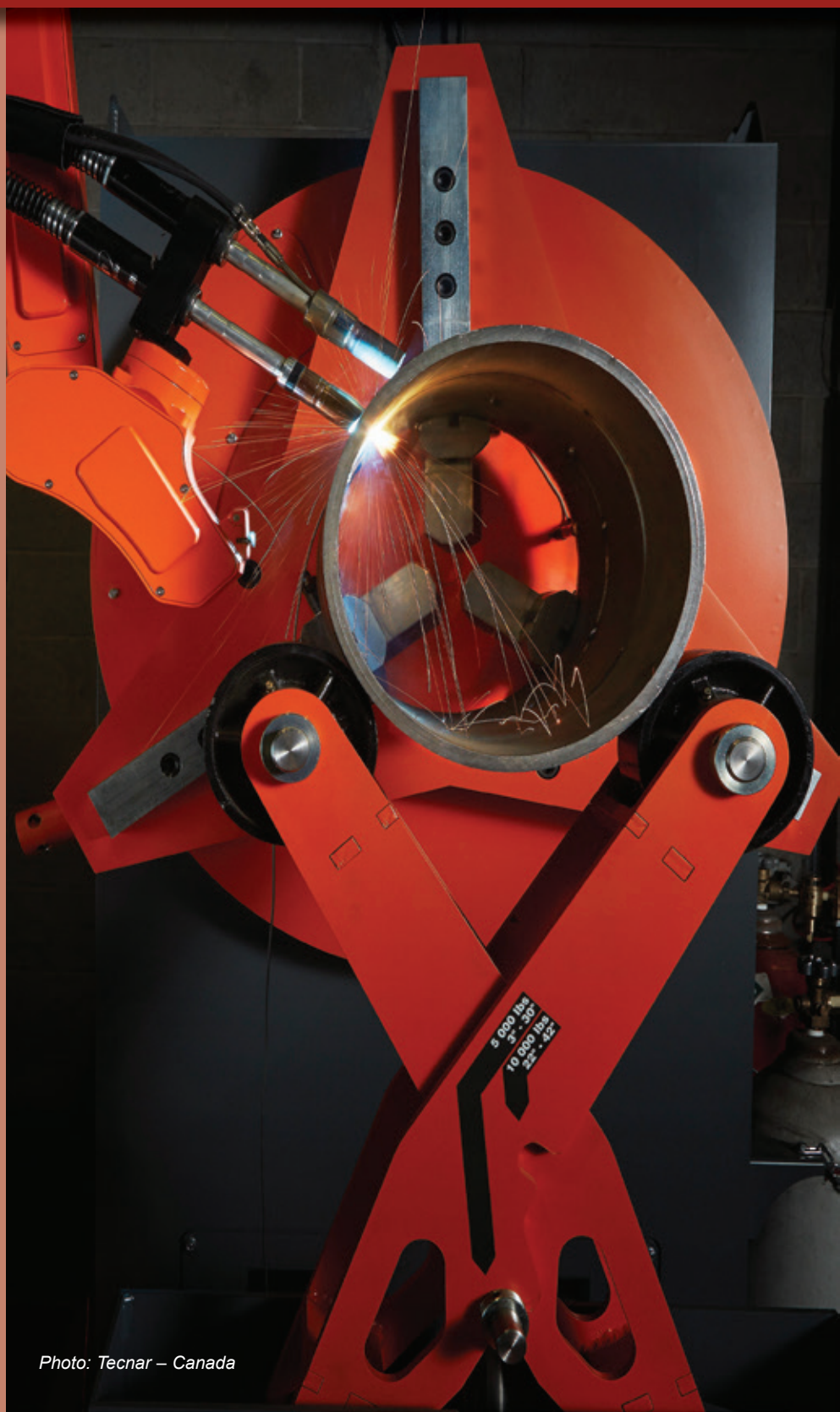


Photo: Tecnar – Canada

Training system improves welding techniques with hands-on, guided skills practice

REALWELD® Advanced Trainer gives students and prospective employees a live-arc, multi-sensory learning experience that merges actual welding with advanced motion tracking technology.

The system helps students master MIG, stick and flux-cored processes with immediate in-booth feedback and analysis. Realweld improves training results by enhancing student comprehension, reducing training time and increasing certification rates in both school and industry settings. It is suitable for use as a bridge to traditional welding training or as a screening tool to determine welding proficiency.

Users can practise multi-pass capability in a number of positions, including 1F, 2F, 3F, 4F, 1G, 2G and 3G, and lap, tee, groove and flat-plate joints. Standard 6" and optional 18" fixtures allow users to perform a number of multi-pass industry-standard welds. A motorised carriage makes it easy to move the table and arm for welding in flat, vertical or overhead positions.

The system features an 'arc off' mode that allows students to practise, troubleshoot and master welding techniques without burning an arc. This approach not only boosts learning and muscle memory but also helps reduce material costs, including welding plate, flux, electrode or wire and shielding gas.

As a user welds, with or without an arc, the system analyses and scores every attempted weld trial on five technique parameters, providing embedded, immediate and objective information on a 17" touchscreen display that students can access in the booth. The system also enables students to review instructional videos, technical documents and instructor hand-outs such as safety data sheets, all on-screen in the booth. The display responds to gloved hands, so users do not have to stop and remove gloves to get instant information.

Lincoln Electric's Realweld training system

Realweld's audio coaching feature provides users with guidance on weld speed, angles, aim, contact tip-to-work distance, arc length and weld position. These cues can be turned off at any time to allow students or prospective employees to demonstrate learned behaviour without a guide.

Instructors can review scoring and analysis to track progress and determine if students are developing bad habits. They also are able to adjust tolerances to lenient, moderate or stringent settings. The system's 'sweet spot' parameters associated with proper welding techniques using welding procedure specifications (WPS) can be set for each weld. Instructors can access the system on the Realweld unit itself or via their own computers using the Desktop Instructor feature.

Lincoln Electric – USA
Website: www.lincolnelectric.com

Pipe and profile company selects Thermatool welding systems

BAŞATLI Pipe & Profile, a manufacturing and industrial company from Turkey, has started the creation of its new tube and pipe production mill in Başiskele. Başatlı Boru will be using induction welding systems manufactured, delivered and installed by Thermatool.

Thermatool now has 275 of its solid state welders in Turkey, with this additional sale to Başatlı the start of another strong relationship in the country. The CFI and CFD range of Thermatool's induction welders were selected by the company with notable features including variable frequency and dual functionality (both induction and contact) built in. Thermatool sales manager Jon West said: "Variable frequency gives Başatlı Boru the ability to produce tube and pipe from several different materials, all on the same mill, wherever possible using existing weld rolls and the same basic mill set-up."

He added: "We also recommended and specified a CFD dual induction/contact welder, which provides two welding processes in one system with quick-change capability."

Murat Biriktir, production executive officer of Başatlı Boru, said: "In order to ensure our high production quality our preference was to use high-tech equipment in our new tube mill investment."

Başatlı Boru is a manufacturer of a wide range of structural pipe specifications such as heavy series mechanical tubes, heavy series square and rectangular tubes and industrial pipe shaped and circular hollow sections.

Başatlı Pipe & Profile – Turkey
Website: www.basatli.com.tr

Orbital TIG welding

FOR high quality orbital TIG welding it is important that the tungsten electrode is ground precisely or the weld will never be correct. Such precision requires experience and skill.

A tungsten grinder offers high quality welds, and Inelco Grinders have developed several machines based on this technology that uses tungsten electrodes.

With accurate grinding it is possible to weld longer; that means greater efficiency and at the same time the weld seams are higher quality.

The Ultima-Tig-Cut model serves a double function: precision grinding and cutting of tungsten electrodes. The electrodes can be cut down to just 8mm, thereby making it possible to make the exact electrode length needed for the orbital welding head and minimising waste of the expensive electrodes. Ultima-Tig-Cut is also an environmentally friendly wet grinder that collects toxic dust particles so they can be safely disposed of.

With an AutoGrind module on Ultima-Tig-Cut or Ultima-Tig the user is guaranteed the same precise grinding every time as AutoGrind takes care of it automatically, effectively and reliably. This results in a more effective work process and better welds. For workers, grinding with AutoGrind is also more ergonomic as it cuts out repetitive wrist and arm movements.

The electrodes are ground and centred with 100 per cent precision, so

it is easier to achieve top quality welds. Full adjustability ensures the proper angle every time. Waste of electrodes during grinding is minimised with each grinding job. Grinding is not needed as often when the electrode has been ground with an Inelco grinder, and the company's grinders can grind down to 8mm.

Inelco Grinders – Denmark
Website: www.inelco-grinders.com

Purging large diameter pipes for welding

WAITING for pipes to be purged ready for welding can take hours, depending on the diameter of the pipe being welded and the method chosen for purging.

Huntingdon Fusion Techniques (HFT) designs and manufactures a range of QuickPurge® inflatable pipe purging systems that reduce waiting times. The company was recently tasked with a special project in the USA, where pipes with 90° elbows, up to 54" Ø were required to be purged.

Georgia Gascoyne, CEO at HFT, said, "We manufactured QuickPurge systems with longer sleeves so that they could easily be pulled around the sharp bends in the pipework. The welders were previously spending half a day purging the pipe, which was costing a considerable amount in time and gas costs. With the help of QuickPurge the pipe was purged down to 100 ppm ready for welding in just 55 minutes. The dramatic savings in time and argon paid for the system in just one weld."

QuickPurge has an additional gas input line, which means extra purge gas can be introduced for applications such as this, achieving a faster purge down to the lowest oxygen levels, which is suitable for larger diameter pipes where quality welds are required.

The design of the QuickPurge system means that zero-colour welds can be achieved, and there will be no loss of corrosion resistance caused by oxidation.

Using IntaCal® combined with the integrated PurgeGate® device makes it possible to safely inflate the dams with argon gas, for purging the space between the dams where the weld joint is located.

HFT's QuickPurge systems

With PurgeGate, burst dams are prevented in the event of undue pressure increase or accidental flow increase of the purging gas.

All systems are manufactured as standard with a hose for connecting a Weld Purge Monitor®, which can read oxygen levels down to as low as 10 ppm, depending on the model.

Materials used in the manufacture of QuickPurge are resistant to the higher weld temperatures present, and they do not outgas, preventing weld contamination.

For pre-heated chrome steel and high strength stainless steel pipe joints, HFT designs and manufactures the HotPurge™ range for a higher and longer temperature exposure.

Huntingdon Fusion Techniques – UK
Email: hft@huntingdonfusion.com
Website: www.huntingdonfusion.com

Unified welding management software

THE unified WeldEye software decreases the time spent on documentation and gives those involved in welding processes an insight into the work being done.

WeldEye is developed by Weldindustry and Kemppi, and integrates two welding management software systems: Kemppi's ARC System 3 (KAS3) and Weldindustry's Weldeye. The software has wide coverage of different welding-related processes, and has applications across industries such as shipbuilding, oil and gas, automotive, construction, and machine manufacturing.

"Several industries are now facing severe cost challenges and are looking at how to simplify documentation," said Jarle Mortensen, chief operating officer at Weldindustry. "WeldEye is built for this exact purpose – to help everyone in the welding value chain document the work being carried out and to simplify end project documentation."

WeldEye provides real-time insight into the performance of welders and the progress of projects, as well as 100 per cent traceable compliance with welding procedures, regardless of which welding equipment is being used. This makes it easier to reduce costs, improve performance and conduct quality controls. It manages welding procedures and test results, and the reduction in manual work gives a claimed 70 per cent faster documentation process. At the end of a project, the time spent on creating documentation can be cut by weeks or months.

WeldEye is available as an online cloud service, accessible from computers or smartphones without the need for software installation, making it easy to enter information during the execution of a project. The welding operator can also get constant feedback from his or her activities.

In addition to giving full traceability, the software works as a quality controller and keeps track of compliance with international welding standards. The added transparency also means that defects can possibly be spotted earlier and can be fixed immediately.

"If a batch of filler is faulty, WeldEye knows exactly which welds are done with that filler batch," explained Tuomas Kivisaari, software product manager at Kemppi. "At the end of the day, this boosts your efficiency by reducing the need for repair work. More information allows project managers to make quicker and better decisions and simplifies the documentation process."

WeldEye is automatically updated with new standards, ensuring that work is always compliant with current demands and standards, including EN ISO 3834, EN ISO 9606, ASME IX, AWS, NORSOK and others.

The universal solution works with all welding equipment brands. It is available globally, is location independent and supports many different languages. WeldEye can also be easily integrated into existing IT solutions, such as HR and ERP systems.

Kemppi Oy – Finland
Email: info@kemppi.com
Website: www.kemppi.com

ESAB's Cutmaster series of handheld plasma cutters

ESAB Welding & Cutting Products Cutmaster® Series of portable air plasma cutting systems range in output from 20 to 120 amps and produce a recommended 'quality' cut on material from 6 to 40mm. ESAB Cutmaster plasma cutters are among the lightest and most compact in the industry, making them highly portable and easy to store.

The five models of the Cutmaster range

With ESAB Cutmaster products, the recommended cut capacity equals the system's true cut capacity. A recommended cut has a smooth cut face with little or no dross and requires little or no rework or grinding, all of which improve productivity and quality. ESAB Cutmaster products provide additional output when needed, offering a maximum cut thickness that ranges from 60 to 150 per cent greater than the recommended cut. As a result, they eliminate the concept of having to buy up, or purchase a machine larger than end-users actually need.

Four products in the ESAB Cutmaster Series (the 60, 80, 100 and 120) share common features. These include a tubular 'roll bar' that protects the front and rear of the power supply for durability, as well as making the unit easier to carry. A trigger latch feature prevents hand fatigue during longer cuts, as it allows the operator to release the trigger while the system keeps cutting. Colour-coded LEDs on the front panel indicate pressure status and setup errors. The Auto Pilot Restart feature instantly reignites the pilot arc while cutting expanded metals such as grates and chain link fences. Each unit comes standard with the 1Torch (6.1 or 15.2m cable options), but they also accept mechanised and automated torches. Primary power options are 50/60 Hz, 400V, 3-ph CE unit.

The ESAB Cutmaster 60 features a 60-amp output, and has a genuine cut of 20mm and severance cut of 32mm. It provides a 12mm cut at 635mm per minute, which is 25 per cent to more than 100 per cent faster than competitive models, and weighs just 19.5kg. This unit can also be used for medium duty gouging applications when fitted with the correct torch consumables.

The ESAB Cutmaster 80 features an 80-amp output, and has a genuine cut of 25mm and severance cut of 38mm. It also weighs just 19.5kg.

The ESAB Cutmaster 100 features a 100-amp output, and has a genuine cut of 35mm and severance cut of 45mm and weighs 28.1kg.

The ESAB Cutmaster 120 features a 120-amp output, and has a genuine cut of 40mm and severance cut of 55mm and weighs 28.1kg.

For primary power and location flexibility, the ESAB Cutmaster 40 enables users to switch from one-phase, 208 – 230VAC primary power to 115VAC primary. This unit produces a genuine cut on 12mm material, cuts a maximum thickness of 15mm material and weighs only 11.8kg.

ESAB Welding & Cutting Products is a recognised leader in the welding and cutting industry. From time-honoured processes in welding and cutting to revolutionary technologies in mechanised cutting and automation, ESAB's welding consumables, equipment and accessories bring solutions to customers around the globe.

ESAB – UK
Website: www.esab.co.uk

Longitudinal seam welders

Bode HSW seam welding positioner

BODE™ longitudinal seam welders are designed for welding longitudinal seams of cylinders, tubes, conical and rectangular work pieces, as well as flat sheets of plate.

The robust construction of the machines and patented design of the clamping finger operation ensures the correct alignment for the welding of thin-gauge material in stainless steel, mild steel, titanium, copper or aluminium. The variable speed travelling carriage, which traverses an accurately machined beam, ensures the torch precisely follows the welding seam. The Bode HSW range of positioners can produce uniformly strong welds using TIG (argon arc) with and without filler wire, MIG (metal inert gas) using argon, CO_2 or gas mixture, and submerged arc processes. An automatic welding function, via Siemens touchscreen PLC technology, allows the possibility of a simple one-button 'weld start' for the operator.

Machines are available in lengths from 500mm to 13.5m.

Bode Positioners Ltd – UK
Fax: +44 1995 643 211
Email: sales@bode.co.uk
Website: www.bode.co.uk

Updated pipe welding work cell

ROTOWELD pipe welding work cells have been used in the pipe spool prefabrication industry for more than 20 years. Specifically developed for industrial pipe pre-fabrication, small pressure vessel manufacturing or other similar 1G welding, Rotoweld integrates machine vision, adaptive control and robotics technology in a dedicated package that produces high quality GMAW full penetration 1G girth welds, at five times the rate of manual SMAW.

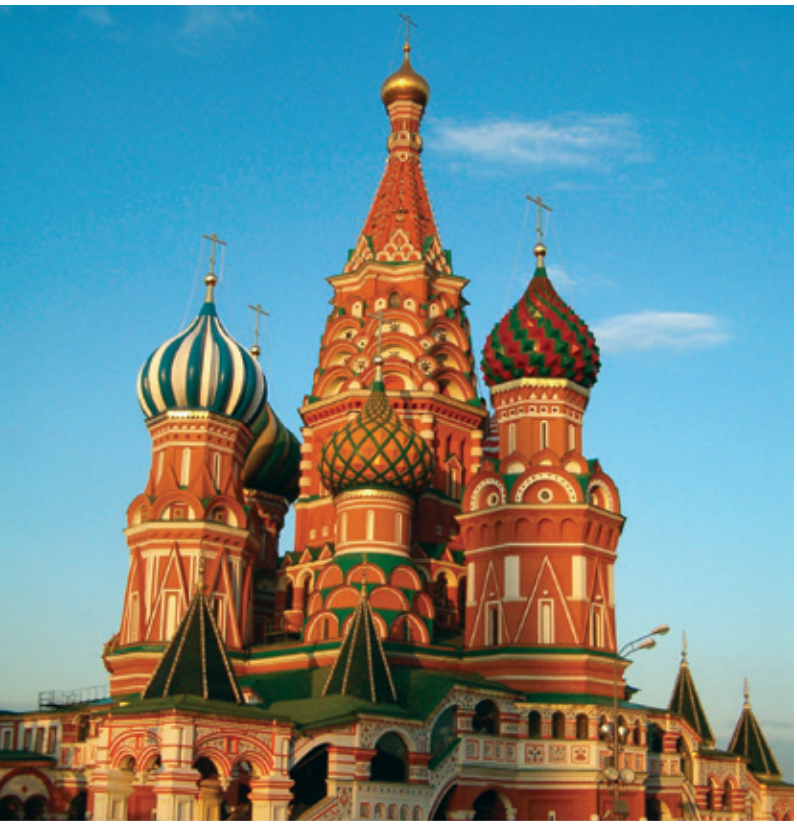
The new Rotoweld 3.0 is the result of the re-engineering of all aspects of the machine, including mechanical design, servo-controls, computer and software, taking advantage of the latest technologies. The most visible change is the robotised manipulator, which provides increased flexibility for torch positioning in various machine configurations.

The core of the Rotoweld technology is its patented vision-based penetration control loop. It allows any operator, even without welding experience, to perform full penetration girth welds with just a few hours of training. Operating like the welder's eyes and hands, the control loop continuously analyses the image of the root weld pool. Image processing algorithms use the image to adjust welding parameters such as travel speed, wire feed rate, arc voltage or weaving width, constantly adapting the process to varying conditions (gap, alignment, root face and temperature).

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

Tecnar – Canada
Fax: +1 450 461 0808
Email: sales@tecnar.com
Website: www.tecnar.com

Tecnar's Rotoweld has been fully re-engineered



Tube Russia

International tube and pipe trade fair in Russia

5-8 June 2017

Despite a difficult economic environment over the past few years, the tube industry is now looking to the future with optimism thanks to the constantly improving investment climate in Russia.

Investment activities are up, the construction sector is picking up speed again, and consumption remains a strong pillar of this upswing. The trade fair is one of the most important trading and contact platforms in Russia and for the neighbouring states. The organisers are aware of the optimism prevailing in the industry and can now already see a positive trend in exhibitor registrations.

Messe Düsseldorf GmbH, Messe Düsseldorf Moscow OOO and its Russian partner Metal-Expo have secured official participations from Germany, Italy, Austria and China.

The trade fair is supported by the leading international industry associations AMAFOND – Italian Association for Foundry Machines and Products, ITA and VDMA – German Engineering Association, among others.

VENUE

ZAO EXPOCENTR, Exhibition Centre, Krasnaya Presnya,
Moscow, Russia
Email: centr@expocentr.ru
Website: www.expocentr.ru

ORGANISERS

Messe Düsseldorf GmbH
Tel: +49 211 4560 01
Fax: +49 211 4560 668
Website: www.messe-duesseldorf.de

OPENING TIMES

5 to 7 June: 7:10am – 6:00pm
8 June: 10:00am – 4:00pm

www.metallurgy-tube-russia.com

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中文综合

这一栏目专为我们的中文读者介绍国际管道行业的最新技术和行业新闻的综合信息。

先进的感应加热系统

INDUCOTHERM的Banyard品牌是全球领先的最先进感应加热系统设计者和制造商，这些加热系统用于在液压机挤出无缝钢管前对黑色和有色金属坯料进行预加热。

这些系统用于金属加工过程两大特定领域。一种是薄壁有色金属管道的挤出生产，如用于空调的铝制管状型材，另一种是用于石化和核应用领域的无缝合金钢管的重型挤出生产。

轻有色金属加热器配置为水平推进型。坯料被推进感应线圈加热到所需温度，以逐渐递减的线性温度梯度，然后再转移到挤压机。

近年来Banyard的一个重要发展是推出了零摩擦铝坯加热器。为铝制微型管道领域提供专业机械处理技术。

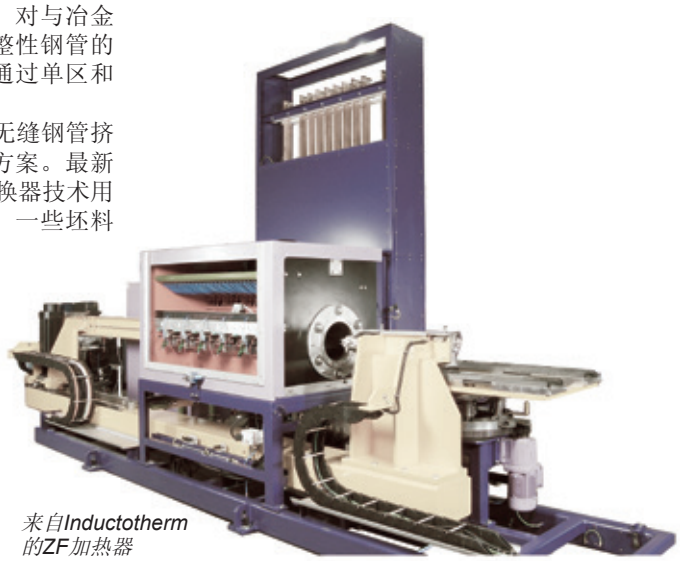
在微型铝管挤出前，坯料所有表面划痕或压痕（处理前/后）能够在成品外表面呈现。这些表面损伤在这种小直径微型管道上将放大出现。

这些加热器有最新的 Banyard LFi IGBT功率转换器技术。这一转换器技术能够呈现多区域线圈精确的低频率能量，为高品质挤出生产坯料提供可变能量和温度曲线。对于合金钢坯料的预热，可利用水平推进通过加热器，或者对于大型坯料，如1000公斤重的，将有重型升降系统将坯料送到垂直安装的感应线圈。

近年来，随着无缝钢管挤出生产对垂直钢坯加热系统需求的增加，对与冶金结构完全均匀同质的高度完整性钢管的需求也在增加。这一需求可通过单区和多区加热系统实现。

Banyard的VSI加热系统为无缝钢管挤出生产商提供了交钥匙解决方案。最新的Banyard LFi IGBT功率转换器技术用来为坯料提供多区线圈能量。一些坯料在挤出前经过膨胀过程，对多区线圈线性温度校正过程有益。

Inductotherm Group集团为几乎所有金属热处理应用设计和制造最先进的感应加热系统和产品。为Inductotherm能以成熟的技术为每种感应需要提供最高效、最可靠以及适用的产品，为客户带来竞争优势。



来自Inductotherm的ZF加热器

Inductotherm Heating & Welding – 英国
电子邮件: info@inductothermhw.co.uk
网址: www.inductothermhw.com

工具生产线减少了管端精加工作业

对于管道产品制造商以及用管道组件生产产品的制造商来说，Severance Tool公司开发了一系列管端精加工旋转工具，可根据应用需要进行去毛刺、成型或倒棱角加工。

这些工具设计用来在单个操作里完成管端内径和外径精加工，还有可调节的两件结构，可用来加工相同大小而不同壁厚的管道。

根据不同应用，还可能包括其他一些功能，如Chatterless™齿面几何形状加工技术，替换齿形切割角，可消除工和工件共振，用于光面精加工，以及Severance的独特的Grayhone™表面处理技术，能提供准备加工的切口，无需间断期。

这些工具中还包括一套完整的管道去毛刺工具，有高速钢和硬质合金材质。虽然这些工具能提供30°的内部倒角和45°的外部倒角，但主要用于轻型作业，可以同时切割内径和外径上的锐角。他们具有齿面形状加工以及剪切功能，能快速切割，防止切屑加载。

这些工具可以重新研磨很多次，用于长时间的服务，操作速度范围为50到200转每秒。外环或部件可调节，由螺丝固定，以提供各种外部边缘切割尺寸以及补偿给定管道直径范围内不同壁厚。管道去毛刺切割机标准尺寸用于外径1/8英寸（内径1/16英寸）到2 1/4英寸（内径为2英寸）的管道加工，有各种形状的柄。

管端倒角机提供和去毛刺切割机相同的剪切功能以及可调节外环，还有Chatterless™角尺寸加工技术用于重型切割，用来加工精确光滑的45°外径和30°内径倒角，用于需要和其他组件快速组装的应用领域。倒角机提供的尺寸用于外径3/16英寸到2 1/2英寸的管端加工。

管端成型切割机可同时加工内径和外径半径，加工成一个光滑的圆头，适用于管道需暴露在外的应用。这些高速钢或硬质合金工具提供的尺寸可用于外径1/8英寸到2 1/2英寸的管道加工；每种外径都有一系列的直径或计量尺寸补充，以适应各种最受欢迎的管道应用。

Severance还提供特定应用的设计和服务，包括定制尺寸，倒角角度以及成型特点等。还提供单切割（内径或外径）倒角工具，公司也提供各种样式和大小的工具用于管壁穿孔的去毛刺。

其他Severance工具包括3N1®组合埋头钻/钻头、Midget Mills®旋转锉和去毛刺机、内径和外径去毛刺以及倒角机、Micro-Reamers™、电极修整机、双管端埋头钻、Chatterless™埋头钻和可调节限位埋头钻、限位埋头切割机以及各种手动精整工具。

Severance Tool Industries, Inc – 美国
传真: +1 989 777 0602
电子邮件: info@severancetool.com
网址: www.severancetool.com

为系统操作者减负

来自Schuler的LoadMaster®装载系统可通过在机器间自动来回运输部件来提高车削和铣削中心生产力。

图片来源：Schuler

LoadMaster Assist让车削和铣削中心能够在晚班进行无人值守作业

新开发的LoadMaster Assist辅助机器人单元通过执行一些任务进一步提高了效率，比如在设备中夹住原材料部件或者对部件进行清理和去毛刺等，而这些工作之前必须由系统操作员来完成。这样使操作者可以专注于其他重要任务。

加工中心的自动化程度提高到了不仅能够进行晚班无人值守作业还能够例如在周末连续操作。机器能够连续几天作业，无需操作员介入。

Schuler自动部领导，董事总经理Stephan Mergner表示："LoadMaster Assist是对我们机床自动化解决方案的逻辑添加"。装载系统供应范围包括LoadMaster Compact紧凑模块化系统、LoadMaster Flex高货架系统、以及用于3至8吨高重量级别的LoadMaster Herkules。LoadMaster Tool链接到加工机器的工具库。

Schuler在9月德国斯图加特举行的AMB交易会上展出了LoadMaster Assist。

图片来源：Schuler

Schuler LoadMaster Compact、Flex和Herkules装载系统可以配备机器人单元

Schuler AG – 德国
传真: +49 7161 66233
网址: www.schulergroup.com

Adda Fer制造双平头机

ADDA Fer公司已将自己打造成为顶级的管道机械制造商，其产品包括从整套轧管生产线到精整线。获得API认证的机器比如平头机以及液压试验机已经成为Adda Fer的标准产品。公司的新目标是巩固生产力和保持最好的质量。

平头机通常是对管道的一端进行坡口加工，而且一次只加工一根管道。为了能够每次同时加工两根管道，Adda Fer改进了机器，采用两个平行的头同时加工两根管道。这样客户几乎有两倍的时间来加工管道坡口。这是非常重要的，当轧管机正在真正执行加工时完成每根管道的坡口加工瓶颈就是时间问题。

为了尽可能加工循环时间避免短管移动很长的距离，一对坡口加工头是固定的，一对坡口加工头是移动的，以减少管道移动到合适长度的距离。

每次可装载、移动以及加工两根管道，这样用于操作的时间增多（几乎是单根管道加工的两倍），生产力提高，而且对过程没有影响。

另一个优势是这台机器不需要复杂的电动滚筒系统来移动管道。只需要气缸移动管道几厘米，使其在坡口加工前对齐整。

管子由两个液压夹紧器夹住（一根管道一个）以便在坡口加工时稳定住管子。为了确保锁住管子避免振动，有一个虎钳用于每根管道。坡口加工头也是通过可编程控制器在管道中心自动调整的。事实上，这条生产线是自动设置到正确的尺寸的。系统有无刷电机上下移动轴以对准管道中心。

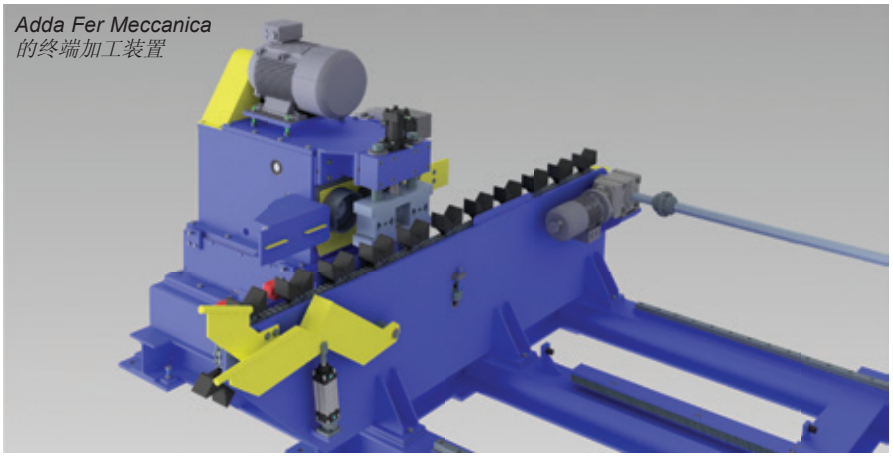
加工长度的调整取决于管子长度，这也是通过可编程控制器自动设置的。三台电机移动输送机以及可移动的坡口加工头。

Adda Fer的EF4平头机能处理外径30到114毫米的圆管，管道长度为3到12米，全部自动控制；可以加速到120米/秒（管子长6米，6秒处理两根）；四个链式输送机支持所有的管子；两个平行的坡口加工头能够安装内、外以及正面的刀片用来加工所需的表面；无刷电机可根据管道直径自动调整坡口加工头的轴；一套成熟的系统使用无刷电机控制的伸缩芯棒来驱动与相同电机平行的两根管道上的芯轴。

西门子元器件以及西门子Sinamics驱动器和变频器用来实现过程全自动化。

为了加工出完美的坡口以及实现最大效率，界面使操作者能完全控制参数。交互式诊断也使得操作者能够立即识别系统中操作停止或异常的原因。

报警/故障信号遵循逻辑顺序，因此如果有问题，操作者将有足够的时间得到警报。问题也将保存到数据库以备随后的诊断和维护。



Adda Fer Meccanica的终端加工装置

Meccanica Adda Fer Srl – 意大利
传真: +39 035 4946564
电子邮件: info@addafer.it
网址: www.addafer.it

新的管道加工系统为循环时间和环境带来好处

作为正在进行的替换掉到达自然寿命终点的机器项目的一部分，Worcester Bosch集团推出了第一套BLM 4-Runner管道加工系统。新机器与替代的原机器相比循环时间节省25%到30%，也将为公司带来环境效益。

作为家庭取暖和热水设备制造商，Worcester的主要目标之一是能源效率，这也是客户需求的。公司的政策是确保所有的机床购买都要提现能源/环境职责。之前，Worcester的管道加工是由液压动力机器完成。转变成全电动伺服控制的BLM 4-Runner，在环境方面取得了进步，而且提高了质量和一致性，减少了循环时间。

制造集团领导Chris Packer表示：“这是我们长期愿景的一部分，我们将用现代化全电动伺服驱动的管道加工系统更换掉所有旧的BLM Planet液压机。4-Runner的伺服控制几个非常重要的原因，比如弯曲精度、一致性和循环时间的提高，即使不是更好，但至少也相当，而且与液压机相比更节能，这也是购买决策的关键。”

BLM 4-Runner上的弯管加工

BLM 4-Runner是模块化机器，可以配置开卷、矫直、管端成型、弯曲、切断以及卸载功能。Worcester的机器是完全按这种方式配置的，可以从直径22毫米的成卷铜管提供成品部件。

4-Runner的弯曲功能可以完成右弯和左弯，以及在单平面和3D平面上的固定半径或可变半径弯曲。该机器也有压弯和拉弯技术。BLM 4-Runner的管端成型功能拥有多站管端成型装置，有四或六个冲压式成型站，以及四个冲压站和一个旋转站。还根据加工材料的不同配有各种不同的切割设备，包括内部或外部无切屑切割机，或者是传统的锯片。

BLM 4-Runner的全电动系统一个关键的好处是弯曲的一致性。私服驱动定位的每个弯曲都一样。生产工程师Rob Crane表示：“自从换成4-Runner后，我们之前在液压弯曲机上发现的变化已完全消除”。对于液压转向全电动对环境带来的好处，生产主管Adam Timms表示：“完全不用液压油后更容易保持工作环境质量。更清洁的环境使我们更容易保持我们的5S、全面生产维护(TPM)以及计划保养方案(PMI)”。

除了4-Runner，Worcester已交付了全电动BLM Tube-Form ELE管端成型加工机。该机器有一个能提供8公吨压力的冲压头，使公司能够生产更复杂的形状，能提供六次冲压，而且能加工比之前更大直径的管道。

BLM Group UK Ltd – 英国
传真: +44 1525 402 312
电子邮件: sales@blmgroup.uk.com
网址: www.blmgroup.com

用于更复杂形状加工的数控管端坡口机

几十年来，机械仿形设备一直是管端坡口加工的标配。但这种单一的生产方法再也不能满足管道行业不断提高的质量要求。

一些国际标准，如美国机械工程师协会（ASME）已呼吁比机械仿形设备生产的更复杂的管端形状。

Graebener的解决方案是一台根据单面或双面设计不同要求用机械仿形设备或数控刀具轴操作的数控管端坡口机。有了这台数控管端坡口机，Graebener开发了“一机多用”技术，来优化碳钢和不锈钢加工：将机械仿形和数控仿形结合到一台机器里，用于所有焊缝形状。

传统的单一方法遇到一些复杂形状以及厚壁管道时常常会失败。有了精确的刀架数控控制，Graebener机器能实现复杂的焊缝形状技术，即使是针对壁厚增加的管道。相对简单的形状也可以机械仿形。

数控管端坡口机自动考虑到管端的椭圆度，确保实现最佳的切角形状。这是通过电子测量系统实现的，测量系统可以记录到整个管周中心的管道椭圆度。理论上的管道中心偏差可以以图形化显示。

每个管端可以生产单独的数据集，这些数据集用于在数控软件中自动校正工具。即使是加工过程中不再需要考虑焊缝。在精确的测量数据基础上，智能控制软件能检测到焊缝不均匀，并标注出来加工。

新的Graebener数控管道坡口机最近已被墨西哥一个重要的客户用于生产。另一台数控坡口机不久将交付给土耳其的一家大型管道制造商。

Graebener Maschinentechnik GmbH & Co KG – 德国
传真: +49 2737 989 110
网址: www.graebener-group.com

Graebener的数控管端坡口机在一台机器里同时提供机型仿形和数控仿形加工

MAC系统检测管道拉拔过程中的偏心度

偏心度，即外径和内径的不同心，通常是坯料拉拔成管道前坯料挤出加工时最容易产生的问题。Magnetic Analysis Corporation公司最近在美国一家生产商业和工业级管道的铜管厂安装了一套测量偏心度的新型Echomac®超声波检测系统。公司需要一种能以600英尺/分钟的速度测量外径2.125英寸、壁厚0.1英寸主管偏心率的方法。

超声波检测是在挤压过程后、管道在高速拉拔生产线拉拔时、以及管道进一步的缩径加工前完成的。成品的离心度意味着壁厚不符合规范，可能会在进一步的下游加工时引起问题。

这一检测将对这一状况向处理者发出警报，而且他们可以使用检测结果调整过程提高同心度。

Echomac®系统在管道四周每隔90度用了四个传感器。这样可以精确的计算非同心管道的偏心度，确保内、外挤出模具都是圆的。

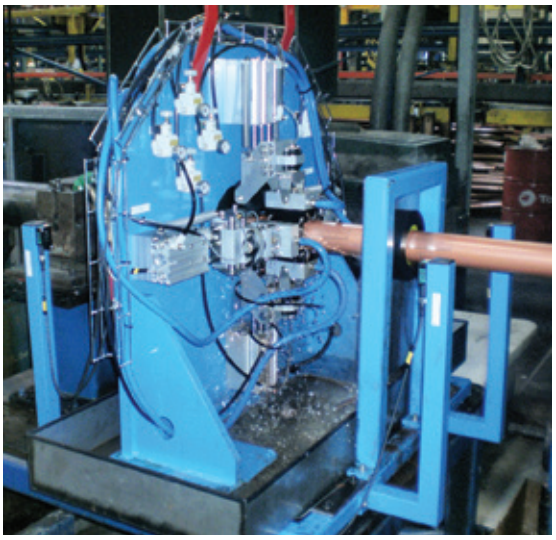
采用独特的机械设计使传感器跟踪到管道离开中心的运动。传感器托架采用轮式保证一直与管道表面接触，而且有喷洒系统确保一直为超声能提供耦合剂。这些托架安装到气缸上，在管道进入后靠近，然后在管道后端退出前收回。这种接近跟踪管道表面，可避免传感器和托架因来料管道的不对齐而可能引起的损坏。还有编码器轮安装在连接起来的气缸上，能精确跟踪管道并测量Echomac®电子。还有弹簧连接到所有气缸，这样在系统失去空气压力时可以自动故障收缩。在后面安装有聚氨酯刮水器总成，用于水容器。

四通道偏心度检测是一种特殊的四个传感器操作的检测，是对绕管周每隔90度四个固定点分开测量的基础上测量壁厚变化的。软件采用三角函数来构造一个正弦函数和偏移量。

偏移量是这四个壁厚测量值的平均值，也是管道的公称壁厚。偏心度是对壁厚变化的一种表达，但定义取决于特定的用户以及与客户签订的协议。准确的最小和最大壁厚也可以推断出，而不管在固定传感器下四周管道方向如何。在这个阶段，因为拉拔跟踪夹具可能管道会有椭圆度，但偏心度归属于管道壁厚，而椭圆度将被忽略。

每个检测平面的原始壁厚数据可以显示用来设置。每个计算通道是单独处理的，包括阈值、报警值和记录值。用户可以设置四个单独偏心阈值等级。该软件提供五中偏心计算法，满足客户各种不同的方法。操作者可以通过选择观察这四个通道中每个通道的类型来自定义数据以怎样的方式呈现。在Echomac®装置中，2个通道设置用于不同的偏心分类等级，而第三个用于最大和最小壁厚报警，而第四个监控平均壁厚。可以证明这四种通道偏心率方法有效，不管管道如何旋转以及偏心值如何，平均壁厚仍然不变，而且在整个生产运行中都是不变的。

Echomac® 超声波偏心检测系统的检测头安装在铜管厂里



Magnetic Analysis Corp – 美国
电子邮件: info@mac-ndt.com
网址: www.mac-ndt.com

扩展的原型设计选择用于新型管道成型形状

管道成型技术是一个复杂的领域，对于不同行业一些先进的新项目公差更小。有新想法的一些公司需要在开发后将新产品安全可靠地转移到成批生产。

机器构造商transfluid使用管道加工技术在其内部原型设计部门进行研究。除了对新的开发进行取样外，如在工具技术领域，没有自己机器的公司还可以在transfluid公司进行试样系列的分析和精确的改进。

transfluid公司董事总经理Stefanie Flaeper表示：“对这一领域的支持比预期要求还高。因此我们最近又再次扩大了研究和原型设计部门。我们可以在这里对直径65毫米内的管道进行各种部件和工具试验。”

数控型SRM滚压成型机和双轴成型机被用到，成型力达到25吨。整个过程链可用额外的数控弯管机和轨道型管道分离系统完成，确保满足要求，比如关于毛刺形成。

对于特定客户项目，部门专家可以检测新的成型形状和工具概念系列化成熟度以及质量。除了别的外，transfluid团队依靠部件和工具的触觉和视觉测量系统。中间结果到确定的结果被可靠地记录下来。

transfluid的专家作为增值管道成型技术初始开发者有专业的经验，可以实现高强度和极高强度材质管道的部门旋转-对称成型。尤其是，可以对轻质组件和高强度材料进行审查和评估。根据形状不同，甚至可以由工具独立完成，公司可以提供试样系列或原型生产。

管道加工技术，如连续SRM成型机在原型设计部门提供

图片来源：© transfluid

从车削部件到无切屑成型

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transfluid Maschinenbau GmbH – 德国
传真: +49 2972 9715 11
电子邮件: sales@transfluid.de
网址:
www.tube-processing-machines.com

Case study: Deco Automotive invests in high-performance pipe bending cells

By Schwarze-Robitec GmbH, Germany

Suppliers to the automotive industry are facing the same challenges worldwide – how to supply their products quickly, economically and flexibly, while considering the individual demands of their customers at the same time. In order to increase the quality of its products and reduce costs at the same time, the Canadian supplier Deco Automotive replaces three existing older bending machines with three state-of-the-art automatic CNC 100 E TB MR VA pipe bending lines by Schwarze-Robitec. The company will profit from the integrated high-performance control system NxG by increasing its output and optimising cycle times.

"Based on their own constant optimising processes, our customers demand high requirements from their pre-products and with that, as supplier our requirements are also increased. In order to provide the customer with products in different versions and large quantities at a consistently high quality, we continuously invest in the further development of our production processes," said Ray Metzner, manufacturing engineer at Deco Automotive. The company, headquartered in Toronto, Canada, belongs to the global Magna Group and manufactures various automotive components including vehicle frames and structures, and engine cradles. Among the customers of the automotive supplier are international original equipment manufacturers. Deco uses a total of four production lines and manufactures more than 1,750,000 products per year.

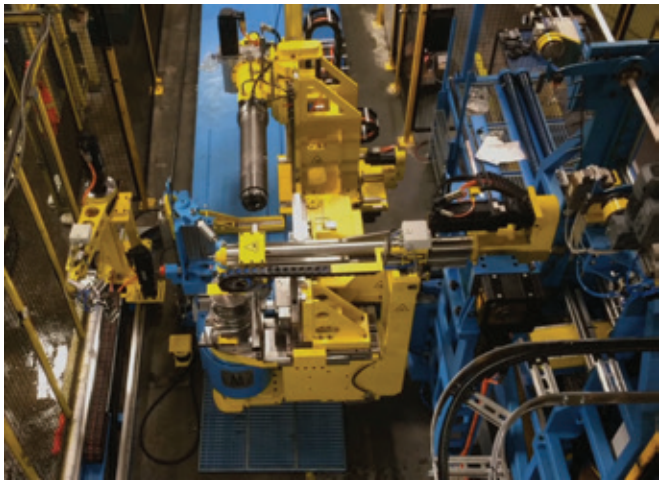
Fully automated bending cell: the bending cell by Schwarze-Robitec guarantees fully automated production processes – starting with material buffering to weld seam inspection to bending

Project requirements

Due to the continuously high demand and a high annual output, Deco Automotive is dependent on reliable and intelligent pipe bending machines, which provide excellent results in terms of degree of automation, precision, speed and bending processes. Before being accepted by automobile manufacturers, steel pipes run through the fully automatic cold bending process at the production facility in Toronto. Subsequent manufacturing steps include hydroforming, laser cutting and welding.

The number of bending processes performed at Deco reaches 12 million per year. Up until now, the automotive supplier reached this volume by using a total of nine bending machines spread over four production lines. Seven of the machines come from Schwarze-Robitec, whereby three pipe bending machines were already in use for more than 20 years. The reason for the replacement of the old equipment with three new CNC 100 E TB MR VA made by Schwarze-Robitec was, for Deco, that the bending and handling process is ensured to continue reliably and efficiently. "In 20 years, we have purchased a total of 13 pipe bending machines from Schwarze-Robitec and we have come to appreciate the very high quality and durability of the machines. We value the high technical expertise of the employees and the comprehensive services, such as remote maintenance, and decided at the end of 2015 to continue the partnership," said Mr Metzner.

CNC 100 E TB MR VA: The electrically operated systems process round and oval tubes that are 2.8m long and have a diameter of up to 76.2mm



Automatic pipe bending line

Following an extensive consultation and planning phase in cooperation with Deco Automotive in Canada, Schwarze-Robitec produced three pipe bending lines tailored to the requirements of the automotive supplier. “We expect the new bending cells to provide significantly improved production and anticipate to reach our production targets even faster,” said Mr Metzner. Of the three CNC 100 E TB MR VA machines two machines are right- and one is left-bending. In addition, the multi-stack bending machines are equipped with a pipe magazine, a weld seam finding device, automatic loading and a removal device. The electrically operated systems process round and oval tubes that are 2.8m long and have a diameter of up to 76.2mm, including a wall thickness from 1.2 to 3mm. The process is fully automated: the pipes to be processed are taken randomly from the tube magazine and fed to the integrated weld seam finding device.

This device aligns the pipes in accordance with their weld seam position. Following the alignment, the pipe is passed on to the pipe bending machine. To do this, a mandrel is used which supports the tube on tight radii from the inside. A fully automatic loading arm then removes the finished bent tube from the machine and places it on a conveyor belt. From there, the tube continues to the hydroforming equipment. Another feature of the solution is the integrated raised, vertical travel routes. This allows pre-loading the pipe bending machine, while parallel to this function a finished bent tube is removed at another location.

NxG high-performance control system

Compared to the pipe bending line that had been in operation at Deco until now, the new machines are equipped with the high-performance control system NxG. An advantage of the new control system is the significantly reduced non-productive times, as individual steps of the bending process were arranged synchronously. “With the NxG control system, it is possible to prepare the next step simultaneously to executing a machining operation. For example, while a pipe is supplied to the tool, the clamping functions close almost completely,” explains Bert Zorn, managing director at Schwarze-Robitec GmbH. “When the tube then reaches its target position, the tool is immediately ready for the next bending step – this allows users to shorten the cycle times and production objectives are reached more quickly.” In addition, a diagnostic and maintenance tool integrated into the control system minimises downtimes. The intuitive operability of the control system also contributes to an ergonomic and efficient way of working. “The pipe bending machines made by Schwarze-Robitec produce reliable, accurate, and high-quality products and yet the machines are easy to use for our staff,” said Mr Metzner.

Feeding the CNC 100 E TB MR VA: the pivoting loader designed by Schwarze-Robitec feeds the bending machine automatically with raw material

Control system NxG: Deco profits from the integrated high-performance control system NxG by increasing its output and optimising cycle times. The process is fully automated: the pipes to be processed are taken from the tube magazine and fed to the Roland SND 40 integrated weld seam finding device

Conclusion

Due to the new automatic bending cells made by Schwarze-Robitec, the automotive supplier was able to optimise the cycle times and increase the production output of higher complex shapes and materials. “With the new pipe bending machines and the bending programs of the control system NxG, we have reduced cycle times significantly,” said Mr Metzner. With this, the accuracy that the company produces and the repeatability of its equipment in the production process is outstanding. “The predecessors of our existing machines have been operating in multi-shift operation flawlessly for almost 20 years. In addition, we received continuous services from Schwarze-Robitec, from their engineers in Cologne, and the employees of the US subsidiary – for us, this is a win-win situation.”

Schwarze-Robitec GmbH
Olpener Straße 460-474
51109 Cologne, Germany
Fax: +49 221 89008 9920
Email: sales@schwarze-robitec.com
Website: www.schwarze-robitec.com

Technologies for the measurement of diameter, wall thickness, eccentricity and sagging during hose and tube extrusion

By Sikora AG, Germany

Manufacturers of hoses and tubes have been investing intensively in measuring and control technology as well as line control over recent years, aiming for an online quality control, process stability and cost reduction. Nowadays, online measuring devices with a connected control are a standard for extrusion lines.

Used test devices include, amongst others, gauge heads that measure the inner and outer diameter, the ovality, eccentricity as well as, ideally, the sagging ('sagging' of the melt during the solidification at a too high viscosity) of the product during the extrusion process. The used measuring systems are based on varied technologies for different application areas.

The following article provides an overview of conventional as well as innovative measuring technologies and discusses the advantages and limits of their usage in extrusion lines.

Technologies for diameter measurement of hoses and tubes

For the measurement of the product diameter of hoses and tubes, two established techniques are used: the 'Scanning System' as well as the 'CCD line sensor technology'.

Scanning System

The scanning method is based on a rotating mirror or a rotating disk, whereby a laser beam scans across the measuring field. In between the rotating mirror and the light sensor, two lenses are arranged. The first lens diverts the laser beam almost parallel across the measuring field while the second lens directs the light beam onto a light sensitive detector.

The product is arranged between these two lenses and disrupts the laser beam, while it is scanned across the measuring field. Therefore, the product diameter is calculated by comparing the time the laser beam needs to pass the whole measuring field with the time the laser needs to scan the complete product surface. In this case, time equals the diameter (Figure 1).

The measuring rate depends on the rotation speed of the mirror. An increase of the measuring rate is made possible by the use of a polygon mirror. This highlights the problem that the mirror surfaces need the exact same perfect surface finish. Often, an averaging from several measurements is necessary to achieve a reasonable accuracy.

CCD line sensor systems

There are two prevalent measuring methods for the CCD line sensor technology. The first method is based on a laser beam that is focused on one line sensor using optics (lenses). By counting the darkened diodes from the shadow image of the object, the diameter is determined. The advantage of this method is the omission of moving parts, but the costs for the lens are high (Figure 2).

The second approach is an intelligent method for which a high-resolution CCD line is directly illuminated by a laser and the diameter is calculated from the diffraction fringe. The measuring rate is extremely high and only limited by the chosen CCD line sensor. The advantages of this second method are the omission of the expensive lenses as well as moving parts.

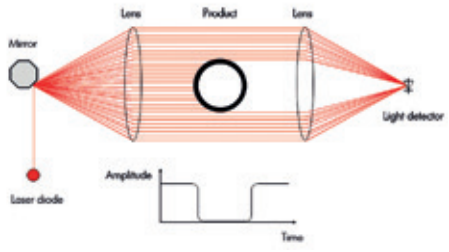


Figure 1: Scanning method with rotating mirror

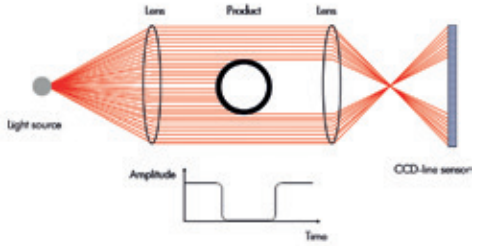


Figure 2: Scanning method without rotating mirror, with CCD-line sensor

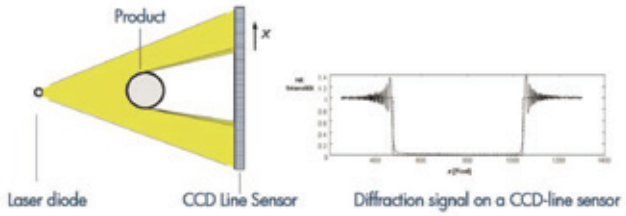


Figure 3: CCD line sensor measuring principle and analysis by diffraction analysis without optics and moving parts

The main difference between scanning and the line sensor technology is that the CCD line sensor technology works solely digitally and does not need moving components. Therefore, accuracy, repeatability and measuring rate are higher and calibration is not necessary.

Gauge heads that work with the line sensor technology measure the diameter in two or three planes. They are capable of measuring opaque as well as transparent products from all kinds of material with a diameter from 0.05 to 500mm. In addition, some models offer up to 5,000 measurements per axis per second and, therefore, also a reliable detection of lumps and neckdowns.

Technologies for the measurement of diameter, wall thickness and eccentricity

For applications where a diameter measurement is not sufficient, manufacturers of hoses and tubes use measuring systems that additionally measure the wall thickness and the eccentricity of the products. Thereby, in addition to the quality control and process optimisation, the saving of plastic material and cost reduction play an essential role. Conventionally available technologies are, for example, based on ultrasound technology. This method is suitable for the basic measurement of the wall thickness of single layer products but reaches its limits due to its function and dependence on material properties, the plastics temperature and the coupling medium. A precise measurement of all product parameters without dependence on environmental or material influences is nowadays ensured by X-ray technology.

Figure 4: X-ray measuring system installed in a hose extrusion line

Ultrasound technology

The ultrasound technology is only partly suitable for online quality control of hoses and tubes. For example, the ultrasound is not able to penetrate the aluminium layer that is used as a vapour barrier in composite pipes and is therefore not applicable for this application. Measuring rubber hoses, the ultrasound signals are largely absorbed by the porosity and absorption of the rubber so that they are also not reliably measurable.

Furthermore, multi-layer rubber hoses contain typical fabric reinforcements, which divert the ultrasound echo and make a measurement impossible. The ultrasound measurement is usually realised in a water bath as the water is used as a coupling medium for the transmission of the sound. A precise temperature compensation is necessary as the propagation speed of the ultrasound, which is used for the calculation of the eccentricity, depends on temperature and material. This technology requires calibration. Further, an estimation of the wall thickness is typically only possible by combining the ultrasonic technique with an additional gravimetric system.

X-ray technology

The X-ray technology is based on an imaging principle. The X-ray technology does not require an adaptation to materials and no coupling medium is needed. The technology is independent of the temperature of the material, which makes it possible to integrate an X-ray measuring device directly into an extrusion line without any additional effort. Calibration is not necessary. The system is either installed directly after the extruder (hot measurement) or at the end of the line (final quality control). With a four-point online measurement, the measuring values for the wall thickness, the eccentricity, the inner and outer diameter and the ovality are determined by one device.

The system measures up to three different material layers. These measuring values are visualised numerically and graphically in the form of the tube/pipe cross section in real-time and enable the user to perfectly centre the extrusion tool. Important for highest efficiency is the automatic control of the line speed or extruder rpm while considering the minimal values. Thus, the quality of the hose is ensured. On the other hand, the control to the minimal values ensures that only the needed material is used. X-ray technology is available for products with a diameter from 0.65 to 270mm. Concerns on the safety of X-ray devices are arbitrary, as the radiation is – because of the low energy – of no relevance. Practically, a human is exposed to a much higher radiation on a flight from New York to Frankfurt.

Technologies for the measurement of large plastic pipes

For the dimension measurement of large plastic pipes starting at a diameter from 120mm, as they are found in the building and service area, the above-described technologies can be used. Nevertheless, these technologies reach their limits

either functionally (ultrasound) as well as regarding the costs, the limited measuring range and number of measuring points on the circumference (X-ray) or the limitation in the measurement of the diameter only (laser).

A further technology for quality control is currently tested. It uses terahertz pulses, which activate a powerful fibre laser that is aimed at the material. The wall thickness is determined by means of the reflected echoes from the inner and outer boundary layers. The usage of this technology for the measurement of larger wall thicknesses and materials with a high damping, as for example PVC, are however limited. Furthermore, the durability of the laser is limited and the costs are very high.

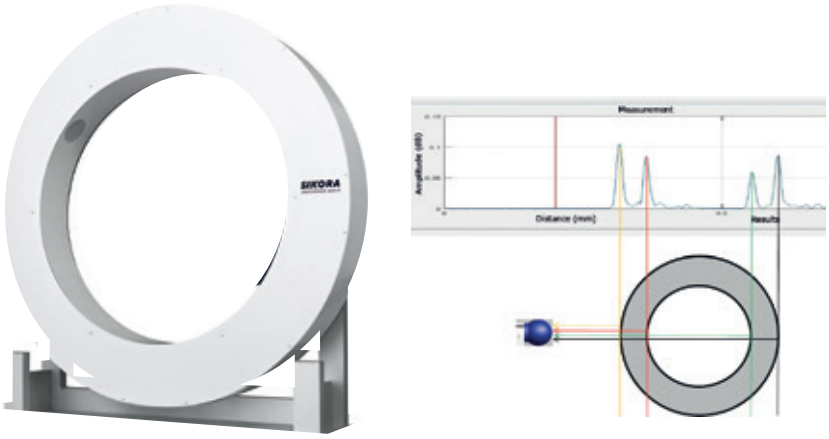


Figure 5: The measuring system based on millimetre waves technology for the determination of the diameter, wall thickness and the sagging based on the time difference analysis of reflected signals

Millimetre waves technology

An innovative, significantly less expensive technology for the dimension measurement and recording of the sagging is the radar technology FMCW (frequency modulated continuous waves). These systems work within the sub-terahertz range and have already been used for some time in automotive technology for distance measurement. They are based on semiconductor technology, are inexpensive and practically not limited regarding their lifespan.

Within the chosen area from 80 to 300GHz all plastic materials are penetrated with low absorption and thus, the wall thickness is measured. One or two continuously rotating transceivers continuously send and receive frequency modulated millimetre waves while moving around the tube.

As an alternative, a static system measures selectively the wall thickness and outer and inner diameter of a tube with two transceivers at four points.

A rotating gauge head is used when the complete measurement of the wall thickness around the whole circumference of the tube is required. In this version, the sagging is also measured and displayed precisely. The measurement uses the time difference of the signals that are reflected by the boundary layers of the front and back site of the plastic material.

The measurement is realised with an accuracy of a few micrometres and a measuring rate of 500 single measurements per second. The millimetre waves technology measures products with a diameter from 120 to 2,500mm precisely, around the complete circumference, with no need for coupling medium and is not influenced by the temperature or plastic material.

The measuring system adapts the properties of the extruded plastics by itself – calibration by the user is redundant. Furthermore, the technology provides information for centring the extrusion tool and thermal control of the line. Thereby, the measuring values are used to ensure an optimal concentricity and minimal wall thickness.

Conclusion

With the increasing quality requirements in the production of hoses and tubes, the precise and reliable quality control for plastic pipes during extrusion by non-destructive testing (NDT) becomes significantly important. Furthermore, an efficient usage of materials for cost savings is in focus of the plant management. Measuring and control systems monitor and control important product parameters continuously. Thereby, hose and tube manufacturers may choose from various technologies with different functions and diverse applications.

The laser technology offers a reliable online measurement of the diameter from 0.05 to 500mm. Additionally, X-ray measuring systems measure the wall thickness and eccentricity of products with a diameter up to 270mm.

A further innovative technology, based on millimetre waves, is used for extrusion lines where large plastic pipes up to 2,500mm are produced. The technology is applicable for different material types, and measures common tube dimensions as well as the sagging precisely.

Which measuring technology should be used in an extrusion line depends, therefore, on the application area and the requirements of the user regarding measuring and control technology for quality assurance, process optimisation and cost savings.

Sikora AG
Bruchweide 2, 28307 Bremen, Germany
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