WCN

IWMA INTERNATIONAL WIRE & MACHINERY ASSOCIATION

WIRE & CABLE NEWS Autumn 2013 - issue No 49 www.iwma.org

OFFICIAL NEWSLETTER OF THE INTERNATIONAL WIRE & MACHINERY ASSOCIATION

Bright future ahead for the IWMA

IT'S a bright new look for the International Wire and Machinery Association – the world's largest and most influential membership association for our industry.

A new logo, website and corporate identity have all been designed to mark the association's new phase of growth and development.

The new corporate design, to set colours, typography, images and marketing material such as literature and exhibition stand design, will help drive the growth of the IWMA, now in its 43rd year.

The new logo design will help promote a more consistent, professional and recognisable global image for the association. With a more dynamic and modern appearance, the IWMA is ideally placed to help its members worldwide.

New foreign language sections – catering for German, Russian, Italian, French, Spanish and Chinese – can also be accessed from www.iwma.org

A new section – with a members, log-in area – provides access to industry news, market information and analysis, databases, video and question and answer forums with board members.

"The new corporate image is being introduced to standardise branding and marketing material across the association and help to reinforce our position as the largest and most influential corporate membership association for the wire, cable and wire product industries," said executive manager Andy Lewis.

"This new image signals the start of a new phase of growth and development for the association, and the new logo and website emphasise our unique platform to promote new technology and growth within the industry."

Teeing up nicely

Budding Rory McIlroys were out in force at the IWMA's Golf Day at the Fairhaven Golf Club, Lytham St Annes, in June.

Chris O'Connor from Bridon International carried off the winner's trophy in the members section. Second was executive board member Peter Large and third, IWMA chairman Steven Rika.

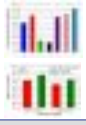
Guest winner was Mark Heneghan of AEI Cables; J Chappell from Caparo Wire was second, and third was Ian Wood from Bridon International.

Wayne Escreet from Hempel Wire received the prize for the longest drive, while Girvin Palfrey, of Cable Tapes UK, also took home an award for his nearest the pin shot on the 17th hole.

CONTENTS

Technical Article 23

Determining of parameters characterising the functional behaviour of spring steel wire in helical springs



Wire & Cable News

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Autumn 2013
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WCN

220 not out for Ormiston Wire

▲ *Thomas Heatherwick's 'Bleigiessen'. Photo: Steve Speller, Ormiston website*

British company Ormiston Wire celebrates its 220th birthday this year. The company, formed in London in 1793 by Philip Ormiston, is currently under the stewardship of his descendant Mark Ormiston.

Ormiston Wire began trading as a manufacturer of spring wire for corsets and wigs, but diversified in the 19th Century. During the 1960s and 1970s Ormiston provided vital support for some of the biggest television stars of the decade. Gerry Anderson's Thunderbirds puppets were lifted by Ormiston Wire, and in the 21st century the company supplied the wire that made the broomsticks fly in the popular Harry Potter series.

Other bespoke applications of Ormiston wires include sculptures from the Thomas Heatherwick Studio, and antenna braid for the British Antarctic Survey.

Ormiston Wire – UK
Email: info@ormiston-wire.co.uk
Website: www.ormiston-wire.co.uk

Queen's award for Metalube

▲ *The award-winning team at Metalube*

Manchester, UK–based Metalube is celebrating being named as winner of a Queen's Award for Enterprise in International Trade 2013 – the UK's highest accolade for business success.

Metalube produces speciality lubricants and protective greases used for making non-ferrous tubes, wires, cables and electrical conductors. This experienced exporter employs 31 people and is active in 80 markets with offices in China, India and Brazil.

Investment is paramount, with a particular emphasis on marketing as well as research and development programmes.

"This is the greatest tribute we could receive and our team is tremendously proud," said David Lee, founder and managing director.

"For the three-year period, our overseas sales growth has been 51 per cent with exports accounting for 96 per cent of our total turnover.

"When we started the business back in the 80s all our trade was in the UK. Over the decades we have watched the domestic industry diminish, and today we are almost entirely an export business, selling our oils and greases to over 80 countries worldwide."

He added: "It is very gratifying to have our hard work and commitment recognised by such a prestigious award and we look forward to receiving this honour from the Lord Lieutenant of Greater Manchester later this year."

Metalube Ltd – UK
Email: info@metalube.co.uk
Website: www.metalube.co.uk

Launch of new fine wire spooler

▲ *The new winder from Cemanco*

Cemanco has launched a KMK fine wire spooler and re-winder for material down to 0.05mm (0.002") diameter.

The design is modular and allows the integration of mechanical as well as dual laser controlled traverses for high quality windings. The laser guided flange detection system allows precise winding of bi-conical and stepped spools.

All control functions are accessed and displayed by means of a single control wheel and a digital display. Displayed functions include spool rpms, length of material, rpm up and down ramp and basic settings like maximum rpm, sense of rotation and dancer settings. Take-up spool speed can range from 0 to 2,800 rpm and in this configuration the maximum pay-off spool weight is 15kg.

Simplicity of operation and precise tension control for very fine wire were realised with this new machine design.

Cemanco LC – USA
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Website: www.cemanco.com

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

2013

SEPTEMBER

17-19	**wire Southeast Asia 2013** *Bangkok, Thailand* **Exhibition**	→	**IWMA** **Tel:** + 44 1926 843680 **Email:** info@iwma.org **Website:** www.iwma.org

OCTOBER

1-3	**wire South America 2013** *São Paulo, Brazil* **Exhibition**	→	**IWMA** **Tel:** + 44 1926 843680 **Email:** info@iwma.org **Website:** www.iwma.org

NOVEMBER

4-5	**CabWire World Conference 2013 and Gala Dinner** *Innovations driving worldwide wire & cable markets, Milan, Italy* **Conference**	→	**IWMA** **Tel:** + 44 1926 843680 **Email:** info@iwma.org **Website:** www.iwma.org
22	**IWMA Dinner Dance** *Royal Garden Hotel, London, UK* **Event**	→	**IWMA** **Tel:** + 44 1926 843680 **Email:** info@iwma.org **Website:** www.iwma.org

2014

FEBRUARY

12	**AGM & Members' Lunch** *The Mere Golf Resort & Spa, Knutsford, UK* **Event**	→	**IWMA** **Tel:** + 44 1926 843680 **Email:** info@iwma.org **Website:** www.iwma.org

APRIL

7-11	**wire Düsseldorf 2014** *Düsseldorf, Germany* **Exhibition**	→	**Messe Düsseldorf GmbH** **Email:** wire@messe-duesseldorf.de **Website:** www.messe-duesseldorf.de

JUNE

5	**IWMA Golf Day** *Fairhaven Golf Club, Lytham St Anne's, UK* **Event**	→	**IWMA** **Tel:** + 44 1926 843680 **Email:** info@iwma.org **Website:** www.iwma.org

Read all about it

Please remember that member news stories can be published on the IWMA website at any time, so submit them to info@iwma.org as part of your company's promotional campaign and they will be uploaded.

Case studies are also being included so if your company enjoys a significant business win or provides a customer with a solution to a particularly difficult problem, then the IWMA would be happy to help spread the news for you.

Going with a bang!

▲ *Techna – making sure London's New Year fireworks went with a bang!*

London's New Year fireworks display is always impressive, but the days of running around lighting touch papers are long gone and putting on such a highly co-ordinated display now involves complex electrical ignition and control systems.

To help protect the 2013 display, a long-standing Techna customer chose its JTEC range of 10kA MCBs to ensure that the temporary electrical installation was safe.

With more than 65 years' experience, Techna International Ltd is well known as a major supplier of machinery and ancillary equipment (Uhing, Witels-Albert, Mobac and many more) to the wire and cable industries. However, it also manufactures its own ranges of low voltage electrical components which are used worldwide by global and multi-national companies. These can be found in all sectors of the electrical, electronics, cable and wire, marine and transportation, motion control, environmental and general engineering industries.

Low voltage products include extensive ranges of miniature circuit breakers (6kA and 10kA), RCCBs, RCBOS, thermal breakers, hydraulic-magnetic circuit protection, motor starters, contactors and overloads (1.5kW/6A to 315kW/600A), outdoor isolators, rotary, isolator, changeover, step, disconnect and emergency-off switches (16A to 125A, in IP65 cast aluminium or plastic enclosures, distribution units (including dual RCD 17TH edition boards), DIN-rail terminals (screw-clamp, spring-clamp, stud type, tab connection, compact distribution blocks, power terminal blocks, ceramic blocks, earth grounding terminals), power and data plugs, sockets and connectors (Schuko and CEE types for most countries), rocker switches (up to IP 68 fully sealed), toggle switches (1-4 pole/20A), control and emergency-off push buttons, LED signals, DIN-rail enclosures (for instrumentation, control, safety, data-com and field-bus applications), and safety relays (designed as core components for safety devices and circuits as a requirement of European Machinery Directive EMD 89/392 EEC).

All products carry full certification to international approvals for European, North American and world markets such as VDE, TUV, UL, UL Listed, CSA, and SEMKO equivalents to products from the large LV component manufacturers but at substantially less cost and normally for next day delivery, subject to availability.

Techna International Ltd – UK
Email: richard@techna.co.uk
Website: www.techna.co.uk

New managing director

Adrian May has taken up the position of managing director of the Institute of Spring Technology.

▲ *Adrian is pictured indulging in one of his main hobbies – motorcycling*

Mr May has had an interesting and varied career having spent nine years in the Royal Air Force as an avionics engineering technician on the Tornado GR1 strike fighter aircraft, with responsibility for air radar, flight systems, air communications and weapons systems.

Following the RAF, Adrian joined British Airways installing TCAS systems (Traffic Collision Avoidance Systems) on Boeing 747 series aircraft. He left the aerospace industry in 1996 to concentrate on building a career in sales and marketing.

In 2008, Mr May joined United Springs Ltd, Rochdale, UK, as sales and marketing manager and in 2010 was appointed divisional sales and marketing director with responsibility for the sales teams in UK, Netherlands and France.

He has an MBA from the University of Manchester and is a Fellow of the Chartered Management Institute. He was awarded a Chartership in Management in 2006. He is married to Laura, has four children and his interests include Freemasonry and motorcycling.

Institute of Spring Technology – UK
Email: ist@ist.org.uk
Website: www.ist.org.uk

Annual general meeting

The IWMA's next annual general meeting will be held at The Mere Hotel, Manchester, on Wednesday, 12th February 2014.

President Colin Dawson will step down from his position and his place on the executive board has been taken by son Glyn Dawson, who is currently managing director of Whitelegg Machines Ltd.

Glyn's appointment to the board continues a family tradition with Whitelegg Machines having had a member on the executive board of the IWMA since it was originally formed in 1970.

As in previous years, the AGM will be followed by a members' lunch – an ideal opportunity for members to network in a more social environment.

Profelis offers exceptional wet blasting performance

Vapormatt has launched the Profelis, an in-line wet blasting, cleaning and drying system that offers exceptionally high quality results with all continuous wire, cable and strip products. The machine has been designed for easy integration with existing process lines, bringing the potential to apply a range of surface treatments to the maximum number of users.

The Profelis can be used to clean, degrease, descale, etch or satin polish all wire, cable and strip products and provides an extremely consistent surface finish that can be reproduced time after time. The Profelis is also versatile, and can cope with a wide range of diameters and materials, including plastic, soft metals and steel.

No harsh chemicals are used in the process and no dust is created. In addition to its versatility, the Profelis is constructed from durable composite and PU components that offer a long lifespan, despite the stresses of the wet blast processing environment, to deliver maximum ROI.

The Vapormatt wet blast process combines controlled flows of gas, air and solids which are mixed then accelerated through focused blasting nozzles. Changing the fluid pressures, blast material, slurry composition, number and direction of attack of the blasting nozzles allows for a range of processing effects to be achieved, from harsh to soft.

Follow-on rinsing and drying stages further wash, clean and dry the product creating an almost surgically clean surface to the product exiting the Vapormatt Profelis line. The entire machine is ventilated and watertight, while media concentration, process temperature, additive and blast pressures can all be controlled to ensure the most effective and repeatable wet blasting results.

Typical applications include heat scale and surface contamination removal; cosmetic finishing; preparation for bonding, coating, encapsulation and cladding; pre-cleaning and oxide removal of feedstock in preparation for follow-on processes; drawing lubricant/ soap removal; band saw blade honing, descaling, peening and satin polishing; and carding wire processing.

Vapormatt Ltd – UK
Email: sales@vapormatt.com
Website: www.vapormatt.com

For fine and small diameter stainless steel and nickel alloy

Plasmait has introduced a new PlasmaAnnealer for fine and small diameter stainless steel and nickel alloy wire.

▲ *The new annealer from Plasmait*

The annealer can be used for small cross-section round, flat and shaped wire as well as for fine ropes and tubes made of stainless steel and nickel alloys.

This new concept allows for a radical increase of continuous annealing speeds that can surpass 15m/s in the case of fine wire sizes of austenitic stainless steels. With such speeds annealing can be performed in-line with drawing or rolling, substituting multiple lines of a traditional tube furnace.

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 quickly. This avoids the lengthy heating-up and cooling-down times and associated energy costs that are symptomatic a conventional furnace.

Ion sputtering on the material surface results in fine dry surface cleaning and surface oxide removal, which have proved beneficial to applications with demanding surface requirements.

High-speed trials on the new line 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 and similar applications.

Plasmait GmbH – Austria
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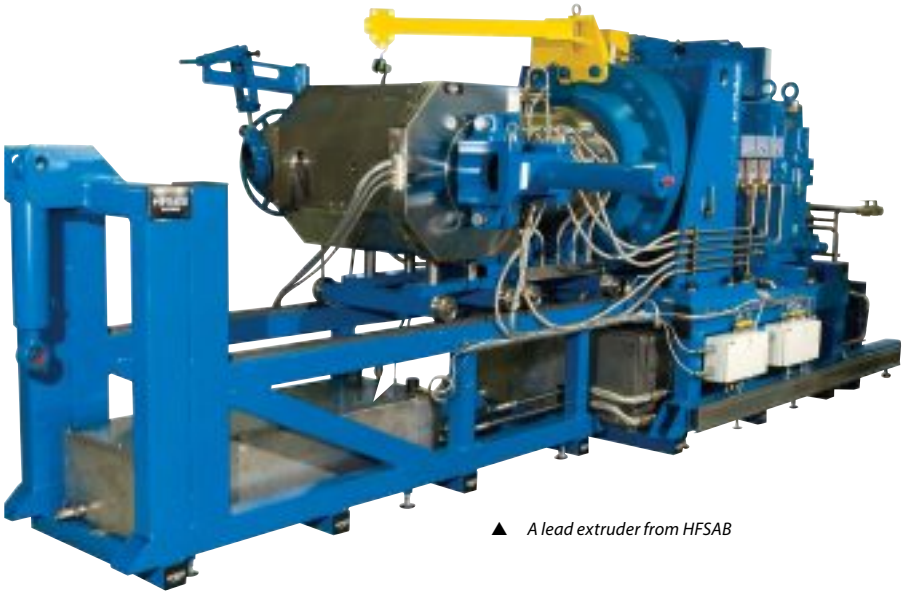
Website: www.plasmait.com

An even stronger partnership



▲ *A lead extruder from HFSAB*

The Niehoff Group has been working together with HFSAB in international sales outside Europe for more than two years, with the sales and service department helping to market HFSAB products.

The Niehoff Group acquired shares in HFSAB with retroactive effect from 1st January 2013.

The management of HFSAB in Motala, Sweden, will remain under the proven leadership of Derek Russell, CEO, and Mats Larsson, CFO. Production and development are to be maintained and expanded at the existing site, and HFSAB will continue to run and be developed as an independent brand.

What connects the Niehoff Group and HFSAB is that both are premium manufacturers of technologically cutting-edge and high-quality products, constantly seeking to develop these further, and can offer a reliable service worldwide for their respective products. They have workforces with first-class training who boast outstanding technological expertise and are fully and squarely behind the products of their companies.

The two companies are also connected by the fact that their global customer bases are identical.

HFSAB supplies lead extrusion systems and CRRS (cable repair and recovery systems) for subsea cables, underground cables, high-voltage cables and cables for the oil and gas industry. HFSAB also offers upgrades for existing systems.

Maschinenfabrik Niehoff develops and manufactures plant and machinery for the drawing, annealing, galvanic coating, bunching, take-up, rewinding and braiding of wire made of non-ferrous metals. The production programme also includes machinery for the stranding, winding and take-up of insulated data and special cables, automobile wires and power cables.

The Niehoff Group has more than 700 employees in all major markets around the world. The products and services it offers range from development and design to the turnkey delivery of fully-fitted cable factories.

Both companies offer expert advice and a comprehensive after-sales service across the world.

Maschinenfabrik Niehoff Gmbh – Germany
Email: info@niehoff.de
Website: www.niehoff.de

H Folke Sandelin AB – Sweden
Email: info@hfsab.com
Website: www.hfsab.com

Next issue

Members: Please send us your editorials for free publication in the next WCN – or for the IWMA website at any time.

One of the strictly members-only benefits of belonging to the association 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 the worldwide distribution, WCN is freely distributed at all major industry trade fairs and IWMA technical events. The next important upcoming exhibition is wire 2014 in Düsseldorf between the 7th and 11th of April 2014.

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

Providing editorials 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 both events
- Advising customers of personnel changes
- Announcing major new developments
- Celebrating winning new contracts and orders
- Staying one step ahead of the competition

Please send us your editorials (not advertisements) with supporting photographs to **info@iwma.org** for the Spring 2014 edition.

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

Please submit editorials by 2nd December 2013

Death of Mr Arthur F Organ

Mr Arthur F Organ, a former president of the International Wire and Machinery Association, and founder of Arthur F Organ Packaging Machinery Ltd, has died at the age of 89.

Mr Organ, of Tarbert Argyll, Scotland, created the brand of 'Organpak'. Arthur F Organ (Packaging Machinery) Co Ltd had been operating for just over two years when he first exhibited at The Wire Machinery Exhibition in Basle, Switzerland, in 1973. He was president of the International Wire Machinery Association from 1979 to 1983. After retiring he went on to form another company, Waterbourne Equipment.

Following the sinking of the Scottish trawler Antares, with the loss of four crew, Mr Organ and a friend developed and manufactured a Net Release system, which many trawler men took up, so if they were caught by a submarine they could release themselves. He became secretary of the Tarbert RNLI and spent much of his and his second wife Jean's time fundraising for them.

Mr Organ had two sons, Robin and Rupert, with his first wife Doris who pre-deceased him.

Taking stock mid-year

Queins Machines GmbH, Germany, has major orders from customers in Saudi Arabia, USA, Great Britain and Germany.

Machines for these customers comprise a huge 72-bobbin planetary machine, a high-speed skip strander, an 8-bobbin closing machine for reel size 1,200mm (3.9ft), and equipment for umbilical stranding lines. According to Queins' management there are various promising projects pending.

The pre-owned machinery department is presently offering a very modern extrusion/foaming line for RF (radio frequency) cable, with main and skin extruders, foam injection, capstans and portal take-up, as well as electronic controls.

Furthermore a new triple extrusion/sheathing line is available now from stock for cable diameter up to 120mm (4.72").

The company is looking forward to the wire exhibitions in Bangkok, Thailand, and São Paulo, Brazil, where you can discover trends including the continuing extension of regenerative energy generation such as wind parks and solar energy plants, which require constant innovations and developments for the wire and cable industry and thus also for the machine manufacturers.

Queins Machines GmbH – Germany
Email: info@queins.com
Website: www.queins.com

First anniversary

Normanton, UK-based Anglia Metal celebrated its first anniversary of trading in June – 12 months since taking over the business of the former Tri-wire Limited. Anglia Metal is now the last remaining copper conductor manufacturer operating in the UK and Ireland and is continuing to show growth and strength in the copper wire market.

Industry sectors served by Anglia Metal include automotive, data, power, defence, and specialised cables. Its dedicated and experienced operational team work closely with the quality department to improve processes, flexibility and lead times.

The product range covers single end, multi-end and bunched wires as well as braiding bobbins, in both uncoated and tin coated finishes. The product size range runs from 0.1mm to 3.5mm in wire diameters and up to 10mm² in cross sectional area.

Anglia Metal Ltd – UK
Email: info@angliametal.com
Website: www.angliametal.com

They get satisfaction!

In the first quarter of 2013 EuroMadem, Spain, conducted a customer satisfaction survey with 16 wire and cable-manufacturing customers in five countries.

EuroMadem received nine (56%) responses from customers polled in four categories: bad, regular, good and very good, with 98.75% of responses falling into the good and very good categories.

EuroMadem polled the following services: claim response, quantities shipped X received, documentation, deliveries, quality inspections, performance, and packing.

"We are very proud of our customers' feedback and pleased with the results of the survey; we will continue to work towards 100 per cent customer satisfaction," said Roger Santasusana, general manager.

This is a boost for the company which also received 100 per cent in its own customer satisfaction survey from customers in Brazil.

The next survey will be conducted in January 2014.

EuroMadem Spain Sl – Spain
Email: sales@madem.com.br
Website: www.mademreels.com

IWMA new members

AESA Cortaillod

AESA is a leading company in the field of electric cable metrology and passed the audit for standard EN45001 & ISO17025. The company offers a wide range of testing equipment (hardware) for automatically checking your LAN, telecom, industrial or energy cables and wires conformance. AESA also offers specific cable management systems (software) to acquire and evaluate the product and process quality data.

Clinton Instrument Company

Clinton Instrument Company manufactures a full line of high quality spark test units for wire and cable insulation testing. Included are AC, mains and high frequency, as well as DC units for in-line testing of most types of insulated wire and cable. Also available are cable fault locators and calibration units that work on all brands of spark test units.

Stride Supplies Ltd

Stride Supplies is the largest distributor of high carbon spring wire in the UK. The company supplies to all the leading manufacturers of mechanical springs for use in the automotive, medical, construction, domestic appliance and general engineering sectors. Materials are sourced from world leading suppliers which include KOS, Arcelor Mittal, DSR, Suzuki, Bridon, WDI, Fox and Caparo. Full traceability is guaranteed on every consignment and the company is fully accredited to ISO 2001:2008 requirements.

P W Hall Ltd

P W Hall is a UK-based manufacturer of colour concentrates for use in the wire and cable industry. The range includes masterbatch for HFFR/LSZH, PVC, PE/XLPE (including Borealis Visico-Ambicat™) and PBT. Grades are offered for both sheathing and insulation applications. A standard range of cable colours are available or more bespoke masterbatches can be tailored to customer requirements for a specific RAL shade, compound used or light fastness and weathering requirements including UV stabilised. The company is accredited to ISO 9001 and ISO 14001 and has a dedicated team of technical, quality, and commercial staff.

Cemanco LC

For 25 years Cemanco has been supplying the wire and cable industries in the USA, Canada and Latin America with wear parts and machinery. Product groups offered include: laser controlled take-ups and re-winders for fine wire, traversing systems for take-ups, mechanical and laser guided, ceramic drawing rings, cones and capstans in zirconia and alumina, ceramic eyelets, bow guides, rods, tubes, hook guides, etc, pulleys and sheaves in solid ceramic, ceramic/metal composites, hard coated with ceramic or tungsten carbide, plastic, wire straighteners and roller guide systems, hydraulic and pneumatic steel rod and cable cutters up to 380mm material OD, nickel annealer bands and rings.

Iune Prozesstechnik

Founded in 1991, Iune acted as sales representatives for Luxtron and Ircon – who manufactured a used non-contact wire temperature measurement system using the convective heat flux principle (CHF) – for more than 20 years. The system was sold under the name Wiretemp and Cabletemp and was a standard in the industry. In 2008 Fluke/Raythek took over Ircon, and shortly after this, Fluke scrapped the complete line.

Due to Iune's long-term experience with CHF and strongly driven by customer requests, it was decided in May last year to revitalise a complete new product line named Iune-CHF. This led to the launch in July of this complete new line onto the wire and cable market. All existing Luxtron/Ircon heads can be adapted to the new Iune-CHF system.

COMPANY	COUNTRY	WEBSITE
Kei Industries Ltd	India	www.kei-ind.com
Cemanco LC	USA	www.cemanco.com
Iune Prozesstechink GmbH	Germany	www.lune-gmbh.de
AESA Cortaillod	Switzerland	www.aesa-cortaillod.com
Clinton Instrument Co	USA	www.clintoninstrument.com
Golden Technologies Wire & Cable Equipment Co	China	www.gtcablemachine.com
Hangzhou Xingguan Machinery Co Ltd	China	www.ztxg.com
Jiangsu Handing Machinery Co Ltd	China	www.hdxljx.com
Jiangsu Rentian Industrial Enterprise	China	www.rtindustrial.com
Shanghai Resources Industrial & Trading Co Ltd	China	www.shanghai-resources.com.cn
P W Hall Ltd	UK	www.pwhall.co.uk
Stride Supplies Ltd	UK	www.stride-supplies.co.uk

Death of Peter Frank Whitelegg

▲ *Peter Whitelegg*

Peter Frank Whitelegg, a founder member of the International Wire and Machinery Association, has died at the age of 91. He is survived by his wife Margaret, daughters Sally and Diana, and three grandchildren.

Mr Whitelegg was born in Clapham Common, London, in 1922. The family and the business moved to Sutton in Surrey where he was educated at Sutton Grammar School. He joined the family business but joined the Army after the Second World War broke out.

After serving in the tank corps in North Africa and Sicily, he was injured in Italy during the Monte Casino campaign and was invalided back to England. After the war he joined the family business and helped his father develop the business from purely an import agency into manufacturing and exporting.

The principal companies represented by Frank Whitelegg before the war were Wafios Maschinenfabrik and Emil Jaeger. When the situation in Germany had stabilised, the agency for Jaeger was continued and very close ties between the two families developed. The Jaeger family and many of their employees managed to escape from Neustadt/Orla in East Germany and rebuild in the West at Muenster/Westfalen. Whitelegg continued to represent Jaeger for over 50 years.

Under Peter's guidance, the Whitelegg company expanded to include a number of agencies for spring coiling and grinding equipment, and in-house production of wire bending machines and coil winding machines which were exported to over 130 countries worldwide.

He supported the Boy Scout movement throughout his life and when he retired in 1987, became deeply involved in the Night Shelter charity.

Peter sold the business to his employee of 40 years, and later director, Colin Dawson who is currently president of the IWMA. The Whitelegg company is one of the few companies in the wire machinery business which has exhibited at every European wire exhibition since the very first exhibition of wire machinery in 1967 at Olympia in London, and indeed the first spring machinery exhibitions in Manchester prior to this.

Whitelegg – UK
Email: info@whitelegg.com
Website: www.whitelegg.com

Remaining dedicated

Ajex & Turner has remained dedicated to serving the wire and cable industry with its wide product range of dies and other tooling.

Adapting the latest methods and its continuous efforts toward technological development and expertise has led to Ajex & Turner remaining strong in a fiercely competitive era.

The company has gained expertise in making extrusion toolings for all the international brands and adopts the latest shrink fitting technology without any joints. The New Delhi-based company is equipped with the latest quality control systems and automatic machines to offer high efficiency products. Ajex also offers the correct geometry of dies, manufactured by Conoptica of Norway with the highest die checking profiler.

Ajex & Turner Wire Dies Co – India
Email: sales@ajexturner.com
Website: www.ajexturner.com

▲ *The NG-1 from Ajex & Turner for grinding hardened steel pins*

Equipment never installed on the market

Mathiasen Machinery Inc has been awarded an exclusive contract to sell a 2009 Redex 5-stand rolling mill and two Compact RESY filtration systems.

The equipment was built in 2009, but was never installed. It is still in its original shipping crates.

"This is a great opportunity for a manufacturer to save time and money to add production capabilities.

"This high quality equipment is ready to ship now," said Mike Mathiasen, co-owner of Mathiasen Machinery Inc.

The rolling mill is rated to produce a cross sectional area of 2 to 125mm^2 with a yearly capacity of 15,000 metric tons.

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

British specialists

▲ *A typical BWE Conform 550i installation for copper bus bar and sections*

BWE Ltd is a British engineering company specialising in continuous extrusion machines and cold pressure welders for many different applications.

Conform™ and Conklad™ are well-established continuous extrusion technologies in the non-ferrous, cable and tube industries. Typical applications include copper and aluminium rectangular wire (magnet wire for transformers), solid aluminium conductor (SAC for cables), copper bus bar, trolley wire and other shaped conductors, AS wire, OPGW, CATV, round refrigeration tube, and multiport or PFC tubes in different alloys.

With six lines currently in production, BWE's SheathEx™ technology is fast becoming the new alternative to seamless aluminium sheathing of high voltage cables. A further line was schedule to be installed and commissioned in Europe during the second quarter of this year.

The SheathEx process provides a continuous (no stop marks), reliable (no weld) and cost-effective (cheap materials, low energy, etc) method of sheathing high voltage power cables.

A new Conform machine has been specifically designed to extrude solid aluminium conductor (round or sector shaped) from 2 x 9.5mm diameter rods, providing a cost-effective process to a product in demand.

BWE continues to manufacture and supply a complete range of cold welders and dies for a fast, cost-effective and reliable solution to welding non-ferrous materials from fine wire to round rod. ™ SheathEx, Conform and Conklad are Registered Trade Marks of BWE Ltd.

BWE Ltd – UK
Email: info@bwe.co.uk
Website: www.bwe.co.uk

Düsseldorf beckons

The largest wire and cable exhibition in the world opens its doors again next year with wire Düsseldorf being held between Monday 7th and Friday 11th April.

Exhibitors and visitors alike will flood into the city for the five-day show and the IWMA will again be in attendance to offer assistance to its member companies.

A multi-lingual translation service, reception area with drinks, office facilities and Wi-Fi are all on offer to the association's members, free of charge.

"Not only does wire Düsseldorf promise to increase in size from 2012, it really is the place to attend to see many of the technological advances made throughout the last two years," said Andy Lewis, executive manager of the IWMA.

"From a personal point of view I will be making my first appearance at the show and I am delighted that I will be on hand to offer our services to members."

Additionally, the IWMA has negotiated a special agreement with Erberich Messestandbau + Design and Messe Düsseldorf GmbH for stand building at the wire Düsseldorf exhibition. This special arrangement is only available for IWMA members. Owing to its office location within the exhibition grounds as well as many years' experience of operating at the Messe site, Erberich is able to provide a highly attentive and premium service to exhibitors.

This arrangement has been developed following feedback from members after the 2012 exhibition when exhibitors ordered their stand and electrical supply separately.

There are two schemes available - Scheme A is €98.00 per m^2 and Scheme B is €119.00 per m^2. Prices are not inclusive of German VAT at 19%, which is recoverable or can be exempted for organisations with EU VAT numbers.

The schemes include an electrical supply as well as the items detailed in the specification. Both schemes will be invoiced to exhibitors by Messe Düsseldorf GmbH.

• The IWMA's gala dinner will be held on Tuesday, 8th April 2014. Details will be forwarded to members later this year.

It's a sell out

The lure of Samba dancing has proved too much for member companies of the IWMA – with the allocation of booths already filled for the first wire South America!

Brazil, one of the original member states of the BRICS countries, is one of the fastest growing economies in the world, and wire and cable companies are actively looking to promote and expand into the South American country.

This is the first time that Messe Düsseldorf has been involved on the continent, having joined forces with Grupo Cipa following last year's successful WiCAB event in São Paulo.

The exhibition, from 1st to 3rd October, is being held at the Imigrantes Exhibition Centre.

The IWMA will be supporting members who have taken advantage of the package offered by the association.

"We are obviously delighted that so many of our members have taken advantage to exhibit at this show," said executive manager Andy Lewis.

"This not only shows the strength of the Brazilian market, but also the foresight of member companies wishing to expand into South America."

Rosendahl steps up energy efficiency

Rosendahl has been one of the leading companies in extrusion lines for many years. One of the biggest milestones on the way towards this aim was the continuous improvement which led to the ROEX Extruder Generation.

To achieve a reduction in power consumption, Rosendahl focused on the extruder unit (the main consumer of energy in an extrusion line) and developed measures to enhance the energy efficiency of the new Rosendahl Extruder Generation ROEX.

The following improvements were made:

The drive has been modified from DC technology to state-of-the art A,C power technology. Additionally the thyristor rectifier, which caused enormous wastage due to reactive power, was omitted.

By converting to a direct screw drive by means of a planetary gear motor mechanical losses were reduced. The planetary gear is directly driven by four symmetrically aligned motors ("compact motor and gearbox design").

Thanks to an optimised processing unit (screw and feeding section) the material output could be massively increased while, at the same time, reducing energy consumption.

During the development of the new Extruder Generation ROEX special attention was paid to additional electrical power consumers like the heating and cooling section. A new design of the heating elements in combination with the cooling channels and the fans allowed substantially faster reactions of the extruder temperature control.

The effect of this was not only a precise control but also a reduction of the power consumption of the heating and cooling section.

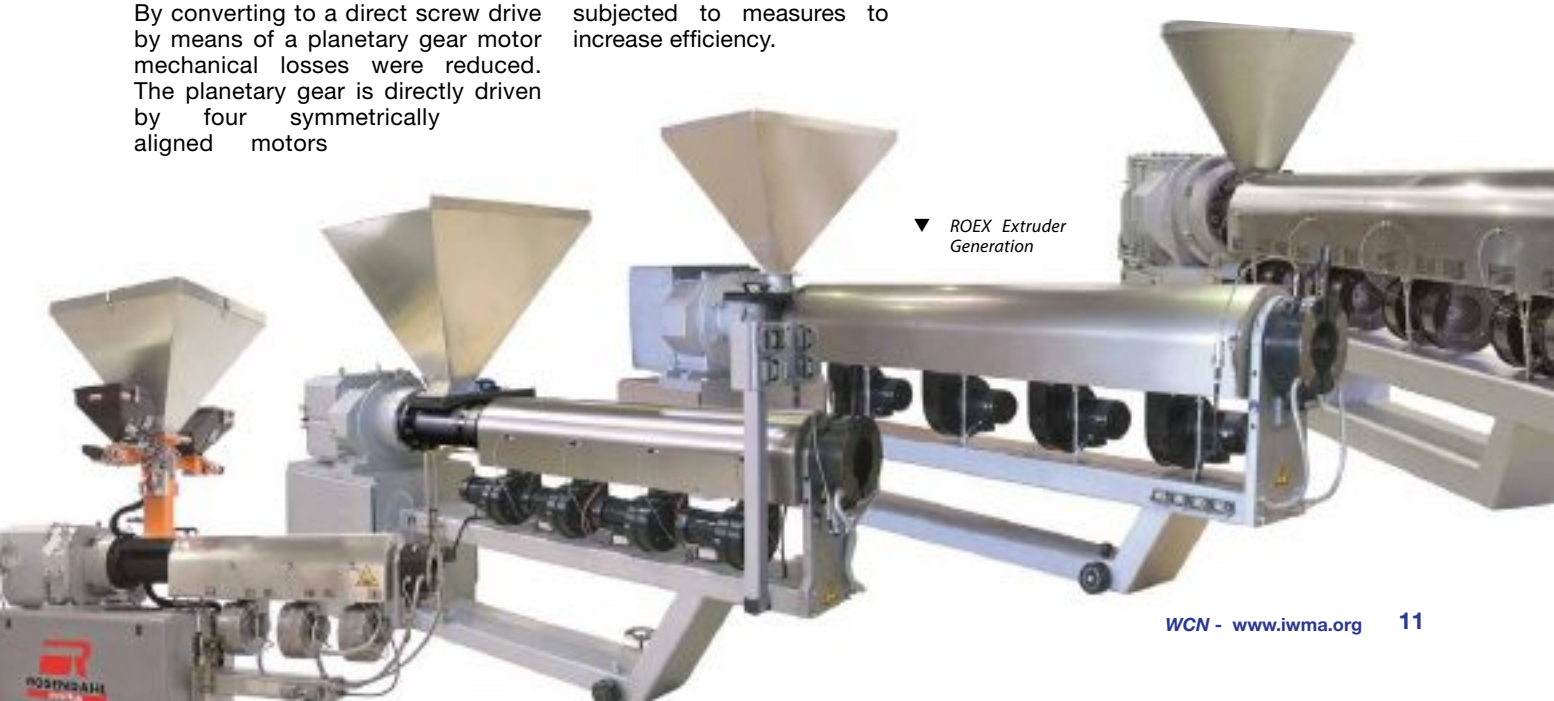
Needless to say, further machines of the Rosendahl extrusion lines were subjected to measures to increase efficiency.

It is of great importance to Rosendahl that the latest technologies are constantly applied (eg use of more efficient electronic components like AC motors, illuminants, conflation of several PLC systems, regulators and relays).

Rosendahl also uses a high-level line control system. This system coordinates the processes of all machines and demands only the power which is required for each particular process.

Rosendahl's ROEX Extruder Generation saves compared to conventional production lines from 15 to 25 per cent energy for the entire production line with a comparable productive capacity.

Rosendahl Maschinen GmbH – Austria
Email: info@rosendahlaustria.com
Website: www.rosendahlaustria.com



▼ *ROEX Extruder Generation*

Group heads for Southeast Asia

Five companies of the Gauder Group will be heading to Bangkok for wire Southeast Asia between 17th and 19th September.

Bow Technology

Bow Technology (France), is the answer for cable makers concerned by quality and long-life reliable bows for all brands of double twist machines. With a comprehensive range of 500 plus designs in constant evolution, the division offers a global service from conception to production.

This is the owner of the patented GreenBow, a unique design enabling important energy savings. The new multi-use "GreenBow2" (one bow fibre, three wire paths) is available now.

Bow Technology – France
Email: bowtechnology@gaudergroup.com
Website: www.bowtechnology.com

Daloo

For cable producers wanting simple and reliable machines at affordable prices, Daloo is the obvious choice. While the design is based on European experience, the manufacturing is done in China following strict quality criteria. Its complete stranding lines and accessories for the production of power and communication cables are delivered worldwide: rigid cage stranders, taping lines, rewinding lines, take-ups and pay-offs and pulling caterpillars.

Daloo – China
Email: sales@daloo-machines.com
Website: www.daloo-machines.com

Gauder sa

Inspiring solutions together, Gauder, Belgium, has in stock more than 1,000 second-hand machines ready to manufacture non-ferrous and ferrous products like rods, wires, conductors, cables, strands, ropes, bars and meshes. Any new entries can be viewed in real-time on the website at www.gauderonline.com

Gauder sa – Belgium
Email: sales@gaudergroup.com
Website: www.gauderonline.cm

Pourtier

Pourtier, France, develops and produces successful rigid stranders and drum twisters for producing high quality Milliken conductors for high voltage and extra-high voltage power cable, from overhead cable (including ACCC™ , ACSS-TW and ACSR-TW) to insulated cable AC type (using high quality Milliken conductor) and conductors for DC cables (round compacted and trapezoidal wires), as well as large equipment required for the production of submarine, umbilical and oil pump cables. Among proposed services, maintenance and upgrades are the ideal solution for enhanced production capacities.

Pourtier sas – France
Email: sales.pourtier@gaudergroup.com
Website: www.gaudergroup.com

Setic

Setic, France, designs and manufactures large and small double twist bunchers/stranders for the power cable and automotive industry, as well as complete solutions to produce special/LAN cables with enhanced performance in one or two steps according to the product mix.

Aftersales and spare parts services including high technology bows – as well as the exclusive GreenBow2 – and accessories for all brands of rotating machines aim to maintain and improve production capacity of existing machinery.

Setic sas – France
Email: sales.setic@gaudergroup.com
Website: www.gaudergroup.com

Manufacturing dies since 1870

Balloffet has been manufacturing since 1870 and now has several subsidiaries the USA, UK and Germany, as well as a worldwide agents network.

▲ *A range of dies from Balloffet*

The company produces: natural diamond dies from 6µ to 3mm; synthetic mono-crystalline dies from 6µ to 1mm; poly-crystalline (PCD) dies from 50µ to 30mm; compacting, stranding and special shaped dies; enamelling guides; extrusion tooling (guides and dies); special tooling with diamond insert; and repolishing machines and equipment.

Balloffet's services include repolishing; training of operators/technicians in Balloffet training centre and showroom, training of operators/technicians at customer plant; and control and technical report of customers' dies.

The company is a quality partner, registered as ISO 9001-2000, giving you the surface conditions, accuracy of the diameters and the technical characteristics of your wires and cables. A forerunner in manufacturing innovation (drilling, forming, sizing, polishing), and tight control of the products, customers get a constant manufacturing process which is a guarantee of reliability of its production.

Balloffet – France
Email: info@balloffetdie.com
Website: www.balloffetdie.com

CabWire World Conference 2013
Palazzo Turati Milan, Italy
4-5 November 2013
Innovations driving worldwide wire and cable markets

CabWire 2013

Innovations driving worldwide wire and cable markets

Leading speakers and companies from around the world will converge on Milan, Italy, for the CabWire World Conference in November, co-organised by the International Wire and Machinery Association.

The theme at this year's conference, on Monday, 4th November, is "*Innovations driving worldwide wire and cable markets*" and features a panel of both ferrous and non-ferrous expert speakers, presenting papers on the latest technological developments within the industry.

Keynote speaker for the conference is Philip Radbourne, of highly acclaimed Integer Research, who will give his "Review of the European Wire and Cable Sector". This will be followed by speakers from Italy, China, Japan, Turkey, Sweden, Germany and Finland.

The conference – **priced at just €150 for members** – will also have tabletop exhibits on display for the duration of the day and there will be the opportunity to attend a gala dinner at the nearby Palazzo Clerici, originally the home of the rich and influential noble family of Milan Clerici.

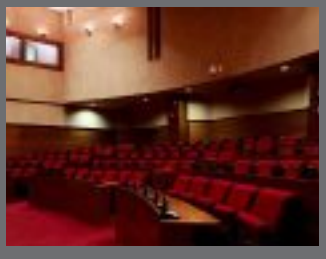
The following day, Tuesday, 5th November, there will be the opportunity to visit local factories for a guided tour of the facilities.

The ferrous tour will be to Ori Martin factory located in Brescia and the non-ferrous tour to Alenia Aermacchi. Transportation will be provided for each tour and more information can be found on the "Plant Tour" page at **www.cabwire.com** with details of cost and how to book.

The conference itself will take place at the **Palazzo Turati** in Milan.

For interested delegates, the organisers of CabWire have negotiated a special delegate rate of only **€199 per night for a superior room including breakfast at the Rosa Grand,** a stunning five star luxury hotel surrounded by Milan's iconic sights and attractions, and within only a 15-minute walk of the both the Cabwire conference and gala dinner venues.

The cost for the conference, for members, is just **€150** which includes access to all conference sessions, refreshments and lunch and a ticket to the gala dinner. For non-members it is **€175**. You can also take advantage of the excellent sponsorship and table top exhibit opportunities by visiting **www.cabwire.com**



The conference has been jointly organised by the IWMA, Associazione Costruttori Italiani Mecchine per Filo (ACIMAF), Comité Européen, de la Tréfilerie (CET), the International Wire & Cable Exhibitors Association (IWCEA) and the Wire Association International (WAI).

WCN

CabWire World Conference 2013
Palazzo Turati Milan, Italy
4-5 November 2013
Innovations driving worldwide wire and cable markets

Ferrous sessions from 10.15am

'WIRE ROD FOR THE FUTURE GLOBAL MARKET'
Alberto Franchi, Fabio Guarneri, Alessandro Lombardi and Vincenzo Volponi, ORI Martin Group, Italy

'EFFECTS OF NIOBIUM ADDITIONS TO A VANADIUM MICROALLOYED HIGH-CARBON WIRE STEEL'
Emmanuel De Moor and Stephanie L Miller, Colorado School of Mines, USA

'THE USE OF TITANIUM DIOXIDE ON LUBRICANTS FOR DRY DRAWING'
Eng Giancarlo Arrighetti, Dr Fabio Bellina, Dr Eng Enrico Bisoffi and Eng Giovanni Garoli, Tecnovo Srl, Koner Srl and University of Trento, Italy

'DRAW HIGH CARBON WITH THE LATEST REQUIRED QUALITY'
Alberto Visconti, Mario Frigerio SpA (MFL Group), Italy

'APPLICATION OF THERMAL DRAWING IN STEEL WIRE PRODUCTS'
Tan Dianlong, Fasten Hopesun Group, China

'CHANGES IN MECHANICAL PARAMETERS OF PATENTED COLD DRAWN STEEL WIRES WITH THE STORAGE PERIOD'
Rüdiger Lux, Ulf Kletzin, Veronika Geinitz and Peter Beyer, Ilmenau University of Technology, Germany

'EFFECTS OF HEAT TREATMENT ON PROPERTIES OF EXTENSION SPRINGS'
Mark Hayes, Institute of Spring Technology, United Kingdom

'RESEARCH ON TREATMENT TECHNOLOGY OF WASTE LUBRICANT IN THE WIREDRAWING PROCESS OF METAL PRODUCTS'
Yang Liu, Li hua Liu, Hong Xu, Cai ping Mo and Weijie Ma, Fasten Group, China

'INLINE WIRE DIAGNOSIS'
Marcus Paech and Walther Van Raemdonck, Witels-Albert GmbH, Germany, and Bekaert NV, Belgium

'THE NEW WIRE ROD MILL AT ARCELORMITTAL IN DUISBURG'
Peter Janßen, ArcelorMittal Duisburg, Germany

'FAST VALIDATION OF HIGH-VALUE WIRE ROPE-RELATED PRODUCTS CLOSE TO REAL USAGE'
Philippe van Bogaert, Bogimac Engineering NV, Belgium

CabWire World Conference 2013
PROGRAMME

Non-Ferrous sessions from 9.40am

'A REVIEW OF THE EUROPEAN WIRE & CABLE SECTOR'
Philip Radbourne, Integer Research UK, United Kingdom

'COPPER SCRAP: AN OLD CHALLENGE ... AND AN OPPORTUNITY FOR TODAY'
Carmelo Maria Brocato, Continuus-Properzi SpA, Italy

'WATER LUBRICATING APPLICATION IN WIRE AND COAXIAL CABLE DRAWING PROCESS WITH NANO-DIES'
Zhang Wenhua, Guo Songshou, Zhang Zhiming, and Shen Hesheng, Shen Bin and Sun Fanghong, Diamond Coating Co Ltd and Shanghai Jiaotong University, China

'DEGRADATION OF MECHANICAL PROPERTIES OF COPPER DRAWN WIRE BY OCCURRENCE OF DYNAMIC RECRYSTALLISATION'
Kazunari Yoshida, Naoyuki Katsuoka and Kota Doi, Tokai University, Japan

'MAIN GOALS AND FIELDS OF RESEARCH IN A CHANGING WIRE AND CABLE MARKET'
Artemio Affaticati, SAMP SpA, Sampsistemi Division, Italy

'APPLICATION CONSTRAINTS AND DESIGN CONSIDERATIONS FOR MILITARY CABLE HARNESS'
Barbaros Şerbetçi, Aselsan Inc, Turkey

'ELECTRICAL CABLES RECYCLING'
Roberto Bentivoglio, Guidetti Srl, Italy

'SPEED OPTIMISATION FOR CROSSLINKED PE INSULATION (PE-XA) AT A HORIZONTAL CV LINE'
Wolfgang Menne and Horst Scheid, Siebe Engineering, Germany

'POWER CABLES – DYNAMICS IN MARKET AND TECHNOLOGY'
Florian Faul, Maschinenfabrik Niehoff GmbH & Co KG, Italy

'P-LASER: THE NEW TECHNOLOGICAL PLATFORM FOR MV EXTRUDED CABLES'
Alberto Bareggi, Prysmian SpA, Italy

'INCREASED PRODUCTIVITY IN MEDIUM-VOLTAGE XLPE INSULATING WITH CONTINUOUS TYPE CHANGE'
Jorma Leppänen and Pekka Huotari, Eero Korolainen, Maillefer Extrusion Oy and Neutro Oy, Finland

'OVERVIEW OF WIRE AND CABLE PREPARATION WITH WRAPPED CORD TECHNOLOGY'
Gerhard Boockmann, Michaela Boockmann and Kai Boockmann, Boockmann GmbH, Germany

Dream is now a reality

Today several companies offer 'turnkey' solutions supporting the management processes through IT-applications networked over the company's LAN. These solutions are designed for general purpose and can fulfil most of the common requirements with quite heavy investment and complex structure.

However, for manufacturers of electrical cables and wires, the situation is particular as most of the data to be processed is not related to quantities but to length. They also need specific functional modules to complete the management toolbox.

Pilot your production to deliver higher quality at lower cost. The dream of every cable manufacturer to gather the information in one sole centralised database is now a reality.

AESA Cortaillod's CIQ (integrated data management system) covers the capture, visualisation, evaluation, storing, reporting and diffusion of the information. CIQ interconnects the different quality islands, the production, the office and more.

AESA Cortaillod works in partnership with different operators in the cable industry. That means its data management system can be connected to a large number of equipment (drivers) of third party companies. Interfaces exist as well with applications like ERP (Enterprise Resource Planning) or MES (Manufacturing Execution System), as an example. Partnerships and the combination of skills, knowledge and products result in providing a complete, integrated and professional solution, exactly suited to this specific market.

AESA Cortaillod continually adjusts its market offering in terms of products and services. Its mission is 'enhancing quality management and production performance of electrical wire and cables.'

AESA SA – Switzerland
Email: aesa@aesa-cortaillod.com
Website: www.aesa-cortaillod.com

Thailand and Brazil for PWM

PWM's high-performance cold welders will be on show at wire Southeast Asia and wire South America.

British company PWM, which has been at the forefront of cold welding technology for over 25 years, will be showcasing its range of high-performance cold welders at wire Southeast Asia (stand H09) and wire South America (stand 401).

Designed and built in PWM's own UK workshops to stringent quality standards, PWM cold welders produce strong permanent welds on non-ferrous wire and strip. Standard or custom designed dies for round or profile wire are individually hand-made in matched sets by PWM's skilled engineers.

PWM's comprehensive range includes lightweight, hand-held machines, robust manual models for use on a workbench or trolley, and a range of powerful freestanding rod welders. Machine capacities extend from 0.1mm up to 30mm.

▲ *The M101 from PWM*

PWM's largest manual welder, the M101, is one of the company's best-selling models. A heavy-duty, versatile machine that is very simple to operate and maintain, due to the low number of component parts, the M101 is designed for wire sizes 1mm to 3.6mm copper and 1mm to 5mm EC aluminium. The M101 can be used on a workbench or supplied with a trolley, enabling the operator to wheel it quickly to the work area.

PWM's smaller BM10 and BM30 models provide a reliable weld on non-ferrous wire 0.1mm to 1.8mm diameter, while the M10, M25 and M30 hand-held machines for wire sizes 0.1mm to 1.8mm are ideal for repairing wire breaks in confined spaces.

PWM Ltd – UK
Email: pwm@btinternet.com
Website: www.pwmltd.co.uk

The used machine specialists

GER sa, Belgium, is specialised in the sale of new and second-hand machinery for wire and cable, tube and sheet works, for the ferrous and non-ferrous industry. For sale are single machines and complete plants for steel rod and wire, non-ferrous wire, steel ropes, electrical insulated cables, etc.

A large stock of machinery is immediately available, guaranteeing quick help and GER will also search for equipment for customers.

▲ *A drum twister pay-off from GER*

Worldwide exports and selling the machinery in the as-is condition or reconditioned and modernised make GER a strong partner for the industry.

The sales department can also send an estimate for complete, ready-to-use production units.

Test-runs of the machines before shipment, as well as installation and commissioning of the machine at the customer's plant, and training for operators complete the service.

GER SA – Belgium
Email: ger@ger.be
Website: www.ger.be

Complete system on show

▶ *The new AccuScan 4012 single-axis diameter and ovality gauge*

Beta LaserMike will exhibit its complete system solution for in-process measurement and automated quality testing of wire and cable at the Wire Southeast Asia trade fair in Bangkok (Booth K12).

Beta LaserMike's in-process measurement system solution monitors all critical points of the cable production process to improve product quality, increase productivity, and reduce manufacturing costs.

Notable brands on display include AccuScan for laser scanning diameter and ovality measurement, CenterScan for eccentricity measurement, LayScan for lay length measurement, LaserSpeed for non-contact length and speed measurement, LN Series for lump and neckdown detection, BenchMike for off-line sample inspection, and DataPro for process control.

Beta LaserMike will showcase its new AccuScan 4012 single-axis diameter and ovality gauge, specially designed for the Asia market. This compact, economical gauge performs 1,200 scans/second and can measure product diameters from 0.1 to 12mm (0.004 to 0.47") with accuracies to ±0.0005mm (± 0.000020").

It also includes highly flexible communications to a host PC or PLC and an optional, ultra-bright display. The AccuScan 4012 gauge can be used with Beta LaserMike's AccuNet supervisory networking software. With AccuNet, you can monitor and manage up to four AccuScan gauges in real time from a single location with complete SPC and trend analysis. AccuScan 4012 gauges are Ethernet-ready, enabling you to create a network hub using standard cabling for ordinary connection to a PC.

Beta LaserMike will also exhibit the latest release of its LayScan lay length measurement system. LayScan enables manufacturers to simultaneously measure four pairs at the cabler to confirm the accuracy of twisted-pair cable construction during production.

This non-contact system uses four individual pair lay sensors and Beta LaserMike's LaserSpeed length and speed gauge to perform the high-speed lay length measurements. A data acquisition and control system effectively collects and processes each lay length in the cable and allows the full use of the customer's off-line analysis tools such as trend charts, statistical analysis, or FFT analysis to readily observe, measure, and report systematic lay variations within each lay.

Data can be easily stored on a local PC. The LayScan system performs measurements to within 0.025mm (0.001") overall accuracy on the same twisted pair. It can measure lay lengths up to 25.4mm (1") at throughput speeds up to 152.4m/min (500ft/min).

In addition to its in-process measurement system, the company will display its solution for automated cable testing such as the DCM Model ES-2G for the quality testing of 4-pair category LAN/data cables up to 2 GHz and the DCM Model SCS-350B for the quality testing of 4-pair category LAN/data cables up to 600 MHz.

Beta LaserMike offers a full line of DCM cable testing solutions for testing LAN/data, telecom, RF/coaxial, and aerospace/defence cables. Products include fast, reliable solid-state switching technology to automate cable testing functions and can be integrated with powerful vector network analysers (VNAs) for a complete high-performance testing system. The DCM line of cable testing systems is engineered to deliver the highest quality results, performance, and value for the investment.

Beta LaserMike – USA
Email: jay.luis@betalasermike.com
Website: www.betalasermike.com

Flying seriously high!

Leoni manufactures high- specification and reliable silver-plated conductors for use as space wire – the most extreme of applications, where there is no margin for error.

Its precision drawing and stranding capabilities produce high performance copper and copper-based alloy conductors with excellent flexibility and durability. The company manufactures to the tightest tolerances – giving high quality signal performance and lightweight constructions to maximise results for weight-saving opportunities.

Silver plating provides excellent resistance to corrosion. With established expertise Leoni can easily achieve the high plating thickness requirement of 3 microns, on the finest wire diameters, to safeguard against even the most aggressive forms of corrosion such as red plague.

The silver plating also protects the wire against extreme temperature fluctuations, ranging from high temperatures (up to 200°C) and down to cryogenically low temperatures (below -150°C) to which the wiring may be exposed in this most hostile environment.

The technologies developed for this ultra-critical and high-tech application can be utilised to great effect for more earthly applications – satisfying the demands of the most exacting Aerospace market segment requires expertise that gives the company a distinct advantage when transferred to any number of specialist applications.

Leoni AG – Germany
Email: info@leoni.com
Website: www.leoni.com

Time to grab your partners

It's time to get your dancing shoes on for the IWMA's annual dinner dance in London this November.

This is an ideal opportunity to take in the sights of the UK capital and meet up with friends and colleagues for a Friday night of good food, music and company.

This year's dinner will be held at the Royal Garden Hotel, in Kensington, on Friday 22nd November.

For a long weekend in a hotel of this quality and location the new prices, again heavily subsidised by the IWMA, represent exceptionally good value.

The closing date for bookings is Friday, 27th September 2013. No cancellations will be accepted after this date, but substitute names will be permitted; no refunds will be made for cancellations received after 27th September.

This year the main course will be lamb – if you do not wish to have this, please select the vegetarian option.

We look forward to receiving your early registration for this popular event.

In the meantime, should you have any further questions, please do not hesitate to contact Debi Coleman at the IWMA on +44 1926 834680 or info@iwma.org

RG rolling ring drive steals the limelight

For more than 60 years, Joachim Uhing KG has been successful with linear drive technology, above all with the RG rolling ring drive invented by the company founder. In 1983, the RS linear drive nut was added to the product range. Both products operate as non-positive linear drives on plain shafts.

The previously mechanical elements were fitted with in-house, intelligent controls so the customers can purchase turnkey systems from Uhing. At Intec in Leipzig and Hannover earlier this year, Uhing showcased two product studies on this topic.

One of the studies focused on the Uhing RS linear drive nut. The prominent features are the lack of backlash and the excellent sealability. The linear drive nut is equipped with a position sensor system in an underwater application.

On the controller, the user can set the start position, the travelling distance, and the travelling speed. The position sensor system used in this application has a positioning accuracy of ±0.1mm; higher resolutions are possible.

The second study focused on the RG rolling ring drive. The linear direction of travel can now be changed individually without interfering with the mechanics while the shaft continues rotating in the same direction. In addition, a wide range of stroke speeds can be set almost continuously with the shaft rotating at a constant speed.

The gear pitch can now be set with a stepper motor in dependence of data provided by connected sensors, or by direct user input.

Joachim Uhing KG GmbH & Co – Germany
Email: info@uhing.com
Website: www.uhing.com

Head to NETDA

Nantong Economic and Technological Development Area (NETDA), approved in 1984, is one of China's first 14 state-level development areas opening up to the outside world. It is located in the southeast of Nantong and bordering the Yangtze River to its south.

Its superior geographical location, evolving investment infrastructures and existing industrial foundation make it an ideal destination for investment in the Yangtze River Delta.

NETDA has planned and established a number of industrial bases and formed several industrial clusters, including:

- equipment manufacturing industry
- material industry
- medicine industry
- energy industry
- outsourcing industry
- modern textile industry

NETDA has already established over 600 foreign-invested enterprises with total investment of more than $US10 billion from over 30 countries and regions, including 52 projects invested by Fortune 500 companies.

Strategic advantages of investing in NETDA include:

- Easy access to raw material suppliers and prospective customers
- Complete infrastructure to facilitate easy start-up
- Comparatively low business cost
- Easy access to skilled labour
- Convenient transportation

NETDA has many wire rope and electronic connection wire manufacturers. Among these are: Hitachi Cable, a joint venture company from Japan; Nantong ZTT wires, which is developing rapidly, with the major business in electric wires and marine cables; Kiswire Ltd from Korea, with an investment of $US200m, which produces radial steel ropes for tyres; Nantong Wire Rope Company; more than 100 SME wire rope manufacturers; and more than 100 wire rope reprocessing factories, eg Dehui Connecting Wires Co Ltd.

NETDA also provides a full set of services including pick-up at the airport, board and lodging, interpreting, etc.

Nantong Economic and Technological Development Area – China
Email: zhang940620@163.com
Website: www.nantong.gov.cn

Bar sets the products level even higher

▲ *2013 could be the most successful year in the firm's 20-year history*

Following a successful 2012, Bar Products and Services Ltd has continued to grow, and with new staff and equipment to support this growth, plans are already being put into place for further investment in the Yorkshire-based precision tooling company. Major orders for the wire rope industry have already been received and shipped to various companies in Europe and the UK – a very promising start to 2013, which could make it the most successful year of the firm's 20-year history. Worldwide export sales now account for over 75 per cent of the company's sales.

"We have not only taken on experienced staff to cover the company's immediate growth, we have also started a new apprenticeship scheme to provide for our future skill requirements," said Steven Rika, managing director.

Preparations are already well underway for the industry flagship exhibition in Düsseldorf in 2014, where it will once again display the extensive range of its products to illustrate the company's capabilities.

Bar Products and Services Ltd – UK
Email: enquiries@barproductsandservices.com
Website: www.barproductsandservices.com

Systematic measurement of flat profiles and shaped wire

▼ *Pivoting support DVW 1 with ODAC® laser dimension measuring head*

Shaped wires are today indispensable in industry sectors such as aerospace, watch and jewellery making and dentistry. In other words, wherever there is a demand for absolute precision and an extremely long service life.

Shaped wire can be used to quickly create near net shape complex geometries and profiles at a significantly lower cost than with other production methods which require finishing work such as abrading.

Although flat profiles and shaped wires are used in a huge range of environments, all application areas have one thing in common: mediocre quality is not an option. Manufacturing tolerances are extremely tight, and the surfaces of the cold-rolled profiles must be cleanly worked and exhibit no anomalies. It is surprising that manual measurements by skilled workers are still widespread today. The manual checks do not just interrupt the production flow but also consume valuable time and involve a certain margin of error. Nobody can afford to make errors.

The majority of optical systems equipped with laser or CCD cameras measure the shadow height of a product. This, however, like the human eye, is subject to heavy fluctuation if the product is not precisely aligned with the laser beam. A deviation of a twist angle of one degree may already lie outside the permissible tolerance range. So how can perfect production of flat profiles and profile wires be ensured?

Zumbach's answer is in its product range. It includes various solutions for in-line height and width measurement of profiles which are able to measure with extremely high precision, regardless of position and twist, and no worries about incorrect measurement. Robust and compact measuring systems can easily be integrated in existing production lines. Measurements are performed using either laser technology (ODAC®, DVW 1, DVO 2) or the light-cut method with image processing (Profilemaster® PMM 30/50/80).

Measuring with laser technology: Zumbach's ODAC® laser measuring heads measure the height and width of any profile without contact and ultra-fast (1,200 measurements/s). The extremely dirt-resistant scanners ensure maximum error detection and permanent calibration – incomparable with manual measurement methods and, in view of tight manufacturing tolerances, an advance in quality in every respect.

The pivoting mechanism of the DVW 1 support rotates the ODAC® laser measuring heads mounted on it continuously around the measuring axis within ±2.5° , ±5°, ±7.5° or ±10°. Extremely accurate measurements are ensured by the continuously pivoting motion of the laser heads together with the electronic 'minimal value detection' of the relevant dimension.

With the DVO 2 oscillating device for ODAC®, the angle can be increased to ±50°, thereby ensuring maximum possible measurements of profile dimensions. The values acquired from the DVW 1/DVO 2 and ODAC® are processed via a connected USYS system and used for automated production monitoring.

Measuring with the light-cut method: Product quality can also be assured using image processing profile measuring systems. Zumbach's Profilemaster® PMM 30/50/80 are non-contact in-line and off-line high-tech systems for measuring profiles. The CCD megapixel gigabit Ethernet cameras used measure fields with diameters of within 30, 50 or 80mm. One to six laser/camera modules continuously measure the cross-section of the moving profile. A powerful PC-based processor adds the cameras' partial images, consisting of straight lines and curves, together to yield the momentary cross-section of the profile. All relevant dimensions such as width, height, thickness, angle and radii are added together to form the full cross-sectional picture.

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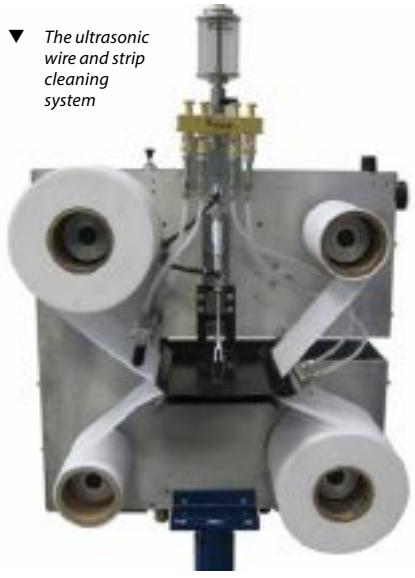
The specialists

For almost two decades GEO-Reinigungstechnik (GEO) has specialised in continuous cleaning equipment for wire, cable and strip.

Whether in high-speed applications, the manufacture of medical products, in combination with plasma treatment or in the production process of fasteners such as bolts and nuts, GEO components and systems are used in a multitude of production and finishing stages.

▼ *The ultrasonic wire and strip cleaning system*



Typical cleaning applications include the removal of oil, grease, stearates, soap and dust following the drawing process and final cleaning before further operations such as coating.

Demanding applications require wet chemical processes which are generally supported by compact high-performance ultrasound units and high-pressure nozzles to boost the cleansing capacity of the purifying agent.

Depending on the applications, further methods like steam cleaning and mechanically-supported washing, either separately or in any combination, are available. In less demanding applications, pure mechanical cleaning can be sufficient.

Perfect examples of the applicability of wet chemical systems are the contact-free cleaning of precious metal and aluminium alloy strips for the production of precision stamped parts, as well as the fully automatic cleaning of high-grade steel ribbon for the production of high temperature superconductors (HTS tapes/wires). The high quality demands on the cleaning processes have been realised with proven GEO components, complemented by state-of-the-art systems for continuous bath monitoring, take-up and pay-off units and much more according to individual requirements.

The cleaning of high-grade narrow strips illustrates one facet; the Primary Wire Wipe (PWW) system is suitable for the less demanding requirements.

The principle is as ingenious as it is simple: the wire to be cleaned passes between two strips of absorbing tape material which move in opposite directions laterally so that a clean tape surface is continuously presented to the wire. In this way the wire does not come into contact with contaminated wipers as is the case when rags or stationary felt pads are used.

▼ *The ultrasonic wire and strip cleaning system*

The PWW is suitable for wiping wire or strand with a diameter of up to 2mm or narrow tapes. Customised modifications of the PWW have proven successful in applying different types of lubricants and finishes, such as corrosion inhibitors, adhesion enhancers and welding wire finishing materials.

GEO's product range is completed by powerful air wipes and a wide variety of spiral brushes with metal and synthetic filaments.

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

New butt-welder

August Strecker has introduced its new development: dual upset butt-welding machine MK300-3P.

The machine is equipped with a three-phase DC transformer and welds copper wires as well as cables up to 2,500mm² (5,000 kcmil).

Like all machines in the Strecker SS, MS, SMK and MK series, the MK300-3P conveniently deburrs the conductors automatically after welding.

August Strecker GmbH & Co KG – Germany
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▼ *The new MK300–3P*

Essentials for high product quality

▲ *A pioneering development from Lune*

Precise and continuous temperature measurements in all phases of product development are essential for achieving high product quality. By increasing productivity and reducing energy costs they provide better competitiveness and better environmental performance of the company.

lune Prozesstechnik GmbH, a Neuss, Gemany-based company, is now launching a pioneering further development of the established temperature measurement (formerly Luxtron and Ircon) on the market. The innovative principle is based on measurement of heat flows. Thus, the disadvantages of optical systems, such as emissivity variations and changing light conditions, are eliminated.

Non-contact surface temperatures of round (up to 7mm wire, cables and pipes up to 100mm and larger) square profiles up to 45mm, and flat products (sheet, foil, strip of metal and plastic), can be measured. The maintenance-free system reliably covers a high temperature range of 10 to 250°C (or 50-482°F).

Two sensor halves ensure independent calibration of the system. In addition, this arrangement is unaffected by production speed, texture, colour and vibration caused by fluctuating measured distances.

lune warrants for this newly development apparatus complete compatibility with existing systems from Luxtron and Ircon companies. A modernisation of the electronics and a network with other process steps is easily possible using existing Luxtron/Ircon sensors.

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Highest quality made simple

Ridgway Machines has launched the new advanced NCT narrow coil taping machine with a unique multi-axis taping head motion control system. Coupled with a fully programmable and intelligent touchscreen HMI, this simplifies the taping of all narrow coil configurations to ensure that the highest levels of quality and productivity are consistently achieved. The innovative design solves a common problem where traditional taping machines have limited access to both sides of the coil. To simplify set-up the coil support system features automatic coil turn-over and height adjustment; this also eliminates the need to remove or reposition a coil to tape both sides, improving operational efficiency and productivity.

The NCT is fully programmable and the operator is able to set the number of layers required for each coil side, tape pitch, linear speed and tension control. Auto reverse at the end of each pass allows for uninterrupted, multiple layers without incurring machine downtime.

Coil lengths between 700mm and 3,000mm can be accommodated with weight up to 200kg. The NCT will accept tape widths of 20mm or 25mm with a pitch capability between 5mm and 28mm, whilst operating at a rotational speed up to 60 rpm. Tension control is between 20 50N.

▲ *New advanced NCT narrow coil taping machine from Ridgway*

For manufacturers of narrow profile coils such as wind turbine generator stator coils, taping quality and productivity will be maximised. The NCT also uses remote machine diagnostics, enabling Ridgway to provide live, machine specific user support worldwide. This ensures that performance of the NCT can be rapidly optimised for different operating conditions.

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Determining of parameters characterising the functional behaviour of spring steel wire in helical springs

By Veronika Geinitz, Peter Beyer, Mathias Weiß and Ulf Kletzin, Ilmenau University of Technology, Germany

1. Manufacture of helical springs

Helical compression springs are made of oil-hardened and tempered spring steel wire, stainless spring steel wire and patented-drawn spring steel wire as indicated in EN 10270 [1]. After drawing, the wire is coiled in a spring coiling machine.

The residual stress developed in the spring wire during the cold shaping then has to be relieved by a tempering stage as the next step in manufacture. The degree of residual stress will be dependent on the spring index of the springs. After tempering, there are further possible manufacturing steps, basically grinding and de-burring of the ends of the springs.

Shot peening is used to extend fatigue life, followed by further heat treatment. The pre-setting introduces a form of stress into the spring wire that will be favourable for the later loadbearing, ensuring that the threatened shortening (setting) of the spring in use is all but avoided. The final stages of spring manufacture are surface coating and the measuring and testing of the spring properties.

Thus, the production of helical springs for engineering purposes involves a series of processes, among which coiling, peening, pre-setting and, in particular, the different tempering processes will significantly change the properties of the spring steel wire and thereby the functional and strength properties of the springs [2][3].

These changes are not completely known even today, which means that optimisation of spring production can take place only by means of the sample spring process with all its costs in time and money. To enable these alterations in the material to be taken account of at the dimensioning stage for the springs, it is necessary for the characteristic values to be known for the spring steel wire after the various treatment stages of tempering, pre-setting and so on.

2. Dimensioning of helical springs

The strength test in dimensioning the springs is intended to ensure that the stresses arising in the spring remain within permitted limits. Optimum exploitation of the material is necessary to save both material and installation space because of industry demands for compact, light construction. It presupposes that the exact yield points for the spring steel wires be known for the various types of load. This involves both tensile and torsional stress testing.

Helical springs, the type most frequently deployed, are subjected mainly to torsion in use. The yield point under torsional stress t*0,04 should therefore be used as the permitted stress t zul for dimensioning purposes to allow the spring material to be loaded most efficiently [4]. These yield points are not, however, known for the various materials. It has so far been usual to estimate them on the basis of the tensile strength Rm (Table 1) [5][6]. The assumption is made that the structure of the material is homogeneous and isotropic [7].

As the approximations used do not provide sufficient accuracy, a sampling process is necessary for helical springs, particularly those under heavy loads, with experimental proof of the springs' function and strength. As the quality and load specifications for springs become ever more demanding, it becomes essential that their precise deformation behaviour under torsional stress be established. This means, firstly, investigating spring steel wires under tensile and torsional stress separately and, secondly, investigating the effects of the various spring production steps (tempering, peening and pre-setting) on the characteristic values for the material.

3. Investigational method

The various steps in spring manufacture cause changes on the one hand to the geometry and functioning of the spring, and changes on the other to the wire material of which the spring is made.

Main stress	Example of spring	Original material	Proof of functioning	Proof of strength
Torsion	Helical compression spring	Wire	$s = \frac{8 D^3 F n}{G d^4} = \frac{F}{R}$	$\tau_{vorh} = \frac{8FD_m}{\pi d^3} = \frac{Gds}{\pi D_m^2 n} \leq \tau_{zul} = 0{,}56 R_m$

▲ *Table 1: Basis of calculations for helical springs*

The effects of all production stages on the properties of the spring can only be determined and analysed on the spring itself: amount of pre-setting, relaxation behaviour, and fatigue life. However, the changes to the material properties can only be established on the wire before it is coiled into the spring, ie on wire rods: by means of tensile testing, torsional testing, rotating bending tests (Nakamura) and relaxation tests on the wire.

Apart from the residual stress in the wire caused by the cold forming of the wire into the spring and partly relieved by the succeeding tempering, all the other processes can be carried out on the wire and their effects can be measured. As well as the tempering and the peening with subsequent relief tempering, even the pre-setting can be tested at the wire stage by twisting the wire to beyond its yield point. Wires prepared in this way have been subjected to tensile and torsional stress testing and the results have been compared with the changes met in the corresponding spring properties.

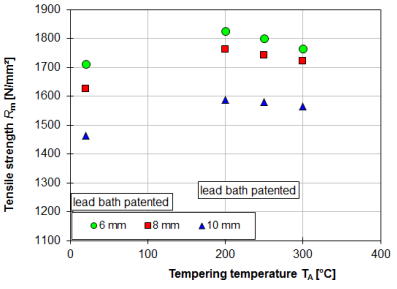
The tensile testing was carried out using a precision extensometer. Similarly to the tensile testing, torsional testing to breaking point was carried out using the authors' specially developed torsional testing station [8]. Particular attention was paid to the area of transition from elastic to plastic in the direction of torsion under conditions of alternating load and release. The torsion tests were carried out using a precision shearing strain extensometer (as the counterpart to the precision extensometer in the tensile test).

The characteristics of the materials investigated in this way are in particular the technical yield point under torsional stress t*0,04 being the stress limit t zul for helical compression springs (Table 1), and the G-modulus which determines the spring rate, plus the tensile strength which is the strength characteristic mainly determined at present, and other deformation characteristics.

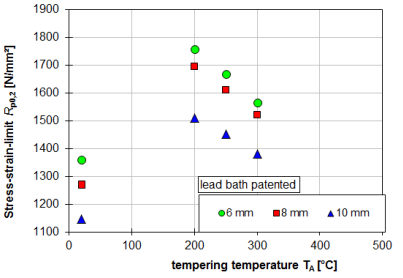
4. Effects of tempering: results of tensile and torsional stress tests

Certificates from wire suppliers usually contain only the details of tensile strength and necking failure, which are measured on the wire when it is ready for supply. The diagrams which follow (Figures 1 and 2) show the changes to the tensile strength Rm and the stress-strain limit Rp 0,2 achieved by 30 minutes tempering at different temperatures; the example is patented-drawn wires (rolled wire: patent lead bath) of a variety of diameters. This tempering comes after coiling in spring manufacture process and serves to relieve residual stress in the coiled springs.

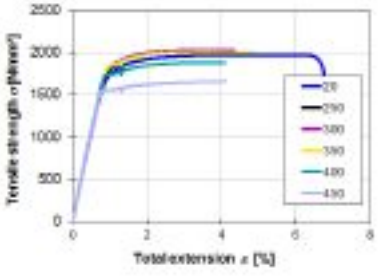
The results show that the change in tensile strength Rm through tempering at approximately 150 N/mm² is considerably less than the change in stress-strain limit at approx. 400 N/mm². However, the results also show that at the temperatures of more than 250°C currently used there is already a clear reduction in the stress-strain limit.



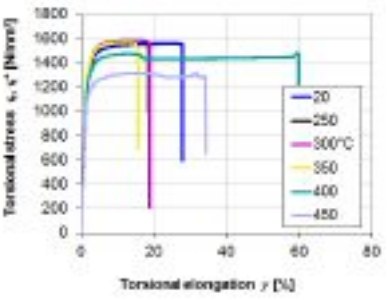
▲ *Fig. 1: Tensile strength of patented drawn spring steel wires with 3 different wire diameters tempered 30 minutes with different temperatures*



▲ *Fig. 2: Tension yield points of patented drawn spring wires with 3 different wire diameters tempered 30 minutes with different temperatures*



▲ *Fig. 3: Graph of tension stress vs. elongation as a function of the tempering temperature [°C], oil-hardened and tempered spring steel wire (VDSiCr) d=3.0mm*



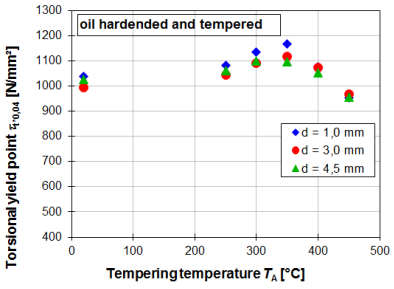
▲ *Fig. 4: Graph of torsion stress vs. shearing strain as a function of the tempering temperature [°C], oil-hardened and tempered spring steel wire (VDSiCr) d=3.0mm*

Spring steel wire is, because of its means of manufacture, neither homogeneous nor isotropic. Therefore it is not possible to come to an immediate conclusion concerning the torsional properties of the wires from the tensile properties measured. Thus torsion testing to fracture was carried out on different types of wire, both tempered at various temperatures and not tempered at all.

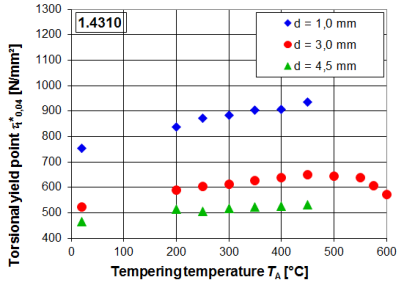
To determine the shearing strain which is the equivalent of the elongation in the tensile tests, the torsional stress testing was carried out using a precision shearing strain extensometer. This means that the yield point under torsional stress and the G modulus can also be determined. Figure 3 shows the change in the tensile test curves resulting from the earlier tempering and Figure 4 the change brought about similarly in torsional test curves for an oil-hardened and tempered spring steel wire.

Although the wires had already been tempered at more than 400°C during oil-hardening and tempering, the torsional strength characteristic values

rise with further tempering between 300°C and 350°C (Figure 5) and sink considerably if the further tempering is at higher temperatures.



▲ *Fig. 5: Torsion yield points of oil-hardened and tempered wires with 3 different wire diameters tempered 60 minutes with different temperatures*

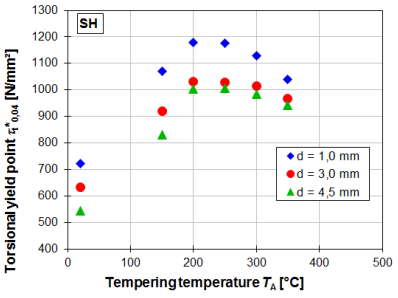


▲ *Fig. 7: Torsion yield points of stainless steel spring wires with 3 different wire diameters tempered 60 minutes with different temperatures*

The torsional stress test results on the three types of wire material can be summarised as follows (1 ≤ d ≤ 10 mm) [8]:

In the case of oil-hardened and tempered spring steel wires (Figure 5) the technical yield point under torsional stress t*0,04 for the non-tempered wire rises by approximately 10 per cent until the tempered wire (tempered at 350°C) and then falls significantly for tempering temperatures higher than this. The G modulus is nearly independent of the tempering temperature. The number of twists Nt reduces gradually until TA = 350°C and then rises significantly from TA = 400°C.

In the case of patented drawn spring steel wires (Figure 6) the t*0,04 of the non-tempered wire rises significantly up to the 200°C tempered wire; the increase is between 400 N/mm² and 500 N/mm². Then at higher tempering temperatures it falls. The G modulus rises slightly with the tempering temperature. The number of twists



▲ *Fig. 6: Torsion yield points of patented drawn spring wires with 3 different wire diameters tempered 60 minutes with different temperatures*

Nt is high overall and becomes less between the non-tempered and tempered wire. The patented lead bath wires show a massive reduction in number of twists after tempering between 200°C and 250°C. These wires often fail to break at right angles to the wire axis but break in extended fracture areas, parallel at times to the wire axis. In the patented drawn wires there may be a build up of cracks all round in the torsional tests before breakage.

In the case of stainless 1.4310 spring steel wires (Figure 7) the technical yield point under torsional stress t*0,04 rises constantly until the tempering temperature TA is 450°C, by about 15-20 per cent, and then falls away again at tempering temperatures above 550°C. The G modulus rises significantly with the tempering temperature. The number of twists Nt is almost independent of the tempering temperature TA.

In summary, it can be said that the tempering temperatures that enable the highest yield point under torsional stress and thus the best use of materials in the case of helical compression springs under static load are lower in the case of oil-hardened and tempered and of patented drawn spring steel wires than those normally met to date and in the case of stainless spring steel wire higher than those normally met to date.

5. Effects of peening: results of tensile and torsional stress tests

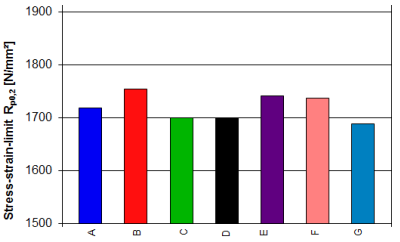
The effects of shot peening are here demonstrated using VDSiCr, d = 4.5mm wire as the example. The wire was prepared as follows for the tensile and torsional stress tests to fracture:

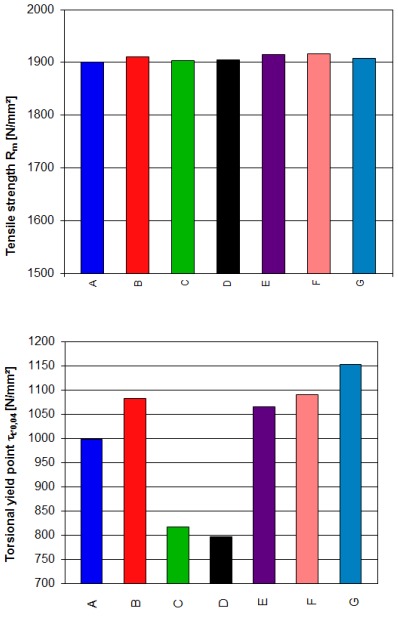
- state as supplied [A]
- tempered at 350°C for 30 mins [B]
- tempered at 350°C for 30 mins, peened [C]
- tempered at 350°C for 30 mins, pre-twisted up to = 1,200 N/mm², peened [D]
- tempered at 350°C for 30 mins, peened, relief-tempered at 240°C for 30 mins [E]
- tempered at 350°C for 30 mins, pre-twisted = 1,200 N/mm², peened, relief-tempered at 240°C for 30 mins [F]

- tempered at 350°C for 30 mins, peened, pre-twisted = 1,200 N/mm² [G]

The charts in Figure 8 show a selection of the parameters for the tensile and torsional stress tests on the wires prepared accordingly. The Rm values for tensile strength hardly change at all despite the various manufacturing histories. The stress-strain limit Rp 0.2 alters by approx. 50 N/mm² on account of the wire pre-treatment. The greatest changes are seen in respect of the yield under torsional stress t*0,04. The first tempering sees the t*0,04 slightly raised. The peening leads to considerable reduction of t*0,04, which is fully restored by the succeeding relief tempering. Pre-twisting up to 1,200 N/mm² as the last procedure [F] has the effect of raising t*0,04 significantly.

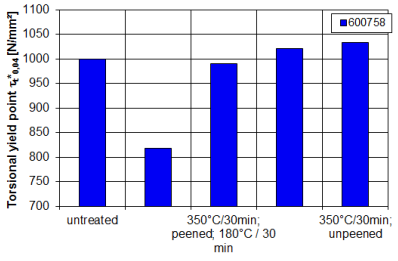
As stated above, the yield point under torsional stress is in certain cases reduced considerably by shot peening. Relief tempering after





▲ *Fig. 8: Stress-strain limit Rp0,2, Tensile strength Rm and technical yield point under torsional stress t*0,04 in peened wire d=6mm, VDSiCr, with variation of tempering and pre-setting*

peening causes the yield point to rise again significantly. Further sample experiments have shown that the yield point has not been restored as well by relief tempering at 180°C for 30 minutes after peening as it is after 30 minutes at 240°C (Figure 9).

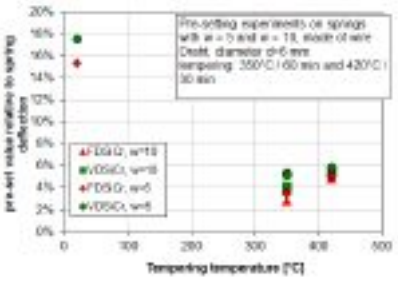


▲ *Fig. 9: Technical yield point under torsional stress t*0,04 in VDSiCr peened wires without and with a variety of post-peening tempering at d=6mm*

6. Effects of pre-setting

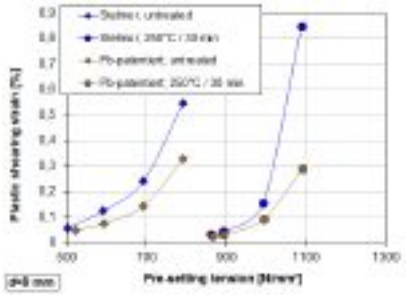
The wire in a helical spring is not twisted to fracture point when in use, but only by a low amount of shearing strain in comparison with ultimate shearing deformation. The transition from elastic to plastic in the torsional test to failure is the section of the results graph for the torsional stress testing which is of particular interest for the pre-setting behaviour of helical springs. A close investigation of this area should make it possible to draw conclusions about the pre-setting figure to be expected from helical compression springs in this material for a prescribed stress level. The torsional test under conditions of alternating load is suitable for this investigation.

In this type of torsional stress test, the wire is loaded with a certain torsional stress, then relieved and the plastic (residual) deformation is established. The counterpart of the plastic deformation in the case of springs is the pre-setting figure. A new wire is taken for each investigation.



▲ *Fig. 10: Pre-setting experiments on springs with spring index w=5 and w=10, Tempering: 350°C for 60 minutes and 420°C for 30 minutes wire material (oil-hardened and tempered wire) for d=6mm*

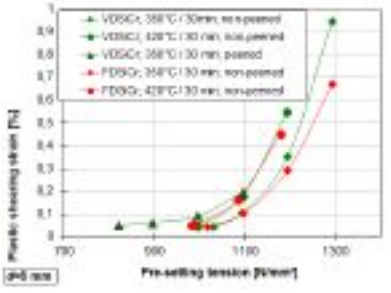
The comparison of the square dots with the circular dots in Figure 11, for example at stress of 1,200 N/mm², shows that the wires tempered for 30 minutes at 350°C (square dots) reveal less plastic deformation than those tempered for 30 minutes at



▲ *Fig. 11: Plastic deformation of wire as a function of the load strain (pre-set tension) in dependence on the tempering temperature and the wire material (oil-hardened and tempered wire) for d=6mm*

420°C (circular dots). For this reason a lower pre-set tension is also to be expected for springs tempered in this way and this is proven by the results from springs demonstrated in Figure 10 (here compare the dots for 350°C with those for 420°C). In addition, the springs made of FDSiCr wire (shown in red) have a lower pre-setting figure than those made of VDSiCr wire (shown in green), which agrees similarly with the investigation outcomes from the wires in Figure 11.

The wire peened after tempering, if not relief-tempered afterwards, will achieve plastic deformation of 0.04 per cent (the yield point under torsional stress) even at low pre-set tension.



▲ *Fig. 12: Plastic deformation as a function of the load strain (pre-set tension) in dependence on the tempering temperature and the wire material (patented drawn wire) for d=6mm*

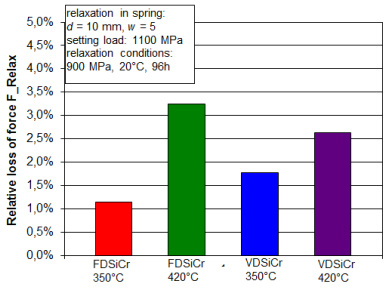
In Figure 12 the influence of tempering on the pre-setting tension to be expected for patented drawn wires is particularly clear, as the same values for the plastic deformation of tempered wires appear for much higher pre-set tension figures as do for that of non-tempered wires.

7. Results of relaxation investigations of wires and springs variously tempered

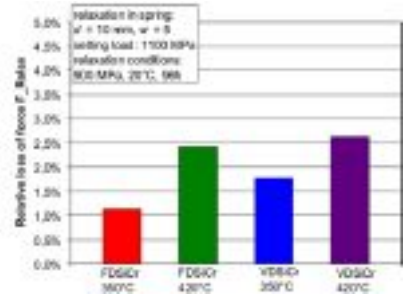
Relaxation is the term used for the degree to which a spring of constant length loses its force over time [6]. Diagrams of the relaxation that takes place in cold-shaped helical compression springs are given in the European standard EN 13906-1 [5]. The questions to ask about it are how it comes about, which properties of the material are important for relaxation and, then, which steps in the manufacturing steps of the spring and/or which

parameters have what effect on the force lost by relaxation of the spring.

A necessary procedure is to establish the relaxation behaviour of the wire used for the spring and then compare it with the relaxation behaviour of the spring made from the wire [3][4]. The investigations of the wire provide knowledge of relaxation affected only by the material properties and the conditions in which the relaxation takes place. The relaxation of the finished springs will, of course, also be influenced by the process stages to which the wire is submitted during spring manufacture.



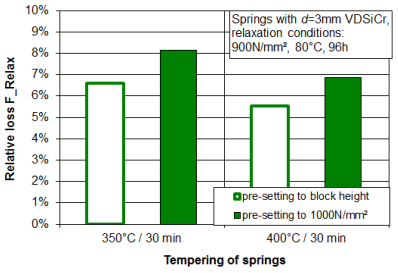
▲ *Fig. 13: Relative loss of force at the working point for springs made of oil-hardened and tempered wire FDSiCr / VDSiCr of d = 10 mm after varied tempering of springs [4]*



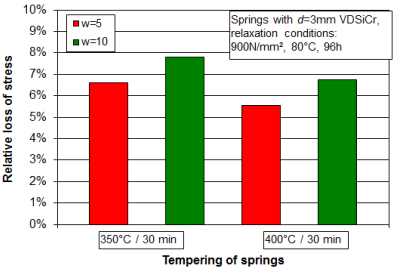
▲ *Fig. 15: Relative loss of force at the working point for springs preset to a setting load and preset to block height; Variation: tempering*

Figure 13 shows the relative loss of force after relaxation at room temperature of helical springs tempered differently and made of wire of d = 10 mm. Figure 14 shows the relative loss torsional stress in the wire on relaxation. The losses on relaxation at room temperature are lower in both wires and springs after tempering at 350°C than they are after tempering at 420°C. When relaxation takes place at higher temperatures, this effect is reversed. Overall, the results of the relaxation tests on wires and springs are very similar.

Figures 15 and 16 show relaxation results for springs which had been tempered in different ways and were then subjected to a relaxation test at 80°C. Further variations are the pre-set stress (Figure 15) (pre-set to block height and pre-set to a setting load) and the spring index. The percentage of force lost in the springs tempered at 350 °C for 30 minutes is higher for all variants because of the relaxation temperature of 80°C than is the comparable percentage loss of force in the springs tempered at 400°C for 30 minutes.



▲ *Fig. 14: Relative loss of torsional stress on relaxation of oil-hardened and tempered wires VDSiCr, FDSiCr, d = 10 mm after varied tempering [4]*



▲ *Fig. 16: Relaxation loss in springs; Variation of spring index, tempering*

The tension figures given have not been corrected. (Because of the curvature of the wire in the helical spring the tension is higher at the inner diameter of the spring than it is on the outer diameter. There are correction factors available for the calculation of the maximum torsional stress which should be taken into consideration when dimensioning springs under dynamic strain, as indicated in the standard [5]).

8. Summary

The changes to wire characteristics caused by manufacturing steps in spring production are here proved by tensile and torsional stress test results. The characteristics established permit considerably more exact dimensioning of helical springs. The pre-set figure arising from the pre-setting procedure was compared with results from the torsional stress testing on wires prepared accordingly. Relaxation results for spring steel wires were shown in relation to relaxation results for helical springs manufactured out of these wires.

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