New technology centre

The world’s fastest secondary coating line was created when Rosendahl of Nextrom launched its new generation of loose tube lines, which is not only small in footprint but also the first to crack the 1,000m/min mark.

Rosendahl Nextrom has placed a good share to bring the high speed production line to market, but the line itself isn’t the only major investment Rosendahl Nextrom has made. The company also invested in its production facility in Pischelsdorf, Austria.

Besides the three already established technology centres – one laboratory for cable production, one for battery machine manufacture and one clean room laboratory for optical fibre technology in Vantaa, Finland – a fourth one is established for exclusive customer demonstrations in a highly professional environment.

The newly established technology centre is home to inspirations and ideas of visionaries and technologists, and includes the opportunity for customers to visit to see the running lines. The facility covers 700m² for the set-up and testing of the newly developed production lines and includes a meeting room for technical workshops.

Through the new technology centre, Rosendahl Nextrom is developing all the processes that will make state-of-the-art cable manufacturing reality. Rosendahl Nextrom is pushing the limits of regular cable production and enabling customers to visit and see the performing lines themselves.

“Our new technology centre will allow us to innovate locally for our customers and promote those innovations to the world,” said CEOs Siegfried Altmann and Gerhard Jakopic.

“Over the past decade, we have risen our R&D investment and expanded our global network of sales and service units to address customers’ growing needs for breakthrough technology that we develop together with them. We see significant performance opportunities and having the best technology will ensure we maintain our quality in our solutions.”

Rosendahl Nextrom GmbH – Austria
Email: office.austria@rosendahlnextrom.com
Website: www.rosendahlnextrom.com

▲ The management, from left, Johann Jäkel, Gerhard Jakopic, Ernst Altmann and Siegfried Altmann
New IWMA board member

The International Wire & Machinery Association’s executive board has been strengthened following the appointment of David Robinson at the AGM in February 2015.

David, managing director at X-L Technologies UK Ltd, has 30 years in the wire and cable industry and continues the company’s long history with the association, following his father’s retirement from the board in 2014.

Simple and effective from GER

GER SA Belgium has its own manufacturing programme of new continuous resistance annealers for in-line use with copper wire drawing machines. The idea is to offer simple and effective machines to complete already existing drawing machines at very attractive prices.

This manufacturing programme basically comprises three wire diameter ranges: annealers are being offered for fine wire diameters ranging from 0.15 to 0.5mm, for intermediate wire from 0.4 to 1.2mm, and for larger wire diameters from 1 to 3.6mm.

Machines for other wire diameter ranges are also possible (tailor made). All annealers are offered as stand-alone models with their own drive motor, or without motor, driven by transmission belt from the wire drawing machine. All major parts (pulleys, steam generator, carbon brushes, transformer, etc) are of German origin.

Investment pays off

During 2015 Gurfil Foil Film Tape has invested in a third state-of-the-art, high technology lamination line, increasing the production capacity by 50 per cent. Gurfil also built its own three high sensitive and high output slitting lines to support the new lamination line.

Gurfil has been developing its new product range of PP identification tape, high end Mica tape, foamed PP tape, water blocking tape and yarn, and non-woven tape. Gurfil has been constantly working on improving quality of its laminated cable foil, film and tape products.

After two years of searching the Russian market, Gurfil has assigned a distributor contract with a reputable Russian company. Sales of braiding and Mica taping machines in the European market were good for Gurfil in 2014 and there is a radical increase in the first half of 2015.

In 2014 Gurfil invested in land for its new factory project that will start in 2016 to increase capacity, quality of products and service.

Gurfil Foil Film Tape – Turkey
Email: info@gurfil.com
Website: www.gurfil.com
Join the best!

wire Düsseldorf – once again, the wire and cable industry is focusing its attention on the Rhineland. The world’s biggest and most important forum of the industry’s experts – wire 2016 – will again be presenting itself in Düsseldorf as the hub of the trade from 4th to 8th April 2016.

The figures of the last wire event – that of 2014 – speak for themselves: Over 1,300 international exhibitors presented current trends in the industry and tomorrow’s technologies to approximately 38,050 professional visitors (78,000 combined with Tube Düsseldorf) from around the world. A glimpse into the future: Neither industry nor our everyday lives are conceivable without wire and its derivatives. At the same time, industrial progress goes hand in hand with the increasingly stringent requirements to be met by wire and wire products.

Whether your line is spring manufacturing or metal forming technology, glass-fibre machines or quality assurance systems: wire Düsseldorf is the ideal place to present your innovative products on THE international wire and cable industry stage.

LinkedIn to us!
Remember to follow the IWMA LinkedIn page to ensure you are kept up to date with all activities, whether it is announcements about exhibitions, conferences and events or the education trust, as well as members’ news.

## DIARY OF WORLD CLASS WIRE & CABLE EVENTS
FOR BUSINESS, TECHNOLOGY, EDUCATION & NETWORKING

### 2015

#### SEPTEMBER

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<th>Event</th>
<th>Location</th>
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<tr>
<td>16-18</td>
<td>wire Southeast Asia 2015</td>
<td>Bangkok, Thailand</td>
<td>Exhibition</td>
<td>Messe Düsseldorf GmbH Email: <a href="mailto:beatrice@mda.com.sg">beatrice@mda.com.sg</a> Website: <a href="http://www.wire-southeastasia.com">www.wire-southeastasia.com</a></td>
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#### OCTOBER

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<tr>
<td>6-8</td>
<td>wire South America 2015</td>
<td>São Paulo, Brazil</td>
<td>Exhibition</td>
<td>Messe Düsseldorf GmbH Email: <a href="mailto:niemannh@messe-duesseldorf.de">niemannh@messe-duesseldorf.de</a> Website: <a href="http://www.wire-south-america.com">www.wire-south-america.com</a></td>
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<tr>
<td>3</td>
<td>CabWire 2015 World</td>
<td>Düsseldorf, Germany</td>
<td>Conference</td>
<td>IWMA Tel: +44 121 781 7367 Email: <a href="mailto:info@iwma.org">info@iwma.org</a> Website: <a href="http://www.cabwire.com">www.cabwire.com</a></td>
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<tr>
<td>4</td>
<td>CabWire World</td>
<td>Plant tour to ArcelorMittal</td>
<td>Technical</td>
<td>IWMA Tel: +44 121 781 7367 Email: <a href="mailto:info@iwma.org">info@iwma.org</a> Website: <a href="http://www.cabwire.com">www.cabwire.com</a></td>
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<tr>
<td>20</td>
<td>IWMA Dinner Dance</td>
<td>Royal Garden Hotel, London, UK</td>
<td>Event</td>
<td>IWMA Tel: +44 121 781 7367 Email: <a href="mailto:info@iwma.org">info@iwma.org</a> Website: <a href="http://www.iwma.com">www.iwma.com</a></td>
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### 2016

#### FEBRUARY

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<tr>
<td>3</td>
<td>AGM and Members’ industry Luncheon</td>
<td>The Mere Golf Resort &amp; Spa Knutsford, UK</td>
<td>Event</td>
<td>IWMA Tel: +44 121 781 7367 Email: <a href="mailto:info@iwma.org">info@iwma.org</a> Website: <a href="http://www.iwma.com">www.iwma.com</a></td>
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#### APRIL

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<tr>
<td>4-8</td>
<td>wire Düsseldorf 2016</td>
<td>Düsseldorf, Germany</td>
<td>Exhibition</td>
<td>Messe Düsseldorf GmbH Tel: +49 211 45 60 77 68 Email: <a href="mailto:wire@messe-duesseldorf.de">wire@messe-duesseldorf.de</a> Website: <a href="http://www.wire.de">www.wire.de</a></td>
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<tr>
<td>26-29</td>
<td>wire China 2016</td>
<td>Shanghai, China</td>
<td>Exhibition</td>
<td>Messe Düsseldorf GmbH Tel: +86 21 45 60 77 68 Email: <a href="mailto:ryfischd@messe-duesseldorf.de">ryfischd@messe-duesseldorf.de</a> Website: <a href="http://www.wirechina.net">www.wirechina.net</a></td>
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#### OCTOBER

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<tr>
<td>5-7</td>
<td>wire India 2016</td>
<td>Mumbai, India</td>
<td>Exhibition</td>
<td>Messe Düsseldorf GmbH Tel: +91 221 45 60 77 68 Email: <a href="mailto:ryfischd@messe-duesseldorf.de">ryfischd@messe-duesseldorf.de</a> Website: <a href="http://www.wire-india.com">www.wire-india.com</a></td>
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Annual general meeting and industry luncheon

The IWMA will hold its next annual general meeting at The Mere Golf Resort & Spa in Knutsford, near Manchester, UK, on the morning of Wednesday 3rd February 2016. All members are welcome to attend.

As in previous years, the AGM will be followed by the members’ industry luncheon held in the James Braid Suite. Starting with a drinks reception at 12 noon, this is an ideal networking opportunity, followed by a three-course luncheon served at 1pm and rounded off by some live entertainment.

Last year, nearly 200 people from the wire and cable industry attended this excellent networking and social event, making it one of the IWMA’s most popular functions of the year.

For more information about either the AGM or industry luncheon, please contact the IWMA office.

On the effectiveness of mechanical-chemical cleaning of wire

When looking for a cleaning system for wires, cables, etc, there can be a dilemma. Which method, in general mechanical or wet-chemical, is suitable for the desired surface quality? In addition budget, or the available space is limited and the range of manufacturers of in-line cleaning systems as well as the current market solutions is manageable.

The appropriate method is difficult to determine at first glance. As a result there is often an attempt to construct and implement your own solution only to find that the outcome is, despite intense input of time and material, inadequate.

Basically, the definition of the cleaning target and the analysis of the surface texture should be at the beginning of the search. Only when these points are defined, can the choice of the suitable method and, if necessary, a suitable cleaning agent, be carried out.

As mentioned, usually a subdivision in “mechanical cleaning” and “chemical cleaning” is made, whereby nearly all mechanical cleaning methods can be combined with the chemical cleaning.

On mechanical cleaning the contamination is removed by the mechanical frictional force of normally solid cleaning materials such as brushes, textiles and microfibers. To remove gross contamination from the wire surface, cleaning with brushes or textile materials is very effective.

Since the surface characteristics of the wire are far from ideal due to, for example, fine cracks and defects, these methods quickly reach their limits.

On the other hand, chemical cleaning means, in most cases, that a fluid exposure performs the cleaning. The performance of these methods is considerably improved by increasing the velocity of the liquid by means of high pressure, ultrasonic or steam relaxation. Cleaning processes with liquids, supported by ultrasonic, high pressure or steam, can substantially meet the challenging task of removing dirt even from the smallest surface defects.

Finally, the effectiveness of the cleaning process depends on how targeted the cleaning power (force or impulse) can be applied to the contamination for a certain time.

Since the choice of the appropriate cleaning method is determined by many other factors, a comprehensive analysis of all parameters should be undertaken. This is precisely the approach that GEO-Reinigungstechnik GmbH (GEO) has selected. For the last two decades GEO has explicitly dealt with the cleaning of continuous profiles such as wires, ribbons, strands and cables. The procedures can be tested under near-production conditions at GEO’s test laboratory and from the knowledge gained suitable solutions can be selected and implemented.

GEO-Reinigungstechnik GmbH – Germany
Email: info@geo-reinigungstechnik.de
Website: www.geo-reinigungstechnik.de

New colour match system for wires

Siebe has launched the Siebe Colour Match System for wires. Its application is inline control of colour during production or colour quality test for harnessing or laboratory control.

The device can detect single colour-coded insulation as well as stripe coded wires and shows both colours.

Reference colour can be taken from an RAL database or a user-defined database, where new entries are created with a teach-in function. The result is either nearest database colour or colour difference to selected reference (in units of Lab-dE).

Minimum wire diameter is 1mm (40 mil), minimum stripe width is 0.5mm (20 mil).

Two device types are available: Inline with TCP-IP connection to line PLC, or stand-alone with touch screen. The offline device comes with touch screen and turn mechanism for 360° inspection.

Siebe Engineering GmbH – Germany
Email: vkde@siebe.de
Website: www.siebe.de

The new system from Siebe

Wire cleaning from GEO

On the effectiveness of mechanical-chemical cleaning of wire

When looking for a cleaning system for wires, cables, etc, there can be a dilemma. Which method, in general mechanical or wet-chemical, is suitable for the desired surface quality? In addition budget, or the available space is limited and the range of manufacturers of in-line cleaning systems as well as the current market solutions is manageable.

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GEO-Reinigungstechnik GmbH – Germany
Email: info@geo-reinigungstechnik.de
Website: www.geo-reinigungstechnik.de

The new system from Siebe

Wire cleaning from GEO
Join the IWMA at the 11th edition of wire Southeast Asia, which returns to Bangkok, Thailand, in September this year.

Amidst a vibrant manufacturing and industrial landscape, the region is gearing up for the full establishment of the ASEAN Economic Community, bringing with it free movement of goods, services, investment and capital through the development of a common marketplace across Southeast Asian nations.

wire Southeast Asia is expected to continue on its upward trend, presenting a wide range of innovative machinery in wire manufacturing and finishing, fastener manufacturing and spring and wire formed parts manufacturing alongside new and upgraded machines, tools and auxiliary materials in process engineering, as well as wire and rod materials.

New processes will also be shown in measuring, control and test engineering as well as in other specialist areas. The biennial trade fair is co-located with the synergistic Tube Southeast Asia 2015.

With Thailand anchoring as the region’s manufacturing and production hub, Southeast Asia is set to achieve a real GDP growth rate of 5.4 per cent per annum between 2014 and 2018, thereby setting its wire and cable industries to greater heights in the years ahead.

With wire Southeast Asia, you can be assured Messe Düsseldorf Asia is providing the best business opportunities for you to navigate the dynamic marketplace of Thailand and Southeast Asia.

New for 2015
• Wire manufacturing and finishing machinery
• Fastener manufacturing machinery
• Spring and wire forming machinery
• Process technology tools
• Auxiliary process technology materials
• Materials including cold heading quality wire
• Measuring and control technology
• Test engineering
• Specialist technologies

Rail network improvements over the next ten years will provide excellent opportunities for companies in Singapore, while the construction sector in Vietnam is on an upward cyclical phase with projects valued at US$85 billion to 2015. Construction spending in Malaysia is also forecast to grow by 4.5 per cent annually over the next five years.

To book your space at the region’s largest exhibition for the wire and cable industry, contact project director Beatrice Ho at +65 633 29620 or email her at wire@mda.com.sg or tube@mda.com.sg

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Plascom’s wide range of compounds

Plascom Arab Co for Cable Polymers Ltd, Saudi Arabia, was established in 1995, and produces a wide range of highly specialised crosslinkable and thermoplastic compounds for cable insulation, jacketing, and Pex b Pipes.

The compounds listed below are produced on well-known state-of-the-art BUSS plant from Switzerland.

PLS 400A-PLS 420: LV Silane XLPE compound – sunlight resistant.
PLS 603CA, PLJ 602MD and PLJ 603A: LLDPE/MDPE/HDPE black jacketing compound – (natural and UV versions are also available of these jacketing grades).

LS HFFR Compound: Low smoke, halogen free, flame retardant compound for power and communication cable bedding/jacketing and insulation.
PLS FR634: (LS-HFFR jacketing compound for unarmoured cables). (Anti-termite (AT), anti-rodent (AR) and anti-rodent and termite (ART) versions also available.)
PLS FR633: (LS-HFFR jacketing compound for armoured cables). (Anti-termite (AT), anti-rodent (AR) and anti-rodent and termite (ART) versions also available.)
A warm welcome to Jas

Jas Loi has been appointed financial accountant for the International Wire & Machinery Association.

Mrs Loi started her new role on 2nd March 2015 and is responsible for maintaining robust financial control systems and processes, and ensuring accuracy and integrity of the financial ledger.

André Lewis, IWMA executive manager, said: “With nearly 20 years of experience working in accounts and a degree in accountancy and finance, Jas will undoubtedly be a major asset to the association.”

Married to Raj with two young children, Jas said: “I am really looking forward to working for the IWMA and being part of the future success of the association.”

Cost effective and flexible cross section scanning

Most optical profile measuring systems are in line-devices equipped with a sensor ring with four to six cameras. This makes quality control a costly and inflexible obligation.

Camera/laser-modules are by far the most expensive parts of an optical measurement system using the laser light section principle. Furthermore, sensor ring-based devices lack flexibility regarding the range of views they offer. Both problems can be addressed with innovative design and engineering, using only one sensor module and a simple turntable.

Beside its high accuracy, Copra® ProfileScan Desktop offers great flexibility and mobility due to the compact build and a patented 360° measuring method. The turntable-based design allows mapping of the entire visible cross section. Additionally, ProfileScan Desktop scans large inner areas even with the smallest slots in the profile, considerably reducing the “dead range” compared to a device with multiple sensor modules.

Due to its high range of views and full integration into the Copra® workflow, ProfileScan Desktop represents the ideal measuring tool for reverse engineering projects.

The profile (in DXF format) is compared with the point cloud after measuring, resulting in a deviation diagram.

In a nutshell, Copra® ProfileScan offers a particularly cost effective way for measuring of profiles, tubes, and wired cross sections. Paired with the provided software solutions, it represents a powerful tool for quality control and reverse engineering.

data M Sheet Metal Solutions GmbH
– Germany
Email: datam@datam.de
Website: www.datam.de

Become an exhibitor: wire South America 2015

wire South America is fast approaching and with it your chance to present your machinery and equipment to the South American market.

IWMA companies will be in attendance at the exhibition, which is being staged at the Imigrantes Exhibition Centre in São Paulo, from 6th to 8th October.

Economic development is set to continue in the region and with it demand for wire and cable products will increase. 750 exhibitors from 26 countries presented their products in 2013 attracting some 15,000 visitors, proving that demand is strong. This trend is set to continue as we approach this year’s event to be held concurrently with TUBOTECH.

Companies that wish to be successful in Brazil must understand the specifics of the local markets, know when and how to adapt their products to local tastes, use their expertise to become more efficient and be able to provide high quality and rapid service.

Participating in wire South America and TUBOTECH is the ideal opportunity to either enter or expand your presence in the local market and gain valuable local knowledge.

Make sure to take advantage of this marketing and communication platform to build and strengthen your contacts in South America.

Email niemannh@messe-duesseldorf.de for more details.
Extrusion line for Automarine

Danross Engineering recently supplied a 45mm extrusion line to an Automarine cable facility in Manchester, UK.

The line was engineered specifically to Automarine’s requirements but features a unique combination of used, refurbished and new cable machinery to provide a truly versatile extrusion line.

Key features of the line are medium speed despatch winding on-line, using a new twin head despatch winder and accumulator. Alternatively, there is an option for a high speed extrusion to feed a refurbished Biwater dual reeler or to an existing Box Pack take-up. The process line includes a new design of electrical control with touch screen technology.

The original used extrusion line was sourced from Goodwin Machinery. New machinery was added as required and the line commissioned in Danross works. The line was run by Automarine staff prior to installation by Danross.

This project is one of a number in the pipeline where the Danross range of new equipment and machinery combined with Goodwin’s range of used equipment can give real value for money.

When looking for a new cable process line a combination of quality second hand and new machinery can offer the most cost effective solution. Lines can be assembled which best fit your production requirements in preference to a compromise solution.

Automarine plant manager Alan Ainscough said: “Danross designed, engineered and delivered a machine to a tight specification. We were looking for a versatile production line and with Danross, that’s what we got.”

Prakab uses CableERP and CableBuilder

Prakab Prsžská Kabelovna (Prakab) has selected InnoVites CableERP and CableBuilder as its business solution.

CableERP is InnoVites’ comprehensive ERP solution for the wire and cable industry on Microsoft Dynamics AX. CableBuilder is the leading cable design solution of Cimteq that fully integrates with CableERP. For more than a year, the Prakab team evaluated available solutions in the market. They selected InnoVites, based on their industry expertise and the industry-focused solutions.

Based in the Czech Republic, Prakab is a member of the SKB Group and a leading cable manufacturer in the region.

Mr Krňák, CFO at Prakab, said: “The cable industry has unique requirements for its business solutions. These requirements are not covered by standard ERP systems. That’s why our old system has been heavily customised to support our processes. We were excited when we learned more about InnoVites CableERP. It addresses the key issues of our industry in sales, logistics, planning, production and scheduling. The full integration with CableBuilder minimises product data maintenance. With InnoVites CableERP we have a complete and sustainable solution for the future.”

InnoVites CableERP is based on Microsoft Dynamics AX, the world-leading and innovative ERP solution with rich functionality that help enterprises benefit from modern technology. InnoVites complements AX with the functionality that is focused on the wire and cable industry.

The **InnoVites solution helps customers to:**
- Improve customer satisfaction by meeting their cable requirements better and faster
- Reduce working capital and material losses by optimising for length in logistics and production
- Become more agile with reliable product data available online throughout the company
- Become smarter with a best-of-breed IT solution that understands the cable industry
- Reduce risk of price volatility with comprehensive non-ferrous metals module

InnoVites BV – Netherlands
Email: info@innovites.com
Website: www.innovites.com
New addition to family

The Polaris Neptune Electric Immersion Heater is a new addition to the Polaris family of immersion heaters.

For over 50 years Braude has specialised in acid proof equipment for heating corrosive liquids. Its range of products is used in industries such as galvanising, aerospace, metal finishing as well as the chemical industry. The company has also received requests to broaden its product range to include a heater that was not only cost effective but also a more conventional option for the most common process solutions.

The Polaris Neptune electric immersion heater was created for typical applications such as degreasing solutions and common electroplating processes where the full chemical resistance of Teflon is not required.

Braude engineers were working to ensure that a high performance tubular MI electric heater was created without compromising on the quality that you can rely on from the company.

The principal materials are stainless steel or titanium but other options such as Inconel and Teflon sheathed are available on request. The heaters are available in single or three phase supply and the standard solution level is at least 50mm above the hot zone of the heater. There will be no exposed joints near the surface of any liquids. The heaters should normally be mounted to the flange of the tank and all are fitted with a fully encapsulated head to IP66 with a flying lead for easy connection. For solutions generating deposits such as phosphating, polished heaters and low watt density models can be provided.

Braude can provide temperature and level controllers as well as complete control panels for use with your heaters.

The principal features of the heater are:
• A robust construction
• A choice of either stainless steel or titanium
• Various sizes from 1kW to 18kW
• Option of either single or three phase
• Resin heater connection to IP66
• Flying lead for easy connection
• Over the side mounting with hanging bracket provided
• Choice of configurations to suit tank
• Compatible with Thermostatic and Levelmaster controllers

Braude – UK
Email: info@braude.co.uk
Website: www.braude.co.uk

Efficiency of wire drawing lubricants

Traxit International provides the wire drawing industry with a complete range of lubricants to suit all types of wire for all applications. It will be exhibiting on stand K33 at the forthcoming wire Southeast Asia in Bangkok, Thailand.

All its products meet EC health and safety regulations and are backed up with ISO 9001 and OSHAS 18001. The company uses its vast experience to look ahead and remain in the front of advances in wire drawing.

Traxit has changed all lubricants to borax-free versions and has reached better performance results in most cases.

Traxit has entered the market with lubricants for pressure dies (hydrodynamic lubrication)

Traxit Interantional – Germany
Email: info@traxit.com
Website: www.traxit-international.com

Spring 2016 issue

Members: Please send us your editorials for free publication in the next WCN (or on the IWMA website at any time between editions of WCN).

One of the strictly members-only benefits of belonging to the IWMA is the facility to publish your company’s editorials in WCN, both the hard copy and electronic versions, completely free of charge, and reach thousands of readers worldwide.

In addition to worldwide distribution WCN is freely distributed at all major industry trade fairs and IWMA technical events. The next important upcoming exhibitions are wire Southeast Asia in Bangkok, Thailand, and wire South America in São Paulo, Brazil.

Members should also bear in mind that the IWMA website can accept editorials at any time during the year.

Providing editorial for WCN and the website can help members in many ways:
• Communicating important messages worldwide
• Attracting interest from the high number of national visitors to this year’s exhibitions
• Creating a high profile at all events
• Advising customers of personnel changes
• Announcing major new developments
• Celebrating winning of new contracts/orders
• Staying one step ahead of the competition

Please send us your editorials (not advertisements) with supporting photos to info@iwma.org for the Spring 2016 edition. Photographs should be a minimum of 300 dpi and in .jpg format.

If marketing and public relations is not your area of responsibility please make sure that the relevant department/person is aware of this information.

Please submit editorials by 15th January 2016.
Dinner and a weekend in London

Here's your chance to grab a fantastic weekend in London and enjoy an evening at the IWMA dinner and dance at the Royal Garden Hotel in Kensington.

The annual event takes place on Friday 20th November 2015 at this 5-star hotel situated in the heart of London and starts with a drinks reception followed by dinner in the Palace Suite.

After dinner, live entertainment will have you dance into the evening. There is then the time to enjoy the rest of your weekend in the capital city.

Again, the association’s discount covers your entire booking, so why not make this a weekend to remember. For more information contact the IWMA office.

Convert your galvanised wires in storage to Galfan® wires

Commonly, Galfan® is produced in-line with the galvanising bath. Consequently, it requires space but it also imposes the use of one position per galfanised wire on your galvanising bath.

FIB has developed a technology that allows galfanising “off-line” some galvanised wires.

Advantages:
• Large flexibility in the manufacturing programme
• Number of wires in the galvanising line becomes independent of your Galfan® programme
• Compact solution
• Upgrading of existing galvanising line with limited space

FIB Belgium sa – Belgium
Email: info@fib.be
Website: www.fib.be

Fine wire die development

As a member of Shanghai Kingway Technology Group, Tianchang Kingway Diamond Dies factory has been devoted to diamond drawing dies of hole size less than 0.04mm for fine size wire drawing since October 2014.

For hard wire drawing, its technical department in die-making has been advancing wire drawing dies for stainless steel wire, high carbon steel wire and low carbon steel wire, etc.

Since May 2015, the company has gained new customers from Brazil and the Netherlands who are in the field of low carbon steel wire drawing. It is planning to develop the European market and Thailand customers.

Shanghai Kingway Technology Group Limited – China
Email: martinding@188.com
Website: www.kingwaytechnology.com

Search is over

One of Force Measuring System’s valued customers, a global producer of low, medium and high voltage cables, suffered from excessive downtime of its older bunchers. In particular, with the proprietary buncher cradle data system no longer being supported by the OEM, a search for a retrofit solution was undertaken.

A substantial production backlog required management to consider either obtaining new machines or finding an alternative. With the risk of a very large capital investment, FMS was contacted to review the project.

FMS proposed the use of the RTM (radio transmitted monitoring) system as a replacement for the existing outdated and fragile electronic components. The required signals (encoder for capstan speed ratio control and length measurement, analogue for dancer arm position, and multiple 12/24VDC digital), are transmitted wirelessly from the cradle inside the bow to the receiver located outside the bow.

Customer benefits include:
• Low capital investment, compared to the purchase of new machines
• Time savings: Reduced production downtime due to short-term retrofit of RTM system
• Simplicity: No data transmission via slip rings, virtually maintenance-free RTM X2.MP system
• Simplicity: Plug and play concept with a minimum of components
• Transmitter – Located within the bow, 24VDC operation
• Receiver – Located outside the bow
• Versatility: Multipurpose signal transmission of:
  - Two encoders
  - Eight digital signals (bi-directional)
  - One analogue signal (bi-directional)
  - Two tension measurement signals

The proposed RTM X2.MP system upgrade for the bunchers was successfully implemented and trialled, and this customer is currently in the process of duplicating the upgrade on a total of 40 machines.

Force Measuring Systems AG – Switzerland
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Website: www.fms-technology.com
Middle East cable market to show continued strong growth

The Middle East cable market is expected to experience the strongest global growth, particularly in the Gulf Cooperation Council (GCC) countries. Enormous investment in the Middle East, which averages at 25 per cent of the region’s GDP, is seen to be the strongest driver for the steady growth in the cable sector.

The findings of Integer Research’s recently published Global Wire and Cable Data Service reveal that the demand for energy cable in the Middle East will show the fastest increase during 2015-2019, while telecom and data cable will also see a healthy growth due to strong investment and upgrades within the construction and infrastructure sectors.

However, the decline in raw material prices, particularly oil prices, may have a detrimental effect despite the strong growth rates. The fall of oil prices in the past year have been largely influencing the entire economy in the region and the tendency of the prices is considered as one of the key drivers for the sustainable development for the Middle East cable market.

The challenge for the industry is to identify where the greatest margin exists and to develop the right partners to convert potential into profit.

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Taking place on the 2nd-3rd February 2016 in Abu Dhabi, Integer’s 2nd Advanced Cable Middle East will examine the present and future of the Middle East cable industry and investigate the most promising growth areas in the region.

The conference will provide a unique knowledge sharing and business networking platform for international and regional wire and cable stakeholders to keep updated on the fast pace of the Middle East market and discover the most profitable and exciting business opportunities in this emerging region.

Integer Research Ltd - UK
Email: Conferences@integer-research.com
Website: www.integer-research.com/conferences/acme-2016

New standards for wire straightening

Eurobend GmbH operates through a new state-of-the-art production facility and headquarters, offices and service centres throughout the world (USA, Germany, France, Dubai, Moscow, India and Brazil).

Its wire processing equipment lines include a complete range of high-output programmable wire straightening and cutting machines (type “MELC”) based on the rotor straightening principle, method that was invented and introduced by Eurobend engineers in the early 1980s, setting a new standard for the wire producing and processing industries.

The newest addition to the MELC straightening machines using the rotor straightening method is the Melc 50 Monoline, which can process up to 50mm (2”) wire.

Other machine versions available (single line and multi line, with up to six independently operating lines), processing diameters from 2mm (0.0787”) and above.

The Eurobend straightening method is based on its invented method - the rotor straightening system with hyperbolic rollers. These rollers execute the two fundamental operations of straightening and feeding, simultaneously. This is achieved by positioning the rollers at an angle to the wire axis and rotating around it, thereby at the same time accomplishing feeding and straightening.

The placement of the rollers at an angle to the wire axis results in line contact with the wire surface and not in point contact as in conventional rotors with dies. Also, when the rotor is spinning and the rollers are feeding the wire through, there is no sliding friction, but only rolling friction, and thus the wire surface is not damaged.

The Eurobend straightening method ensures:
- Optimal straightening quality and consistency
- No marking on the wire surface
- No continuous adjustments required
- Elimination of premature wear of the rollers

Eurobend SA - Greece
Email: info@eurobend.com
Website: www.eurobend.com
Meeting facilities for IWMA members

With the IWMA being situated centrally in Solihull, UK, at an office complex only half a mile from Birmingham International Airport, train station and major motorway networks, Wellington House could be a perfect cost-effective solution for your meetings and events.

IWMA member companies can make full use of the meeting room facilities at Wellington House, whether you are looking to arrange a small meeting for just a few people, right up to a full board meeting of 20 people.

There is ample free parking, plenty of nearby hotels and catering, and audiovisual equipment can also be provided to ensure that meetings run smoothly.

Also, individuals who are in the area and need somewhere to catch up on those important emails can make use of the “hot desk” available in the IWMA office.

If you are interested in hiring a meeting room then please contact the IWMA office for details.

Outstanding results

Results have been outstanding for Rosendahl and Nextrom who have focussed strongly on the extrusion of silicone and high temperature materials in recent months, and the results were presented at this year’s wire Russia.

The company has two offices in Moscow, Russia, to assist both brands. The service office, OOO Rosendahl Nextrom, fully supports Rosendahl’s and Nextrom’s customers in every aspect of project execution and post-project support. This includes consulting, factory design and throughput calculations, cooperation on cable or manufacturing lines and machine developments right up to long term maintenance.

Furthermore, OOO Rosendahl Nextrom fulfills spare parts orders locally. The company’s close contact with its partners and the strategically positioned office ensures the shortest-possible response time.

Its core competencies include:
• Extrusion
• SZ-stranding
• Corrugation
• Optical glass making
• Fibre drawing
• Fibre coating
• Ribbon making
• Proof testing

RichardsApex appoints Ralph Creneti as research associate

RichardsApex, a global supplier of speciality metalworking fluids, has promoted Ralph Creneti to the position of research associate in R&D. He has been instrumental in driving technology gains for the company over the last 13 years.

Prior to joining RichardsApex, Mr Creneti worked for eight years in QC and technical service for the division of Elf Atochem that provided lubricants to the cold rolled steel industry. This division became part of Henkel Surface Technologies through a series of mergers and acquisitions at the time.

Bruce Calvert, EVP and director of R&D, said: “Ralph has made important contributions to our success. He is a valued resource internally and externally.”

Mr Creneti holds a BS in Chemistry from Temple University.
Reduce manufacturing costs

NDC Technologies reports that its innovative Beta LaserMike LaserSpeed® non-contact gauge enables wire and cable manufacturers to accurately measure the length and speed of products during production to avoid costly product overages and shortages, as well as reduce product scrap and rework.

Manufacturers of wire and cable have applications where they need to tightly control the length and speed of product during production. Applications include continuous length measurement, differential speed control, cut-to-length control, product positioning, and printing/marking control, and other demands.

Most manufacturers depend on the accuracy of their drive speeds or mechanical contact encoders. But, mechanical encoders can lose contact on various product surfaces due to slippage or vibration, and require frequent calibration because of mechanical wear and tear.

A contact encoder with inaccuracies as much as two per cent can cost a manufacturer a significant amount of money due to product give-away, waste, maintenance and system downtime. To solve this problem, manufacturers have installed the LaserSpeed non-contact gauge on their production line to directly measure the length and speed of product.

The LaserSpeed gauge uses advanced, laser-based technology to precisely measure the length and speed of wire and cable during production without making contact with the product. This high-performance gauge projects a unique pattern on the surface of the product.

As the product moves, light is scattered back to the LaserSpeed unit. This information is translated into product speed and pulses are produced to determine the product length. Length and speed measurements are captured with ±0.05% accuracy and ±0.02% repeatability. NDC offers a complete line of LaserSpeed systems with measurement speeds up to 12,000m/min (39,400ft/min) and down to the true zero speed, standoff distances up to 1,000mm (39.4”), and measurement depth of field up to 100mm (4”). NDC also offers a European certified length measurement system that meets MID (Measuring Instruments Directive) 2004/22/EG requirements.

Gesadur® WN machine under-rollers

Having worked on behalf of the manufacturer Sachsenroeder GmbH & Co KG for many years, Techna International is ideally placed to supply high grade Gesadur® support under-rollers for large rotating machines.

Many machines are equipped with under-rollers made of laminated fabric sheets impregnated with resin and compressed into plates. Rollers are then turned out of these plates with their laminates positioned vertically to the running direction, which can result in relatively quick wear and delamination.

Due to the laminated structure it is difficult to attain an adequate surface finish and during long non-operating machine times, the rollers tend to develop flats which remain when the machine is restarted, causing high noise and machine vibration.

In comparison, Gesadur® WN is a homogeneous material consisting of 60% natural fibre with good surface quality, and having a three-dimensionally linked structure which can withstand extremely high forces. This often allows increased machine rotational speed combined with decreased noise and, due to the memory properties of the material, rollers are not subject to developing flats and associated vibrations are consequently dampened.

Applications include Trunnion or support rollers for cable and wire stranding machines, pressure rollers for spinning machines, insulating flanges for annealers and forming surfaces for metal spinning machines.

Advantages include:

- Very good processing properties:
  - machining, drilling, milling and sawing
  - high impact strength leading to longer service life
  - reduced vibrations and noise
  - increased machine speed and output
  - smooth running surface
  - resistant to oil and grease
  - good electrical insulation characteristics
  - low water absorption
  - climatically stable
  - memory allows any flattening to be removed after a few machine rotations

Technical parameters:

- Tensile strength – 7,000–8,000N/mm²
- Bending strength – 80N/mm²
- Pressure resistance – 350N/mm²
- Specific gravity – 1.4g/cm³
- Dimensional stability/Martens – 130°C
- Coefficient of friction (dry steel) – 0.21
- Dielectric strength (machined) – 15.5kV (4mm)
- Water absorption acc. DIN 53495/32 – 80mg
- Surface electrical resistance (machined) > 109 < 1010 Ω
- Coefficient of friction (depending on grease) 0.1

Rollers are pre-machined with a universal oversize of 2mm on the outer and inner diameters and width, for final machining at customer facilities. They are completely finished with steel bush and/or steel sleeve, outer diameter turned with diamond, concentricity max. 0.01mm.

In dusty/dirty working environments deposits may collect on the under-roller surface causing small pressure point overloading which can result in burning and subsequent damage.

An under-roller cleaning system and Gesaclean fluid are available for maintenance.

Techna International Ltd – UK
Email: sales@techna.co.uk
Website: www.techna.co.uk
Quality and first class stranding

Based on its success over the last two decades, Sket Verseilmaschinenbau GmbH in Magdeburg, Germany, has become a valued and important partner in the cable and wire rope industries in over 50 countries, whether it be as a supplier of individual machines, complete technological lines or equipment for the manufacture of electric cable or steel wire rope.

Amongst leading machines for the cable industry are MKZS/T series central stranders, type MWR drum twisters, and cage-type stranding machines type MKVD and MRKD with variable back-twist for the manufacture of very long offshore AC energy cables in all diameter ranges.

These machines are designed to strand together three insulated round conductors into very long ocean-going cables in the most varied of constructions. The round conductors are accommodated in pancake style pay-offs suitable for very heavy handling weights. Depending on the requirements of the cable construction, other elements such as glass fibres, control or communications cables can be incorporated into the strand from stationary or rotating pay-offs.

In the last two years Sket systems carrying the type reference MVD have been supplied to market-leading manufacturers in Europe and Asia and these are now in full production.

The wire rope industry too uses mainly stranding machinery manufactured by Sket. Throughout the world high-speed tubular stranding machines type SRW, double-twist bunching machines type MSDN and cage-type stranding machines type MKVS are in use, these being the company’s main products for the steel wire rope industry.

Most recently, stranding machines for the manufacture of very long offshore ropes have become increasingly important. Included amongst these are special high-speed stranding machines with over 48 bobbins and bobbin diameters of 630 or 800mm for the production of steel wire strand.

The rope is then produced on large cage-type closing machines with variable back-twist, and having bobbin flange diameters of up to 2,800mm, in single or tandem arrangement. These cage-type closing machines can be supplied with traversing pay-offs and take-ups for maximum processing weights of over 600 tonnes.

The Cimteq stand at Interwire - a huge success for Cimteq as reflected upon by Ali Shehab, CEO: “It was great to see some of our existing customers and hear their feedback and success stories. We received a lot of appreciation for the responsive and professional support we provide.

“...This is because at Cimteq we consider the customer a part of our team; we apply the same values to them as we do internally to our own team and business framework. We look forward to returning again in two years.”

CableBuilder 3D launch

Atlanta, Georgia, USA, hosted Interwire 2015 in late April. With many delegates from around the globe in attendance and some of the key players in the industry exhibiting, the show proved to be one of the best yet.

Cimteq, producer of the world’s leading cable design and manufacturing software, returned to exhibit at the show for the seventh time running, showcasing its flagship product CableBuilder, and also launching an exciting new product – CableBuilder3D.

The new product further secures CableBuilder’s future. It fully integrates into CableBuilder and has extensive 3D modelling graphics abilities, engineering drawing generation and full CAD capabilities. The system can take designs generated in CableBuilder and automatically transform them into 3D near-photorealistic drawings, negating the need to hire a photographer or subcontract out to an external graphics agency.

The images can be integrated into datasheets to provide much more professional literature that can then be supplied to the cable maker’s own customers for use in their marketing material both on- and offline. In addition to the attention attracted at the show by CableBuilder and CableBuilder3D another of Cimteq’s products, CableMES, a cable specific manufacturing execution system based on the Wonderware platform, drew a great deal of interest.

Following its listing in Wire & Cable Technology as one of the top products of 2014 its popularity is soaring, with companies recognising that MES is fast becoming a must have when it comes to cable manufacturing due to the ability to reduce manufacturing costs, improve quality and increase performance.

Overall the show was a huge success for Cimteq as reflected upon by Ali Shehab, CEO: “It was great to see some of our existing customers and hear their feedback and success stories. We received a lot of appreciation for the responsive and professional support we provide.

“...This is because at Cimteq we consider the customer a part of our team; we apply the same values to them as we do internally to our own team and business framework. We look forward to returning again in two years.”

Cimteq Ltd – UK
Email: info@cimteq.com
Website: www.cimteq.co.uk
The 7th biennial conference returns to Düsseldorf, Germany, the home of the wire industry, and is already attracting significant interest following the huge success of the 2013 CabWire conference in Milan.

This non-profit event is subsidised by key industry associations, and at only €175 per delegate offers incredible value for money - an unparalleled opportunity to learn about the latest industry innovations.

Cabwire World Conference is a ‘must attend’ industrial technology event for all wire and cable professionals.

CabWire 2015 has an impressive list of world-class speakers in ferrous and non-ferrous fields, headed by Dr Klaus Probst, recently retired Chief Executive Officer, President and Head of Wire & Cable Division of Leoni AG, and presentations from companies including:

- SAMP SpA (Italy)
- Maschinenfabrik Niehoff GmbH & Co KG (Germany)
- SICME Italia Implanti (Italy)
- Sikora AG (Germany)
- De Montfort Leicester University, School of Engineering and Sustainable Development (UK)
- NV Bekaert SA (Belgium)
- FMS Force Measuring Systems AG (Switzerland)
- Ceeceo Bartell Products (Canada)

**Reasons why you need to be there:**

- Packed ferrous and non-ferrous programmes by industry leaders
- High quality keynote speakers
- Table top exhibition
- Evening reception - an excellent opportunity to network
- Backed by leading industry organisations
- Tour of a major industrial plant to see the latest technology in action
- A world-class venue in the world centre of the wire industry

**Exhibition & Sponsorship Opportunities**

A table top exhibition complements the conference sessions. It is an excellent showcase for your business and a great opportunity for one-to-one discussions with suppliers.

Exhibition spaces are limited, so early booking is essential. You can also take advantage of excellent sponsorship opportunities.

**Also included in your delegate fee**

CabWire 2015 evening function will be held at the Zum Schlüssel, a venue with a long and rich tradition, located in the heart of Düsseldorf old town.

**Ferrous plant tour**

Plant tour, Duisburg, Wednesday, 4 November at ArcelorMittal, the world’s leading steel and mining company.

To register or for more information visit www.cabwire.com
# CabWire World Conference 2015
## DRAFT PROGRAMME

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### FERROUS

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<td>Traxit International</td>
<td>New efficiency coatings and dry drawing lubricants</td>
</tr>
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### New members from AESA

**Aymak Makina**

Aymak Makina Mühendislik Hizmetleri San Ve Tic Ltd Şti was founded in Istanbul, Turkey, in 2003, offering the most appropriate solutions to its customers in the field of cable machinery industry, and bringing technology, knowledge accumulation and expert staff together.

**Aymak’s production programme and capability includes:**
- Production lines from 0.5mm² to 4x300mm² (0.6–1kV) steel armoured or without armoured energy cables producing
- From 35mm to 150mm extrusion lines
- From 1+6+12+18+24/315mm up to 630mm rigid strangler lines
- From 315mm to 2,000mm bunching twister lines
- From ø1,000mm to ø3,200mm drum twister lines
- From ø400mm up to ø1,600mm planetary strangler lines
- Coiling lines
- Rewinding lines
- Armouring lines
- Pay-offs and take-ups
- Crossheads
- Taping heads
- Auxiliary machines

**SWR Ltd**

SWR Ltd, established 1989, offers an extensive product range of high quality steel wire ropes and fittings for a variety of markets, specialising in the production of bespoke assemblies backed with an enthusiastic approach to customer service. ISO9001 accredited, SWR aims to be a supplier of great value to customers with quality and innovation at the heart of everything it does.

For more information visit: [www.steelwirerope.com](http://www.steelwirerope.com)

### New functions from AESA

AESA Cortaillod, the Swiss manufacturer of ATE for the cable industry, has introduced additional functions for its balunless HF test equipment Cobalt. Thanks to a triaxial accessories set, EMC measurements (ie coupling attenuation AC, screening attenuation AS and transfer impedance TI) are now available among plenty of flexible possibilities only offered by such a balunless system.

There is no longer manipulation needed between HF and EMC measurements, so the time required for the cable preparation (as for the screening attenuation where all wires have to be soldered together) is significantly reduced. Moreover, all data is recorded in a single file, for easy and optimised data evaluation storage.

Additionally, screening attenuation is now available for each pair and not only one for the worst case value.

AESA also improved the patchcord measurement, implementing the direct testing of RJ45 samples with connectors. This is only an example of a connector used for assemblies; any other connector can be used to test according to customer requirements. Knowledge is the driving force of AESA. This is demonstrated by its active participation in study committees (eg Cigré), the writing of smart and useful application notes, the publication of technical articles or the setting up of seminars.

AESA has now reinforced its development team with Peter Fischer joining. He brings significant experience as development and test engineer at Reichle & De-Massari, and a degree from Zurich’s university. He is presently member of several standardisation committees, and become a TIA member in June 2015. He works specially in the innovation for high frequency measurements.

**AESA Cortaillod – Switzerland**

**Email:** info@aesa-cortaillod.com
**Website:** www.aesa-cortaillod.com
Rapid progress in 12 months

Singhania International Limited has seen a lot of progress and expansion, and has many plans for the near future. The company is now ISO 9001:2008 certified by TUV Nord.

Over the past six months, Singhania has added new wire drawing machinery from China, Taiwan and India. Its total monthly production capacity for processed steel wires has now reached 3,500m/month, and it is selling processed steel wires up to 30mm in diameter.

It has also installed two more bell-type spheroidised annealing furnaces (in addition to the existing one), which are now fully functional. As a result, its monthly spheroidised annealing capacity is now around 400m/month.

The company has also installed a new, wire coil packaging machine and is now supplying all its OEM customers packaged wire with branding visible on the wire packaging.

Singhania is also planning to order a new high-speed wire drawing machinery for producing spring steel wires up to 1.5mm diameter. It is strengthening its hold in the high carbon and spring steel wire industry. It also recently launched its own branded spring steel wires under our brand name Singhania Wires™. The demand for its spring steel wires is picking up and it has reached monthly volumes of about 200m/month in the spring steel wire category just two months after the launch.

The company launched its new catalogue in April.

Singhania International Limited
(Singhania Wires) – India
Email: info@singhaniawires.com
Website: www.singhaniawires.com

Mathiasen’s exclusive contract

Mathiasen Machinery Inc has been awarded an exclusive contract to sell two complete continuous copper rod upcast systems.

COCESA, a power cable manufacturer located in Chile, has appointed MMI as its exclusive sales agent for the two upcast systems. Both systems were purchased new in 2008 and each one has a monthly output of 770 tons of 12mm diameter oxygen-free copper rod. Decommissioning took place in late 2014. The equipment is still installed. Complete specifications and photos are available by contacting Mike or Mark Mathiasen at +1 860 8731423 or emailing mmi@mathiasen-machinery.com.

Mathiasen Machinery – USA
Email: mmi@mathiasen-machinery.com
Website: www.mathiasen-machinery.com

Bechem continues USA expansion

At Interwire in April, Bechem presented its full range of high performance lubricants for wire drawing, from established classic products to most modern product solutions, such as emulsion technology in aluminium wire drawing, new fully synthetic products in copper wire drawing and totally new coatings for wire products in cold massive forming. This was the first fair for the company with new sales power and in Bechem corporate design in the USA.

Last year the company completed the acquisition of its joint venture partner’s 50 per cent interest in Etna-Bechem Lubricants, LLC, and formed the new company Bechem Lubrication Technology, LLC.

This will continue to focus on the growth and expansion of the current markets being served, while looking to further expand into other niche markets with the globally recognised Carl Bechem technologies and brands.

Bechem Lubrication Technology – USA
Email: info@bechem.de
Website: www.bechem.de

New feature added to Marlodon airwipes

The Marlodon “variable orifice” airwipe design has always offered users the economy of a single unit to process a range of cable (or tube) diameters effectively, but the guidance of cable into the unit has been the responsibility of the customer. Correct alignment of cable through the unit is essential to good drying and also to avoid the cable coming into contact with the airwipe which may damage the cable and, over time, the airwipe.

Marlodon now offers an attachment which holds roller guides on the input and output side of the unit. The attachment is compact and sits neatly within the airwipe assembly. Each roller is independently adjustable for height to accommodate the specific diameter of cable (or tube) being processed (as the centreline must remain constant across all cable diameters).

This and other news from Marlodon is now regularly updated on the @marldon Twitter feed.

Marlodon Group Ltd – UK
Email: sales@marldon.com
Website: www.marldon.com
1,000m/min – the future is here!

It has been a busy year at Maillefer’s new R&D centre in Finland, and for fibre optic cable solutions the company has reached the ultra-high speed of 1,000m/min with the new secondary coating line OEL 40///Explore.

Secondary coating is the most essential part of the fibre optic cable production process. By considering the consistent quality of loose tube as a starting point, Maillefer was able to develop its offering to better respond to the other requirements fibre optic cable production.

OEL 40/Enter: If you are considering to start fibre optic cable manufacturing, OEL 40/Enter is a quality choice that is in range of start-up investment plans. The line speed reaches up to 300m/min for jelly-filled tubes. OEL 40/Enter is a robust, low maintenance line, with which you get maximum productivity from day one.

OEL 40/Extend: If you are interested in a high-speed, flexible secondary coating line, OEL 40/Extend is a lean and proven solution. The line speed reaches up to 500m/min and works perfectly with both jelly-filled and dry tubes. The high quality of loose tube is ensured by Excess Fiber Length (EFL) and shrinkage control with the compression caterpillar CCA 1000.

OEL 40///Explore: If you prefer ultra-high speed production with the ability to use a variety of materials, you should choose OEL 40///Explore. The line and its components are fine tuned for high speeds. This includes precise alignment and balancing of all rotating and moving parts. With an output of up to 1,000m/min, the line provides you with jelly-filled and dry loose tubes within tight quality tolerances. EFL and shrinkage control with the CCA 1000 compression caterpillar are also included.

Niehoff’s D 1251 double twist buncher works at 1,200tpm

In a permanent and close cooperation with renowned cable manufacturers, Maschinenfabrik Niehoff has been designing and building bunching machines and stranders since 1966.

The result of this development was the D series of double twist bunching machines whose biggest model, the D 1251 type version, works with a pulling force of 12,000 N. Its production speed is impressive: In one industrial application, for instance, when used for the manufacture of conductors with a 7 x 3.05mm design and a compaction of 10 per cent the machine works at a speed of 1,200 twists/min (tpm). This is approximately three times as fast as the industry standard production speed.

The D 1251 is foreseen for the manufacture of copper wire strands with a cross-section of up to 95mm² and aluminium wire strands with a cross-section of up to 120mm² with a steplessly variable lay length of 40 to 500mm.

The strands can be compressed or formed into sector-shaped conductors. The D 1251 is designed for spools with a flange diameter of 1,250mm and a maximum weight of four tons. Another advantage of the machine is that no special foundation is required for its installation.

Like all machines of the D series, the D 1251 features a single-bow design and contactless machine data transmission. The result: Lower energy consumption, lower noise emissions, and lower maintenance costs than with double-bow machines.

All the new D type machines are operated using a network-compatible human machine interface (HMI) a colour touchscreen monitor called NMI (Niehoff Machine Interface) which clearly displays any information, instructions and system status messages in the operator’s language.

The winding tension is infinitely adjustable and is precisely regulated by an integrated load cell throughout the entire winding operation. The result: Compliance with closest production tolerances and reduction of material use.

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wire Russia 2015

The IWMA was delighted to support wire Russia 2015, the leading Russian trade fair for wire, cable and wire-processing held at the Expocentre in Moscow from 12th-15th May.

The IWMA joined exhibitors from 25 nations – including over 40 IWMA member companies – from big names on the manufacturing side, small specialists, long-standing participants as well as first-time exhibitors. Particularly well represented were suppliers from Germany, Italy and Austria. Joint corporate participations from companies as well as first-time exhibitors.

200 exhibitors presented product and service innovations during the four days. This underscores how important this industry platform is for the Russian Federation. Some 2,500 experts from the wire, cable and wire-processing industries came to wire Russia, the all-encompassing B2B-event in Moscow.

Werner M Dornscheidt, president and CEO of Messe Düsseldorf, assesses market opportunities with cautious optimism despite the tight political and economic situation: “Although the current situation is anything but easy I am convinced the outlook for the wire and cable industries on the Russian market are positive in the long run.

“We have already overcome many global economic challenges. This has shown us that those standing their ground on the market even in difficult times are among the winners when business picks up again.”

He added: “The fact that visiting trade fairs abroad has become more difficult for Russian experts benefits local events. We are satisfied with the number of visitors.”

PlasmaAnnealer awarded Top Products of 2014

PlasmaAnnealer for fine stainless steel and nickel alloy wires has been awarded “Top Products of 2014” by the editors of Wire and Cable Technology magazine. Annealing of stainless steel and nickel alloy wires has so far been done almost exclusively in the traditional tube/strand furnaces.

Energy coupling in the traditional furnace is not effective enough to allow high-temperature annealing to be done at drawing or rolling speeds. Stainless steel wires have up to now always been annealed in a multi-line setup.

PlasmaAnnealer for fine wire is the first machine of its kind to enable annealing of fine austenitic stainless steel and nickel alloys wires at the speed of drawing (ie at up to 25m/s). Austenitic stainless steel wires with diameters from 0.5mm to 0.1mm (0.02” to 0.004”) can be recrystallisation annealed with plasma at speeds of 360m/min to 1,500m/min (1,200ft/min-5,000ft/min).

A single line PlasmaAnnealer can substitute 15-30 lines in a traditional tube furnace whilst abolishing the need for expensive multi-line take-ups and payoffs. PlasmaAnnealer can be used for small cross-section round, flat and shaped wires as well as for tubes, ropes and strands made of stainless steel and nickel alloys.

The annealer features compact design, high energy conversion efficiency, and very low gas consumption, and gives the operator the ability to target mechanical properties with a great degree of accuracy. Rapid heating and reduced time of recrystallisation results in fine grain size with uniform crystal structure. The PlasmaAnnealer can cold start production in a few minutes and can be stopped immediately.

This avoids the lengthy heating-up and cooling-down times and associated energy costs that are symptomatic of conventional tube furnaces. The installation in the layout drawing on the left features a line with a double-head takeup with automatic spool changeover functionality. This allows for long continuous drawing runs and minimal operator assistance.

High-speed annealing trials can be performed at Plasmait’s facility in Austria. The annealer can process different type of materials used in applications such as fine wire for mesh and textile, filter wire, EMS mesh wire, electronics resistance wires, heating element wires, copper clad steel and copper clad aluminium wires, as well as wires, ropes and tubes for medical, jewellery, aerospace, automotive and similar applications.

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New concept of wire drawing

After studying years on how to make cost effective dies, Ajex & Turner is now proposing diamond coated dies. These dies are replacing PCD with more wear resistance, and extremely smooth surface with immensely low friction, and the wire and cable industry can save the metal which is the basic raw material of the industry.

The dies are used:
- To draw stainless steel wire or carbon steel wire up to 0.6% C
- To draw aluminium or Al alloy wire
- To draw nickel silver wire
- To draw copper/brass tubes

These diamond coated dies can be used for wire drawing and compacting copper/aluminium/aluminium alloy/nickel/ stainless steel, copper and brass tube and it can be made from 3mm to 72mm.

The dies also give:
- Lower friction
- Range from 1.2mm to 7mm
- Improvements of 2-3 per cent in raw material utilisation
- Metal and metal saving
- Aluminium RBD processes make stronger and better wire using low friction diamond coated dies, which provide much better performance than TC or PCD dies, made possible by vastly improved diamond die technology. Hold +0 tolerance for up to 500 tones (stainless steel and carbon steel wire up to 0.6 per cent C). The price is two to ten times lower than PCD dies (depending on bore diameter).

For high and low carbon, Ajex has developed pressure dies for long life. These dies are used for dry and wet drawing. With its revolutionary concept of disassembling dies, it improves lubrication, gives 30 per cent more nib or pallet life and produces higher quality wire. The pressure dies contribute significantly to increase drawing speeds and improve productivity to wire plants.

By using the pressure die, the re-cutting or refurbishment is very much eliminated and the wire drawing speed also increases up to 50m per second. This performance can only be achieved with Ajex pressure dies and their drawing inserts.

Ajex also provides three-day workshops to engineers, giving operators the chance to learn step-by-step maintenance for maximum utilisation and longer life.

Ajex has developed many machines for die polishing and re-cutting for carbide and polycrystalline.

Dies which are running one to three shifts need periodic cleaning for smooth performance and long life. For the same purpose it has developed a die cleaning solution with ultrasonic machine which is developed in two parts for longer life.

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PWM to exhibit manual cold welders at wire Southeast Asia

British company PWM, which has been at the forefront of cold pressure welding technology for more than 30 years, will present its comprehensive range of high-performance manual cold welders at wire Southeast Asia 2015 (stand J11).

Conductor preheating and temperature measurement

Manufacturers of cables, specifically automotive and data cables, require a reliable conductor preheating, to ensure an optimum adhesion of the insulation on the wire, respectively, a controlled foaming.

With the Preheater 6000 TC (temperature controlled) Sikora presents an advanced solution for precise conductor preheating, the basis for high-quality cable production and repeatable control of the production.

In only a few applications, it may be sufficient to control the output power of a conductor preheating device only depending on the conductor size and type, the line speed and the required temperature. However, there are numerous influences on the accuracy of the conductor temperature, such as the ambient temperature, the initial temperature of the conductor and particularly the development of the temperature of the wire guiding short-circuit wheel within the first 10 to 20 minutes after starting the production or after an interruption of production.

The Preheater 6000 TC is positioned before the extruder and inductively heats the conductor to the desired nominal value. The integrated IR camera ensures a non-contact measurement of the wire temperature at the output of the preheating device.

The controlling module of the Preheater 6000 TC continuously adjusts the power of the preheating with the result that the wire always has the nominal temperature, independently of conductor material, the dimensions of the conductor and the line speed. No further setting is necessary. LED displays directly on the Preheater 6000 TC show the measured temperature at different perspectives.

The integrated, non-contact temperature control makes the Preheater 6000 TC unique. It is available for temperatures up to 250°C for a product diameter of 0.32 to 4.5mm (0.08 to 16mm²) and for line speeds of up to 2,500m/min.

Three device models are available for the power range of 10, 20 and 30kW.

During the production of cables or wires, the conductor is heated prior to the extrusion process to ensure optimum adhesion of the insulation on the wire.

Wire-Temp 6000 is a system for precise online measurement of the conductor temperature. The Wire-Temp 6000 can easily be installed in insulating as well as CV lines after the preheater.

Independent of external influences and on a non-contact basis, the Wire-Temp 6000 continuously measures the temperature of the conductor prior to entering the extruder, assuring repeatability in the production process.

Designed for diameters from 0.3 to 5mm, or alternatively from 5 to 50mm, the system is laid out for product temperatures up to 150°C, and optionally up to 250°C. The non-contact measurement of the temperature is independent from the cross-section, the material and the surface structure of the conductor.

Temperature measurement is done by means of a thermal image sensor in an infrared camera.

The company will be exhibiting at wire Southeast Asia in Bangkok, Thailand, on stand J25, from 16th to 18th September.

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Niehoff’s new MSM 86 rod breakdown concept

In Spring 2014, Maschinenfabrik Niehoff introduced its new completely developed type MSM 86 rod breakdown machine designed for wires made of copper, copper alloys, aluminium, aluminium alloys and other non-ferrous materials.

Being of modular design, the MSM 86 with electronic controls offers users more options in terms of process technology. The controls allow drawing/annealing with minimised slip, resulting in high quality wire surfaces and maximum energy savings.

The optimised wire path, the high pressure cooling of the drawing die holders and the optimised reliable fully submerged drawing basin for lubricant cooling all contribute to the high wire surface quality. Capstans which are not in use are switched off.

In addition, design changes have been made to reduce maintenance requirements and improve access to the different operation and maintenance areas. A quick drawing die change system reduces downtime when changing the machine setup for different dimensions, and enhances productivity.

The drawing machine also features a highly reliable drawing emulsion and gear oil separation system using mechanical sealing. The result is an ergonomic, user-friendly system which is easy to maintain and requires less frequent maintenance.

Like all other new machines built by Niehoff, the MSM 86 rod breakdown line is operated by means of the newly designed and standardised NMI (Niehoff Machine Interface), a network-compatible colour touchscreen which features a clear task and user-orientated navigation structure, and enables easy, intuitive operation.

The total energy consumption of the new MSM 86 machines is up to 10 per cent lower than that of its predecessor model MSM 85, and 20 per cent lower than conventional rod breakdown machines.

The MSM 86 is designed to be combined with the new R 502 continuous resistance annealer. With an annealing power of 600kW, the R 502 is the most powerful annealer made by Niehoff to date. Power consumption is reduced by 20 per cent compared to state-of-the art DC annealers due to the newly developed voltage control system NAC (Niehoff Annealing Controller) and the AC annealing principle.

The rod breakdown line (a 13-draft two-wire MSM 86 + R 502 + SND 801 + SPH 1001 rod breakdown line) is capable of producing, for example, two wires with a diameter of 2.6mm at a production speed of 24m/s, resulting in an output of 8 tons per hour.

The SND 801 automatic double spooler is designed for a larger wire range (diameters of 0.8 to 4.5mm for copper wire and 1 to 6mm for EC grade aluminium wire) and can transfer the wire automatically from full to empty spool with very high successful transfer rates. Another special feature is that the threading of the wire process has been streamlined. Foundations requirements and machine installation have also been simplified.

The SPH 1001 automatic single portal spooler features automatic spool changing for increased productivity of the overall line. The SPH 1001 spoolers are built in two versions: Fully automatic and semi-automatic. Both versions are suitable for spools with 1,000mm flange diameter or less down to 630mm.

In this case a lifting table is necessary. The difference between both spoolers is their degree of automation. While the fully automatic version works with automatic wire and spool handling, the semi-automatic version is characterised by manual wire handling and automatic spool handling. The electrical system with independent PLC enables flexible integration of the spooler into existing or new lines.

Technical data MSM 86 line, two-wire version:
- Maximum production speed 40m/s
- Maximum production output 45,000t/a (at 7,000 hrs operation and 80 per cent utilisation)
- Maximum inlet diameter 2 x 8mm
- Finished wire diameter 2 x 1.2 to 2 x 3.8mm
- 1 x 1.2 to 1 x 5mm

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Rope-Tek achieves VGP compliance

Metalube’s Rope-Tek™ WRD40 now complies with VGP (Vessel General Permit) standards demanded by the US Government for all commercial shipping above 79ft entering US coastal waters. To comply with VGP standards Metalube has been issued with an EU EcoLabel. The company’s licence number is UK/027/015.

Rope-Tek WRD40 is a new high-performance, biodegradable lubricant specifically designed from renewable raw material sources. Rope-Tek WRD40 is designed to protect steel wire ropes that come into direct contact with seawater in the shipping, oil and gas and fishing industries.

Commenting on the EcoLabel, commercial director Douglas Hunt said: “Having a wire rope lubricant with VGP compliance will enable Metalube to enter a whole new market place. We are extremely excited about this opportunity since the market is becoming more concerned about using environmentally acceptable lubricants in marine environments.”

Metalube manufactures a range of industrial wire rope lubricants and many other high performance industrial lubricants. The experienced exporter employs 34 people and has offices in China, India and Brazil.

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Automated tape-wrapping head to insulate Poloidal Field coils

Ridgway Machines has received another major contract for the ITER international nuclear fusion reactor project.

Placed by the Sea Alp Engineering Consortium, a European-based innovator in high technology solutions for Research Projects for Nuclear Physics, this order covers additional tape wrapping head systems specifically designed to insulate superconductor coils for the ITER Poloidal Field (PF) coils.

Ridgway Machines, located in Leicester, UK, has already designed and supplied a number of tape wrapping head systems for the Toroidal Field (TF) coils as part of the European supply to the ITER project. Ridgway then extended its designs to supply further machines for the tape wrapping head system for tapping the Central Solenoid (CS) coil manufacture by General Atomics, as part of the USA consortium’s supply to the ITER project.

This latest contract for the PF coils demonstrates the confidence the consortium members have with the consistent quality, performance and design technology provided by Ridgway, to select Ridgway as supplier of the tape wrapping head systems for the manufacture of all three critical coil structures within the Tokamak magnetic confinement vessel.

ITER has been called the largest science experiment in history and aims to demonstrate the technical and scientific feasibility of fusion power for commercial-scale energy. The ITER Tokamak machine will be one of the most complicated machines ever engineered – 30 metres high and weighing 23,000 tons, housing an estimated one million components. The poloidal field (PF) magnets pinch the plasma away from the walls and contribute in this way to maintaining the plasma’s shape and stability.

The Poloidal Field coil system consists of six horizontal coils placed outside the toroidal magnet structure. Due to their size, the actual winding of four of the six poloidal field coils will take place in a dedicated, 257m-long coil winding building on the ITER site in Cadarache, France.

The ITER organisation was formed to advance the development of hydrogen fusion as an energy source. Fusion is a safe, carbon-free energy source fuelled by abundant resources (heavy hydrogen from sea water) and can produce high levels of power.

Partners, the European Union (EU), India, Japan, Korea, Russia and the USA will implement the project during its estimated ten-year construction and 20-year operational phases. The seven ITER members share every aspect of the project, including science, procurement, finance and staffing, with the aim that ultimately each member will have the know-how to produce its own fusion energy plant.

Ridgway’s sales and marketing director, Andy Clarke, said: “This further contract for the ITER project demonstrates the high reputation Ridgway holds within the international market for innovative taping head system solutions. We are delighted to be a major contributor to the manufacture of these critical components for the ITER project. Our close collaboration will ensure our customers meet the demanding engineering criteria for such a large scale scientific experiment.”

### Troester at wire Southeast Asia and wire South America

Troester GmbH & Co KG is a world-leading supplier of machines and complete lines for the cable manufacturing and rubber processing industry, comprising CV lines for XLPE and rubber cables, silane lines, sheathing and insulation lines.

**At wire Southeast Asia (stand J19)**

Troester will be exhibiting:

- High voltage CCV and VCV line concepts for XLPE power cables up to 1000 kV
- Low- and medium-voltage CCV lines for XLPE/rubber power cables 1-66 kV
- Sheathing lines for medium and high voltage cables
- Upgrade solutions for existing CV and insulation lines

In addition, X-Compound, the new company of the Troester Group will join Troester at both wire Southeast Asia and wire South America exhibitions and will present kneader technology for the continuous compounding of HFFR, PVC, XLPE, semiconductive materials and EPR/EPDM.

**The company will also be exhibiting at wire South America in Brazil, where it will present new developments from its stand on 705B in the field of:**

- High voltage CCV and VCV line concepts for XLPE power cables up to 500kV
- Medium voltage CCV lines (35kV)
- Sheathing lines for medium and high voltage cables

The ITER Tokamak (showing Poloidal Field Coils PF 1-5)

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Changes in mechanical parameters of patented cold drawn steel wires with the storage period

By Rüdiger Lux, Ulf Kletzin, Veronika Geinitz and Peter Beyer, Ilmenau University of Technology, Germany

Abstract

In a recently completed research project 48 wires were prepared by varying the carbon content, type of smelting, type of patenting, chemical drawing preparation, single cross-section reduction and drawing speed. This paper gives an overview of:

• The changes of characteristic values for the mechanical properties determined by i.e. torsion and tensile tests during storage and depending on heat treatments
• An automated detection of cracks along the wire-length-surface (longitudinal cracks) which is based on the torsion-testing-curve
• The correlation between the variation of wire strength parameters and the variation of geometry of springs and other components

Introduction

The last two years have seen the "wire and spring" research group at Technische Universität Ilmenau cooperating with wire and spring manufacturers (in the form of the Eisendraht- und Stahldrahtvereinigung and the VDFI – the German spring manufacturers’ association) in a research project entitled "Long-term stability of mechanical parameters of patented drawn steel wire". Natural aging effects on (ie the long-term behaviour of) the mechanical parameters of patented drawn spring steel and rope wires were investigated in relation to a large number of initial and process parameter variables.

For the purpose, two types of Stelmor air-cooled rolled wire with 0.6 per cent or 0.8 per cent carbon and a diameter of d = 5.5mm were produced from steel made with two different forms of steel smelting technology (electric-furnace and converter). As preparation for drawing, one portion of the rolled wires was simply pickled in a standing bath; the other was additionally patented in a lead bath. The wires patented in the lead bath where then subdivided and either pickled in a standing bath or a continuous pickling plant. The 12 rolled wires thus derived were shared between two wire drawing machines and there drawn in either eight or 11 stages to a diameter of d = 2mm. There were two drawing speeds, either 6m/s or 12m/s. The process resulted in 48 experimental wires of which the long-term stability was to be investigated.

The first experimental step was to establish the mechanical parameters from tensile and torsional tests carried out shortly after the wires had been drawn. To document the change over time in these mechanical parameters, the same measurements were repeated after two, 12, 28, 166 and 370 days. The wires were also subjected to heating in ways similar to what could be expected in the further industrial processing of the material in question. The mechanical parameters were measured after all the heating episodes, and these tests were repeated after periods of up to eight months.

Changes in characteristic values for the mechanical properties

All these tests on the wire samples served, on the one hand, to confirm the relationships which are already known between the mechanical values and such factors as carbon content, patenting method, and so on. There were further facts established:

• The greater the increase in strength gained by a wire from heat treatment, the greater will be the age-related alterations to the properties of non-heat-treated wire. Tests on heat-treated wires make it possible to predict likely parameter changes due to time spent in storage. (cf. Figure 2 and Figure 3)
• As most components made of patented wires are submitted to heat treatment after manufacture, it makes sense to establish the nominal strength and yield values for the wires in their heat-treated state. (cf. Figure 1 to Figure 4)
• The increase in occurrence of longitudinal cracks during torsion tests after heat treatment of 150°C–200°C for 30 minutes is significant
• No conclusions can be drawn from the values established in tensile tests as regards the torsion behaviour of the wires in helical springs. (compare Figure 2 with Figure 4)
• In this series of experiments, necking failure and number of twists, which are characteristic values for deformation, were not factors enabling any predictions to be made about alteration in wire ductility
• In use of drawing machines with an increased number of drawing steps and/or more intensive cooling of the wires, there will be greater alteration of the characteristics with storage time or with heat treatment, respectively.
Long storage may mean that the tensile strength ranges detailed in the standard fails to be met.

During the torsion tests (with measurement of the torsion-angle and torsion-moment) on the 48 sample wires it was found that there were also intermediate stages in the fractures described in\(^2\). Disregarding certain mixed forms and fractures from recoil, these fractures can be roughly categorised into three types. As Figure 5 shows, the distinctions are:

- crack type 1: no longitudinal crack, "normal torsional fracture", Smooth – Fracture plane perpendicular to wire axis (or slightly oblique). No cracks in fracture plane (1a according to EN 10218-1\(^2\))
- crack type 2: longitudinal crack is not along the whole wire axis, "fracture with local cracks", Smooth – Fracture plane perpendicular to wire axis and partially cracked (roughly 2a according to EN 10218-1\(^2\))
- crack type 3: complete longitudinal crack along the wire axis, "fracture with cracks along the entire length", Smooth – Fracture plane perpendicular to wire axis and partially cracked (3a according to EN 10218-1\(^2\))
- crack type 3*: longitudinal cracks distributed irregularly over the length of the wire, fracture plane parallel to the wire axis in parts.

If one compares the graph for stress/strain under torsional stress (curve from the torsion test on wires) with these different types of cracks (Figure 6), it can be seen that in the case of all wires that do not have the normal torsional fracture represented by 1a in EN 10218-1, the torsion stress first increases up to an initial peak, then falls abruptly. When the torsion stress has fallen, the wires (with cracks of type two and three) start to become strong again and achieve a further maximum of torsion stress. It is after this that the fracture occurs. Only in the case of wires with type 3* cracks is there no further strengthening, ie no further peak in the torsion testing curve. However, even in the case of wires with this type of crack, the crack can be recognised clearly from the torsion testing curve.

The significance of this is that it is possible to recognise a crack simply by examining the torsion testing curve. However, it should be noted that the curve does not give any indication of whether the fracture plane can be classified as being at right angles to the axis.

A search was made for one characteristic as an objective and automated means of evaluating the cracks using the torsion testing curve; the value for this characteristic should permit evaluation of the wire in respect of probable cracks without further close examination of the curve. In the course of the search the total strain under torsional stress in the torsion test was related mathematically to the distance travelled in one traverse of the measuring machine so as to keep the tensile stress constant in the torsion-test (the quotient between total strain under torsional stress and traverse distance was found) (Figure 7). For wire that does not crack (crack type 1 in Figure 5), this quotient is approximately -0.05; for wire that cracks partially it is approximately -0.1; and for wire cracking along the complete length it is -0.25.

These are the values for wires of diameter \(d = 2mm\), length under stress of 300mm, as found with the instruments at the research centre. A second step is a novel evaluation of the torsion tests. By this means, it is possible to detect cracks directly in the graph of stress plotted against strain under torsional stress by establishing the maximum torsional stress on cracking and the strain (under torsional stress) on cracking (see Figure 8).

The correlation between the variation of wire strength parameters and the variation of geometry of springs and other components
When rolled wires are manufactured for the spring steel industry there are various speeds of cooling during the Steilmor air-patenting process for different sections of the wire. As with every steel product, the alterations in the crystalline structure of rolled wire are set by the speed of cooling and the length of time for which a temperature is maintained. The variations in the cooling of the separate sections of wire will thus cause an inhomogeneous distribution of crystalline structure and thus less than satisfactory distribution of the strength in the wire.

For extremely high quality products that require very high uniformity and strength, the rolled wire is given additional cost-intensive patenting in a continuous lead bath. However, to save money this step is often omitted from the process. It is now intended to shape the unpatented wire into a high-tech product with sophisticated geometrical and resilience requirements: the industrial spring. When springs are manufactured, for instance using an automatic coiling machine, the principle is to bend the wire in a defined space until it has passed its yield point. Any variation in strength of the spring steel wire will have an effect on the geometry at exactly this point. Varying strength along the wire axis, ie, varying yield points, will cause deviations in the shape of the end product. Figure 9 demonstrates the point with two springs: in material that is irregular (wire one above) and uniform (wire two below).

The extreme variations in coil diameter D of the spring section in the case of the non-uniform material can be clearly seen. The equation for the spring ratio (1) makes it clear that such diameter variations will affect the spring ratio to the power of three, which is, obviously, a considerable modification.

\[
R = \frac{G d^4}{8 D^3 R} \tag{1}
\]

Even in the case of shaped wire parts or leg springs, variations in strength will play a significant role, for example influencing the angle between the two legs and thus often preventing automatic assembly of parts.

Conventional practice is currently only to test the tensile strength at the beginning and end of a wire coil. Absolute accuracy would only be possible if many tensile tests were made across an entire wire lot – but as wire is an “endless” product this is not practicable. To find out the variations in strength present in a wire, there is the time- and cost-intensive option of a high number of tensile tests on the wire (see Figure 10). What Figure 10 shows is the results from 50 tensile tests on two different wires, one very uniform and one very far from uniform. The samples were cut from the wire coil in the form of wire rings and then subjected to this series of tests. The range of tension in the case of “wire 2” was only about 30 MPa, while it was 160 MPa in the case of “wire 1”.

A different test of spring steel wire reflects the EN 10270-1 norm – the determination of the free wap diameter W and the axial displacement fA of a ring taken from a wire coil (cf. Figure 12). While the standard intends the measurement to be made from a single ring of wire, it is possible to take numerous random samples from the coil, make the same measurement, and come to conclusions about the wire’s uniformity. By way of example, Figure 11 gives the data for the coils of wire which were used for the tensile tests in Figure 10 and the winding tests in Figure 9. The method provides an initial comparison between variations in geometry and variations in strength. There is an obvious association between the tensile strength Rm and the changes in the wap diameter W. To eliminate any influence of the drawing machine on the measurements, both wires were drawn on the same machine using exactly the same set of dies. The lower spring in Figure 9 was made from “wire 2” and the one above from “wire 1”.

Using the “sensor wheel” measuring setup developed by the research group it is possible to find the uniformity of the wire properties along the entire length3,4. For “continuous” wire it is thus possible to monitor the uniformity throughout the whole coil.

In absolutely every wire drawing process, that is in every wire drawing machine, the wire is deformed. However, the deformation is not only the obvious type, ie, the reduction in cross-section, but the wire is also deformed during the process in the direction of its bending by interaction with the drawing machine – among the reasons for deformation are bending at the guide rollers and fluctuations in the tuner rolls for the individual drawing stages. If one imagines two pieces of wire of different strength which are shaped into an identical curve, the wire with the higher strength will deform with less plasticity. In theory, the same thing happens when wire is being drawn.

The variations in strength due to the rolling of the wire will also result in different radiuses of bending and consequently in varying free wap diameter. Again, wires one and two are presented as an example of the phenomenon. Looking first at the signal from the sensor wheel as recorded and then represented in relation to wire
length (Figure 14 and Figure 15), far greater variation is clear for wire one than the variation for wire two. The significance is that in the case of wire one the sensor wheel has recorded much greater differences between the forces produced by the wire along its axis than in the case of wire two.

So that the statement is even more accurate, the representation is of the frequency distribution for the signals recorded. The method shows clearly how often the sensor wheel recorded the measured values in the particular classes: the narrower the distribution, the more “uniform” is a wire. Wide frequency distribution, on the other hand, means that the values varied very considerably, indicating that the wire is far from uniform. Figure 16 and Figure 17 give a comparison between the frequency distribution of the sensor wheel signals and the distribution of the tensile strength $R_m$ of the relevant wires. This comparison makes it plain than a wire possessing wide variation in tensile strength also possesses much variation in its geometrical properties – and vice versa. The method permits definite prediction of variation in tensile strength for a wire to be made from the (non-)uniformity of shape.

**Prospects and usefulness to industry**

The research on the 48 sample wires shed light on the natural and artificial age-related alterations in mechanical properties in relation to numerous wire manufacturing parameters.

Using the sensor wheel measuring method here presented, 100 per cent monitoring of wire uniformity (both of tensile strength and of shape) will be possible during production. The experiments are applicable and potentially useful not only for spring steel wires, but also for welding wires, bead wires, steel cord or rope wires.

The sensor setup might also be applied to the monitoring of the drawing parameters during drawing.

The method of crack detection and evaluation which has been developed could be transferred with little further effort to the torsion test benches used in industry.

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