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Wire

The International Magazine for the Wire & Cable Industries

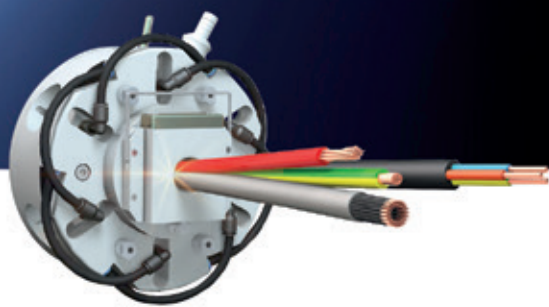


WIRE & CABLE
INDIA 2016

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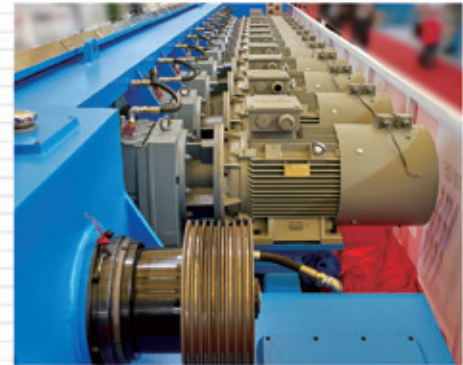
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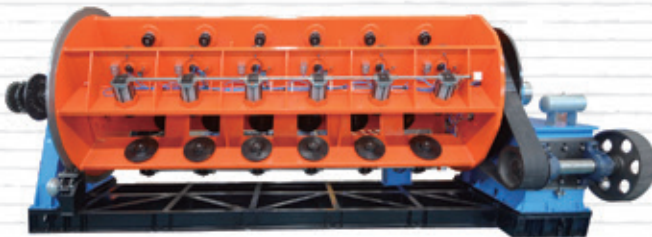
W2D23



Rigid Frame Stranding Machine — By Reducer



Aluminum Alloy/ Copper Rod Breakdown Machine- Separate Motor



Rigid Frame Stranding Machine — By Belt



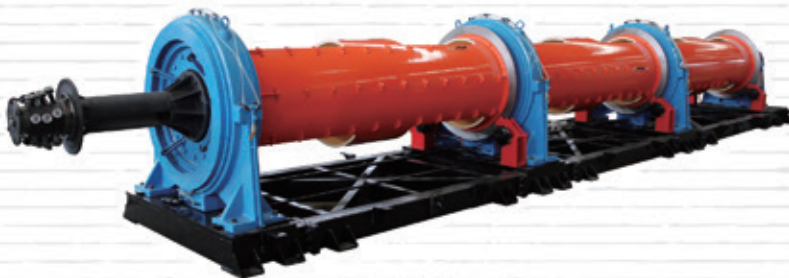
Aluminum Alloy/ Copper Rod Breakdown Machine (one head-two heads)



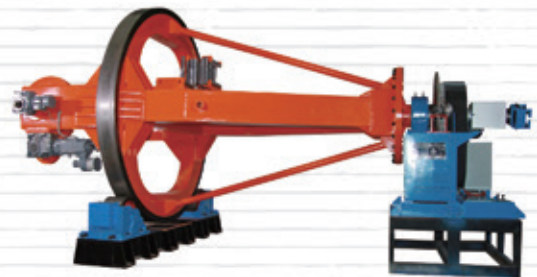
Bow Type Laying-up Machine



Copper Rod Breakdown Machine with Continuous Annealer



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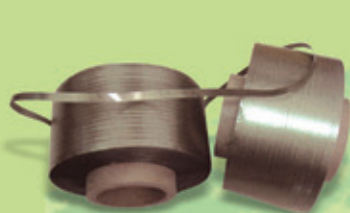
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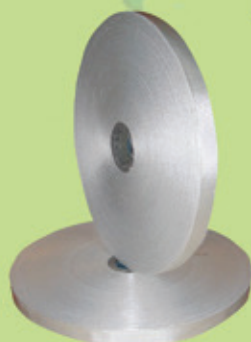
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See page 100 for further details*

EDITOR:David Bell
FEATURES EDITOR (USA):Dorothy Fabian
EDITORIAL ASSISTANT:Christian Bradley
DESIGN/PRODUCTION:Julie Tomlin
PRODUCTION:Lisa Wright
SALES & MARKETING:Jason Smith
(INTERNATIONAL) UK & ROW sales
 Giuliana Benedetto
 Italian speaking sales
 Linda Li
 Chinese speaking sales

ADVERTISEMENT COORDINATOR:Liz Hughes
ACCOUNTS MANAGER:Julie Case
SUBSCRIPTIONS:Julie Case
PUBLISHER:Caroline Sullens
FOUNDER:John C Hogg

INTRAS OFFICES

EUROPE: 46 Holly Walk, Leamington Spa
 Warwickshire CV32 4HY, UK
Tel: +44 1926 334137
Fax: +44 1926 314755
Email: euowire@intras.co.uk
Website: www.intras.co.uk
Website: www.read-euowire.com

USA: **ADVERTISING/MARKETING**
 Intras USA – Doug Zirkle
 Danbury Corporate Center,
 107 Mill Plain Road,
 Danbury, CT 06811, USA
Tel: +1 203 794 0444
Email: doug@intras.co.uk

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Taking you to the USA, China and India

It may well be the holiday season, but it seems the wire and cable shows are also coming thick and fast at this time of year.

In May it was the turn of the industry across the Atlantic to make its mark on the exhibition circuit with the staging of Wire Expo in Connecticut, USA. More than 1,400 visitors headed to the show in the heart of New England.

President Andy Talbot, of organisers the Wire Association International, described the three-day event as 'outstanding'. The full review starts on page 52.

It is also time to look forward in this issue to three exhibitions across the globe. Our preview of wire China, running from 26th to 29th September, starts on page 56.

Over 57,500m² of exhibition space has been booked to accommodate more than 1,000 Chinese and international companies exhibiting in Shanghai.

It is then the turn of IWCS, which takes place in October in Rhode Island, USA. Turn to page 54 for our coverage, but look out for exhibitor listings in the forthcoming issues of sister publication *wiredInUSA*.

Generally accepted as the leading technical symposium in the industry, IWCS has personal development programmes, a long list of papers from leading names in the industry, and a suppliers exhibition all running alongside each other from 2nd to 5th October.

It is then a move back to the Indian subcontinent with the staging of Wire & Cable India from 5th to 7th October at the Bombay Exhibition Centre in Mumbai, India.

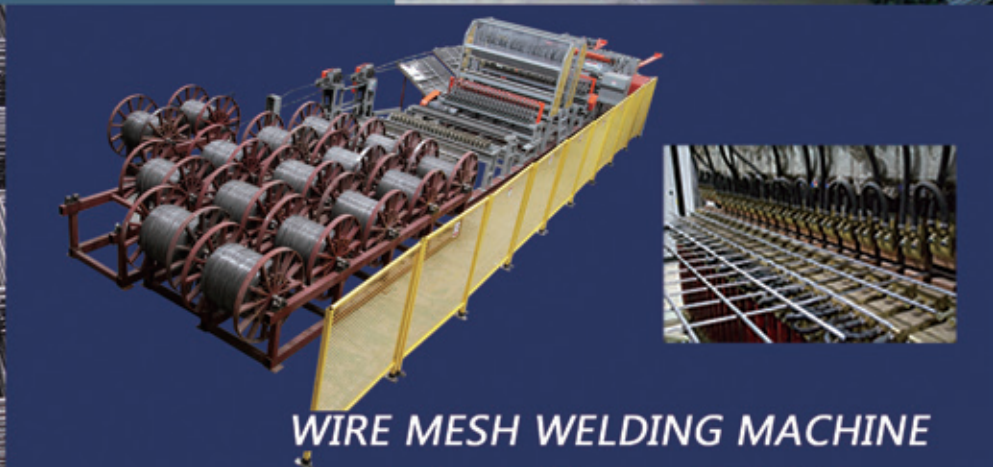
More than 400 exhibitors from 25 countries are expected at the three-day event. Our coverage starts on page 65.



David Bell
 Editor



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Getting Technical:

Manufacturing of compact conductors, highlighting the benefits and potential cost reductions in the whole stranding process

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TEL

23–25 March:

TEL – trade exhibition –
Istanbul, Turkey

Organisers:

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Email: info@voli.com.tr

Website: <http://tel-fair.com>

dates for your diary ...

2017

May

9–11 May:

Interwire –
trade exhibition –
Atlanta, Georgia, USA

Organisers:

Wire Association International

Fax: +1 203 453 8384

Email: sales@wirenet.org

Website: www.wirenet.org

June

5–8 June:

wire Russia –
trade exhibition –
Moscow, Russia

Organisers:

Messe Düsseldorf and VNIKP

Fax: +7 499 246 9277

Email: info@wire-russia.com

Website: www.wire-russia.com

September

19–21 September:

wire Southeast Asia –
trade exhibition –
Bangkok, Thailand

Organisers:

Messe Düsseldorf Asia Pte Ltd

Fax: +65 6337 4633

Email: wire@mda.com.sg

Website: www.wire-southeastasia.com

October

3–5 October:

wire South America –
trade exhibition –
São Paulo, Brazil

Organisers:

Messe Düsseldorf GmbH

Fax: +49 211 4560 668

Email: info@wire-south-america.com

Website: www.wire-south-america.com

8–11 October:

IWCS Technical Symposium –
conference and exhibition –
Orlando, Florida, USA

Organisers:

IWCS

Tel: +1 717 993 9500

Email: phudak@iwcs.org

Website: www.iwcs.org



▲ The OF-Cu rod process from Upcast

Greener casting with 100 per cent recycled copper

UTILISING recycled copper in the process of casting OF-Cu rod is the target for many manufacturers. The reason is simple and obvious: cost efficiency.

Upcast already has a solution in meeting the requirements for using 100 per cent recycled material – or scrap, as many operators call it – in the OF-Cu rod process, all based on the original Upcast continuous casting technology and machinery.

Using recycled material in the Cu rod casting process has been very challenging with regard to both quality control and the mechanical processing of the material. The casting process itself does not remove the possible metallurgical impurities of the raw material. Therefore, it was recommended to charge only small quantities of recycled material together with the pure copper cathodes. This required extra manual work from

operators, increasing the need for workforce.

With consistent development work and understanding the importance for the customers, Upcast was able to change the situation. The first OF-Cu rod continuous casting line utilising 100 per cent recycled material from the other internal processes was successfully delivered some years ago.

The automatic charging technology of the line is designed specifically for recycled material. The final product determines the criteria and limit values for the raw material. Thus, the purity of the recycled material is crucial for the process. When using scrap from other processes of the same manufacturer the customer can be certain that the material is exactly the kind needed for the casting process.

The material feeding and melting process

of recycled material also for smaller pieces is well taken care of by pre-handling of the material and assured by a hydraulic press forcing all the pieces into the melt.

The automated processes together with the advanced control system have added to the production efficiency remarkably. For example, the automatic transfer of the melt results in less manual work, and this way the probability of human error is minimised.

The remote access system allows for a very quick fault detection followed by fast repair actions. This is extremely important in order to avoid any longer disturbances or breaks in the process. Furthermore, the system allows the customers to have all the possible process data, enabling them to make adjustments in order to improve the efficiency.

Upcast OY – Finland
Website: www.upcast.com

Launchpad for new lubricants

ZELLER+Gmelin, an industrial lubricants manufacturer, used wire 2016 in Düsseldorf, Germany, as the launchpad for its latest products for copper and stainless steel wire drawing.

"Among the 300 visitors at the booth, many had travelled from abroad, mainly from Europe and Asia, and a high number of prospective customers from Iran, who engaged in many technical discussions with the lubrication experts," said Wolfgang Kienle, product manager.

The easing of economic sanctions against Iran obviously had a direct influence on trade fair contacts. The number of visitors in total increased by almost 30 per cent compared to 2014.

Zeller+Gmelin offers both individual and holistic solutions from a single source, ranging from research and development to production.

At the centre of the new products were the innovative Multidraw drawing agents for the copper wire drawing sector: 'Multidraw Cu CAS'; a new synthetic product for continuous annealing, 'Multidraw CU MF C' for medium and fine wire drawing and the 'Multidraw CU UNI S' universal drawing agent for rod breakdown and medium wire drawing up to 0.1mm.

Zeller+Gmelin – Germany
Website: www.zeller-gmelin.de



▲ Multidraw CU UNI S is a water-soluble, semi-synthetic coolant for the drawing of copper wire from rod breakdown to the final wire dimensions

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- LRBJ series vertical taping machine*
- WRBJ series horizontal taping machine line*
- Extruding line*
- Pay-off and take-up*

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New extruders maintain long relationship

LONG-TIME Davis-Standard customer Maxi-Blast Inc installed six Davis-Standard Thematic® extruders at its new 40,000ft² facility in St Petersburg, Florida, USA.

This is the latest extruder addition for Maxi-Blast, whose chairman and CEO Robert Donaldson has been purchasing Davis-Standard extruders since founding the company in 1981. Maxi-Blast supplies both cleaning/deflashing equipment and blasting media to support customers in the construction, electrical, rubber and automotive industries, among others.

The Davis-Standard extruders process nylon and polycarbonate pellets used in the company's proprietary line of cabinets for cleaning screws and moulds and deflashing parts.

"From the time I started the company, I felt Davis-Standard built the best extruders," said Mr Donaldson. "They build a lot of the components in-house, their service is excellent and they are a well-run organisation. I am constantly striving to upgrade technology and stay current, so I've been replacing my Davis-Standard extruders every 15 years.

"Not only have I got excellent production out of these machines, but I sell the used ones on the secondary market. Used Davis-Standard extruders are always in demand because they are so well-built."

Davis-Standard's extruder and feedscrew technology has been instrumental in Maxi-Blast's quest to make the perfect pellet for their process. Pellets are manufactured in a variety of sizes, shapes, colours and formulations depending on application.

As Mr Donaldson explained, pellet geometry is especially important when the material is used as blasting medium so it doesn't damage the part. Maxi-Blast technology is not only used to clean screws and moulds, but it is capable of deflashing rubber, phenolic and die-cast metal parts. The company is so astute at what it does, that the recent facility expansion is 25,000ft² larger than the old facility.

Mr Donaldson appreciates Davis-Standard's Thematic extruder because it is built for the most demanding processing requirements. Customers often describe this model as an "industry workhorse" because of its durability, minimal maintenance, and quiet operation for multiple processing requirements and applications. Another advantage is the Thematic's availability with a wide range of feedscrews and control systems. Sizes range from 1½ to 10 inches (40 to 250mm) with L/Ds from 12:1 to 40:1.

"Maxi-Blast is all about quality. The facility expansion, the new extruders and other equipment upgrades are all part of our ongoing investment strategy to support customers by making the best product possible," Mr Donaldson added.

"Our new Thematic extruders are giving us 20 per cent more product in the same amount of hours, which is essential to meeting production goals. We tell our customers we're in this for the long-haul and it's good to know we can rely on Davis-Standard's technology along the way."

Davis-Standard – USA

Website: www.davis-standard.com



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▲ Robert Donaldson with a Thematic extruder

Alloy Wire launches its new technical brochure

THE industry publication for round, shaped profile, wire rope and electrical resistance wire has been launched by Alloy Wire International, and is proving a big hit with customers.

The company used its recent appearance at wire 2016 to showcase its new brochure, an 84-page publication listing more than 60 different types of exotic nickel alloys, including Inconel®, Nimonic®, Hastelloy and Ni-Span C902®.

This brochure provides specification data sheets on each alloy, detailing useful information on post heat treatment guidance and mechanical properties, both useful to customers when designing wire forms.

More than 300 copies have been picked up or sent out to existing and potential customers from the automotive, aerospace, defence, oil and gas, medical and nuclear sectors.

The glossy A4 publication is heading across the world too, with destinations ranging from Istanbul and Nairobi, to Sydney and Shanghai.

"The Alloy Wire Technical Brochure is always very well received, but this year it has surpassed our expectations," explained Mark Venables, managing director.

"A number of customers have been waiting for the brochure to be produced as it gives them such a definitive range of information on all of the alloys we supply in one place."

Alloy Wire, which is celebrating its 70th year in business in 2016, supplies 4,000 customers in 15 sectors worldwide in the wire manufacturing market.

The company has recently added high performance alloys Nitronic 50 (0.025 to 5.5mm) and super duplex (0.025 to 6.5mm) to its extended range and can now draw from 21mm in various different alloys.

Alloy Wire International – UK
Website: www.alloywire.com



▲ The new brochure from Alloy Wire

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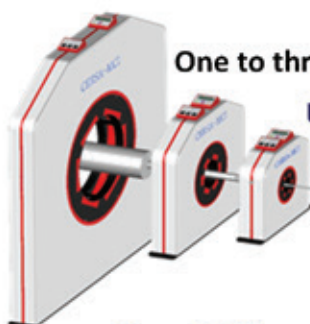
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MEASUREMENT AND CONTROL INSTRUMENTS

Metalube expands manufacturing capacity

DUE to an upsurge in product demand, lubricants manufacturer Metalube has taken possession of the industrial unit located adjacent to its current site. This increases the space available to the company by more than 70 per cent.

The company now occupies a one-hectare site, which includes a 2,500m² covered factory, warehousing and office space alongside a brand new laboratory. Metalube has also purchased four new Jungheinrich forklift trucks to service the new and improved site. Two new blending tanks have also been purchased, to enhance manufacturing capability and enable the company to keep up with increased demand.

Commenting on the new site, commercial director Douglas Hunt said: "We were exceptionally fortunate that the site next door became available as we were fast outgrowing our existing facility. The combined sites have blended together perfectly, giving us a truly outstanding operations."



▲ *Metalube's new premises*

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

The experienced exporter has offices in China, India, Brazil and UAE.

Metalube Ltd – UK
Website: www.metalube.co.uk

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Tenova to supply iRecovery® technology to Arvedi, Italy, plant

TENOVA has been appointed by Arvedi Group, a European steelmaking company, to design and supply an iRecovery® system to be installed at the Arvedi factory based in Cremona, Italy.

This new system will be implemented to an existing Tenova Consteel® system, which heats and feeds metallic charge to a 250-ton electric arc furnace (EAF) for a combination of heat recovery and environmental sustainability. The start-up of the system is scheduled to take place at the beginning of 2017.

Heat recovery technology brings advantages during the operation phase, and the energy recovered can be flexibly used to process steam, heating purposes and power generation.

At Arvedi, the iRecovery system will recover 34.3 MW average of thermal power from the EAF production, corresponding to 52t/h of average steam production, which will feed an Organic Rankine Cycle (ORC) turbo-generator to produce electric energy (up to 7.5 MW) for Arvedi's internal use.

Arvedi's steel plant will have a saving on electric energy consumption with a consequent reduction in CO₂ emissions of approximately 23,300t/y. The ORC turbo-generator will be supplied by Turboden.

Energy optimisation is one of the main topics for the steel industry. The iRecovery system can be installed to recover the energy from every kind of electric arc furnace and the combination of Consteel® and iRecovery is among the most cutting-edge innovations that Tenova has introduced to the market. It is a solution that can give reductions in consumption, cost saving, efficiency and environmental sustainability.

Tenova looks at a currently installed base of 45 Consteel systems and five iRecovery systems on electric arc furnaces. An additional five new orders for the last generation systems – Consteel Evolution and iRecovery – will be commissioned within the next two years.

Tenova SpA – Italy
Website: www.tenova.com

**OUR REVIEW OF
WIRE EXPO STARTS
ON PAGE 52**



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Project praise from Miltec

MILTEC UV's partnership with the University of Maryland for the QUEST Capstone Consulting Project is now complete.

The honour students were tasked with developing a strategy to help Miltec UV choose a method of commercialisation for their ceramic coating technology, a technique that is less expensive, safer and more effective than the current process used to manufacture lithium ion batteries.

The team chosen to provide Miltec UV with a real-time innovative solution, to maximise profit with minimal risk, consisted of electrical engineer Katelyn Walter, mechanical engineer Austin Kendall, accounting and finance honour student Jessica Lewis, and finance honour student Tim Odukale.

The diverse knowledge, skills and perspectives of these students allowed them to evaluate the financial implications and risks associated with multiple commercialisation options. The recommendation was a dual-sided approach that allows Miltec to maximise profits while providing the flexibility to customise the strategy based on the customer's needs.

The strategies were to partner with a coater who would coat the separator while Miltec UV maintains the customer relationship, or licensing the coating technology to the customer, and providing the equipment to coat the separators.

Miltec UV executives are extremely impressed by the financial and risk modules presented by the team.



▲ Pictured are, from left, Austin Kendall, Jessica Lewis, Katelyn Walter and Tim Odukale

Miltec CEO Marilyn Blandford stated: "This type of research and business modelling would have taken Miltec a year to complete in-house. We were impressed with how quickly the students were able to create viable solutions for Miltec and produce deliverables that we will be able to use in the future. This initiative was a huge success and we will continue to utilise the Quest Program to help us solve business, engineering and technology challenges."

Miltec UV – USA

Website: www.miltec.com



YHM



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Copper Alloy Wires & Rods Manufacturer

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- Nickel Silver Wire
- Phosphor Bronze Wire
- Silicon Bronze Wire
- Copper Alloy Wire
- Free Cutting Brass Rod & Wire
- RoHS Brass Rod
- EDM Wire
- Copper Anode

銅合金ワイヤー及びロッドメーカー

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- ニッケル・シルバーワイヤー
- 燐青銅ワイヤー
- シリコン青銅ワイヤー
- 快削真鍮ロッド及びワイヤー
- RoHS快削真鍮ロッド
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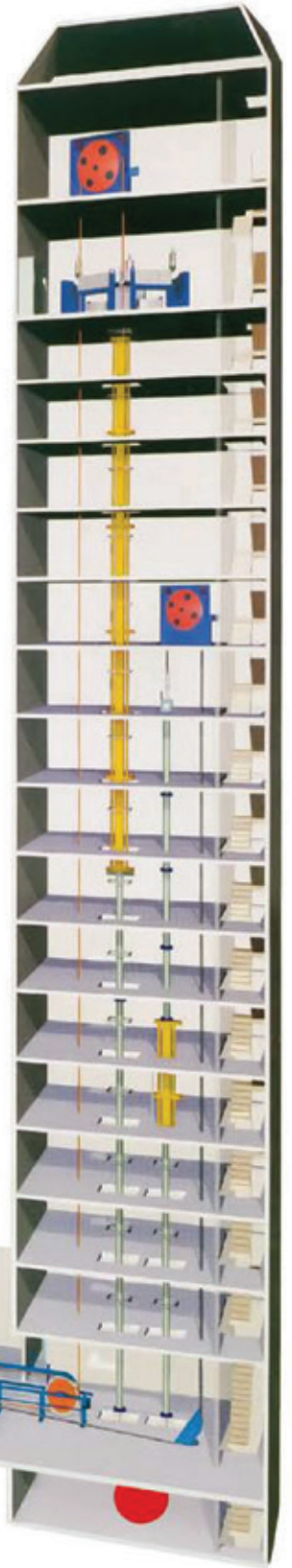


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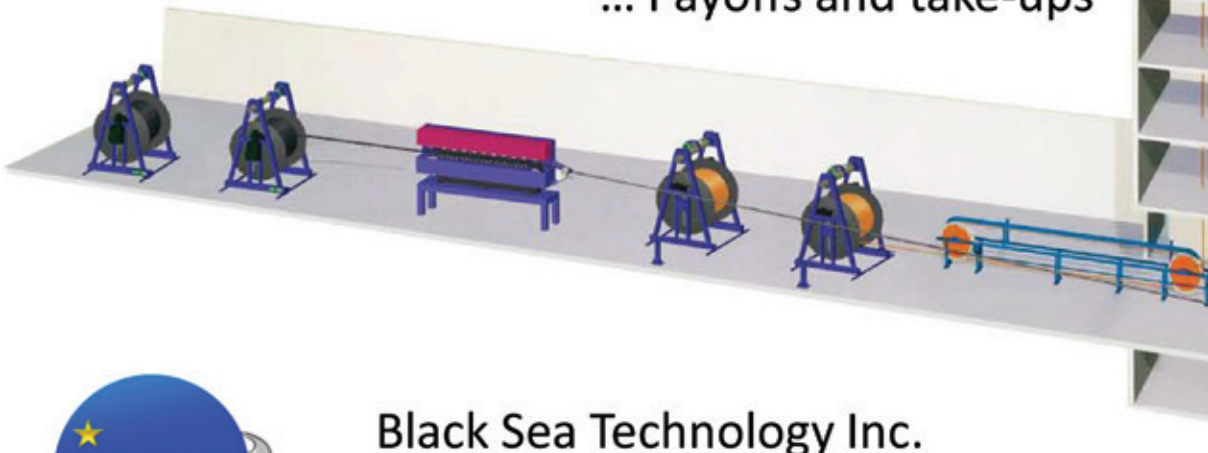
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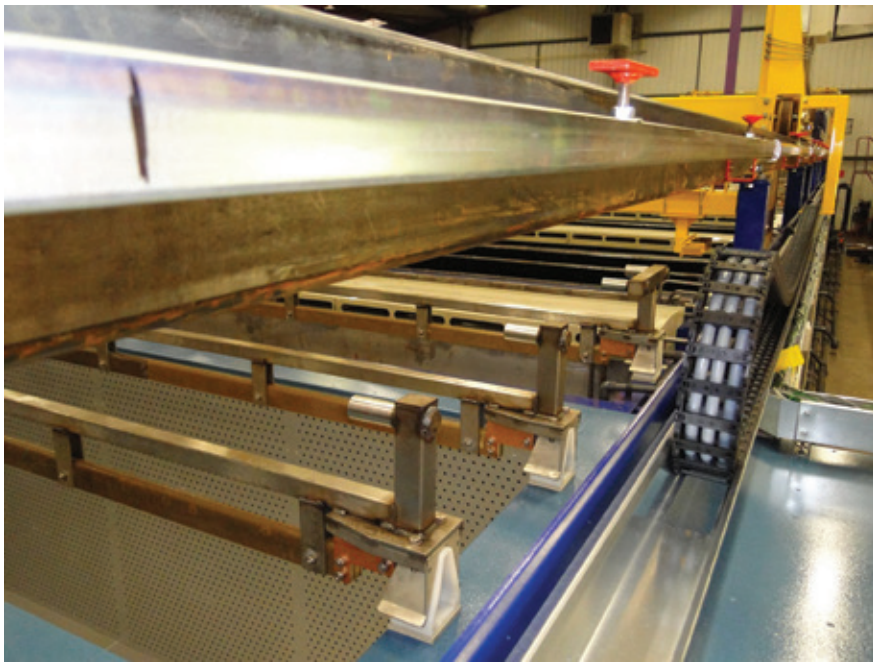


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▲ Jacquet Weston Engineering used igus's E2/000 e-chain® system

Cable management made easy

MANUFACTURING and processing machinery that handle large, long items frequently use overhead gantries to transfer the material to, through and from the processing line. Often these gantries have to travel significant distances, whilst requiring electrical cabling to power their motors and sensors.

The conventional cable management method is to have the cables mounted above the line using festoons supported by steel rails. As the gantry traverses down the line, it pulls the cables along with it on multiple trolley mechanisms.

Jacquet Weston Engineering (JWE), a Berkshire, UK-based manufacturer of surface finishing equipment, looked to igus® for support with its continuous improvement programme. JWE has been manufacturing metal finishing process plants for over 40 years, supplying all sectors of the industry from the traditional subcontract market of acid and alkali zinc to the specialist aluminium treatment and aerospace industries with sulphuric, tartaric, chromic, boric and hard anodising processes.

igus recommended its E2/000 e-chain® system, used by a large number of manufacturers worldwide, to address cable management on all of JWE's lines utilising transporters to dip metal jugged components into the process solutions. This removed the need for the overhead cable loops and trolleys, offering increased efficiency and reliability to the processing line, whilst the absence

of cable loops also satisfied customer requirements for health and safety. The overall height of the equipment was reduced, allowing greater flexibility for machine placement within a facility.

The 1500 series e-chain can be used for guided travels of up to 75m. It can be opened from either side for cable insertion, and is suitable for both vertical and horizontal installations.

The e-chain is placed into horizontally mounted 2m-long guidefast troughs, the segments being connected together with clips that ensure good alignment. This e-chain product is used extensively in industry for replacing festoons as it can be easily installed to the side of an I-beam or bulkhead rather than mounting on top like a traditional e-chain trough, thus saving on installation height.

The E2/000 e-chain is a fourth generation product for igus, utilising years of accumulated experience. It offers quick installation, mechanical stability, low audible noise operation, minimal maintenance and a long service life for cables.

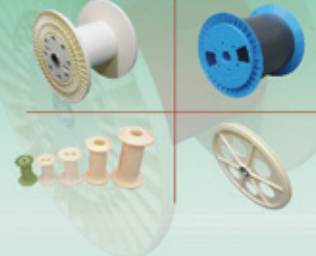
JWE opted to use a fully harnessed readychain® system, complete with chainflex® cables. These rigorously tested cables prevent downtime in energy chain applications, minimise abrasion, have safety certification and are covered by the igus® chainflex® guarantee.

igus – UK Website: www.igus.co.uk

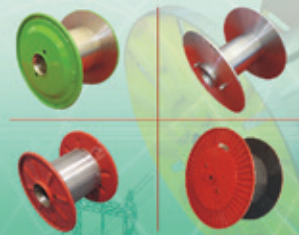
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▲ The new headquarters in Castellanza, Varese, Italy

New corporate campus in Castellanza

TENOVA is moving its main headquarters to Castellanza, Varese, Italy, to a new and modern corporate campus.

The campus extends over a surface of approximately 100,000m² and will host over 400 employees.

It was designed and developed in accordance with principles of functionality and environmental sustainability, characterised by the integration of new buildings with the

Tenova Pomini offices and production site. The company has invested a total of approximately €15m in the project.

“The campus is an expression of the Tenova working approach, grounded in a heightened attention to and awareness of sharing, collaboration and the integration of different company functions,” said Andrea Lovato, chief executive officer.

“This choice reflects Tenova’s long-term strategic vision, focused on continuous

innovation and on attracting, training and developing talents and skills capable of sustaining the company’s future development.”

In this new location, Tenova’s industrial vocation will be fully expressed: the company’s various business units, functional staff and the existing Pomini factory shall all come together in a single site, creating a work environment congenial to the interaction and exchange of best practices between engineers, office staff, specialised and professional workers, with positive effects on the efficiency of the company’s processes.

Collaboration, sharing and integration will be developed alongside another of the company’s values, transparency, which will also be palpable in the Campus’ architecture. All of Tenova’s offices are characterised by floor-to-ceiling windows and walls, for bright interiors overlooking outdoor green areas, which guarantees internal visibility, for a continuous environment where staff can work together.

Tenova will also focus on young people and is set to bolster exchanges with universities, schools and technical institutes. On-site areas have been specifically created for this purpose: for example, in the congress centre there are training rooms and a 150-seat auditorium.

The campus also features numerous meeting rooms and break areas, as well as a canteen that has been designed to encourage conviviality and sharing over lunch. In order to guarantee staff wellness, services available to employees include a new sports and fitness area, featuring a well-equipped gym and a football, beach volley and basketball court.

Tenova SpA – Italy
Website: www.tenova.com



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Double celebration for Niehoff

THERE were two reasons to celebrate for Niehoff as the company looked back on wire 2016 and an in-house exhibition immediately after the show in Düsseldorf, Germany.

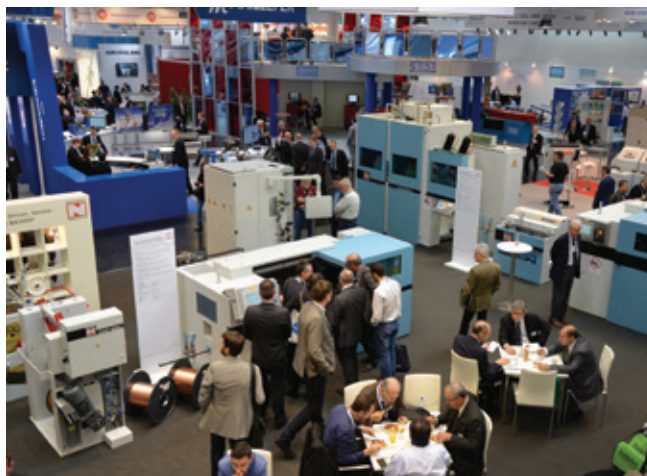
At Düsseldorf itself, a large team of employees from the head office, subsidiaries and representative companies welcomed numerous visitors to the stand – one of the largest at this year's exhibition.

On display was the new rod breakdown machine type MSM 86 offering the customers benefits like improved wire quality and a higher energy efficiency, and – most importantly – notable cost savings. To achieve even more of them with Niehoff systems, the company's portfolio includes wear and spare parts with the "Niehoff Original+" label, also presented at wire.

Central topics of discussions at the stand were energy and materials efficiency, as well as how to reduce manufacturing costs. The company could prove that its innovative and custom-made solutions are the answer to these requirements.

Arnd Kulaczewski, president and CEO, said: "We came to Düsseldorf convinced that the wire 2016 would be a great success again – and we were rewarded for all our efforts."

Delegates from Niehoff subsidiaries and the representative and partner companies met with staff at the headquarters at the agents meeting, held before the trade fair to update all representatives comprehensively regarding the company's technology, latest developments and worldwide market trends.



▲ The Niehoff stand at wire 2016

The second successful event was the company's in-house exhibition at the headquarters in Schwabach, Germany, with more than 150 visitors from Europe and overseas, including India, China and the Middle East. The highlight of this exhibition was the multiwire drawing line type MMH 112. This machine represents the latest state of development of Niehoff's new generation multiwire drawing machines, which is now going into extensive field testing.

Maschinenfabrik Niehoff GmbH & Co KG – Germany
Website: www.niehoff.de



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Investing in its global sales network

A STRONG global presence – this is the reason behind the decision of Schmolz + Bickenbach International to invest in expanding its global sales and services network.

In taking this step, the long steel expert is shoring up its position as a reliable partner providing local supply chain solutions in America, Asia and Scandinavia up to just-in-time deliveries of the special steel products from the group's own production units.

By expanding global sales and services presence, the company is strengthening customer service in strategically relevant markets.

The sales offices will also push special steel from the group's own production, including products from Deutsche Edelstahlwerke, Finkl Steel, Steeltec, Swiss Steel and Ugitech.

In Asia, the steel company opened a subsidiary in Tokyo, Japan, in December 2015, guaranteeing local customer support in the country.

Since December a new sales office in Bangkok, Thailand, has served customers in the automotive and electronics industry, as well as in mechanical engineering.

To meet the increasing demand of the automotive and plastic industry in China, a new warehouse for tool steel, including sawing and milling technologies, was opened in Chongqing.

At the Indian sales and services location in Mumbai, the company raised sawing capacities up to 2,600mm blocks of tool steel.

Target applications include interiors and exteriors for the automotive sector.

The activities at the Scandinavian sales and services location at Valkeakoski, Finland, focus in particular on the precise manufacture and time-efficient delivery of stainless and engineering steels for shipbuilding as well as for the energy industry. The site also has extended sawing capacities.

The company now offers the entire range of dimensions in the processing of special engineering steel – up to 800mm. In establishing a presence at Queretaro, Mexico, Schmolz + Bickenbach is also responding to major developments in the automotive industry in Mexico.

Local warehouse and processing capacities have doubled. The company's location is also strategically located close to plants of leading American, European and Japanese car makers.

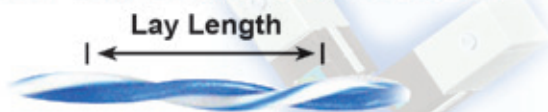
Schmolz + Bickenbach – Germany
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**COVERAGE OF IWCS
IN RHODE ISLAND
STARTS ON PAGE 54**

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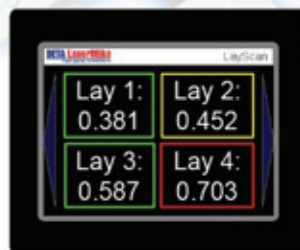
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Extrusion technology for solar cables

RENEWABLE energy is booming. Not only single households, but more and more companies are also changing their power supply sources. Solar energy is one of the sources that is transmitted through solar cables, and these have special properties to fulfil environmental requirements: they need to be UV resistant, weather resistant and mechanically resistant, as well as offering electrical properties with an ideal lifetime of more than 25 years.

RosendahlNextrom delivers extrusion technology for the production of single- and multi-core solar cables. The process covers insulation and jacketing in one production step on two extruders of a similar size. An optional stripe extruder can be included in the extruder group.

The latest standard, TÜV2Pfg1169/08.07, also allows the process to run co-extrusion (dual-layer extrusion with one crosshead).

Some advantages with Rosendahl co-extrusion are:

- Thinner walls on solar cables
- Higher production speeds
- Easy operation, as it is only one extruder group



▲ Solar cable co-extrusion from RosendahlNextrom

- Lower investment costs
- Shorter line length

The extrusion process calls for intense product know-how. The material is typically a polyolefin copolymer which is then crosslinked using either an electron beam or the Sioplas method to achieve the desired product quality. These two methods help the material attain a rigid molecular structure for chemical resistance and mechanical flexibility. The material characteristics can be tailored to suit custom needs.

RosendahlNextrom GmbH – Austria
Website: www.rosendahlnextrom.com

Gotex deal done

Coats has acquired Gotex, a Spain-based manufacturer of high performance fibres, yarns and tapes used in industries such as telecommunications, oil and gas and power transmissions.

Gotex's fibreglass coating technology and products will complement Coats' existing coated aramid product range, providing much synergy between the product offerings.

Gotex SA – Spain
Website: www.gotexweb.com

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Latest technology at new centre of excellence

NDC TECHNOLOGIES recently delivered the latest Beta LaserMike measurement technology to the new Prysmian Group manufacturing academy in Mudanya, Turkey, for the precision measurement of high-performance energy cables. This new centre of excellence will use the technology to strengthen the manufacturing skills of its employees and to build a strong manufacturing community.

"Cable manufacturers today face a number of production challenges involving quality and cost reduction, such as reducing downtime by increasing plant and personnel efficiencies, minimising material usage, and increasing process capabilities and production throughput," said Stefano Cicetti, EMEA sales director for NDC's line of Beta LaserMike products.

"The Beta LaserMike products we provided for the new manufacturing academy allow Prysmian personnel to train on the industry's latest precision measurement technology. We will also share our knowledge and applications expertise to reinforce best technical practices. These manufacturing skills will enable Prysmian to develop higher quality products faster and deliver more value to customers and the industry."

The Beta LaserMike measurement technology at the new Prysmian Manufacturing Academy includes:

- AccuScan 6000 Series – the industry's only four-axis scanning diameter and ovality gauge, providing the highest accuracy

to ensure cable products meet the tightest design and quality specifications

- LN3000 Series – three-axis lump and neckdown gauge that quickly and reliably detects and locates product flaws before they become costly production problems, for maximum quality control
- LaserSpeed® – non-contact gauge that measures the length and speed of moving products with laser precision for significant quality, productivity and manufacturing savings

Prysmian is proud of its new manufacturing academy in Mudanya. It is one of the industry's most progressive manufacturing training centres, alongside one of Prysmian's largest and most efficient global production facilities.

"In our cable business, the tight contact is a must to achieve the best result in quality, efficiency and satisfaction of customers," said Mr Halil Kongur, factory director and chairman for Turk Prysmian Kablo ve Sistemleri AS, Turkey. "We work very closely with NDC's Beta LaserMike products management and feel very familiar in each opportunity. We are sure that we are using the latest technology in measuring equipment and staying up to date on any improvements. The Beta LaserMike products team supports our manufacturing academy with several measurement technologies, showing a conformity of our enforced relation."

NDC Technologies – USA
Website: www.ndctechnologies.com



**THE REVOLUTION IN
TC DIE MANUFACTURING**

New office opening in San Diego, USA

PRUFTECHNIK has opened a new office in San Diego, California, USA, where it will continue to introduce, offer and support its products and services.

Functions of the San Diego office include product sales, tech support, training, consultation and machinery service. Only two months after starting the new North American operations in Philadelphia, Pruftechnik Inc is now operating a new office located in downtown San Diego, only minutes away from the San Diego International Airport.

The suitable location will grant the flow of communication to clients in the Pacific time zone along with providing supplementary 'after-hours' service for customers needing additional assistance on the East Coast. This expansion will add growth to the business as well as promote customer interaction.

Paralign sales and service manager Eric Elder said: "This will have many benefits to our business, and most importantly to our customers."

Products include:

- Rotalign® Ultra iS and Rotalign® touch for shaft and geometric alignment
- Vibexpert® II for route data collection and advanced analysis as well as Vibguard® for complex continuous vibration analysis, along with a wide range of solutions for any budget

Pruftechnik offers complete plant reliability solutions, while offering excellent customer service. Along with products, it also offers specialised services ranging from complex vibration analysis and troubleshooting to Paralign®, a non-optical roller alignment solution.

"This further expansion to California is a symbolic step in the global growth of Pruftechnik," said Florian Buder, CEO North America.

"Being present at the West Coast and East Coast of our most important market will allow us to better support industrial operations in their reliability efforts while keeping and building strong relationships with our clients."

Pruftechnik Inc – USA

Website: www.pruftechnik.com

**HEADING TO WIRE
CHINA? TURN TO PAGE
56 FOR DETAILS**

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WIRE
CHINA 2016
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€300m Messina Straits cable link handed over

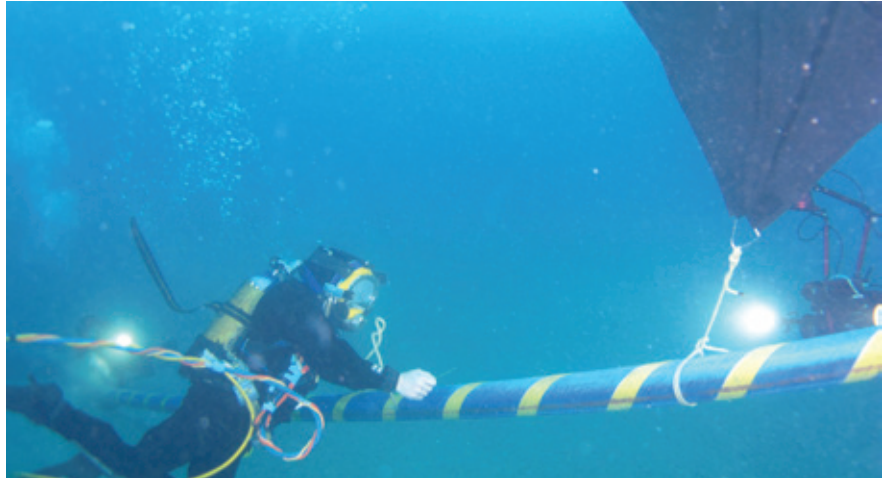
PRYSMIAN Group has handed the extra high voltage power cable link between Sicily and Calabria, Italy, across the Messina Straits over to its customer Terna SpA Rete Elettrica Nazionale.

"We are proud to provide the best technology and know-how owned by our group, worldwide leader in this sector, for such a strategic link", said Valerio Battista, Prysmian chief executive officer. "The cable link handed over to Terna was engineered and produced in the plant located in Arco Felice, near Naples."

Prysmian developed and produced a double-circuit 380 kV HVAC (high voltage alternate current) land and submarine cable system installed along a total route of approximately 44km – of which 38km runs under water – between the power stations of Villafranca Tirrena in Sicily and Scilla in Calabria.

The project includes the installation of the first permanent monitoring system, an exclusive of Prysmian, carried out by way of 18 Pry-Cam Grids devices installed along the entire land route section.

Prysmian installed the submarine cable



▲ The cable being laid across the Messina straits

with its own cables ship, *Giulio Verne*. The land cables installation proved to be among the most technically complex ever, with operations carried out in a vertical shaft of 300m and a 12 per cent sloped and 2.8km-long tunnel.

Prysmian was awarded the €300m contract in December 2009. The order book of Prysmian in the power transmission business amounts to

€3.2bn. With the goal of further strengthening its worldwide leadership in the industry, the group is currently involved in important investment programmes both in terms of technology innovation and of project execution, with the launch of a new cable laying barge.

Prysmian Group – Italy
Website: www.prysmian.com

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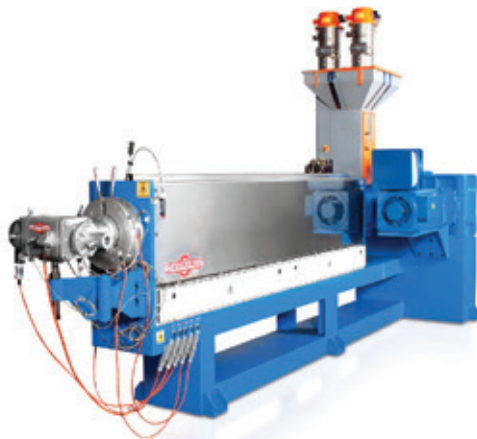
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om LESMO

Tratos signs up to charter

TRATOS has become the newest member to sign the Europacable Industry Charter, joining an elite group of European and worldwide cable manufacturers that have pledged to uphold ethical, sustainable and high quality cable development and manufacturing.

Europacable represents wire and cable manufacturers in Europe. Members include the world's largest producers as well as highly specialised small and medium-sized businesses from across Europe.

Ennui Bragagni Capaccini, vice president of Tratos Group, said after signing the charter: "We are proud to add our name to the Industry Charter. Its principles mirror our own and we are fully committed to delivering continuous improvement in our business where we can."

Launched in November 2015, the charter sets out shared industry principles and objectives. It aims for signatories to play a proactive role in monitoring and evaluating emerging issues and finding innovative solutions that produce cables that exceed minimum requirements.

Founded in 1991, the association's energy and communication cable manufacturer members employ around 70,000 people globally, with more than 50 per cent based in Europe. Last year group members generated a turnover of more than €20bn.

As members of Europacable, Tratos, manufacturing in Italy and the UK and with bases worldwide, will receive information about relevant EU policy developments; representation at EU level; and engagement in policy processes.

The Europacable Charter acknowledges the need to meet the demands of business stakeholders, while at the



▲ The Tratos factory at Knowsley, Merseyside, UK

same time supporting the interests of employees, customers, the wider community and the environment.

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Tratos Group – Italy
Website: www.tratos.eu

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Website: www.europacable.com

New development centre for Melos

Over the past ten years, the turnover of Melos GmbH has almost tripled and the number of employees has doubled to more than 200.

The company also started the new business year strongly with a 14.2 per cent increase in turnover, compared to the first five months of the previous year, and is preparing itself for the future by building a development centre with a total investment of €3m.

Melos GmbH focuses 100 per cent on the production site at Melle, Germany, and will be investing extensively in expanding its development, production and logistics in the coming years.

The building of a competence centre for research and development – with advanced analysis and experimentation systems, new laboratory buildings and associated offices – represents the next step for the company. A further construction project is the 'Melos Village' open-air showroom, where the company's sports and leisure products can be experienced and enjoyed in an entertaining atmosphere across an area of around 1,800m².

Melos GmbH – Germany

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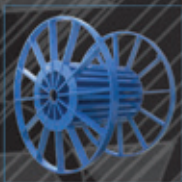
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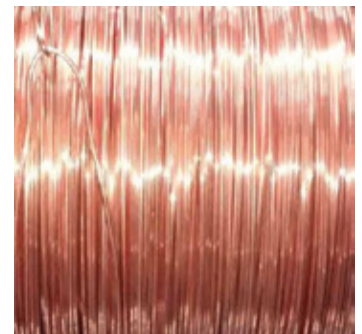


Surface cleaning

SURFACE cleaning and degreasing is an important part of the wire production process. Traditionally this involves mechanical or wet, chemical processes that are potentially harmful to the operator and the environment. One way to turn production chemical-free is to use plasma surface cleaning, which is a dry surface treatment.

PlasmaCleaner is a plasma surface treatment machine designed for surface cleaning, degreasing or oxide removal on ferrous and non-ferrous wire. Plasma treatment is a dry process that requires no rinsing or drying. Plasma treated surface can be used for removal of wet lubricant or fine oxide layer removal.

Whilst the material is kept in an inert atmosphere, the material surface is cleaned and activated, allowing for effective surface coating (good coat adhesion) or strong intermetallic layer creation between the material and surface coating.



▲ Plasma treated copper wire

PlasmaCleaner can be used in conjunction with polymer coating/extrusion (PTFE, FEP, PFA, ETFE or Teflon), cladding, spray coating, taping, enamelling or magnet wire, or for production of power and signalling conductors for various cables (solid, rectangular, braided or bunched). PlasmaCleaner can also be used as an efficient and accurate preheater.

Plasma is ineffective when it comes to removal of large quantities of soaps and scale, where conventional cleaning processes such as ultrasonic cleaning can be used as pre-cleaning in combination with fine, dry plasma treatment.

After cooling in an inert atmosphere the material can also be led to ambient air where a fine oxide layer is formed on the processed material surface. This results in a high degree of surface passivation, which will protect the surface by slowing down subsequent surface corrosion.

Plasmait GmbH – Austria

Website: www.plasmait.com

Awards time for Repsol

During the main conference of the European Plastics Converters (EuPC) annual meeting in Lyon, France, Repsol was bestowed the HDPE Best Polymer Producers Award for Europe 2016 and the overarching award on Innovation covering all polymer types.

The awards are the result of an online customer survey launched by the Polymers for Europe Alliance.

This award is not only the result of the good work of the entire team involved, comprising different businesses and areas of the company, but will also become an additional driver to further increase Repsol's commitment to its clients.

Repsol – Spain

Website: www.repsol.com

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Transatlantic Cable

Innovation

▶ The USA is perceived as global leader in entrepreneurship, but it may be handing off to Europe – and soon

“These trends are reshaping the geography of innovation. And as these changes transform our cities, I believe Europe will replace North America as the start-up hub of the world.”

The trends that led urban strategist Boyd Cohen, PhD, to that conclusion were set out in *Fast Company* in June. They reflect his view that, in Europe, the forces of urbanisation, collaboration and democratisation are converging in ways that will lead it to eclipse the USA as the dominant force in modern entrepreneurship.

With an emphasis on the city, with its collaborative business models and sharing economy, Dr Cohen identified specific elements favouring Europe’s coming pre-eminence. (“Seven Reasons Why European Cities Are Going to Beat US Cities as Hubs for Innovation,” 16th June). Briefly stated, they are:

- 1 Better-designed cities. Mercer [the world’s largest human resources consulting firm, headquartered in New York] utilises ten quality-of-life factors including economy, education, health care, housing and natural environment to compare hundreds of cities around the globe. Seven of the first ten spots in its 2016 survey belong to European cities. Wrote Mr Cohen on *fastcompany.com*, “You may be surprised to learn that the highest-rated USA city on the Mercer ranking – San Francisco – was 28th.”
- 2 Smart cities. For the first time, last year President Barack Obama committed \$160 million to support the development of smart cities in the USA. In contrast, the European Union has been pushing the smart cities agenda for about a decade. Just one of the funding mechanisms for smart cities in Europe committed \$18 billion toward sustainable urban development between 2014 and 2020.
- 3 More rapid adoption of soft infrastructure for entrepreneurship. So-called Fab Labs are “maker spaces,” available to the community, which offer 3D printers, lasers, and other tools for tinkering and developing local products. Despite their origination with the Massachusetts Institute of Technology, Fab Labs in the USA total only 115 versus nearly 300 in Europe. Similarly, co-working facilities have blossomed in European cities. Barcelona alone has more than 300 such spaces; Philadelphia, with a population about the size of Barcelona’s, has only a dozen or so.

- 4 Better safety nets and less inequality. Aspiring entrepreneurs know that in most European countries failure does not mean lost access to health care and education. They are also probably familiar with the GINI Index, the most widely accepted measure of income inequality. (The lower the number, the better.)

Europe-wide, the GINI Index was 30.9 in 2014 and has been approximately the same for the past ten years. The GINI Index is 41 in the USA, where income inequality has risen over the past decade.

- 5 The USA has already lost its leadership in key benchmarks of innovation. By several objective measures of regional, national and local innovation, the EU already has taken the lead. For example, the Global Innovation Index, conducted by Cornell University (Ithaca, New York) and the INSEAD Business School (Fontainebleau, France), is an annual ranking at the national level.

The 2015 Index, which assesses 79 indicators of a country’s innovative capability and actual results, shows eight European countries in the top ten. The top four countries are European, with the USA coming in fifth place. The Innovation Cities Index assesses 162 indicators of urban innovation. The top 20 rankings for 2015 include eight European cities, five USA cities.

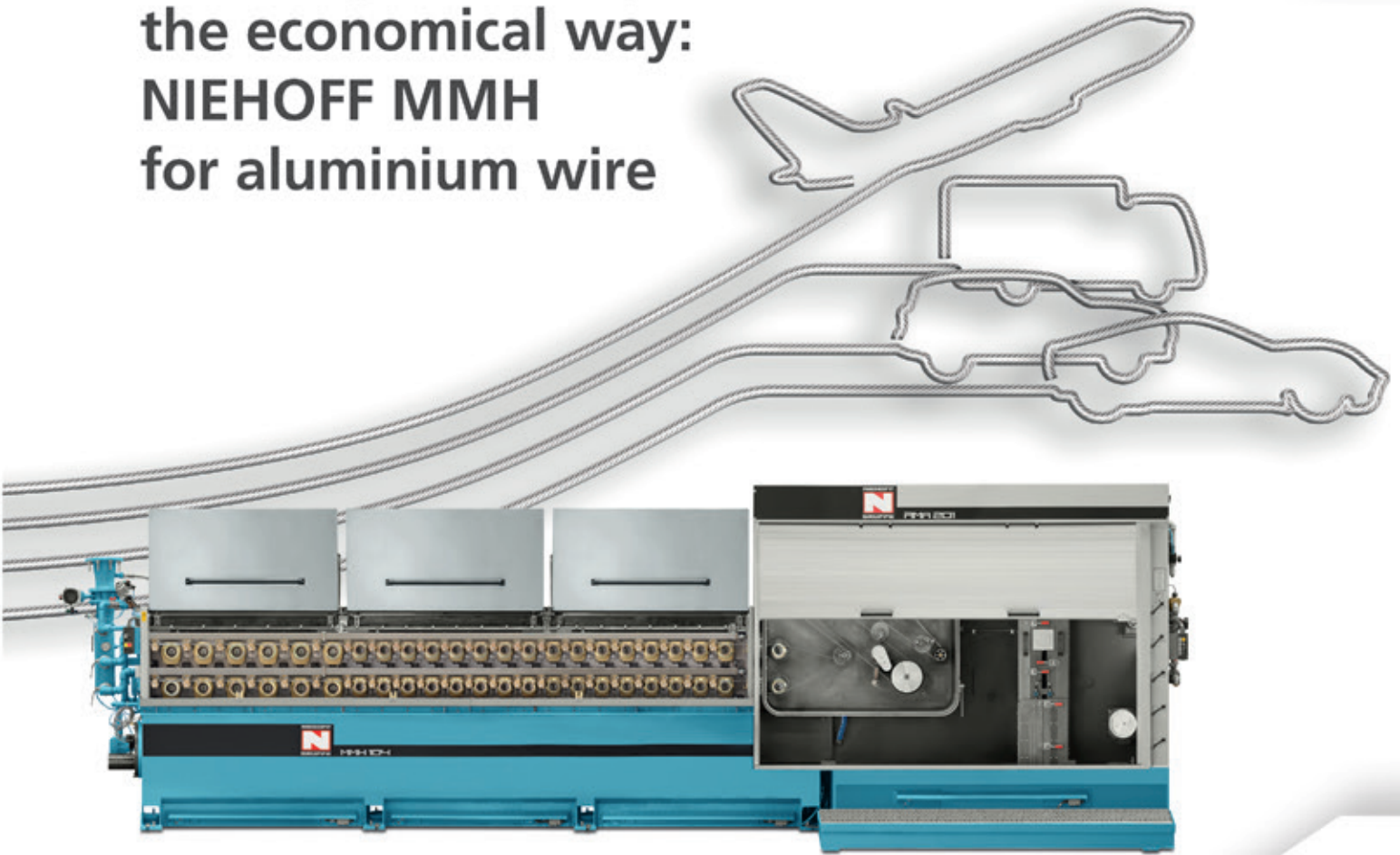
- 6 The EU may never lead in venture capital investment. Does it matter? In Dr Cohen’s opinion, venture capital “is way less important to entrepreneurship than it used to be,” as the explosion in cloud computing, open-source software and hardware, crowd lending, crowd funding and angel networks enable entrepreneurs across a broader spectrum to experiment and leverage lean start-up principles to innovate cheaply.

Key insights from recent research by the Kauffman Foundation [which fosters pro-entrepreneurship policies]: less than five per cent of start-up funding came from venture capitalists last year; only 6.5 per cent of fast-growth start-ups obtained venture capital financing.

- 7 It is easier to be an entrepreneurial immigrant in Europe. The EU is well ahead of the USA on this important topic. Even as the region struggles to absorb an influx of refugee immigrants, it has been making it easier for entrepreneurial immigrants to obtain visas while the USA is making it harder.

If the creative class is highly mobile (and studies show that it is), then countries and cities that facilitate that immigration will have significant future advantages in attracting and recruiting entrepreneurs.

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Transatlantic cable

Steel

Of potential significance to integrated steel-makers, Nucor has plans to make scrap-generated steel more appealing to carmakers

"There's no rule at Nucor that says we have to keep making what we're making and we have to keep making it where we're making it."

That ringing assertion by CEO John Ferriola of Nucor Corp was made in the course of an interview this spring with *Bloomberg News* in New York, at which Mr Ferriola also shared what prompted it. Anticipating a cooling domestic auto market, the biggest American steelmaker is looking to supply more metal products to carmakers outside the United States.

The Charlotte, North Carolina-based steelmaker recycles scrap in the small electric furnaces known as mini mills. As noted by *Bloomberg* reporter Sonja Elmquist, until recently that process has not been able to create the blemish-free flexible steel required by automakers for external car parts.

Now, however, Nucor has begun replacing some scrap with a type of iron refined with natural gas, removing the contaminants from the scrap-based steel. This enables it to compete in a market that has been dominated by integrated producers, like US Steel Corp, that make steel "from scratch" – iron ore and coal/coke.

On 9th June, Nucor announced a \$270 million joint venture with Japan's JFE Holdings Inc to produce steel for carmakers at a plant in Mexico. ("Nucor Looks to Step Up Foreign Steel Expansion in Automotive," 17th June)

The 50:50 joint venture, Nucor-JFE-Steel Mexico, will begin production in 2019, JFE Steel Corp, a unit of the Tokyo-based company, said in a statement. The plant is to have a capacity of 400,000 metric tons a year.

As reported earlier by *Bloomberg's* Masumi Suga, according to the JFE statement the deal fulfils that company's need for a manufacturing base in the region covered by the North American Free Trade Agreement (NAFTA), where Japanese automakers have been growing; even as Nucor has been seeking to expand into supplying high-grade auto sheet.

➤ According to David Gagliano, a metals and mining analyst at Bank of Montreal, Nucor's investment in boosting capacity slated for car parts may have broader implications. Noting the growing interest of automakers in buying steel from recyclers, he told Ms Elmquist, "[The Nucor action is] potentially step one in a meaningful longer-term shift away from the traditional integrated steel producer supplier toward the mini mill."

➤ Ms Elmquist observed that Nucor's push beyond national borders grew at least in part out of the company's awareness of its growing heft in the US market. She wrote: "There are fewer domestic opportunities left to exploit without bumping into antitrust laws." On the sidelines of a World Steel Dynamics/American Metal Market conference in New York from 13th to 15th June, Nucor's Mr Ferriola essentially acknowledged as much. "We might be running out of opportunities in some of our core products because we've grown in terms of market share," he said. "There's a world of things we can do in new products we can bring to the market."

If a new steel is measurably stronger than leading automotive aluminium alloys, is it still only "an interesting product"?

Usibor 2000, a new grade of steel announced by ArcelorMittal, is said to be some one-third stronger than steels currently available to carmakers. As such, it is claimed by its Luxembourg-based developer to promise potential weight savings of up to 10 per cent over the current best steel grades for applications requiring complex shapes.

"It's lightweight because the material is so strong that you need a lot less of it to achieve the same functionality," Greg Ludkovsky, head of research and development at ArcelorMittal, told Michael Pooler of the *Financial Times*. Launch is expected by the end of this year in Europe and by mid-2017 in the USA. ("ArcelorMittal to Launch New High Strength Steel," 5th June)

The appeal of such materials needs no explaining. Ever more stringent regulations on exhaust emissions are compelling automakers to improve the average fuel efficiency of their models. One of the main ways of doing this is by reducing mass.

As noted by Mr Pooler, while steel remains the material of choice in automotive it is increasingly crowded by substrates with weight advantages, such as aluminium and plastic composites. The threat became apparent when, in model year 2015, Ford Motor Co switched to aluminium for the body of its F-150 pickup truck. If the best-selling vehicle in the USA for more than three decades could be made from aluminium, what car could not be?

So ArcelorMittal is justified in expecting a good reception for Usibor 2000. Like many other steelmakers, the world's biggest producer by tonnage is promoting premium grades to offset downward price pressures on bulk steels. The company has in fact declared an intention of raising core profits by \$3 billion by 2020. But, under present conditions of global oversupply, how big a difference can even a worthy new steel product make to the developer's bottom line?

➤ Carsten Riek, a London-based UBS steels analyst consulted by Mr Pooler, said he thinks it unlikely that sales of Usibor 2000 would substantially boost overall profits at ArcelorMittal. One reason he gave is that this kind of steel is a niche product typically used only in frame parts of the car body to prevent structural damage in crashes, rather than throughout the entire vehicle.

"It's an interesting product," Mr Riek told the *Financial Times*. "But there always has to be a large benefit for carmakers."

The USA, with a fraction of the output of number one producer China, again places fourth in steel production worldwide

The 2016 edition of "World Steel in Figures," published by the *World Steel Association* (worldsteel), provides a comprehensive overview of global steel industry activity in 2015. Together with national and regional steel industry associations and steel-research institutes, the worldsteel membership of over 150 steel producers represents some 85 per cent of global steel production.

worldsteel (formerly the International Iron and Steel Institute [IISI]) published this list of the top ten steel-producing countries in 2015 (in millions of metric tons [MT]):

Transatlantic cable

1. China	803.8
2. Japan	105.2
3. India	89.4
4. USA	78.8
5. Russia	70.9
6. South Korea	69.7
7. Germany	42.7
8. Brazil	33.3
9. Turkey	31.5
10. Ukraine	23.0

3. Czech Republic	1,383.2
4. Japan	1,096.4
5. China	1,077.2
6. Germany	1,067.0
7. Turkey	963.0
8. Austria	922.1
9. Canada	892.0
10. Italy	883.0

Automotive

Its stealth Autopilot enables Tesla to gather more autonomous driving data – but rival Google has some advantages

Crowdsourcing, as defined by Merriam-Webster, is the process of obtaining needed services, ideas or content by soliciting contributions from a large group of people. This spring, Tesla Motors Inc put its own stamp on the definition. In the course of describing the performance of its Autopilot feature, an official of the Palo Alto, California-based maker of premium electric cars disclosed that that such "contributions" may not always be voluntary; or even perceptible to the contributor. ("Tesla Reveals Its Crowdsourced Autopilot Data," 26th May)

As reported by Philip E Ross in *IEEE Spectrum*, Sterling Anderson, director of the Autopilot programme, said that Tesla installed the hardware of the feature in cars about a year before uploading the enabling software in October 2015. Speaking on 26th May at a conference in San Francisco sponsored by *MIT Technology*

The worldsteel list of the top ten steel-producing companies includes members and non-members of the Brussels-based organisation. Tonnes for 2015 for all types of steel including stainless (in millions of metric tons [MT]):

1. ArcelorMittal (Luxembourg)	97.136
2. Hesteel Group (China)	47.745
3. Nippon Steel and Sumitomo Metal Corp (Japanese)	46.374
4. POSCO (South Korea)	41.975
5. Baosteel Group (China)	34.938
6. Shagang Group (China)	34.214
7. Ansteel Group (China)	32.502
8. JFE Steel Corp (Japan)	29.825
9. Shougang Group (China)	28.553
10. Tata Steel Group (India)	26.314

worldsteel also provided a breakdown of the top ten steel consumers in 2015 on the basis of "apparent steel use per capita," derived from deliveries of steel into the various countries' marketplaces. (Totals here are in pounds.)

1. South Korea	2,455.0
2. Taiwan	1,654.7

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Transatlantic cable

Review, Mr Anderson shared that Tesla tries out new software by testing it covertly, so that it can tell what the software would have done if it had been turned on.

"We will often install an 'inert' feature on all our vehicles worldwide," he said. "That allows us to watch over tens of millions of miles how a feature performs."

Days earlier, writing from San Francisco in the *MIT Technology Review*, Tom Simonite reported that Tesla began bundling a suite of new sensors into its vehicles in 2014, saying it was for a new emergency braking feature. But the 12 ultrasonic sensors positioned around the car sense nearby objects, and the forward-facing cameras and radar units "were intended for bigger things." Tesla engineers began using data streaming from cars with those sensors to start testing autonomous driving features. ("Tesla Tests Self-Driving Functions with Secret Updates to Its Customers' Cars," 24th May)

Mr Ross of *IEEE* noted Tesla's claim of having logged some 780 million miles of data, 100 million miles with Autopilot in at least partial control. The company's crowdsourcing of its 70,000-odd customers thus has allowed it to amass far more passenger-miles than Google's small fleet of professionally driven cars.

- Tesla logs about a million miles a day. Google has logged some 1.4 million miles since it started testing autonomous cars in 2009. But Mr Ross observed that Tesla's voluminous data not quite comparable to Google's. Autopilot takes charge on highways. Google's cars mainly drive around in cities, making for shorter and much more challenging trips.

Further, Mr Ross wrote: "Google's true master trove of data comes from the fine-grained maps it lays down in every city it tackles. That, and massive simulation tests the company does *in silico* [ie by means of computer modelling or computer simulation] may well put Google in the driver's seat."

Under attack in Europe, diesel suddenly is a worry for carmakers in the world's biggest diesel market – Germany

"One diesel car tested by the German government emitted more than 12 times as much poisonous nitrogen oxide as allowed. Another was five times over the limit, and yet another six times over."

Writing from Berlin, Jack Ewing of the *New York Times* noted that these cars were not produced by Volkswagen, the German company found to have illegally manipulated emissions test results. The results cited were from a Jeep, a General Motors sedan, and a Mercedes-Benz. ("Volkswagen Not Alone in Flouting Pollution Limits," 9th June)

Other recent government and private studies confirm that Volkswagen is hardly the only company to flout emissions limits. According to Mr Ewing, makers of polluting vehicles are taking advantage of a loophole that allows them to throttle down emissions controls whenever there is risk of engine damage; which in some cases, he said, "is nearly all the time."

The *Times* article is more than an exercise in comparative culpability. It pointed out that the emerging information has awakened Europeans to the real environmental cost of diesel, with far-reaching reputational and financial consequences for the auto industry. Carmakers are now on the defensive in their core diesel market.

"It's just a question of who's cheating legally and who's cheating illegally," Ferdinand Dudenhöffer, a professor at the University of Duisburg-Essen who follows the auto industry, told the *Times*. "They're all bad."

If the time of reckoning is indeed here, the consequences could be especially severe in Germany, the world's largest market for diesel cars.

There already were tentative signs that some Europeans are turning against diesel, and according to figures compiled by Mr Dudenhöffer the share of diesel-powered cars sold in Germany by BMW, Mercedes-Benz and Volkswagen (including its Porsche and Audi units) fell three per cent in the first four months of 2016 compared with the same period of 2015.

- In an attempt at damage control, in early June the German government submitted a proposal to European Union transport ministers that would partially contract the loophole that allows deactivation of emissions equipment to protect the engine. Carmakers would be allowed to take advantage of the exception only if they had already deployed the best emissions control technology available.
- Diesel vehicles produce far more nitrogen oxides than gasoline cars and require more emissions treatment equipment. Tighter limits on tailpipe emissions and more rigorous testing – either on the books or being debated in Brussels – will raise the cost of cars with diesel motors. Price-conscious buyers of small cars, in particular, may decide it is no longer worth paying the premium for diesel.

If they do, companies like Fiat Chrysler, Renault and Volkswagen would suffer most. As Mr Ewing observed, "Profits on small cars already are slim."

Putting its first hydrogen fuel cell car to the test, a "green" Welsh carmaker pushes for more hydrogen refuelling stations

One of the reasons advanced for the slow adoption of hydrogen-powered cars is the scarcity of refuelling stations. In partnership with Monmouthshire County Council in southeast Wales, the Welsh carmaker Riversimple has set itself to remedy that. An upcoming trial of its hydrogen-powered Rasa city car, previewed at the London Motor Show in May, will have a second aim: to promote the development of hydrogen infrastructure across the UK.

The 12-month trial, to commence early in 2017, will deploy brand-new autos driven by 60 to 80 Monmouthshire residents under three- or six-month contracts. The carmaker chose Monmouthshire for the short distances between its towns, favourable for testing a car designed for local non-motorway use and restricted to 300 miles per three-minute refuelling.

As reported in *Gizmag* by the Liverpool-based tech writer Stu Robarts, a self-service mobile refuelling point is planned by Riversimple for either Abergavenny or Monmouth. The firm, which says it will cover the running costs of the test cars during the trial, will also erect a temporary 'experience centre' – presumably to receive and record the responses of happy participants. The idea is that the Rasa trial will help raise public awareness of hydrogen-powered autos and set off a groundswell of demand for refuelling stations. ("Hydrogen Cars Set to Take to the Streets in Wales," 16th June)

Mr Robarts said on *gizmag.com* that Riversimple's marketing methods are no less innovative than the Rasa.

Transatlantic cable

When the first full production model of the two-seater becomes available, in 2018, it will not be offered for sale. Instead, customers will pay a monthly fee that covers fuel, maintenance, repairs and insurance on the car. This arrangement, says Riversimple, promises a trouble-free experience for the driver; and, for the vehicle that remains the property of the maker, an extended life in service.

Cybersecurity

▶ Survey finds consumers are dissatisfied with how companies handle breaches and inclined to cut their ties with a hacked organisation

The results of a recent study of consumer attitudes should go some way toward persuading corporations that cybersecurity breaches should be high on their list of concerns.

Commissioned by the security firm *Centrify* (Sunnyvale, California), the online study, which surveyed 2,400 people across the USA, Britain and Germany, found that 66 per cent of American adults are at least somewhat likely to stop doing business with a company that has suffered a cyberbreach. Even more Britons (75 per cent) said they are somewhat likely to stop doing business after a hack.

Centrify, which claims a customer base of over 5,000, including more than half of the Fortune 500 companies (representing two-thirds of USA GDP), also found that most consumers believe the accountability for hacking incidents rests almost entirely

with the businesses. About two-thirds of respondents in all three countries surveyed placed a high burden of responsibility on corporations (nine or ten on a ten-point scale) in terms of how proactive they ought to be in preventing hacks and securing the personal data of their customers.

What is more, many of the respondents (41 per cent in the USA, 50 per cent in Britain, 38 per cent in Germany) said they are extremely likely to hold corporations fully responsible for preventing such incursions. Significant percentages hold that corporations do not accept enough blame for a breach when it does occur.

While most of the respondents believe that businesses and large organisations are likely hacker targets, this was not seen as relieving those entities of the obligation to protect themselves. The study found 21 per cent of USA consumers very likely to stop patronising a business known to have been hacked.

Centrify found that the people most likely to take their business elsewhere are those who have had their personal information compromised in a hack, those who are tech savvy, and those who are frequent online shoppers.

▶ Because companies generally are loath to publicise a hack of their customers' information, executive-suite awareness of the extent of the problem is difficult to gauge.

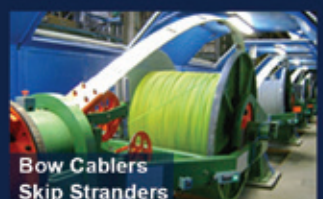
But the attitudes uncovered by the *Centrify* survey should go some way toward persuading businesses to step up their cybersecurity game.

Dorothy Fabian
USA Editor

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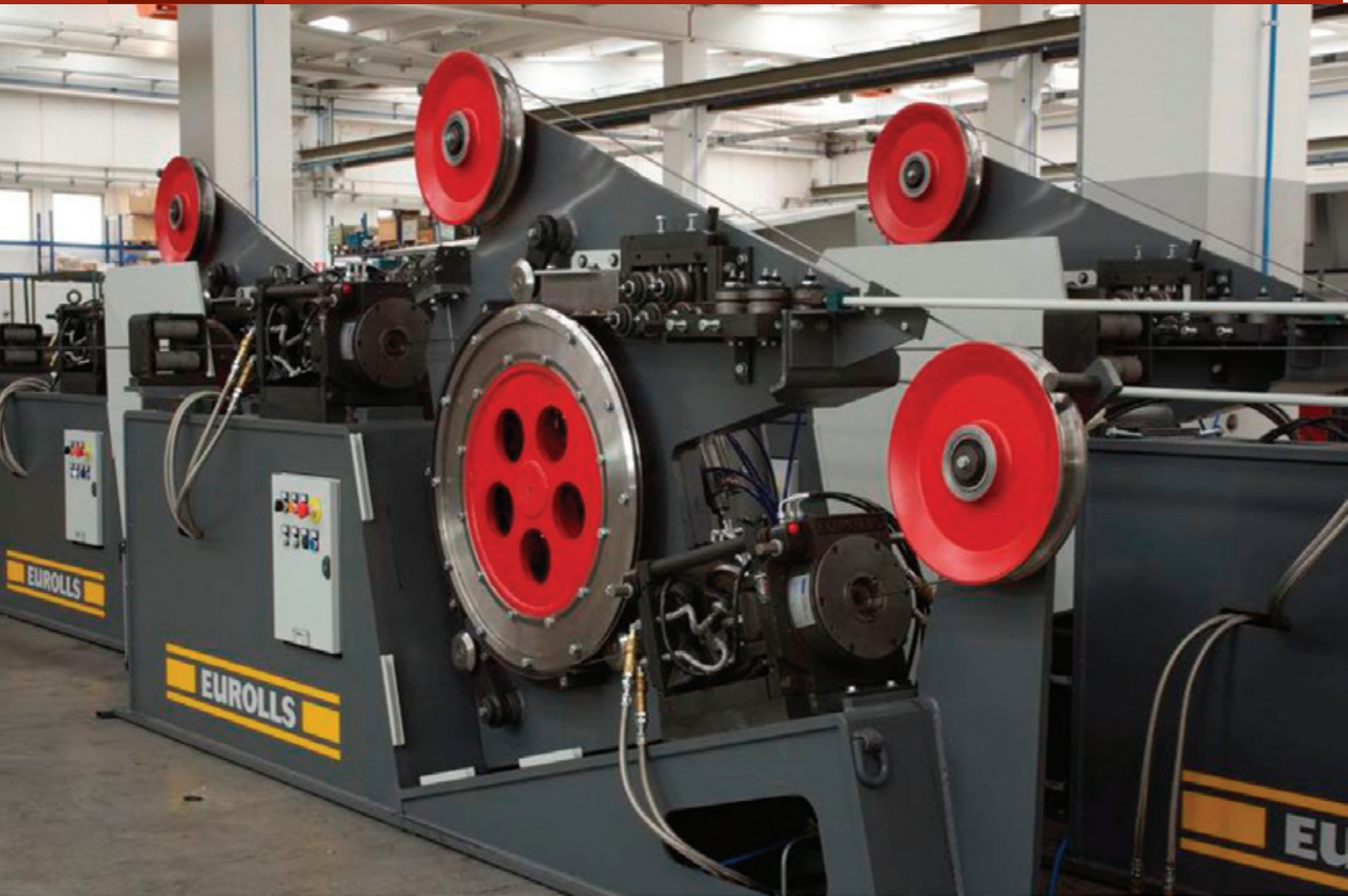
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▲ The Quick Rolling Concept from Eurolls

Quick rolling concept

THE Quick Rolling Concept has been developed by Eurolls to perform multiple tasks. Its function is to produce wire and thanks to its sleek compact design/dimensions allows the perfect union between different wire processing sequences.

Eurolls has supplied this QRC concept in both multiple and single in-line wire rolling configurations. In both cases, the presence of the QRC unit permits the combination of different/distinct processes but always with the same goal: improved production efficiency by having in a single line for the complete process from entry material to final product.

An example of the multiple in-line wire rolling solution was its insertion in a lattice girder manufacturing system with five individual QRC units, three for the longitudinal wires and two for the stirrups wire.

The same philosophy is present in the case of the single in-line solution that combined both a QRC unit and a straightening and cutting line to produce the finished twisted square wire in straight lengths.

In both solutions, the first section is always the QRC unit whose function is to pull the entry material from the pay-off area through both mechanical descaler and cold rolling cassettes, by means of dual V grooved pulling rings which guarantee the traction required to perform the single or double wire draft. These drafts can be performed by using either traditional cold rolling cassettes or a combination of traditional/special cassettes in accordance to the profile required for the finished product.

In the particular case of twisted square wire production, the first cassette

performs the standard rolling process to form the correct intermediate wire dimension suitable for the second draft that uses a rotating cassette to produce the final twisted square profile.

From the QRC unit, the produced twisted square wire moves directly into a modified Vitari NR300 straightening and cutting unit that uses two straightening roll panels, instead of the traditional rotating spinner. The final twisted square bar is then used for the production of antiskid grating panels.

With the same simplicity and efficiency, the components can be changed in order to produce different final wire products to satisfy the different requirements of the wire sector, eg traditional reinforcement bars, electro-welded mesh panels, etc.

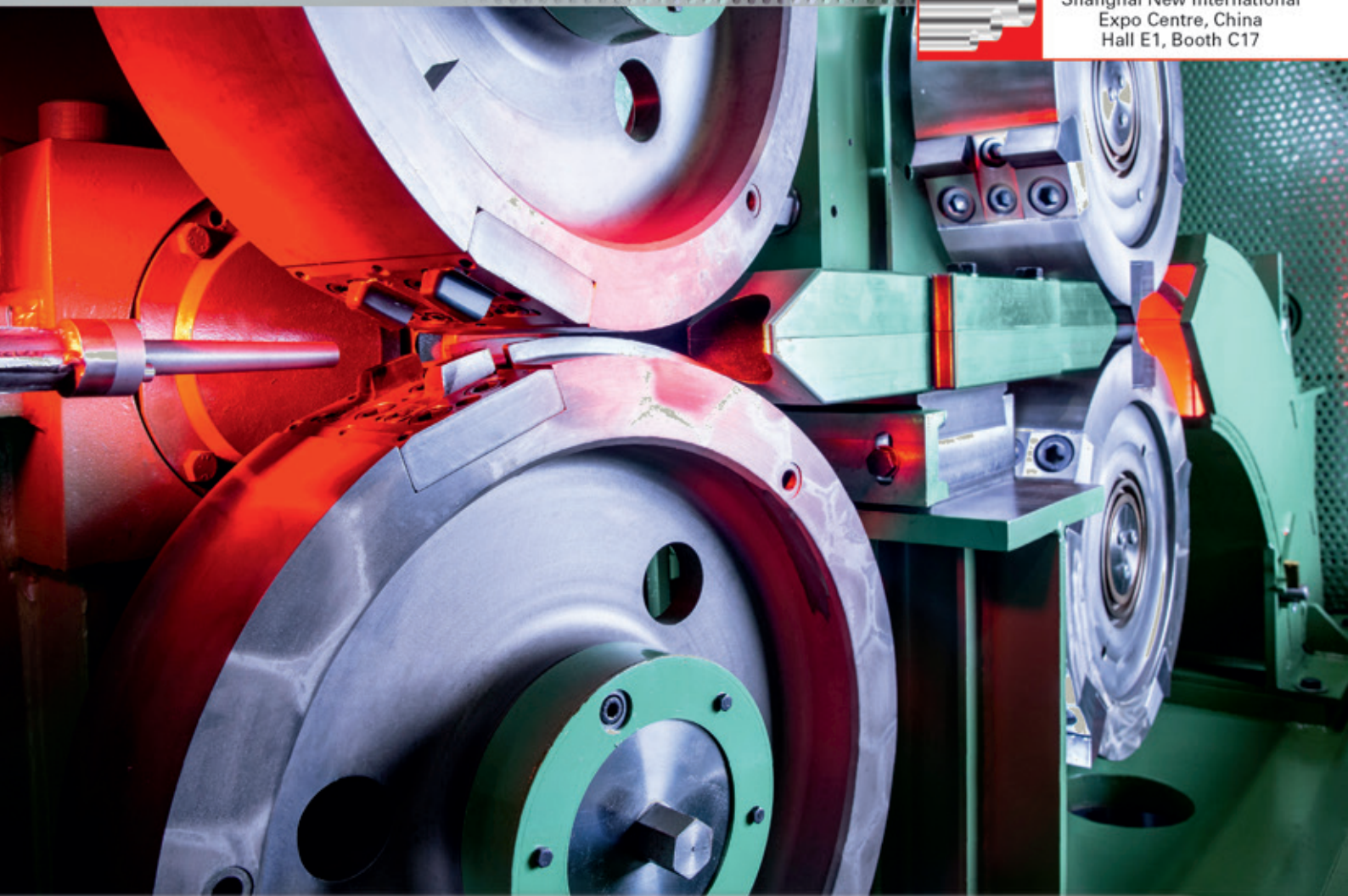
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Advanced software offers greater speed and reliability

WHITELEGG Machines has specialised in the manufacture of 2D wire forming machines with automatic butt welding for over 30 years.

CFMs are in use worldwide bringing accuracy, repeatability and precision to the production of wire and strip components and sub-assemblies.

The CFM range incorporates advanced software, new bend head and intuitive operator control and offers manufacturers even greater speed and reliability.

With the addition of a 16mm version, using the latest technologies, Whitelegg has added to the versatility of the CFM range.

Now with all servo operation and touchscreen industrial PC running the advanced 'Allform 4' software package, the CFM is able to produce highly accurate and consistent parts with or without automatic butt welding.

Wire or strip is taken from the coil, straightened and then pulled through a highly accurate feed system to the freely programmable bend head.

A huge variety of shapes are possible and, if required, the wire ends can be automatically butt welded. Thus squares, rectangles, ovals and rings can be manufactured complete, without the need for ancillary operations.

CFM machines are fitted with remote access capabilities allowing engineers on-line access to the machine so software updates, for example, can be easily and effectively introduced.

Whitelegg Machines Ltd – UK
Website: www.whitelegg.com



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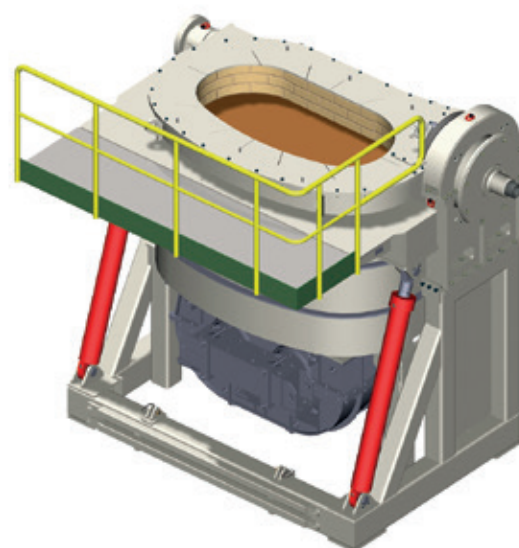
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▲ The new furnace from Upcast

Savings and quality from new furnace

UPCAST'S latest development for line hardware is a new, bigger, one-inductor 15-ton teapot-type melting furnace. This replaces the previous two-inductor 12-ton cylinder-type furnace for the capacity range of 15,000-20,000 TPA.

"When the furnace is equipped with only one inductor, even though it is bigger than before, the purchase price will be less," said sales manager Tuomas Rajaviita.

The new furnace also means new opportunities both for traditional casting lines and for lines utilising recycled copper.

"In certain applications using recycled material, we have always offered a three-furnace system, but now with the larger melting furnace for specific cases a two-furnace alternative is available," added Mr Rajaviita.

Upcast OY – Finland

Website: www.upcast.com

500°F electric walk-in oven

Grieve Corporation has launched the No. 822, a 500°F electric walk-in oven, currently in use for preheating large steel dies at a customer's facility. This unit is a modified version of Grieve's Standard Model WTC686-500 walk-in oven.

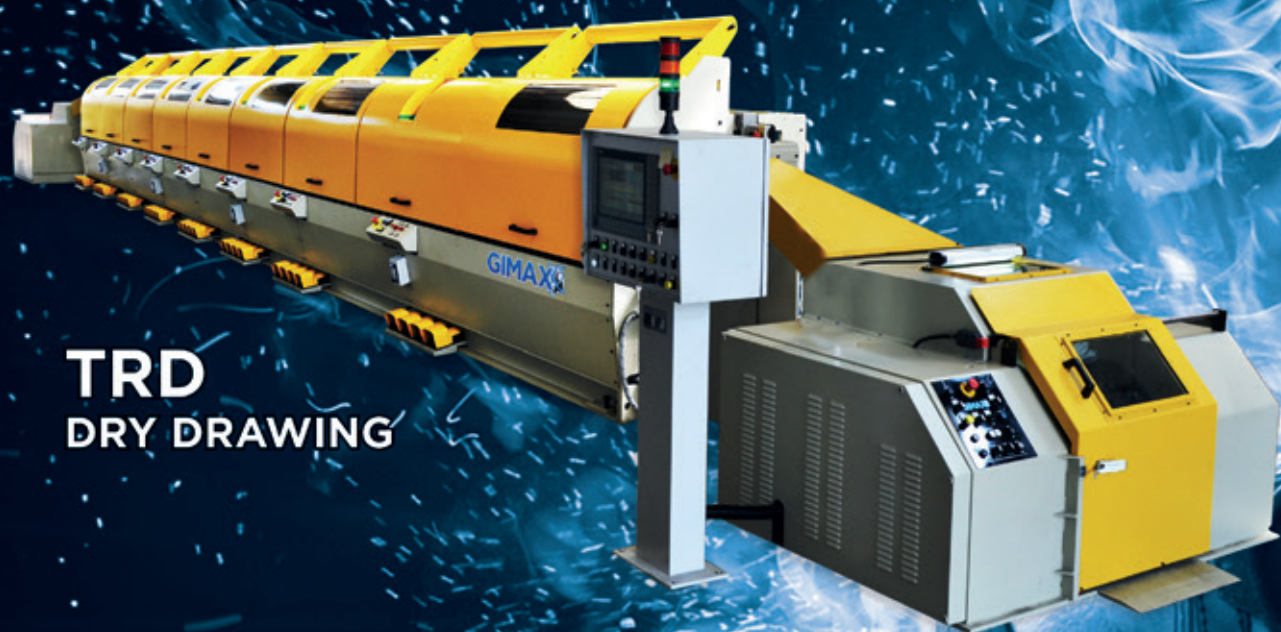
Workspace dimensions inside this unit measure 72" wide x 96" deep x 78" high. 60kW power is installed in Incoloy sheathed tubular heating elements, while a 6,000 CFM, 5 HP recirculating blower provides a combination airflow which sweeps around the workload, travelling upward to a return duct.

This Grieve walk-in oven features an aluminised steel interior and exterior, double doors at each end and a removable top-mounted heat chamber.

Grieve Corporation – USA **Website:** www.grievcorp.com

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▲ The new CP180 portable cold welding machine from PWM

New portable cold welder from PWM

PWM, a manufacturer of cold pressure welding equipment, has launched a new portable cold welding machine for wire 0.3mm to 1.8mm (0.0118" to 0.071").

The new CP180 is a small hand-held powered cold welder housed in a handy carry pack. The compact pack contains the machine and its two-metre air supply line, the air/hydraulic power system and a supply of machine oil. The unit weighs just 16kg and can be easily moved to the work area as and when required.

The CP180 is operated by a foot pedal and is extremely simple to use. It enables even an untrained operator to produce strong high-quality welds on non-ferrous wire, strip and profile up to 1.8mm (0.071") quickly and without effort.

PWM Ltd – UK

Website: www.pwmltd.co.uk

**OUR COVERAGE OF
WIRE & CABLE INDIA
STARTS ON PAGE 65**

Accuracy and reliability a feature from Zumbach

THE highest accuracy, robustness, reliability and functionality distinguish all laser measuring heads from Zumbach. Thanks to the compact design, the Odac® 14XY measuring heads can be used in virtually every manufacturing process in the wire and cable industry, the plastics and rubber industry as well as the steel and metal industry.

The technological basis considered for these measuring heads is always of the latest technology, with laser diodes as light sources combined with intelligent and powerful measured-value processors which facilitate a simple and flexible integration. Long-standing experience as a pioneer of in-line measuring technology, combined with high production figures, result in a product with an excellent price-performance ratio.

Amongst the features is single scan calibration (CSS), single scan monitoring and high data rate output of up to 125 data packages per second. The measuring heads can be used with all line speeds. Vibrations during production have no noticeable influence on measurements.

This is specially suited for fine and extra



▲ Odac 14XY measuring head with optional local display LOC 01

fine wires, enamelled wires, cables, steel cords, fibres, medical tubing, extruded plastic or rubber products.

The Odac 14XY models are available for two measuring ranges:

- Micro version from \varnothing 0.015 to 0.3mm (0.0006 to 0.12"). Thanks to the use of a special laser, these versions can measure smallest diameters within the micrometre range

- Standard version from \varnothing 0.06 to 16mm (0.0024 to 0.64")

All the measuring heads of the Odac series have adaptive signal processing (patent DE3111356), which makes subsequent regular re-calibrations superfluous. Only in instances of component exchange or compliance to calibration regulations ISO 9000/9001 etc would re-calibration be required.

All the relevant parameters for accuracy are continuously monitored by the measuring system and automatically compensated. This is valid in particular also for possible long-term changes of the behaviour of the scanner motor or the measuring electronics.

Flexible communication integration includes:

- Serial RS-232 /-422 /-485
- Ethernet TCP/IP
- Profibus DP
- Profinet IO V2.3
- J/J-M (digital, for connection to Zumbach USYS processors)

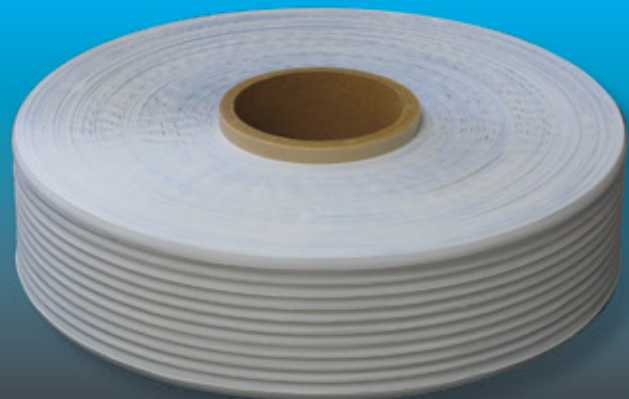
Zumbach Electronic – Switzerland
Website: www.zumbach.com

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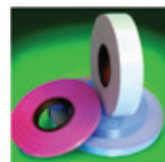
Solid Pack® greatly reduces tangles and breakage in skived, unsintered and low density PTFE films.

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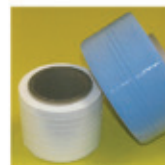
Solid Pack® is for PTFE film from $\frac{5}{32}$ " to $\frac{3}{4}$ ", in $\frac{1}{32}$ " increments. DeWAL PTFE film can be as thin as 0.001".

Custom packages are manufactured at DeWAL's Narragansett, RI, facilities in widths up to 12" and diameters also up to 12". Packages can be with or without sideboards. Film lengths can be as much as 20,000 ft.

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New PV ribbon and tinning line

THE photovoltaic industry has been going through a rapid change over the last decade. In addition to growth, the industry has continued to witness relentless price pressures along the PV value chain. The same is the case in the PV ribbon industry. Only PV ribbon producers that kept consistent product quality whilst maintaining low cost base and efficient production process have remained competitive.

Plasma-based annealing and tinning process represent an efficient PV ribbon production solution that will ensure consistent, top quality finished products at low cost.

Plasmait from Austria has introduced a new PV ribbon annealing and tinning line designed for high output production. The new line features a maximum production speed of 210m/min. This allows the line to produce up to 250 tonnes of PV ribbon per annum in a typical production split between interconnect and bus bar ribbons.

PV ribbon lines can produce a wide range of interconnect ribbons and bus bars in a typical size range of 0.8 to 8mm wide and 0.1 to 0.5mm thick. The ribbons are usually coated with 20 micron thick layer of solder with a coating thickness tolerance of ± 3 microns. The new line can produce ribbons of various yield strength, typically with Rp0,2% between 50MPa and 90MPa.

Copper ribbons are paid off from a 500kg spool with finished tinned PV ribbon being spooled onto 4-10kg spools in a continuous production. The single-head, precision layer winding spooler includes an accumulator to ensure uninterrupted production during spool changeovers on the takeup side. Some producers choose to equip the line with an automatic spool changeover unit that can be integrated with the takeup unit. Multiple lines can therefore be operated with a single operator, which reduces labour cost.

The PV ribbon line can also be integrated with an in-line rolling mill to produce interconnect ribbons directly from round copper wire. A single- or double-stand rolling mill can be used for in-line operation subject to required size and tolerance of the finished ribbon.

Unlike traditional tinning processes, plasma tinning lines operate without chemical cleaning and fluxing whilst rolling runs without cooling agents. This makes the whole production dry and environmentally friendly.

Flux-free plasma tinning process avoids

contamination of tin bath with flux, which makes a big difference in the cost of tin waste. Average annual savings in terms of tin waste alone is as high as €100,000 per line when compared to the traditional flux-based tinning process. This does not take into account the savings a PV ribbon producer yields from reduced scrap rates.

The new line allows PV ribbon producers to reduce labour costs and scrap rates whilst improving production consistency and product quality. It also features low

energy use and maintenance cost per kg of finished material. This combined allows the new PV ribbon line to claim the lowest cost of PV ribbon production overall, according to Plasmait.

The new line can be equipped with specially designed wiping system for round wires for production of a new type round PV ribbons that have recently been introduced.

Plasmait GmbH – Austria
Website: www.plasmait.com



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Process stability and repeatability

QUALITY demands on manufacturers and tailors of automotive and data cables as well as products for the aerospace sector are very complex. The products are used for different applications and need to withstand all kinds of strains. In order to guarantee flawless functionality and safety of the cables in all areas of application, manufacturers need to deliver their products with the highest quality.

The use of technologies for the production and quality assurance of cables, as well as a flexible location corporate policy is indispensable in order to be able to transfer optimised processes quickly and easily to subsidiaries. For example, in the production of automotive cables, the optimal wire temperature is an important criterion for an end product of the highest quality and the further processing: from wiring harnesses for ABS and airbag systems to light systems and sensors.

Many manufacturers of automotive cables work with devices for the preheating of the conductor in order to

create a better adhesion of the insulation to the conductor. In order to achieve a defined adhesion of the insulation to the conductor, it is important to set the conductor temperature according to the insulating material prior to the feeding into the extruder. Only when the conductor temperature is kept constant within a small tolerance during the entire production run, can it be expected that the withdraw forces meet the specifications. Inadmissible scattering regarding the adhesion complicates the process considerably and can often lead to claims.

For devices without continuous measurement and control, the desired conductor temperature has to be measured manually and selectively with external sensors in order to set the power of such a preheating according to these measuring results. Environmental and production-related influences have an unforeseeable effect on the obtainable conductor temperature.

First of all, this includes the different temperatures of the entering copper wire (day/night/summer/winter), the changeable production speed and the gradual heating or cooling of the short circuit wheel of a preheating device. When cheaper conductor preheating devices are used, different supply voltages can also cause a change in the conductor temperature.

At this point, it is worth mentioning that, especially for the production of data cables with foamed insulation, the foam grade is largely dependent on the temperature of the preheated conductor. A constant temperature of the conductor is an important requirement for a stable foaming process.

The innovative technology of the Sikora Preheater 6000 TC bypasses those risks by measuring the temperature permanently. A camera captures the temperature of the conductor after the heating and controls the power of the preheating device automatically and continuously. The device is installed directly in front of the extruder and therefore is able to react to changing environmental conditions as well as line speeds.

The result is a stable conductor temperature independent of the material. This is especially interesting for the production of automotive cables as the conductor material is not only made of copper any more, but also of aluminium.



▲ The Preheater 6000 TC from Sikora

For a supplier it is often of utmost importance to adapt production to the market geographically. As the export of cable products would cause an enormous cost increase, many automotive cable manufacturers establish their plants close to the automobile plants.

In order to guarantee a stable quality worldwide, the same technologies, respectively the same technical equipment, should be available everywhere to specialists and operators – an automatically regulating technology at best. Industry 4.0 is the keyword in order to link production plants internationally. The Preheater devices of the series 6000 TC are, therefore, equipped with comprehensive interfaces.

The Preheater 6000 TC can be integrated into both new and existing production lines. It is able to measure continuously the temperature of the conductor and control the preheating due to the innovative IR (infrared) camera. Therefore, the Preheater 6000 TC works independently of external influences. This makes the devices from Sikora the foundation for one of the most important pillars within cable production – stable process repeatability and a guarantor for a sustainable and future-orientated production.

Sikora AG – Germany
Website: www.sikora.net

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New tester for copper and fibre

IDEAL Networks has launched SignalTEK NT, a network transmission tester which costs up to 30 per cent less than comparable equipment while still offering high quality reporting that proves the speed and reliability of a data cable and network installation. SignalTEK NT can be used with both copper and fibre cabling, reducing costs by removing the need to invest in more than one tester.

To further ensure that work can be completed productively and profitably, SignalTEK NT offers the functionality to produce performance reports at the end of a job, so that subsequent call backs can be charged for. In addition, the ability to transfer deliverables from the tester directly from the work site ensures job completion can be confirmed straight away to customers, reducing delays in payment.

The ability to transfer data in real time using the free Ideal AnyWARE mobile app also ensures that test results are not lost, so no time or money is wasted on re-testing completed jobs. The app connects to the SignalTEK NT using Wi-Fi and transfers test reports to your mobile device. Once data is transferred, users can view the PDF reports and send them using their preferred file sharing method, including email or file sharing app.



▲ For copper and fibre cable testing

SignalTEK NT simulates actual network traffic to prove and document network and data cable performance to Gigabit Ethernet standards across various uses including VoIP, CCTV, video, and web traffic. This is in contrast to some cable testers which do not transmit real Ethernet frames, so do not effectively simulate network traffic. All tests conducted with SignalTEK NT comply with the IEEE 802.3ab Gigabit standard and can be performed on both shielded and unshielded twisted pair cables including Cat 5e through to Cat 8.

SignalTEK NT also uses time domain reflectometry (TDR) to locate common wiring faults such as open and short circuits. The tester offers a number of other useful time-saving functions to verify device, network and Internet connectivity,

including port speed and duplex status, power over ethernet (PoE) and PoE+ availability, port ID with LLDP and Cisco discovery protocol, and tone generation for cable tracing using a compatible amplifier probe. The SignalTEK NT also verifies the power level of an optical device to identify the source of a problem as cabling or network hardware, making testing quicker, easier and less costly.

Easy and intuitive to use, the SignalTEK NT

requires no calibration and comes with replaceable RJ-45 contacts which can help to reduce the cost of ownership of the tester. To further boost efficiency, when testing data cables or active networks, two handsets can automatically pair to allow tests to be initiated from either handset and then carried out by one person to save the time and cost of an additional technician.

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Wire Expo 2016 Review

'Outstanding' success of this year's Wire Expo



▲ Amaral Automation's Rick Amaral talks to visitors during the exhibition

'Outstanding' was how Wire Association International president Andy Talbot described events at this year's Wire Expo, held in the heart of the New England wire and cable sector in June.

The conference and exhibition, run in conjunction with the association's 86th annual convention, attracted more than 1,400 people to the Mohegan Sun Casino Resort in Connecticut, USA.

The educational programme, which was designed to provide practical solutions to wire and cable manufacturing challenges, included:

- Workplace organisation and workforce management sessions
- A health and safety segment
- A capital expansion projects panel

"After the overwhelming success of the 2014 Wire Expo in Indianapolis, our expectations for Wire Expo 2016 were very high," said president Andy Talbot.

"I am happy to report that those expectations were met and exceeded by virtually every measure. Each aspect of the event was outstanding: the quality of the speakers, presentations, and the exhibits, as well as the tours and the many social events was top-notch.

"It was rewarding to see the high levels of attendance, participation, collaboration, and overall enthusiasm from start to finish. The energy and the brisk activity on the exhibit floor was exceptional throughout the show. It was equally

satisfying to hear the immediate positive feedback on every aspect of this event.

▼ Keynote speaker Mark Hortsman



7 – 9 June

"I want to recognise the WAI New England Chapter for its energy, support, and contributions to all that was successful about the show including introducing us to the Mohegan Sun, an amazing facility. It is clear that the Wire Expo format has become a perfect complement to the biennial Interwire show. I am looking forward to Interwire and the next Wire Expo, in Nashville, Tennessee."

Mark Horstman, host of the award-winning business podcast Manager Tools, gave the keynote address: "The most important management tool: One on Ones", followed by a two-hour manufacturing management seminar to further explore the Manager Tools philosophy.

Additional highlights included:

- Opening speaker Frank McGrew – "USA Manufacturing: Open for Business!"
- Full educational programme
- Production solutions demonstrations
- Mordica Lecture by Encore Wire's Daniel L Jones
- Mobile classroom to Davis-Standard
- Plant tour of Freeport McMoRan
- Peer networking opportunities

▼ *The welcome reception for Wire Expo 2016*



▲ *The New England Chapter at work on the floors of Wire Expo*

- WAI's ever-popular welcome reception at Mohegan Sun's Margaritaville
- temperatures," "Marking, printing, and guiding of insulated wire," and "Wire breaks."

Wire Expo exhibits represented 240 companies that manufacture wire and cable or supply the industry. Displays covered more than 120 product types. Live demonstrations included: "Moisture-cross-linkable materials for higher

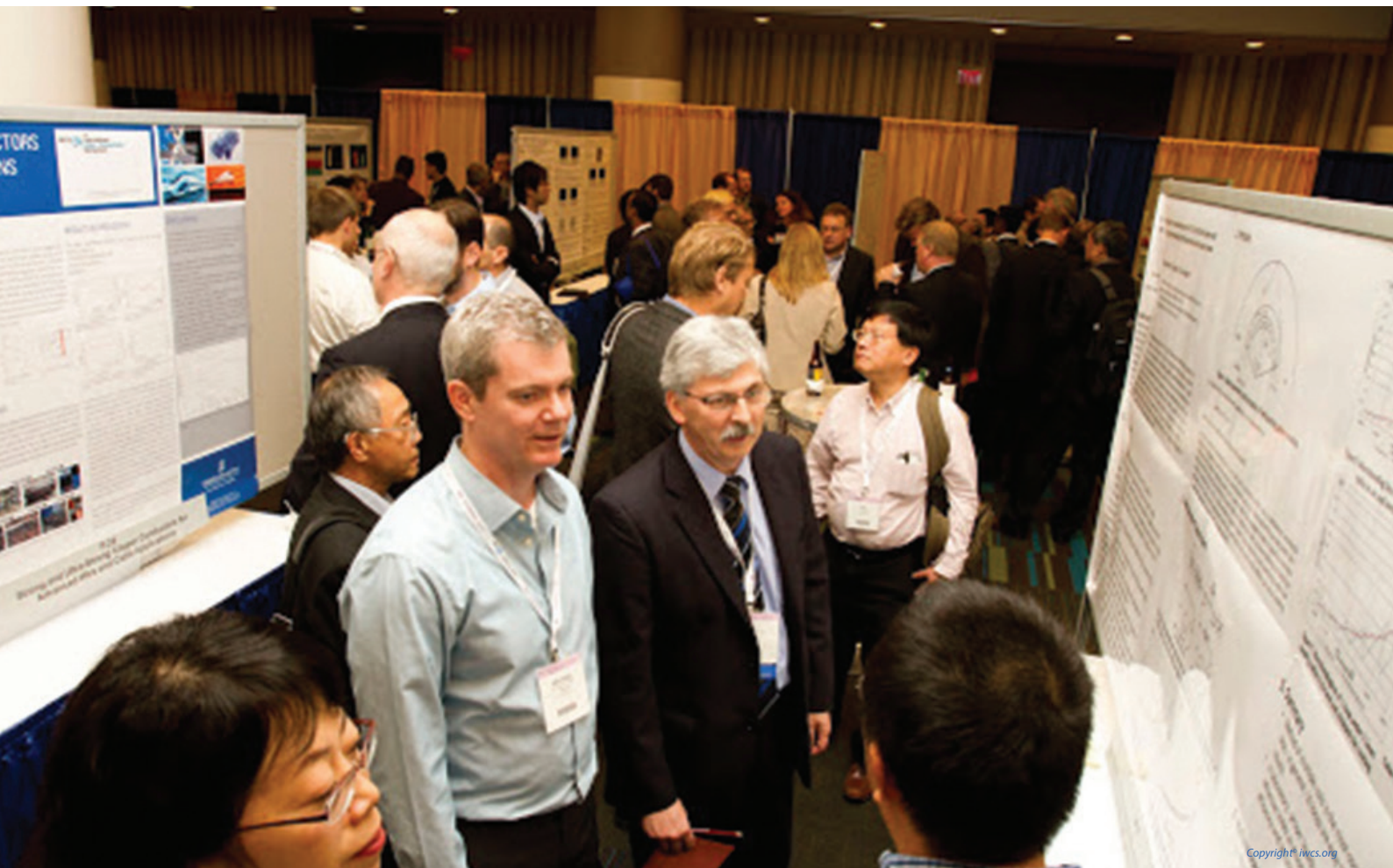
The biennial event will be held next in Nashville, Tennessee, on 15th and 16th May 2018.

Wire Association International – USA
Website: www.wirenet.org





65th IWCS conference in Providence, Rhode Island



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Stage is set for the 65th IWCS conference and exhibition

THE stage is set and the speakers are ready for the 65th IWCS at the Rhode Island Convention Center, Rhode Island, USA, from 2nd to 5th October.

This year's executive track programme will feature speakers from the critical supply chains serving the industry, while the personal development programme provides news courses of high concern and interest, in addition to the core courses in fibre, copper and materials.

The cornerstone of the conference, the IWCS Technical Symposium, is recognised as the premier technical symposium for the cable and connectivity industry, with more than 100 papers

being presented on research and development for wire and cable materials, connector/interconnect technologies, designs, components, fabrication, performance, testing and applications.

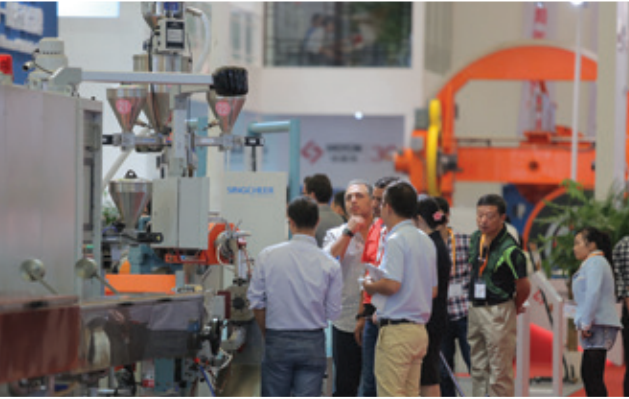
The supplier exhibition will include over 100 exhibitors from various levels in the wire and cable industry. On display from those companies will be a wide variety of commercial product technologies and applications.

Personal development courses and presentations run from Sunday, 2nd October, to Wednesday 5th October, with the exhibition running from 2-6pm Monday 3rd October, to Tuesday 4th October.

65th IWCS Conference 2016 exhibitor listing

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Shanghai's SNIEC opens its doors to wire & Tube China 2016



Industry 4.0 and strong growth in regenerative energies will be at the forefront of this year's wire China – being staged in Shanghai from 26th to 29th September.

The coming decade forecasts strong growth in the area of regenerative energies for China (wind power, solar power, nuclear power). This will entail further demand for wind power cables, PV cables, nuclear power cables and other special cables. Against the background of the growing awareness for green and energy-saving development, smart grids have become an important area that is being closely

watched in many countries. This also faces the wire and cable industries with new challenges: smart energy, smart cities and the smart grid will drive and determine innovations in the field of wire and cable. Due to the swift development of the Chinese economy and increasing urbanisation, the number of high-speed trains, suburban trains and e-vehicles is also rising at the same time with the consequence of higher demand for bare wire, electric wires and cables, power cables and communication cables. There is also strong investment in the areas of electricity, energy, construction and communication as well as in other segments of national infrastructure.

2016 中国线材展

wire China 2016



As this stage 57,500m² of exhibition space has already been rented for the exhibition, while 1,000 Chinese and international exhibitors will be presenting innovations from the areas of wire production and processing machines, auxiliaries, materials, special wires and cables, measuring and control technology as well as detection projects and products, services and solutions from associated disciplines.

wire China 2016 is expanding its two segments – wire and cable materials and wires and springs – to form a joint venture with the Shanghai Fastener & Tech trade fair.

You can pre-register for wire China at www.wirechina.net now. Pre-registered participants receive special deals such as accelerated trade fair access, a complimentary exhibition catalogue and much more.

- **Dates:** 26th – 29th September 2016
- **Website:** www.wirechina.net
- **Location:** SNIEC (Shanghai New International Expo Centre) Shanghai, PR China
- **Organisers:** Messe Düsseldorf China Ltd and Shanghai Electric Cable Research Institute
- **Exhibition times:** 9.00am to 4.30pm every day

26th-29th September

Agir Technologies Stand WC139

Involved in the fields of tungsten carbide tools since 1870 and machinery for decades, Agir Technologies presents a broad range of skills to its customers, where it is able to provide solutions and competent advice to a wide range of requests.

The investments recently made in the company, such as a wire cutting EDM with two-wire spool of 0.03mm, a five-axis CNC machine to cut the electrodes, and new CAD/CAM software, allow the company to expand its range of high precision and quality tools.



▲ The Cut 2000 X-treme from Agir

Agir exports its tungsten carbide tools, machines and know-how on five continents and to over 60 countries.

First for its own needs in tungsten carbide dies and then for its partners, the company has made a point of developing the machinery sector by creating and building a wide range of machines. From a unique shaving head to the various polishing lathes, as well as numerous grinding machines, the company is shaped to bring an answer to the most demanding requirements.

Horizontal or vertical, for large or small diameters, half or fully automatic, with a whole range of options (spindle, chuck, motorisation), substantial possibilities exist to help efficiency and manufacturing processes.

Agir Technologies – France

Website: www.agir-technologies.com

Ajex & Turner Stand W1A70

Ajex & Turner Wire Technologies will showcase VNT dies and other products along with lubricants by Fuchs, UK, and TKT, Italy, for copper, aluminium, steel, and MIG/CO₂ wire.

The company has been an integral part of the wire and cable industry for 40 years, and this time in China is looking forward to showcasing its new developments.



▲ The range of dies from Ajex & Turner

Adrian Day from Fuchs Lubricant, UK, and Fabio Bellina from TKT Tecno, Italy, will accompany the company at the exhibition with technical assistance for all lubricant related queries.

Being a one-stop-shop for major consumable requirements for any wire and cable manufacturing plant, visitors wanting precise quality and troubleshooting for wire drawing units will be able to benefit.

The complete product range of VNT dies, PCD dies, carbide dies for wire drawing and compacting, busbar dies, shaped dies, die polishing machines for PCD and carbide, die polishing accessories and die inspection microscopes will all be on display.

Ajex & Turner – India

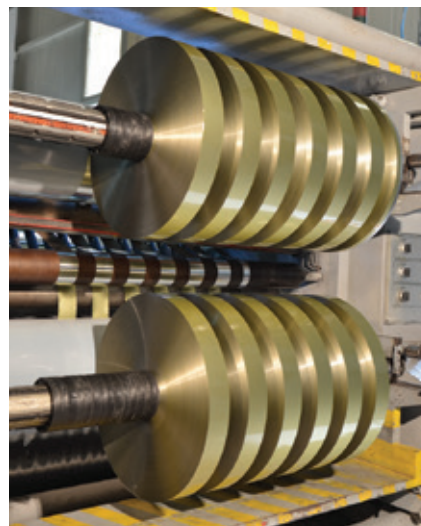
Website: www.ajexturner.com

Besel Basim Stand W1B51

Besel Basim has been a producer and converter of flexible materials for technical applications since 1975.

The company makes high quality insulating films to the specifications of its customers based on the materials of ALU, CU, PET, PP, PE, etc; and water blocking, semi-conductive and conductive films; and other tapes and foils for the cable industry.

▼ Besel Basim will show off its latest developments



With an ISO9001-certified quality system, experienced and skilled staff and management team, the company is happy to show its latest developments and share the experience in building high quality electrical insulation and flexible film materials.

Besel Basim – Turkey

Website: www.beselfoil.com

Cimteq Stand W1F36

The world of cable manufacturing is a constantly evolving environment.

The speed at which the systems and processes available to manufacturers are changing and developing means that in order to keep ahead of the competition companies need to be confident in their systems and be sure that the way in which they are operating is providing them with the best efficiencies, quality of product, return on investment and ultimately profitability.

The 21st Century has seen phenomenal developments in terms of software and technological advancement, therefore it is only natural that this in itself will revolutionise the manufacturing industry.

The onset of what is essentially the fourth phase of an industrial revolution that began back in the 1700s has seen the manufacturing world become increasingly driven by digital systems and the 'Internet of Things', providing increased capabilities in terms of designing, planning, controlling and monitoring down to extremely tight parameters.

Cimteq, one of the leading software designers within the cable industry, is no stranger to this concept.

Its systems fully embrace and promote the idea that through the adoption of sophisticated design and manufacturing software systems manufacturers can produce cable faster, smarter and more profitably whilst adapting quickly to changes in the manufacturing environment.

The launch of CableSuite by Cimteq and its partner, Innovites, earlier this year provides a resource to cable manufacturing companies in terms of helping them to embrace the concept of streamlining their production, designing their product more accurately and controlling the production and manufacturing process closely to reduce waste, improve efficiency and provide improvements in profitability.

26th-29th September

CableSuite consists of two of Cimteq's products: CableBuilder and CableMES. CableBuilder comprises a host of components including cable design, quotation, 2D and 3D drawings, PDM, manufacturing waste simulation and quality control.

CableMES is a cable-specific manufacturing execution system based on the Wonderware platform and covers warehouse management, product traceability, performance management and job management.

Cimteq Ltd – UK

Website: www.cimteq.com



▲ Complete titanium tubes inspection by UT and ET

both ferrous and non-ferrous products – steel, copper, alloys, carbon steel, stainless steel and aluminium.

The non-exhaustive list of applications includes:

- Tubes, bars, pipes and wires inspection
- Surface flaws detection by RotoETscan eddy current rotating head
- Internal and dimensional flaws detection by RotoUTscan ultrasonic rotating head
- Tubes inspection with product in rotation
- Full body and/or weld of welded tubes inspection

- Full body and/or ends of non-welded tubes inspection
- Defects detection on double wall tubes
- Heat treatment, hardness, coating verification and measurement
- Supra conductor wires inspection
- Multiple lines inspection
- Hot rod inspection
- Material sorting
- Exchanger tubes inspection

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

Through its products and its remote assistance, CMS provides quality and productivity solutions for industrial applications worldwide.

Contrôle Mesure Systèmes – France

Website: www.cmseddyscan.com



Contrôle Mesure Systèmes Stand E1D20

Contrôle Mesure Systèmes has specialised for more than 25 years in non-destructive testing, and thanks to its complete NDT range of products in eddy current and ultrasonic methods, can supply solutions for most industrial applications.

The CMS product line is designed to meet inspection, testing and quality control on



Daloo Stand W1F25

Daloo is the logical extension of the Gauder Group global offer for cable producers looking for an alternative between new machines made in Europe (with higher cost) and second-hand machines. >>>

YOUR BEST CHOICE !

Diamond Dies

Natural Diamond Dies 0.01 ~ 1.00 mm
 Polycrystalline Diamond Dies 0.10 ~ 10 mm
 Shaped Wire Drawing Diamond Dies
 Tin-Coated Dies
 Point Dies / Extrusion Dies
 PVF Dies for Enameling Wire
 Guide Dies for EDM Machine

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Jiangsu Qunye Electrical co., Ltd. is a specialized spools manufacturer. We have highlevel workshops and office , first class equipment line and complete inspection facilities, advanced management and quality control system to fulfill all cutomers' requirements. We manufacture all kinds of metal and plastic spools and win a good market both at home and abroad. Looking forward to seeing you at wire China 2016.

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26th-29th September

Z DONGGUAN ZHANGLI MACHINE FITTINGS CO.,LTD

Ceramic coated Cone pulley and roller for in line drawing machines

Tungsten carbide coated cone pulley and steel ring are used for large rod wire drawing machine

Zirconia ceramic pulleys and Alumina ceramic pulleys

Please visit us at **wire CHINA 2016**

Sept 26-29 2016 Booth W2E73

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http:// www.dgzhangli.com
E-mail : whm@dgzhangli.com



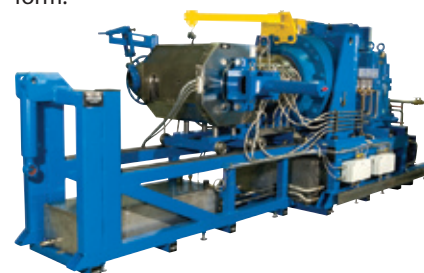
▲ A portal self-traversing take-up, mobile on floor (Daloo SY 2000-8)

Its complete stranding lines and accessories for the production of power and communication cables are designed and made in China following Gauder Group proven methods and strict quality criteria.

Daloo – China
Website: www.daloo-machines.com

has the possibility of removing individual layers, such as the outer jacket, lead sheath or triple layer XLPE insulation, without causing any damage to the subsequent layer below.

This enables the outer jacket, lead sheath or triple layer XLPE to be re-applied and the cable repaired. Even if the cable is just going to be scrapped, the metal price differences for insulated or un-insulated cables are very large and the equipment would have a very short pay-back period, if the metals are scrapped in their "bright" form.



▲ The 5960 extruder from H Folke Sandelin

HFSAB is able to provide a full and extensive after sales service, know how, fully trained and experienced technician support and spare parts.

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

M & M Wire

Tel: 0086 13910833898 Fax: 0086 10 84928449
Website: www.mnsteelwire.com Email: sales@beijingmaster.com



High carbon and Low carbon galvanized wire, Phosphate steel wire, Galvanized steel strand, Galvanized/Stainless wire Rope, Cable armouring wire, Spring steel wire, Baling wire.
Wire diameter: 0.15mm - 14mm
Zinc coating: up to 850g/m²

H Folke Sandelin AB Stand W1F63

H Folke Sandelin AB (HFSAB) from Motala, Sweden, will be a co-exhibitor with Niehoff Machinery Changzhou Co Ltd.

HFSAB has had a leading role worldwide in the following areas for over 50 years, supplying:

Continuous lead extrusion equipment and know-how for trouble-free lead sheathing of cables, providing a moisture barrier. Today the latest design lead extruder from HFSAB is horizontal, floor standing, easy to install and maintain, fully automatic, and reliable, with its control system enabling continuous operation for weeks with little or no variation in temperatures and wall thickness/concentricity.

The lead wall thickness can be kept to a minimum with corresponding savings in lead. A range of die blocks are available to cover an extensive diameter range of 6mm to 190mm (over lead), and a range of melting pots are available for 10, 18, 35 and 60 tonne capacities.

Additional equipment includes the cable repair and recovery system CRRS, which

Maillefer Stand W1F24

Maillefer has its roots in cable manufacturing. This combined with the widest application coverage and over 4,000 line deliveries has created unique competences available for customers via several new products. At China the company will introduce many novelties which enhance the competitiveness and responsiveness of wire and cable manufacturers.

- Maillefer Factory System is a qualified concept to plan and realise a greenfield factory with the lowest possible risk and cost. The system is a way to outsource a factory project right after you have defined the end product, and is also suitable for expansion of current production facilities
- Maillefer Consultation is a new service entity that is built around the wire and cable production process. It exploits core knowledge into individual advice and process skill improvements of wire and cable manufacturers

The company is introducing a new Value Package to the Chinese market, including the new Round Value Package Premium with which production is controlled under very precise tolerances.

26th-29th September

This brand new curing concept guarantees utmost roundness in high voltage cable production.

Maillefer Oy – Finland
Website: www.maillefer.net

Medek & Schörner
Stand W1C32

Medek & Schörner will be presenting the following cable marking machines in Shanghai:

Cable marking machines:

- High quality gravure printers (LAN cables, control cables, etc) for speeds up to 1,200m/min
- Water misting unit for the application of fine water dust for pre-cooling of the hot wire immediately after the extruder
- Embossing metre markers/hot foil sequential metre markers for high accuracy of length measurement (power cables, telecommunication cables, optical fibre cables, etc)
- High performance ring markers for marking telephone wires, switch-board wires, automotive cables and LAN cables
- Video system for monitoring the print quality of fast-running cable printing machines, eg allowing real-time inspection for bad quality and/or missing prints
- Laser marking system for cables

Optical fibre coating systems:

- Top speed optical fibre processing systems
- Optical fibre colour coding up to 3,000m/min
- Ring marking of optical fibres at speeds up to 1,150m/min
- Tight buffering up to 1,300m/min
- Fibre ribbon production with excellent ribbon planarity and for speeds up to 1,000m/min
- CFU (production of compact fibre) units



- ▲ *Optical fibre colouring from Medek & Schörner*
- Copper wire insulation with UV varnishes (enamelled wire)
- Manufacture of dimension-sensitive precision micro flexible flat cables (FFC) using UV resins

Medek & Schörner GmbH – Austria
Website: www.medek.at

Maschinenfabrik Niehoff
Niehoff Machinery
Changzhou Co Ltd
Stand W1F63

Maschinenfabrik Niehoff and Niehoff Machinery Changzhou Co Ltd (NMC), its Chinese subsidiary, will display an MMH 121 + RM 201 type multi-wire drawing machine from Germany and a D 631.5 + ARP 630 type high speed double twist bunching machine made by NMC.

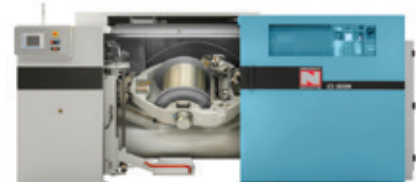
H Folke Sandelin AB (HFSAB), specialist in horizontal lead extrusion and cable repair and recovery systems, will also be a co-exhibitor.

The multi-wire drawing machine MMH 121 is designed to simultaneously draw 14 wires in one level for a diameter range from 0.2mm to 1.05mm.

The MMH 121 is combined with an inline annealer type RM 201 and can work with a speed of up to 40m/s. The MMH 121 is best suited for the production of electronic wires as well as for building wires.

As the MMH machines are based on a modular principle, they can be built adapted to the specific tasks of customers. The wires drawn on these machines exceed the most demanding specifications and processing requirements as far as physical properties and can be processed to multi-wire bundles with outstanding characteristics. Up to now, more than 1,500 MMH lines are in operation worldwide.

The D 631.5 single-bow double twist bunching machine and the ARP 630 pay-off are both built by NMC under Niehoff licence to match the high requirements of the Chinese market. The machine is designed for strands with a cross section of 0.09 to 6mm² and a steplessly variable lay length of 6 to 100mm. The maximum number of twists is 6,500 twists/min while the maximum linear speed is 300m/min.



▲ *The D 631.5 single-bow double twist bunching machine*

The machine is equipped with AC drive technology, contactless transmission of machine data within the machine, field proven energy-saving ECO-Bow and an NMI touch-screen display with colour user interface and simplified navigation structure.

Another special feature is the perfect tension control for the winding of the strand from the beginning to the end of bobbin using a load cell and dancer.

Maschinenfabrik Niehoff has been active in China since the early 1970s. Assisted by experienced Chinese engineers, Niehoff has successfully introduced rod breakdown and multi-wire as well as super fine wire drawing technology to many wire and cable factories in China.



Inosym Reels

Inosym Limited
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inosym@inosym.com
www.inosym.com

26th-29th September

<<< One of the pillars on which this success in the marketplace is built was the Niehoff Service Centre in Shanghai, founded in 1994, which became the Niehoff Shanghai Representative Office in 2000 and eventually changed to the Shanghai sales branch of Niehoff Machinery Changzhou (NMC) Co Ltd.

Maschinenfabrik Niehoff GmbH & Co KG – Germany
Website: www.niehoff.de

machines for CTC conductors, pay-offs/take-ups, taping heads, and disc- and belt-type caterpillars/capstans.



▲ Just one of the machines already delivered to the industry

Highlights of this year's new development was the manufacturing and installation of a large planetary strander for the production of subsea cables, based on reel weights of up to 55 tons per conductor. High-energy efficiency was obtained due to the use of the latest motor and drive technology with full energy recovery.

The second-hand department offers a full choice of machines and equipment for the wire and cable industry.

Queins Machines GmbH – Germany
Website: www.queins.com

Stolberger-KMB – Germany
Website: www.stolberger.com

Pourtier Stand W1F25

Pourtier has made impressive achievements in the field of submarine and umbilical cables with the supply of large armouring lines and laying-up lines, as well as its heavy-duty stranders, cablers and armouring lines for ferrous and non-ferrous cables.



▲ A power regenerative high speed concentric strander module of four reels with three wires each (Pourtier COS 1200-4)

Its multi-wire concentric stranding line is also widely used for low and medium power cable production. All these machines are made in Europe with the highest standards in design and manufacturing for the production of high voltage and extra-high voltage power cable, from overhead to insulated, AC type (using high quality Milliken conductor) for land cable or DC type (using large round compacted conductor or trapezoidal wires) for both land and submarine cable.

Pourtier – France
Website: www.pourtier-setic.com

Queins Machines Stolberger-KMB Stand TBC

Queins Machines GmbH and Stolberger-KMB, both Germany-based companies, have been manufacturing machinery for many years, and will be displaying a number of photographs and videos of machines already delivered to the rope and cable industry.

The main products are all types of high-speed stranding machines,

Rosendahl & Nextrom have undertaken technological developments in:

- Processing high-temp materials and silicone rubbers
- Producing loose tubes with fibre overlength control at extremely high speeds
- Recycling helium during fibre draw
- VAD/OVD preform technology

RosendahlNextrom – Austria
Website: www.rosendahlnextrom.com

Setic Stand W1F25

Setic provides high-speed double twist bunchers/strandings for the automotive industry as well as complete solutions to produce high quality LAN, special and control cables with enhanced performance (in one or two steps, according to product mix).



▲ A large double twist stranding/laying-up machine (Setic TC 1250-4M)

The company is continuously developing new lines and concepts for non-ferrous cables in order to meet customers' needs, such as tandem "mica taping/bunching", special high speed lines for battery cable, and new high speed lines for special and instrumentation cables.

These machines are made in France and some of them are also manufactured by the Gauder Group China division for direct supply to the Asian market, with the same quality standards.

Setic – France
Website: www.pourtier-setic.com

RosendahlNextrom Stand TBC

Rosendahl and Nextrom have been focusing on how to create even more customer value with their advanced manufacturing technology.

Industry 4.0 – "Smart Factory" – is becoming a reality and opening new doors both for suppliers and manufacturers. Predictive maintenance, backtracking of processes and online monitoring are just a few of those values and benefits. It supports optimising of the complete product life cycle.

▼ VAD preform technology



Sikora Stand W1F62

Sikora is presenting a full programme of well proven and innovative non-contact measuring, control, inspection and sorting devices for quality assurance and cost reduction in the wire, cable, optical fibre and plastics industries.

The product range includes X-ray and laser devices for the measurement of diameter, eccentricity, ovality and wall

26th-29th September



▲ The X-Ray 6000 measures the diameter, wall thickness and eccentricity of cables

thickness. In addition, lump detectors for the detection of non-conformities on the product surface as well as devices for monitoring the cleanliness of plastic material and for temperature measurement of PE melts will be shown.

Sikora will showcase the Preheater 6000 TC, a temperature-controlled conductor preheating device that assures an optimum adhesion of the PE or other plastics on the conductor. In this context the Wire-Temp 6000 will also be presented: a non-contact conductor temperature measurement system that is now also available for diameters up to 50mm and suitable for installation in CV lines.

With the Purity Scanner, Sikora offers a system for 100 per cent online inspection and sorting of plastic pellets that contributes to process optimisation, quality assurance and cost saving.

In addition, visitors will get to know the company's sophisticated systems for quality assurance of optical fibres in the drawing tower. The product series is complemented by a gauge head for measuring the fibre temperature, as well as innovative equipment that gives information on the coating concentricity.

Sikora AG – Germany
Website: www.sikora.net

Spirka Schnellflechter Stand W1F57

Since 2012, Spirka Schnellflechter has offered complete reverse coiling lines with revised design and control for shielded low voltage and medium voltage cables.

The advantage of LV- or MV-cables with a waveconal shielding is their easy and safe installation.

The SSB shielding system features a high efficiency, good product quality and a long runtime as it uses drums for the copper tapes in the taper. The mobility of its components ensures a flexible operation within the whole surface line. The entire plant is controlled with a central pivoting touch panel.

The plant is designed for putting shield wires made of soft aluminium or copper wires on a core (cable) in a sinusoidal shape. In order to fix them, the wires are wrapped onto the core with a copper or aluminium tape.



▲ The plant from Spirka Schnellflechter

Main parameters: (deviation on customer's request)

- Line speed: V max = 50m/min
- Core diameter: (cable diameter) 15-70mm
- Metal shield: consists of max 120 soft copper or aluminium wires with a diameter of 0.4 to 2.5mm, depending on the material
- Fixation: Using a copper or aluminium tape with a thickness of 0.1-0.2mm and a width of 5-15mm

In detail, the plant consists of a compensation device for adjusting the wire, reverse coiling device, central tape coiler, stabilisation crawler, electrical equipment and control.

Spirka Schnellflechter GmbH – Germany
Website: www.spirka-schnellflechter.com

Troester Group Stand TBC

Troester GmbH & Co KG is supplier of machines and complete lines for the cable manufacturing and rubber processing industry, comprising CV lines for XLPE and rubber cables, silane lines, sheathing and insulation lines as well as the complete range of downstream equipment, including winders, caterpillars, capstans and accumulators. >>>

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▲ The Troester stand at a previous wire China

◀◀◀ In China Troester is represented by its subsidiary, Troester Machinery Shanghai (TMS), which is responsible for sales, after-sales service and production for the domestic market.

The company will present information and new developments in the fields of:

- CCV and VCV lines for MV, HV and EHV cables up to 1,000kV
- Rubber CV and CCV lines up to 35kV
- CV technology for production of HV cables on CCV lines
- Production equipment for submarine cables

X-Compound, a member of the Troester Group, is specialised in complete systems for the compounding of plastics with

the process steps conveying, melting, dispersing, mixing and degassing. X-Compound will present:

- Kneader technology for the continuous compounding of HFFR (LSOH), PVC and XLPE
- Semiconductive materials and EPR/EPDM

Troester Group – Germany

Website: www.troester.de

Wire & Plastic Machinery Corporation Stand W1G05

Wire & Plastic Machinery Corp will be exhibiting its large inventory of second-hand and reconditioned wire and cable manufacturing equipment.



▲ A rebuilt 150mm (6") Davis-Standard rubber extruder

Over the past 30 years, Wire & Plastic Machinery Corp has earned a reputation for providing a wide range of high quality pre-owned and reconditioned equipment.

The company has more than 30,000 machines in stock.

Wire & Plastic Machinery Corp – USA

Website: www.wireandplastic.com

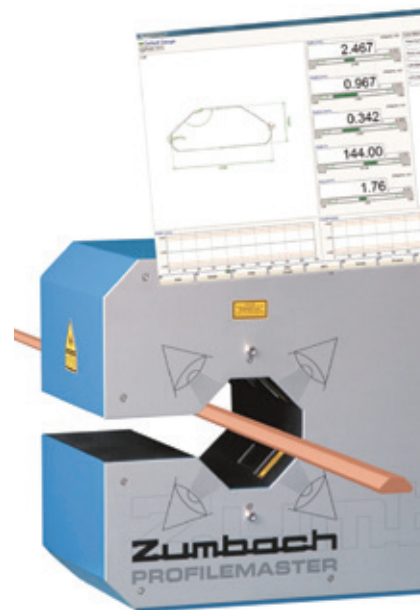
Zumbach Electronic Stand W1E22

Zumbach will be able to give detailed information on its wide range of measuring and control solutions for process monitoring, quality control and cost-effective production.

On display will be:

Sensors:

- New DC and high frequency AC spark tester generation with local BAE 2 SP control and display unit that accurately maintains test voltage under any conditions, including highest capacitive loads
- New, advanced KW Trio fault detectors with local BAE 2 KW control and display unit



▲ The new Profilemaster PMM 10 profile measuring unit for shaped wire and similar

- New 1, 2 and 3 axis diameter gauges for any cable and wire and any budget. Besides the complete line of Odac laser diameter gauges, new models with special beam geometry, fault detection function and high scan rate will be exhibited
- MSD gauges diameter and ovality with multi-source device technology
- The advanced Odex concentricity and diameter gauge for wire extrusion. Fully non-contact, based on magnetic and laser technology
- New ultrasonic wall thickness and eccentricity scanners of the Umac series with quick and easy adaptation to cable diameters and space-saving integration
- Profilemaster profile and shape measurement systems using light section principle and machine vision

Data acquisition, processing and display units (processors):

- Modular high-performance USYS IPCE data acquisition, processing and display units

Complete measuring and control systems:

- Dynamic Rayex D and static Rayex S series: X-ray measuring and control system for CV lines, for wall thickness (three layers), eccentricity and diameter/ovality for CV lines
- Wallmaster/Umac – Diacal systems: Ultrasonic wall thickness and eccentricity systems for cable jackets and Diacal option for fully automatic calibration and control

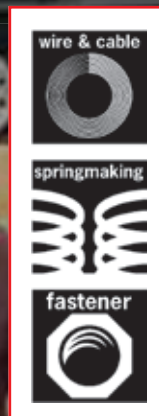
Zumbach Electronic – Switzerland

Website: www.zumbach.com

GUIDETTI
RECYCLING SYSTEMS

25 years of experience
in wires and plastics recycling

www.guidettisrl.com



Wire & Cable India 2016

6th International exhibition for the wire and cable industry, Mumbai, India

Wire and cable companies will be heading to the Indian subcontinent for Wire & Cable India, being staged from 5th to 7th October at the Bombay Exhibition Centre in Mumbai, India.

Co-located with the top events Metallurgy India/Tube India International as well as India Essen Welding & Cutting (organised as a joint event by Messe Düsseldorf India and Messe Essen GmbH), all four trade fairs present technology highlights from the metallurgy, wire and cable industries and the tube industry, as well as from the industrial areas of cutting and welding.

Organisers Messe Düsseldorf GmbH and its Indian subsidiary Messe Düsseldorf India, as well as the Confederation of Indian Industry, expect a total of 400 exhibitors from 25 countries. At this stage many Indian and international companies have already registered for participation, and there will again be group participations from Italy, Austria, France and China.

On display at Wire & Cable India will be machines and plants for wire production and processing, forming technology, spring-making technology, cable and stranded wire machines, tools and auxiliaries for process engineering, measuring and control technology, all types of wires, rolled wire, bare wire, bars, sheet metal as well as special wires and cables.

Metallurgy India presents the entire portfolio of the metallurgical industry with electrical and automation technology systems. Together the three trade fairs cover the complete spectrum of metal working and processing.

Conceptual and technical support for the Indian trade fairs comes courtesy of the international associations IWCEA (International Wire and Cable Exhibitors Association), IWMA (International Wire & Machinery Association), ACIMAF (Italian Wire Machinery Manufacturers Association), WCISA (Wire and Cable Industry Suppliers Association) USA and ITA (International Tube Association).

The Indian associations SWMAI (Steel Wire Manufacturers Association of India) and AIWMA (All India Welded Mesh Manufacturers' Association) are also at hand with their country-specific insider know-how.

Dates: 5th – 7th October 2016

Website: www.wire-india.com

Location: Bombay Exhibition Centre, Mumbai, India

Organisers: Messe Düsseldorf GmbH and Messe Düsseldorf India

Exhibition times:

5th and 6th October: 10.00am to 6.00pm

7th October: 10.00am to 5.00pm

Ajex & Turner Stand B02

Ajex & Turner Wire Technologies will showcase VNT dies and other products along with lubricants by Fuchs, UK, and TKT, Italy, for copper, aluminium, steel, and MIG/CO₂ wire. The company has been an integral part of the wire and cable industry for 40 years, and this time in India is looking forward to showcasing its new developments.



▲ The range of dies from Ajex & Turner

Being a one-stop-shop for major consumable requirements for any wire and cable manufacturing plant, visitors wanting precise quality and troubleshooting for wire drawing units will be able to benefit. The complete product range of VNT dies, PCD dies, carbide dies for wire drawing and compacting, busbar dies, shaped dies, die polishing machines for PCD and carbide, die polishing accessories, and die inspection microscopes will all be on display.

Ajex & Turner – India
Website: www.ajexturner.com

Besel Basim Stand 1D12

Besel Basim has been a producer and converter of flexible materials for technical applications since 1975.



▲ Besel Basim will show off its latest developments

The company makes high quality insulating films to the specifications of its customers based on the materials of ALU, CU, PET, PP, PE, etc; water blocking, semi-conductive and conductive films; and other tapes and foils for the cable industry.

With an ISO9001-certified quality system, experienced and skilled staff and management team, the company is happy to show its latest developments and share the experience in building high quality electrical insulation and flexible film materials.

Besel Basim – Turkey
Website: www.beselfoil.com

DEM Stand TBC

DEM SpA manufactures machines, plants and solutions for the cold rolling of wire.

As an enterprising company with global ambitions, India is already a known market for DEM, with some advanced solutions provided to wire manufacturers.

One of the most notable plants delivered in recent years is a profile wire rolling line for the production of stainless steel triangular wire. The line rolls spools of 2,000kg of AISI 316L wire, with a maximum inlet diameter of Ø 7.5mm.

The finished product has a constant tolerance of 0.005mm at a maximum rolling speed of 8m/sec (480m/min), with superior repeatability. The product is used in screens for oil, water and liquid filtration systems. Beyond this specific application, the DEM line can also be set to produce different final shapes, thanks to a quick roll-changing system and operator-friendly interface.

Besides profile wire rolling lines, DEM covers the full sphere of cold rolling of wire, having expertise in the design, manufacture and start up of:

- Flat wire rolling line: Technological plants to produce flat products, both in ferrous and non-ferrous materials. Finished material can be delivered in coils or cut-to-length bars. Typical applications are: springs, busbars, gratings and electrical connectors
- Cold rolling lines: All-in-one machines to decoil, straighten and roll wire rod for the production of reinforcing wire. The output of these lines can be packed in coils or in straight bars. Additional processes, such as automatic strapping, weighing and unloading, both for bars and coils, are also possible

- Cold rolling cassettes: Usually installed on cold rolling lines for smooth or ribbed wire production, they are interchangeable with any other cold rolling cassette available on the market. In addition, they are used for compacting of rope and strand with high carbon content, for wire rod calibration and for rough shaping of profiles
- Micro rolling cassettes: Technology to replace traditional dies on dry drawing machines. Their economic advantage over dies is demonstrated when running long production batches and for special applications (for instance materials like titanium and zinc)

Flux cored wire lines, payoffs, take-ups and warm rolling systems can all be discovered at the DEM stand in Mumbai.

DEM SpA – Italy
Website: www.demgroup.com

GMP Slovakia Stand TBC

GMP Slovakia manufactures steel reels, take-apart reels and handling equipment for the wire and cable industry. The company has its main manufacturing plant in Pribenik, Slovakia, and a second manufacturing plant in Nashik, India.

This second plant opened two years ago and is equipped to manufacture different models of reels, both for process and transport. The DW-Double Wall model is a reel for drawing, buncher and stranding of steel, copper or aluminium wire. It is machined on the barrel and is dynamically balanced for 30m/sec and more. The structure of this reel is fully welded to make the structure resistant after frequent use, and the barrel can be reinforced.



▲ One of the many reels on offer from GMP Slovakia

CD-Corrugated Drum is a reel for cable and rope process (reinforced version). It is statically or dynamically balanced and also available with reinforcements in the barrel for drum twister application. This model of reel can be also manufactured

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in a light version for transport cable purposes, and can be supplied in a knock down version to reduce transport costs. The reel is supplied with tie rods and screws to be assembled by the customer.

The MR-Massive Reel is a strong construction reel for drawing and stranding steel wire process. The reel is machined only on the barrel, and is usually supplied with hardened changeable bushings, which can be replaced when worn out. This reel is also dynamically balanced and can be supplied with many optional extras, such as lifting hooks and reinforced barrel.

GMP Slovakia – Slovakia
Website: www.gmp-slovakia.com

H Folke Sandelin AB Stand TBC

H Folke Sandelin AB (HFSAB) from Motala, Sweden, will be a co-exhibitor with Niehoff of India Pvt Ltd.

HFSAB has had a leading role worldwide in the following areas for over 50 years, supplying:

Continuous lead extrusion equipment and know-how for trouble-free lead sheathing of cables, providing a moisture barrier. Today the latest design lead extruder from HFSAB is horizontal, floor standing, easy to install and maintain, fully automatic and reliable, with its control system, enabling continuous operation for weeks with little or no variation in temperatures and wall thickness/concentricity.

The lead wall thickness can be kept to a minimum with corresponding savings in lead. A range of die blocks are available to cover an extensive diameter range of 6mm to 190mm (over lead), and a range of melting pots are available for 10, 18, 35 and 60 tonne capacities.

Additional equipment includes the cable repair and recovery system CRRS, which has the possibility of removing individual layers, such as the outer jacket, lead sheath or triple layer XLPE insulation, without causing any damage to the subsequent layer below.

This enables the outer jacket, lead sheath or triple layer XLPE to be re-applied and the cable repaired. Even if the cable is just going to be scrapped, the metal price differences for insulated or un-insulated cables are very large and the equipment would have a very short pay-back period, if the metals are scrapped in their "bright" form.



▲ The 5960 extruder from H Folke Sandelin

HFSAB is able to provide a full and extensive after sales service, know how, fully trained and experienced technician support and spare parts.

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

Maillefer Stand 1C12

How would you define competitiveness? For Maillefer it means increasing the lifetime value of technology in different production and market circumstances. The company does this by empowering people, production and productivity – by equipping customers with the right competency.

To better answer the diverse needs of wire and cable manufacturers worldwide, the company's portfolio is organised in three different solution levels – /Enter, // Extend and ///Explore. These solutions vary in capacity, cost, automation, flexibility, product range, space requirements and maintenance needs. Do you need a qualified concept to realise a complete factory with the lowest risk and cost? The new Maillefer Factory System is a suitable option. Maillefer Consultation allows you to maximise the value of technology, access the best practices and improve your process based on needs.

In India details of the new Round Value Package Premium and how it guarantees utmost roundness in high voltage cable production will be available, as will the new CRM 180 Cable Roundness Meter which enables a totally new method for reliable and error-free measurement of cable core roundness and concentricity of medium, high and extra high voltage cable cores. Other solutions, products and services on display will include, among others, the quick conductor splicing QCS, FO cable secondary coating line OEL 40, MV CCV line EPL 30, and HV CCV line EPL 50.

Maillefer Extrusion Oy – Finland
Website: www.maillefer.net

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SCIENCE BEHIND WIRE DRAWING AND COMPACTING VITRIFIED NANOCRYSTALLINE TECHNOLOGY VNT NANO DIES



- VNT-Nano PCD/ND/Shape Die (PCD & Carbide) Drawing & Compacting
- Carbide Pressure Die
- Carbide Split & Enamelling Dies, Sector Die
- Ceramic Tools/Pulleys
- Die Polishing Machine for PCD, ND & Carbide Dies Designed in Italy & made in India
- Extrusion Tools (PCD & Carbide) Tips & Dies
- Lubricants for Copper /Aluminium/Steel/CO2
- Microscope for Inspecting Drawing Dies
- Ultrasonic Die Cleaning System
- Spiral Brushes & Buncher Bows & Cross Head
- Die Checking Go-No-Go Pins



In house Die Polishing Machines

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Email: sales@ajexturner.com, info@ajexturner.com
Website: www.ajexturner.com

Queins Machines Stolberger-KMB Stand TBC

Queins Machines GmbH and Stolberger-KMB, both Germany-based companies, have been manufacturing machinery for many years, and will be displaying a number of photographs and videos of machines already delivered to the rope and cable industry. The main products are all types of high-speed

stranding machines, machines for CTC conductors, pay-offs/take-ups, taping heads, and disc- and belt-type caterpillars/capstans.

Highlights of this year's new development was the manufacturing and installation of a large planetary strander for the production of subsea cables, based on reel weights of up to 55 tons per conductor. High-energy efficiency was obtained due to the use of the latest motor and drive technology with full energy recovery.



▲ Just one of the machines already delivered to the industry

The second-hand department offers a full choice of machines and equipment for the wire and cable industry.

Queins Machines GmbH – Germany
Website: www.queins.com

Stolberger-KMB – Germany
Website: www.stolberger.com

RosendahlNextrom Stand TBC

Rosendahl and Nextrom are global suppliers of production technologies for cables, wires and optical fibres.

The companies will present the latest advancements and technology highlights, including state-of-the-art achievements in the production of solar cables in co-extrusion as well as tandem extrusion, automotive wires, technologies for optical fibre UV-coating, fibre proof testing and the manufacturing of fibre optic cables.



▲ The solar cable co-extrusion line from RosendahlNextrom

Industry 4.0 – “Smart Factory” – is becoming a reality and opening new doors for manufacturers. Rosendahl and Nextrom take this revolution seriously and provide the technology for companies to be part of this.

RosendahlNextrom – Austria
Website: www.rosendahlnextrom.com

Spirka Schnellflechter Stand TBC

The increasing demand for cables for applications in automotive, data transfer

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and other industrial applications as well as the constantly growing requirements for increased transmission speeds, data security and quality parameters are also making greater and greater demands on the effectiveness and the quality of cable screening with regard to the braids and foil taping of cables.

Fault-free braids, precision in lay lengths, sensitive handling of the core material and gentle, jolt-free winding of the cables before and after the braiding process are decisive for the quality of the cables and their competitiveness.

The same applies for precision taping processes below and after the braiding, whether longitudinal or concentric taping is used.



▲ Improvements on the optimised braiding and taping line

Spirka Schnellflechter offers a comprehensive product portfolio of braiding machines, dancer-controlled payoffs and take-ups, longitudinal foil taping attachments, and concentric taping as integrated or separate units for the above areas of application and requirements which are well known to cable manufacturers.

The lay lengths can be set continuously by motorised capstans. Tensions on the cable are monitored with dancer control and are reproducible; wire tensions can be set and controlled precisely.

SSB has previously presented an optimised braiding and taping line with following improvements:

- Optimised and more user-friendly operating system
- New generation of PLC, HMI and drives
- Expanded pitch range
- Optional energy and temperature measuring system
- Optional remote control and diagnostic system
- Upgraded empty bobbin detection system

The line was presented with options for payoff and take-up to demonstrate

the flexibility of the system for different application ranges and cable specifications.

It offered a wide range of applications and increased flexibility in screening processes.

The concentric horizontal taper integrated in the line featured optimised regulation for precise pre-setting of tape tensions and a harmonised brake system for fine tuning. Alternatively, the taper can be integrated as a vertical version into the braiding machine.

Spirka Schnellflechter GmbH – Germany
Website:
www.spirka-schnellflechter.com

Wire and Plastic Machinery Corp Stand 1F26

Wire & Plastic Machinery Corp will be displaying pictures and videos of recently acquired equipment along with examples of its rebuilding capabilities.

Its inventory of over 30,000+ items can be accessed on the website.



▲ One of the machines on offer from Wire and Plastic

Over the past 30 years, Wire & Plastic Machinery has earned a reputation for providing a wide range of high quality pre-owned and reconditioned equipment to the wire and cable industry.

Specialising in non-ferrous and fibre optic cable manufacturing machinery, solutions are available for the following applications:

- Optical fibre cables
- Data communication cables
- Building/house wires
- Energy cables
- Control and custom cables

During the show the company's specialists will be available to assist in selecting the most suitable equipment.

Wire & Plastic Machinery Corp – USA
Website: www.wireandplastic.com



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A New Flat Indoor/Outdoor Drop Cable for FTTH Applications

By Qin Yu, Fei Qian, Liming Chen, Qingqing Qi, Shiyong Wang, Huiping Shi, Cheng Liu
FiberHome Telecommunication Technologies Co Ltd

Abstract

This paper presents a new flat indoor/outdoor drop cable for FTTH application. The flat cable is all dielectric and with an oblong cross section, and could be applied to harsh environments with large bending stress, lateral pressure or wind load.

Therefore, the flat cable is conducive to the realisation of large-span aerial installation and is particularly suitable for the indoor and outdoor drop application in the FTTH access network.

In this paper, three different combinations of materials are explored to verify the processing performance and product properties of the cable. That is, different combinations of sub-unit material and outer sheath material.

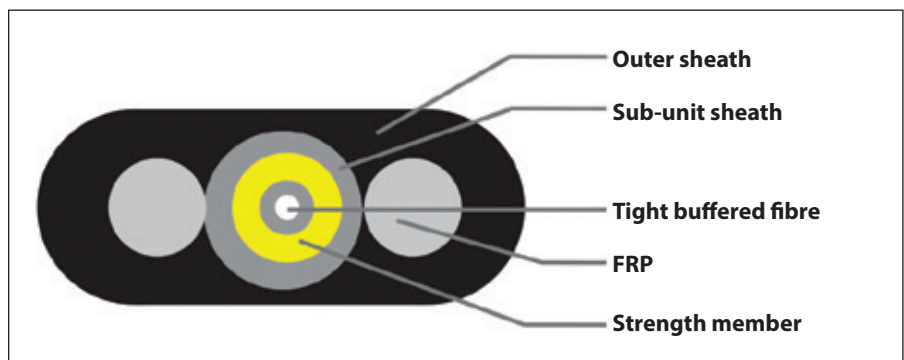
Eventually, it was found that the two kinds of the cable structure could totally satisfy the users' requirements and have excellent transmission, mechanical and flame retardant characteristics, and could apply in the FTTH applications.

1 Introduction

In order to realise the tri-networks integration as soon as possible, operators in China continue to promote large-scale FTTH network construction.

A FTTH network can not only provide higher bandwidth, but also improve the anti-interference performance of the access network and integrated access capacity of service.

To meet the different demands of users, there are many types of FTTH optical cable for unceasing requirements from users, such as different demands of construction



▲ **Picture 1:** The cross section of the flat cable

costs, convenience and rapid cable laying, and the reliability of the optical fibre communication lines. Therefore, it is very important to choose an appropriate cable for different drop applications.

2 Common drop cables

In general, drop cables are small count fibres with special designs, and most drop cables are of self-supported structure with tight buffer fibres.

The most common shapes of drop cables are figure-8 bow-type cable, round cable, or some other special drop cables, such as low friction bow-type cable and invisible micro cable and so on. In the present drop applications, the figure-8 bow-type cable and round cable were used widely. As new drop cables, low friction bow-type cable and invisible micro cable were gradually accepted by more and more users.

Although drop cables become ever more diverse, different kinds of drop cables usually have the following characteristics:

- Diversified and rational structure, could satisfy the users' special requirements

- Smaller size and can save laying space
- Easy to branch and save construction time and money
- Easy to manufacture and can keep the continuity and consistency of processing
- Easy to install, maintain and replace

3 Structure of the flat cable

3.1 General structure of the flat cable

The flat cable developed for this paper was to satisfy the customers' requirements for indoor and outdoor drop applications with both aerial and duct construction.

The cable should have good directional bending properties and excellent ability to resist lateral pressure. Moreover, the flat cable with oblong sectional profile should effectively reduce the destructiveness induced by wind load, and be adaptable to various harsh construction conditions and a complex environment.

Given the specific application environment, the flat cable was designed with an outer sheath, sub-unit sheath, tight buffered fibre, FRP and strength member. See *Picture 1*.

3.2 Different combinations of materials of the flat cable

The flat cable was a tight-structure cable, but after stripping 20-30cm of the outer sheath, the sub-unit cable could not adhere to the outer sheath.

Moreover, the flat cable must meet the requirements of flame retardancy. Therefore, the outer sheath and sub-unit materials both have the flame retardant property and high temperature resistance property.

Taking the users' actual needs and the application environment of the cable into consideration, three different combinations of materials of the flat cable were designed to verify the processing performance and the overall performance of the cable.

That is, three different combinations of sub-unit material and outer sheath material. The first combination was HDPE (high-density polyethylene) outer sheath material and PVC (polyvinyl chloride) sub-unit material. The second combination was LSZH (low smoke zero halogen) outer sheath material and PVC sub-unit material. And the last combination was LSZH outer sheath material and LSZH sub-unit material.

After the cable structure was set, the mould was designed according to the materials' behaviour and the processing parameters adjusted continually to settle various problems that appeared during the cable processing. This then underwent repeated processing verification, and it was found that the first and the second designs of the cable could satisfy the stripping requirements. That is to say, the flat cable with HDPE outer sheath and PVC sub-unit, or with LSZH outer sheath and PVC sub-unit could both assure that the sub-unit cable did not adhere to the outer sheath after 20-30cm of the outer sheath was stripped.

For the last design, the LSZH outer sheath materials and the LSZH sub-unit materials easily adhered to each other. Although this could produce a small amount of sample to meet the stripping requirements, the continuity and consistency of processing for the cable could not be guaranteed, so it was not recommended to adopt this structure.

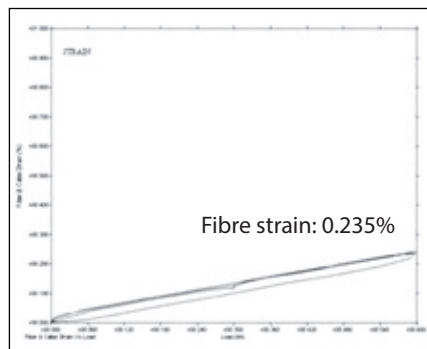
4 Main properties of flat cable

4.1 Performance requirements

All specifications of the flat cable are determined by the installation and the usage of the cable.

Test	Specified value	Acceptance criteria (1,550nm)
Attenuation of cable IEC 60793-1-40	1,310nm 1,550nm	$\alpha \leq 0.4\text{dB/km}$ $\alpha \leq 0.3\text{dB/km}$
Tensile IES 60794-1-2-E1	1,350N for 1 min	$\Delta\alpha \leq 0.1\text{dB/km}$, fibre strain $\leq 0.6\%$, No damage to cable outer sheath
Crush according to IEC 60794-1-2 E3	500N/10cm for 1 min	$\Delta\alpha \leq 0.1\text{dB/km}$, No damage to cable outer sheath
Water penetration IEC 60794-1-22 F5	3m sample, 1m depth of water for 24h	No penetration
Temperature cycling IEC 60794-1-22 F1	-20°C/+60°C, two cycles	$\Delta\alpha \leq 0.1\text{dB}$
Vertical flame propagation for single sample IEC 60332-1-2	600mm sub-unit sample, 60s flame application	The distance between the lower edge of the top support and the onset of charring is greater than 50mm

▲ Table 1: Overview of requirements of the flat cable



▲ Figure 1: Tensile performance for the cable



▲ Figure 2: The anchor clamp used to fix cable

Table 1 shows an overview of the requirements of the cable. After the continuity and consistency of processing for the flat cable, severe measurement to the properties of the two qualified cables according to Table 1 were conducted. In the following sections, all the tests and results are described.

4.2 Test results

4.2.1 Transmission property

The transmission property of the cable was measured by an OTDR (optical time domain reflectometer) according to IEC 60793-1-40.

After testing, all the attenuation values of the flat cable with two different structures were below the limits, that is, the attenuation of the flat cable was no more than 0.4dB/km at 1,310nm, and no more than 0.3dB/km at 1,550nm.

4.2.2 Mechanical property

The following mechanical tests were carried out according the IEC 60794-1-2 and IEC 60794-1-22 standards in order to make sure that all the parameters were

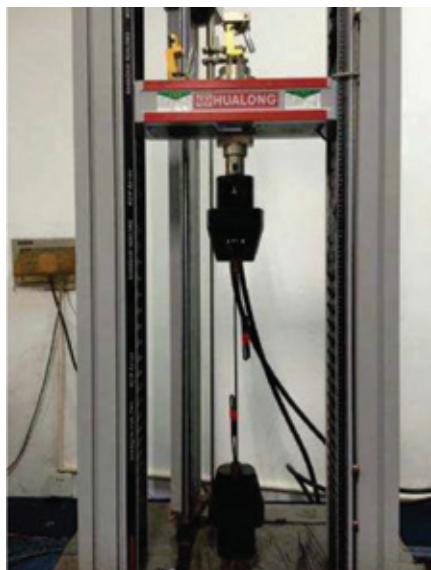
according to the specification and fully met the client's requirements and needs. A main series of tensile and crush tests had been performed and the relevant results are listed in Figures 1 and 4.

4.2.2.1 Tensile test

The client's requirements for tensile performance were a maximum fibre strain of 0.6 per cent and a maximum attenuation increase of 0.1dB for a requested 1,350N load dwell for 1 min. Furthermore, there should be no damage to the cable's outer sheath.

The test result showed that the maximum fibre strain was 0.235 per cent, as shown in Figure 1. In addition, it was also found that the maximum short term additional attenuation was only 0.005dB and the maximum residual additional attenuation was just 0.003dB.

In carrying out the tensile limit test of the cable, a special anchor clamp to fix the cable, as shown in Figure 2, was used. The cable was loaded on the tensile testing machine and force applied until breakage took place, as shown in Figure 3.



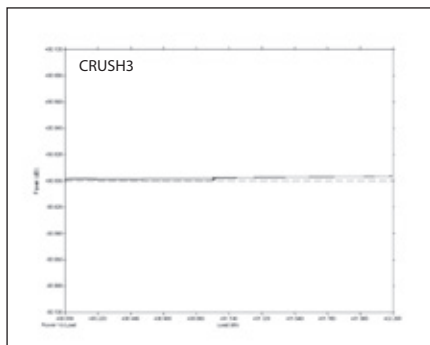
▲ **Figure 3:** The tensile limit test of the cable

The breakage appeared as the force increased to 2,300N, and this value far exceeded the users' requirements.

4.2.2.2 Crush test

In this test, the specified crush force was 500N, and the time for imposed pressure was 1 min.

The result obtained for the 500N load is shown in *Figure 4*, where there was almost no change for the attenuation during the test, even at the high load. The additional attenuation was reversible and there was no damage to the cable outer sheath.



▲ **Figure 4:** Crush performance for the cable

4.2.3 Environmental property

Water penetration and temperature cycling test according to IEC 60794-1-22 F5 and IEC 60794-1-22 F1, respectively, were carried out and the results are shown in the following section.

4.2.3.1 Water penetration test

The water penetration test was carried out on a 3m flat cable sample; the cable must sustain 1m height of water for 24 hours.

After this there should be no water penetration. Five samples were cut to verify the water penetration performance of the cable, and all of the five samples passed the test.

4.2.3.2 Temperature cycling test

According to the requirements of the clients, the flat cable went through a temperature cycling test from -20°C to $+60^{\circ}\text{C}$, and kept 12 hours for -20°C and $+60^{\circ}\text{C}$, respectively.

The whole temperature cycling test included two cycling process. When the experiment was over, the additional attenuation of the flat cable was tested, and the results showed that it was much less than 0.1dB which was the acceptance criteria of the client.

4.2.4 Flame retardant test

The flat cable designed was mainly used for the drop application, and the sub-unit of the cable should satisfy flame retardant requirements.

A vertical flame propagation for a single sample according to IEC 60332-1-2 standard was carried out. After the flame application reached 60 seconds, the distance between the lower edge of the top support and the onset of charring was 120mm.

In other words, the riser cable demonstrated in this paper is safe for the drop application.

5 Conclusions

The first and second designs of the flat cable could both satisfy good processing performance, and the test results showed that they also both have excellent transmission, mechanical, environmental and flame retardant properties.

These two kinds of flat cable could apply in the FTTH application and give the operator more choice for the drop application. ■

6 Acknowledgments

The authors wish to thank the staff of Fiber Home Telecommunication Technologies Co Ltd for their support. Special thanks to the IWCS staff for the articles in this year's publication.

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- ^[3] Mechanical performance for cables: IEC 60794-1-2 Ed 2.0: Optical Fibre Cables- Part 1-2: Generic specification- Basic optical cable test procedures.

^[4] IEC 60794-1-22 Ed 1.0: Optical Fibre Cables-Part 1-22: Generic specification- Basic optical cable test procedures- Environmental test methods.

^[5] IEC 60332-1-2 Edition 1.0: Test on electric and optical fibre cables under fire conditions- Part 1-2: Test for vertical flame propagation for a single insulated wire or cable- Procedure for 1kW pre-mixed flame.

Paper courtesy of the 64th IWCS Technical Symposium, Atlanta, Georgia, USA, November 2015.

Neuer Aufbau drehbarer Inline- oder Querkopf-Düsen mit Geschwindigkeiten bis zu 1.000 Upm

GUILL Tool hat einen neuen Aufbau für seine Drehmodelle mit hoher Produktionsgeschwindigkeit, des Typs Inline sowie Querkopf, auf den Markt gebracht.

Eine Verdoppelung der Geschwindigkeit, mit den abhängig von den Anwendungen bis zu 1.000 Upm laufenden Modellen, steht nun in der Baureihe patentierter Ausführungen von drehbaren Spitzen und Düsen von Guill zur Verfügung.

Durch das Drehen der Werkzeuge, im Verhältnis zum Materialfluss, erhöht ein Drehkopf die während der Extrusion durchgeführte Wandfestigkeit. Dies bewirkt eine dünnere Wand mit weniger Material und entsprechende Kosteneinsparungen für den Nutzer.

Zu den typischen Anwendungen von Drehköpfen gehören medizinische- und Multi-Lumen-Schläuche sowie verschiedene hochwertige Extrusionen bei Bedarf von Verriegelungsschichten (interlocking layers) oder mehrfache Streifen (multiple striping).

Die angebotenen Merkmale dieser neuen drehenden Extrusionsdüsen beinhalten gegenläufige Spitzen und Düsen sowie gleichsinnig rotierende Spitzen und Düsen, drehende Düsen mit konventionellen Spitzen, drehende Spitzen mit konventionellen Düsen, mit Querkopf oder Inline, Mehrschicht, Striping, einige Profile und optionale Schnellwechselkartuschen, die die Stillstandzeiten für die Reinigung minimieren.

Durch den Einsatz drehender Düsen können bei Extruder Kosten eingespart werden, dank der Beseitigung der Sekundärverfahren, der optischen Verbesserung des Endprodukts mit Beseitigung von Bindenähten oder Trennlinien, sowie Reduzierung oder komplette Beseitigung der Ovalität.



▲ Neuer Aufbau für Drehmodelle mit hoher Produktionsgeschwindigkeit von Guill

Guill Tool bietet seine neuen Drehmodelle mit Hochgeschwindigkeit als schlüsselfertige Paketlösungen an, komplett mit Düsenwagen, Werkzeugen und der kompletten Zubehör für die Installation und Wartung.

Guill Tool & Engineering – USA
Website: www.guill.com

Neuer Präsident am Ruder

Magnetic Analysis Corp (MAC) hat vor kurzem Dudley M Boden zum Präsidenten und CEO ernannt.

Nachdem Boden 15 Jahre lang Vize-Präsident im Verkauf und Marketing bei MAC war, bringt er nun ein fundiertes Verständnis über die Prüfsysteme der Unternehmen ein sowie der Prüfungsanforderungen der Kunden. Derzeit fokussiert er sich auf die Erweiterung des Produktangebotes des Unternehmens, um die sich dadurch ergebenden neue Chancen zu nutzen.

“Die Unterstützung durch Boden bei der Erweiterung von Überseeaktivitäten und der Stärkung des Vertriebspersonals sowie der

Amtsverfahren bieten eine solide Grundlage für zukünftige erfolgreiche Initiativen unter seiner Führung,” meinte der Vorsitzende von MAC, William S Gould 3.

Bevor Boden bei MAC eintrat, war er ein Vorsitzender und Generaldirektor der Instrument Systems Division bei der Minolta Corporation. Dort war er für die Produktion und den Vertrieb der Ausrüstung für die Qualitätsprüfung zuständig. Er hat einen Abschluss in Fotografische Wissenschaft und Instrumentierung beim Rochester Institute of Technology.

Magnetic Analysis Corporation – USA
Website: www.mac-ndt.com



▲ Neuer Präsident Dudley M Boden

Neue technische Broschüre

Die Fachzeitschrift für Runddraht, Draht in Profilform, Drahtseil und elektrischen Widerstandsdraht wurde von Alloy Wire International eingeführt und von den Kunden bestens angenommen.

Das Unternehmen nutzte seinen Auftritt bei der wire 2016 um seine neue Broschüre zu präsentieren, eine 84-seitige Publikation in der über 60 verschiedene Typen exotischer Nickellegierungen, einschließlich Inconel®, Nimonic®, Hastelloy® und Ni-Span C902®, verzeichnet sind.

In dieser Broschüre sind technische Datenblätter entsprechend den jeweiligen Legierungen dargestellt, die nützliche Informationen über die Anleitung zur Wärmenachbehandlung und die mechanischen Eigenschaften spezifizieren – zwei Themen, die für Kunden sinnvoll beim Entwurf der Drahtformen sind.

Über 300 Exemplare wurden direkt



▲ Die neue Broschüre von Alloy Wire

mitgenommen oder an vorhandene bzw. potentielle Kunden aus dem Sektor Automobil, Raumfahrt, Rüstung, Öl und Gas, Medizin und Kernenergie versandt.

Die glänzende A4-Veröffentlichung wird außerdem weltweit verbreitet, von Istanbul, Nairobi, Sydney bis hin nach Shanghai.

“Die technische Broschüre von Alloy Wire wird zwar immer begeistert

aufgenommen, doch sind dieses Jahr unsere Erwartungen übertraffen worden,” so Mark Venables, Geschäftsführer.

“Mehrere Kunden warteten darauf, dass diese Broschüre produziert wurde, um maßgebliche Informationen über die von uns hergestellten Legierungen auf einen Blick zu erhalten.”

Alloy Wire, das dieses Jahr sein 70. Betriebsjahr feiert, beliefert 4.000 Kunden weltweit in 15 Sektoren im Drahtherstellungsmarkt.

Seiner umfangreichen Palette hat das Unternehmen letztlich Hochleistungslegierungen Nitronic 50 (0,025 bis 5,50mm) und Super Duplex (0,025 bis 6,50mm) hinzugefügt. Somit kann nun ab 21mm in vielen unterschiedlichen Legierungen gezogen werden.

Alloy Wire International – UK
Website: www.alloywire.com

Modernste Software bietet höhere Geschwindigkeit und Zuverlässigkeit

WHITELEGG Machines ist seit über 30 Jahren Spezialist in der Herstellung von 2D-Drahtumformmaschinen mit automatischem Stumpfschweißen. Die CFM-Baureihe ist weltweit im Einsatz und bietet der Produktion von Draht- und Bandteilen sowie deren Untergruppen Genauigkeit, Wiederholbarkeit und Präzision.

Die CFM-Baureihe umfasst modernste Software, einen neuen Biegekopf und eine intuitive Bedienersteuerung, dabei wird den Herstellern eine noch höhere Geschwindigkeit und Zuverlässigkeit geboten. Unter Hinzufügung einer 16mm-Version, mit Einsatz der neuesten Technologien, hat Whitelegg die Anpassungsfähigkeit der CFM-Baureihe erweitert.

Jetzt, dank dem Servo-Betrieb, dem industriellen Touchscreen-PC, das den modernen “Allform 4“-Softwarepaket ausführt, kann CFM hochgenaue und konstante Teile mit oder ohne automatisches Stumpfschweißen herstellen.

Der Draht oder das Band werden von der Spule entnommen, gerichtet und dann durch ein hochgenaues Zuleitungssystem in den frei programmierbaren Biegekopf gezogen.

Eine große Vielfalt an Formen werden ermöglicht und, falls erforderlich, können Drahtenden automatisch stumpfgeschweißt werden. Demzufolge können Vierecke, Rechtecke, Ovale und Ringe vollständig hergestellt werden, ohne zusätzliche Verfahren zu benötigen.

CFM-Maschinen werden mit Fernzugriffsmöglichkeiten



▲ Ein Gewürzkorb aus Draht für einen Kunden

ausgestattet. Den Technikern wird somit ein Online-Zugriff auf die Maschine ermöglicht, wodurch z. B. Softwareaktualisierungen einfach und effektiv umgesetzt werden können.

Whitelegg Machines Ltd – UK
Website: www.whitelegg.com

Ein neues flaches Drop-Kabel für FTTH-Anwendungen im Innen-/Außenbereich

Von Qin Yu, Fei Qian, Liming Chen, Qingqing Qi, Shiyang Wang, Huiping Shi, Cheng Liu
FiberHome Telecommunication Technologies Co Ltd

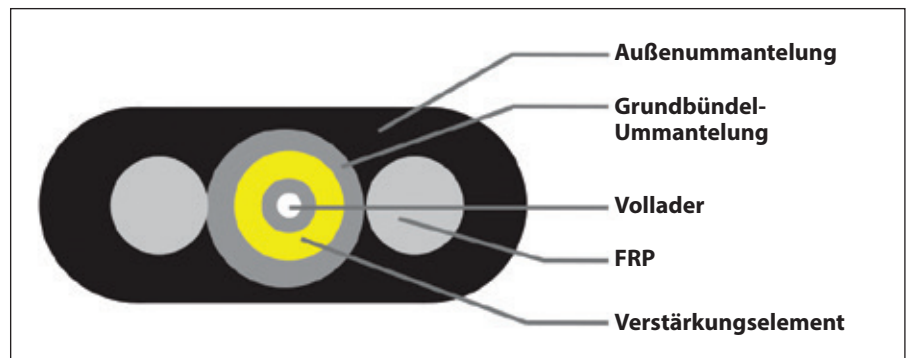
Übersicht

In diesem Artikel wird ein neues flaches Drop-Kabel für FTTH-Anwendungen im Innen-/Außenbereich vorgestellt. Das Flachkabel ist voll-dielektisch, weist einen länglichen Querschnitt auf und kann in rauen Umgebungen mit hoher Biegebelastung, Querdruck oder Windlast eingesetzt werden. Demnach dient das Flachkabel der Realisierung einer Freileitungsinstallation mit großer Spannweite und eignet sich vor allem für Anwendungen als Drop-Kabel im Innen-/Außenbereich bei FTTH-Zugangsnetzen.

In diesem Artikel werden drei unterschiedliche Materialkombinationen erforscht, um die Leistungen während der Verarbeitung und die Eigenschaften der für das Kabel genutzten Materialien zu testen. Das heißt verschiedene Materialkombinationen bezogen auf Grundbündel und Außenummantelung. Schließlich stellte sich heraus, dass zwei Typen der Kabelaufbauten die Anforderungen der Nutzer völlig erfüllen konnten und hervorragende mechanische, flammwidrige und Übertragungseigenschaften aufwiesen, die daher in FTTH-Anwendungen Einsatz finden können.

1 Einleitung

Um die Netzintegration des Typs „Triple-play“ so rasch wie möglich zu realisieren, wird von den Operatoren in China weiterhin der Bau eines großflächigen FTTH-Netzwerks gefördert. Das FTTH-Netzwerk kann nicht nur eine höhere Bandbreite bieten, sondern auch die Störschutzleistungen des Zugangsnetzes und die integrierte Zugriffsauslastung der Dienste erhöhen.



▲ Bild 1: Querschnitt des Flachkabels

Um den verschiedenen Ansprüchen der Nutzer nachzukommen - wie z. B. bezogen auf Baukosten, bequeme und schnelle Kabelverlegung und die Zuverlässigkeit der Kommunikationsleitungen aus Lichtwellenleiter - wurden verschiedene Typen von FTTH-Lichtwellenleiterkabel entwickelt. Demzufolge ist es sehr wichtig, das geeignete Kabel für die verschiedenen Drop-Anwendungen auszuwählen.

2 Gängige Drop-Kabel

Drop-Kabel weisen in der Regel eine niedrige Faserzahl mit Sonderaufbauten auf, und die meisten davon zeichnen sich durch einen selbsttragenden Aufbau mit Vollader aus. Die gängigsten Formen von Drop-Kabeln sind Figure-8 Bogen-artige Kabel, Rundkabel oder noch weitere Sonder-Drop-Kabel, wie z. B. Bogen-artige Kabel von geringer Reibung, unsichtbare Mikrokabel usw. Bei den gegenwärtigen Drop-Anwendungen wurden Figure-8 Bogen-artige Kabel und Rundkabel verbreitet eingesetzt. Als neue Drop-Kabeln wurden bogenartige Kabel mit geringer Reibung und unsichtbaren Mikrokabeln von den Anwendern allmählich immer mehr akzeptiert.

Obwohl Drop-Kabel immer vielfältiger werden, weisen verschiedene davon in der Regel nachfolgende Eigenschaften auf:

- Diversifizierte rationale Aufbauten, um den spezifischen Anforderungen der Nutzer nachzukommen
- Geringere Abmessung und daher platzsparend bei der Verlegung
- Leicht abzuzweigen und daher Zeit- und Geldeinsparungen beim Bau
- Einfache Fertigung kombiniert mit Kontinuität und Konsistenz bei der Verarbeitung
- Installations- und wartungsfreundlich sowie leicht zu ersetzen

3 Aufbau des Flachkabels

3.1 Allgemeiner Aufbau des Flachkabels

Das hier beschriebene Flachkabel wurde für die Anforderungen der Kunden im Bereich der Drop-Anwendungen im Innen- und Außenbereich entwickelt sowohl bei der Freileitungs- als auch Rohrleitungsinstallation. Das Kabel sollte gute direktionale Biegeeigenschaften und eine hervorragende Querdruckbeständigkeit

aufweisen. Darüber hinaus sollte das Flachkabel mit länglichen Querschnittprofil die von der Windlast verursachte Zerstörungskraft effektiv reduzieren und verschiedenen rauen Baubedingungen sowie einer komplexen Umgebung angepasst werden.

Angesichts, der spezifischen Anwendungsumgebung wurde das Flachkabel mit Außenummantelung, Grundbündelummantelung, Vollader, FRP und Verstärkungselement entworfen. Siehe Abb. 1.

3.2 Verschiedene Materialkombinationen des Flachkabels

Das Flachkabel war ein Kabel mit Vollader, doch konnte das Grundbündelkabel, nachdem 20-30cm der Außenummantelung abgestreift wurden, nicht an der Außenummantelung haften bleiben. Darüber hinaus hat das Flachkabel die Anforderungen der Flammwidrigkeit zu erfüllen. Demzufolge sollte das Material der Außenummantelung und des Grundbündels flammwidrige Eigenschaften sowie hochtemperaturbeständige Eigenschaften aufweisen.

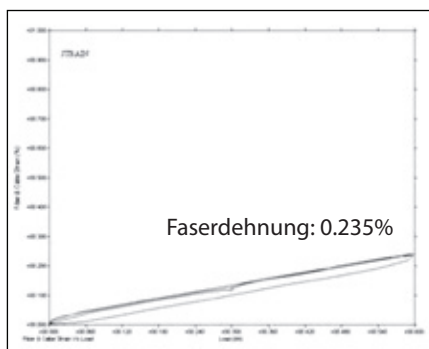
Unter Berücksichtigung der aktuellen Anforderungen der Nutzer und der Anwendungsumgebung des Kabels, wurden drei verschiedene Materialkombinationen des Flachkabels entworfen, um die Verarbeitungsleistung und die Gesamtleistung des Kabels zu prüfen. Das heißt drei verschiedene Materialkombinationen bezogen auf Grundbündel und Außenummantelung. Die erste Kombination umfasst das Material der Außenummantelung aus HDPE (Polyethylen hoher Dichte) und das Material des Grundbündels aus PVC (Polyvinylchlorid).

Die zweite Kombination bestand aus dem Material der Außenummantelung aus LSZH (raucharm und halogenfrei) und dem Material des Grundbündels aus PVC. Die letzte Kombination bestand dagegen aus dem Material der Außenummantelung aus LSZH und dem Material des Grundbündels aus LSZH.

Nachdem der Kabelaufbau festgelegt wurde, ist die Form entsprechend des Materialverhaltens entworfen und die Verarbeitungsparameter kontinuierlich eingestellt worden, um verschiedene Probleme zu lösen, die während der Kabelverarbeitung auftraten. Anschließend wurden wiederholte Verarbeitungsprüfungen durchgeführt. Dabei stellte sich heraus, dass der erste und der zweite Kabelaufbau, die Abstreifenanforderungen erfüllen konnten. Das heißt, das Flachkabel mit HDPE-Außenummantelung

Test	Vorgegebener Wert	Annahmekriterien (1,550nm)
Kabeldämpfung IEC 60793-1-40	1,310nm 1,550nm	$\alpha \leq 0.4\text{dB/km}$ $\alpha \leq 0.3\text{dB/km}$
Zugfestigkeit IES 60794-1-2-E1	1,350N 1 min lang	$\Delta\alpha \leq 0.1\text{dB/km}$, Faserdehnung $\leq 0.6\%$, Schadenfreie Kabelaußenummantelung
Querdruck nach IEC 60794-1-2 E3	500N/10cm 1 min lang	$\Delta\alpha \leq 0.1\text{dB/km}$, Schadenfreie Kabelaußenummantelung
Wasserdichtigkeit IEC 60794-1-22 F5	3m Probe, 1m Wassertiefe 24 Stunden lang	Kein Eindringen
Temperaturwechselprüfung IEC 60794-1-22 F1	-20°C/+60°C, zwei Zyklen	$\Delta\alpha \leq 0.1\text{dB}$
Vertikale Flammenausbreitung für eine einzelne Probe IEC 60332-1-2	600mm Grundbündelprobe, 60s Beflammung	Der Abstand zwischen dem unteren Ende der oberen Befestigung und dem Beginn der Verkohlungs überschreitet 50mm

▲ **Tabelle 1:** Eine Übersicht über Anforderungen an das Flachkabel



▲ **Abb. 1:** Zugleistung des Kabels



▲ **Abb. 2:** Die eingesetzte Abspannklemme um das Kabel zu fixieren

und PVC-Grundbündel oder mit LSZH-Außenummantelung und PVC-Grundbündel konnte sicherstellen, dass das Grundbündelkabel nicht an der Außenummantelung haften blieb nachdem 20-30cm der Außenummantelung abgestreift wurden.

Beim letzten Aufbau ergab sich, dass das Material der LSZH-Außenummantelung und jenes des LSZH-Grundbündels einfach aneinander hafteten. Selbst wenn - um den Abstreifenanforderungen nachzukommen - dadurch eine geringe Menge der Probe hergestellt werden konnte, wurde jedoch die Kontinuität und Einheitlichkeit der Kabelverarbeitung nicht sicher gestellt, und daher sollte dieser Aufbau nicht eingesetzt werden.

4 Haupteigenschaften des Flachkabels

4.1 Leistungsanforderungen

Alle Spezifikationen des Flachkabels werden durch die Installation und den Gebrauch des Kabels bestimmt.

Tabelle 1 zeigt eine Übersicht der Kabelanforderungen. Nach der Abmessung der Kontinuität und Einheitlichkeit der Verarbeitung des Flachkabels, wurden strenge Abmessungen bezogen auf die Eigenschaften der beiden gewählten Kabeln, entsprechend der Tabelle 1, durchgeführt. In den nachfolgenden Abschnitten werden alle Prüfungen und Ergebnisse beschrieben.

4.2 Testergebnisse

4.2.1 Übertragungseigenschaft

Die Übertragungseigenschaft des Kabels wurde mit einem OTDR (Optischen Zeitbereichsreflektometer) gemessen, entsprechend IEC 60793-1-40. Nach der Prüfung waren alle Dämpfungswerte des Flachkabels mit zwei unterschiedlichen Aufbauten unter den Grenzen, d. h. dass die Dämpfung des Flachkabels nicht über 0,4dB/km bei 1,310nm, und nicht über 0,3dB/km bei 1,550nm lag.

4.2.2 Mechanische Eigenschaft

Die nachfolgend beschriebenen mechanischen Prüfungen wurden gemäß der Normen IEC 60794-1-2

und IEC 60794-1-22 durchgeführt, um sicherzustellen, dass alle Parameter den Spezifikationen entsprachen und die Bedingungen und Anforderungen der Kunden voll erfüllen würden. Außerdem wurde eine Reihe von wichtigen Zugfestigkeits- und Querdruckprüfungen durchgeführt, deren entsprechenden Ergebnisse in den Abb. 1 und 4 dargestellt sind.

4.2.2.1 Zugfestigkeitsprüfung

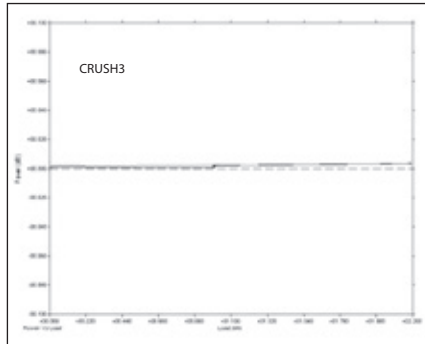
Die Kundenanforderungen der Zugfestigkeitsleistung wiesen auf eine Faserdehnung von höchstens 0,6 Prozent und einer Dämpfungserhöhung von höchstens 0,1dB hin, für eine geforderte Last von 1,350N, die 1 Minuten lang angelegt wird. Außerdem sollte die Außenummantelung des Kabels schadensfrei sein. Das Prüfergebn zeigte, dass die höchste Faserdehnung 0,235 Prozent entsprach, wie in der Abb. 1 dargestellt. Darüber hinaus zeigte sich, dass die maximale kurzfristige Zusatzdämpfung nur 0,005dB und die maximale restliche Zusatzdämpfung lediglich 0,003dB entsprachen.

Bei der Durchführung der Prüfung der Zugfestigkeitsgrenze des Kabels wurde eine spezielle Abspannklemme eingesetzt, um das Kabel zu fixieren, wie in der Abb. 2 dargestellt. Das Kabel wurde auf der Zugprüfmaschine geladen und eine Kraft wurde angelegt bis der Bruch entstand, wie in der Abb. 3 dargestellt. Der Bruch entstand bei einer Kraft bis zu 2.300N, dabei übertraf dieser Wert deutlich die Anforderungen der Nutzer.

4.2.2.2 Querdruckprüfung

In dieser Prüfung entsprach die spezifizierte Querdruckkraft 500N und die Zeit, um den Druck aufzuerlegen, betrug 1 min. Das erzielte Ergebnis für die 500N Last ist in der Abb. 4

▼ **Abb. 3:** Prüfung der Zugfestigkeitsgrenze des Kabels



▲ **Abb. 4:** Querdruckleistung des Kabels

dargestellt, wo fast keine Änderung für die Dämpfung während der Prüfung entstand, sogar nicht bei hoher Belastung. Die Zusatzdämpfung war reversibel und die Außenummantelung des Kabels war schadensfrei.

4.2.3 Umweltbedingte Eigenschaft

Die Prüfung der Wasserdichtigkeit und der Temperaturwechsel wurden je nach IEC 60794-1-22 F5 und IEC 60794-1-22 F1 durchgeführt. Die entsprechenden Ergebnisse sind in den nachfolgenden Abschnitten dargestellt.

4.2.3.1 Prüfung der Wasserdichtigkeit

Die Prüfung der Wasserdichtigkeit wurde an einer 3m langen Flachkabelprobe durchgeführt, dabei musste das Kabel 1m Wasserhöhe 24 Stunden lang widerstehen. Nach diesem Zeitraum sollte kein Wasser eingedrungen sein. Fünf Proben wurden geschnitten, um die Kabelleistung bei der Wasserdichtigkeit zu prüfen. Dabei bestanden alle fünf die Prüfung.

4.2.3.2 Temperaturwechselprüfung

Entsprechend den Anforderungen der Kunden, wurde das Flachkabel einer Temperaturwechselprüfung von -20°C bis $+60^{\circ}\text{C}$ unterzogen, und jeweils 12 Stunden lang bei -20°C und $+60^{\circ}\text{C}$ gehalten. Die komplette Temperaturwechselprüfung schloss zwei Wechselverfahren ein.

Nachdem der Versuch beendet wurde, wurde die Zusatzdämpfung des Flachkabels geprüft und die Ergebnisse zeigten, dass die Zusatzdämpfung weit unter 0,1dB lag, bzw. den Wert, der als Annahmekriterium des Kunden galt.

4.2.4 Flammwidrigkeitsprüfung

Das entworfene Flachkabel sollte vor allem für Drop-Anwendungen eingesetzt werden und das Grundbündel des Kabels sollte die Anforderungen der Flammwidrigkeit erfüllen. Eine vertikale Flammenausbreitung für eine einzelne Probe wurde gemäß der Norm IEC 60332-1-2 vorgenommen.

Nach einer Beflammung von 60 Sekunden, entsprach der Abstand zwischen dem unteren Ende der oberen Befestigung und dem Beginn der Verkohlung 120mm.

Anders gesagt, ist das in diesem Artikel beschriebene Steigleitungskabel für Drop-Anwendungen sicher.

5 Schlussfolgerungen

Sowohl der erste wie der zweite Aufbau des Flachkabels konnten gute Verarbeitungsleistungen erfüllen, und die Ergebnisse der Prüfung zeigten, dass beide auch hervorragende mechanische, ökologische und flammhemmende Übertragungseigenschaften aufweisen. Diese zwei Flachkabeltypen können in FTTH-Anwendungen Einsatz finden und dem Bediener mehr Auswahlmöglichkeiten für Drop-Anwendungen bieten. ■

6 Danksagungen

Die Autoren möchten dem Team von Fiber Home Telecommunication Technologies Co Ltd für deren Unterstützung danken. Ein spezieller Dank geht auch an das Team von IWCS für die diesjährigen Publikationen.

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Qin Yu, Fei Qian, Liming Chen,
Qingqing Qi, Shiyang Wang,
Huiping Shi, Cheng Liu
**FiberHome Telecommunication
Technologies Co Ltd**
Wuhan, Hubei, China
Tel: +86 27 87420569
Email: qyu@fiberhome.com

Новый дизайн вращающихся встраиваемых или с поперечной головкой штамповок со скоростями до 1000 оборотов в минуту

Компания Guill Tool запустила новый дизайн своих высокопроизводительных вращающихся моделей, как встраиваемый, так и с поперечной головкой. Удвоение скорости с моделями, вращающимися до 1000 оборотов в минуту в зависимости от применения теперь доступно в линейке Guill запатентованных вращающихся головок и штамповок.

При вращении инструмента по отношению к потоку материала, вращающаяся головка увеличивает прочность стенки экструзии, таким образом обеспечивая более тонкую стенку с использованием меньшего количества материала, что экономит затраты пользователя. Стандартные применения вращающихся головок включают медицинские и многоканальные трубки плюс различные высокопроизводительные экструзии с переплетающимися слоями или многочисленными требованиями к зачистке.

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штамповки противоположного вращения, вращающиеся в том же направлении наконечники и штамповки, вращающиеся со стандартным наконечником, вращающийся наконечник со стандартной штамповкой, встраиваемые или с поперечной головкой, с многочисленными слоями, зачисткой, отдельными профилями и опциональными быстросменными картриджами, которые уменьшают время простоя для очистки. При использовании вращающихся штамповок устройства экструзии могут осуществить экономию затрат при исключении вторичных процессов, косметических усовершенствований конечной продукции при исключении линий стыка или сварных линий, плюс сокращение или полное исключение овальности.

Guill Tool предлагает новые высокоскоростные вращающиеся модели в качестве готового к установке модуля, дополненного тележкой для



▲ Новый дизайн высокопродуктивных вращающихся моделей Guill

штамповки, инструментами и всеми комплектующими для установки и технического обслуживания.

Guill Tool & Engineering – США
Вебсайт: www.guill.com

Новый президент у руля

Дадли М. Боден был недавно назначен на должность президента и главного исполнительного директора в компании Magnetic Analysis Corp (MAC). Проведя 15 лет в должности вице-президента по продажам и маркетингу в MAC, господин Боден обладает глубоким пониманием систем испытаний компании и потребностями в инспекции клиентов. Сейчас он уделяет особое внимание расширению линейки продукции компании для использования новых возникших возможностей. «Работа Бодена по расширению бизнеса за границей и укреплению продаж и офисных процедур создает твердую почву для будущих успешных инициатив под его руководством», - заявил Председатель MAC, Вильям С. Голд 3-ий.

«Концепция MAC как компании состоит в том, что мы - больше чем просто производитель оборудования», - заявил господин Боден. «Для проведения работ по НК необходимо как оборудование, так и люди. Нашей сильной стороной является комбинация данных двух вещей. Мы сотрудничаем с клиентом для понимания их реальных потребностей и необходимого оборудования для их применения. Затем мы работаем с ними для конфигурации систем испытаний и обеспечиваем работу таким образом, чтобы это было выгодно и прибыльно для них».

До работы в MAC господин Боден был директором и главным менеджером в Minolta Corporation отделе систем КИП. Работая в той должности, он был



▲ Новый президент Дадли М. Боден

ответственным за производство и продажи качественного оборудования для управления.

Magnetic Analysis Corporation – США
Вебсайт: www.mac-ndt.com

Новая специальная брошюра

Alloy Wire International выпустили отраслевое издание по круглому, фасонному профилю и проводам с электрическим сопротивлением, которое пользуется популярностью у заказчиков.

Компания использовала недавнее участие в выставке wire 2016 для демонстрации новой брошюры, 84-страничной публикации, в которой указаны более 60 различных типов необычных никелевых сплавов, включая Inconel®, Nimonic®, Hastelloy® и Ni-Span C902®.

В данной брошюре предоставлены технические характеристики в виде спецификаций по каждому сплаву, с указанием подробной полезной информации по последующей термообработке и механических характеристиках, которые полезны также для заказчиков при расчете новых форм проводов.

Более 300 копий было распространено или отправлено существующим



▲ Новая брошюра от Alloy Wire

или потенциальным заказчиком в автомобильной, аэрокосмической, оборонной, нефтегазовой, медицинской и атомной сферах.

Глянцевое издание в формате A4 разошлось также по всему миру, отправившись по таким разнообразным адресам, как Стамбул, Найроби, Сидней и Шанхай.

«Техническая брошюра Alloy Wire всегда умеет успех, но в этом году она

превзошла наши ожидания», - пояснил Марк Венэйблз, управляющий директор.

«Большое число клиентов ожидали выпуска брошюры, так как она предоставляет им большое количество точной информации по всем сплавам, которые мы поставляем».

Alloy Wire, отмечающие свой 70-летний юбилей в бизнесе в этом году осуществляют поставки клиентам в 15 секторах по всему миру на рынке производства проводов.

Компания недавно добавила высокотехнологичные сплавы Nitronic 50 (от 0,025 до 5,50мм) и Super Duplex (от 0,025 до 6,50мм) к своему расширенному ассортименту и может в настоящее время тянуть проволоку от 21мм из большого количества разнообразных сплавов.

Alloy Wire International – Великобритания
Вебсайт: www.alloywire.com

Более высокая скорость и надежность благодаря усовершенствованному ПО

Whitelegg Machines специализируется на производстве станков для фасонной гибки 2D проволоки с автоматической сваркой встык более 30 лет. CFM используются по всему миру благодаря своей точности, воспроизводимости результатов и четкости в производстве проволоки и компонентов ленты, а также узлов.

Диапазон CFM включает усовершенствованное ПО, новую головку для гибки и интуитивное регулирование пульта оператора и обеспечивает более высокую скорость и надежность для производителей. С добавлением 16 мм версии при использовании новейших технологий Whitelegg добавили функциональности к линейке CFM.

Сейчас с сервоуправлением, сенсорным экраном программируемого ПК, работающего на усовершенствованном ПО модулем Allform 4 CFM способен производить более точные и правильные части со сваркой встык или без нее.

Проволока или лента загружаются с катушки, выпрямляются, а затем протягиваются через высокоточную систему подачи на свободно программируемую головку гибки.

Большое разнообразие форм возможно при необходимости, концы проволоки могут быть автоматически сварены встык. Таким образом, квадраты, прямоугольники, овалы или кольца могут быть полностью произведены без необходимости вспомогательных операций.



▲ Проволочная корзина для приправ для заказчика

Станки CFM имеют функции удаленного доступа, что позволяет инженерам на производстве получить доступ, например, для эффективного и легкого обновления ПО.

Whitelegg Machines Ltd – Великобритания
Вебсайт: www.whitelegg.com

Новый абонентский кабель для внутренней/наружной прокладки оптоволоконного применения

Авторы: Qin Yu, Fei Qian, Liming Chen, Qingqing Qi, Shiyang Wang, Huiping Shi, Cheng Liu
FiberHome Telecommunication Technologies Co Ltd

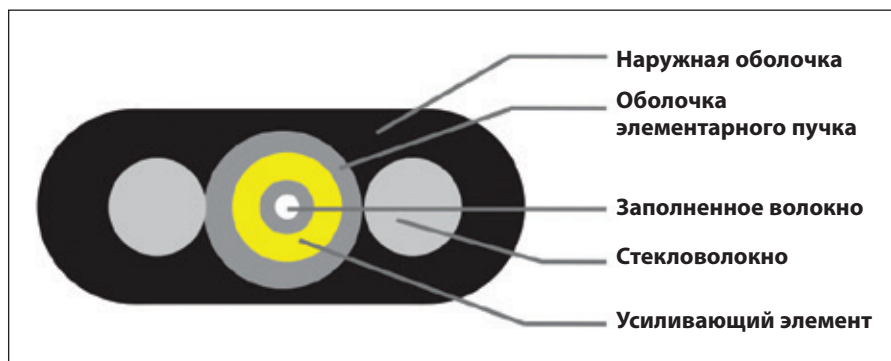
Аннотация

В данной работе представлен новый плоский абонентский кабель для внутренней/наружной прокладки оптоволоконного применения. Плоский кабель является полностью диэлектрическим с продолговатым поперечным сечением, он мог бы применяться для жесткой среды с большим напряжением при изгибе, горизонтальным давлением или ветровой нагрузкой. Следовательно, плоский кабель приспособлен для реализации большепролетных антенных установок, и особенно подходит для абонентского кабеля внутренней/наружной прокладки сетей с полностью оптоволоконным доступом.

В данной работе проанализированы три различные комбинации материалов для проверки производительности обработки и свойств продукции кабеля. То есть различные комбинации материала элементарного пучка и наружной оболочки. В результате, было обнаружено, что два вида конструкции кабеля могут полностью соответствовать требованиям пользователей и имеют отличную передачу, механические и огнестойкие характеристики и могут применяться для оптоволоконного доступа.

1 Введение

Для реализации интеграции тройных сетей в кратчайшие сроки операторы в Китае продолжают поддерживать



▲ **Картинка 1.** Разрез абонентского кабеля

полномасштабное строительство сетей с полностью оптоволоконным доступом.

Сеть с полностью оптоволоконным доступом могут не только обеспечить более высокую скорость, но также улучшить помехоподавляющие характеристики сети доступа и возможности интегрированного доступа.

Для соответствия требованиям пользователей существуют много типов оптического кабеля с полностью волоконным доступом при постоянно растущих требованиях пользователей таких, как потребности снижения затрат при строительстве, удобство и быстрая прокладка кабеля, а также надежность оптоволоконных коммуникационных линий.

Следовательно, выбор надлежащего абонентского кабеля для различных применений очень важен.

2 Кабели с общим волоконным доступом

В основном, абонентские кабели - это небольшое количество волокон специальной конструкции, и большинство абонентских кабелей - это самонесущие конструкции с вторичным буферным покрытием стекловолокна.

Самые распространенные формы абонентских кабелей показаны на рисунке 8 - FTTP кабели, круглые кабели, или некоторые иные особые абонентские кабели, такие как FTTP кабели с низким коэффициентом трения и невидимые микро-кабели и т.д. В современных применениях абонентских кабелей на рисунке 8 показано, что FTTP кабели и круглые кабели широко используются.

Как новые абонентские кабели FTTP кабели с низким коэффициентом

трения и невидимые микро-кабели были постепенно приняты все большим количеством пользователей.

Хотя абонентские кабели становятся более разнообразными, различные виды абонентских кабелей обычно имеют следующие характеристики:

- Разнообразная и рациональная конструкция, которая может удовлетворить особые требования пользователей
- Меньший размер, что экономит место при прокладке
- Легкие в обеспечении отводов и экономящие время и средства при строительстве
- Легкие в производстве и могут сохранять целостность и постоянство обработки
- Легкие в установке, обслуживании и замене

3 Конструкция абонентских кабелей

3.1 Общая конструкция абонентского кабеля

Абонентский кабель, разработанный для данной работы, должен был удовлетворять требованиям заказчика для применения при наружной и внутренней прокладке как для подвесной, так и для кабельной конструкции.

У кабеля должны быть хорошие характеристики изгиба в зависимости от направления и отличная способность сопротивления горизонтальному давлению. Кроме того, абонентский кабель с удлиненным продольным профилем должен эффективно сокращать разрушительное воздействие от ветровой нагрузки и может адаптироваться к различным жестким условиям строительства и сложным условиям окружающей среды.

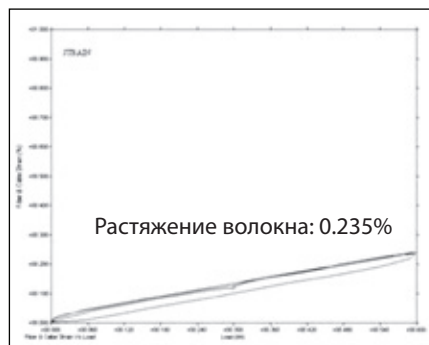
Учитывая особую среду применения абонентский кабель был разработан как кабель с внешней оболочкой, оболочкой элементарного пучка, с заполненным волокном, со стекловолокном и усиливающим элементом. См. Рисунок 1.

3.2 Различные комбинации материалов абонентского кабеля

Абонентский кабель был кабелем с плотной структурой, но после зачистки 20-30 см внешней оболочки элементарный пучок не мог бы соединяться с внешней оболочкой. Кроме того, абонентский кабель должен соответствовать требованиям

Испытание	Указанное значение	Критерии приемки (1550 нм)
Затухание кабеля IEC 60793-1-40	1310нм 1550нм	$\alpha \leq 0.4 \text{ дБ/км}$ $\alpha \leq 0.3 \text{ дБ/км}$
Растяжение IES 60794-1-2-E1	1350N В течение 1 мин	$\Delta\alpha \leq 0.1 \text{ дБ/км}$, Растяжение волокна $\leq 0.6\%$, Отсутствие повреждения наружной оболочки
Разрушение согласно IEC 60794-1-2 E3	500N/10cm В течение 1 мин	$\Delta\alpha \leq 0.1 \text{ дБ/км}$, Отсутствие повреждения наружной оболочки
Влагопроницаемость согласно IEC 60794-1-22 F5	Образец 3 м, глубина воды - 1 м в течение 24 ч	Отсутствие проникновения
Термоциклирование согласно IEC 60794-1-22 F1	-20°C/+60°C, Два цикла	$\Delta\alpha \leq 0.1 \text{ дБ}$
Вертикальное распространение пламени на одном образце IEC 60332-1-2	Образец элементарного пучка 600 мм, применение пламени в течение 60 с	Расстояние между нижней границей и верхней опорой, а также возникновением обугливания больше 50 мм

▲ Таблица 1. Обзор требований к плоскому кабелю



▲ Рисунок 1. Характеристика растяжения кабеля



▲ Рисунок 2. Анкерный зажим, используемый для фиксации кабеля

огнестойкости. Таким образом, материалы внешней оболочки и элементарного пучка должны обладать свойством огнестойкости и характеристикой устойчивости к высоким температурам.

Учитывая актуальные потребности и среду применения кабеля три различные комбинации материалов абонентского кабеля были разработаны для проверки производительности обработки и общей производительности кабеля.

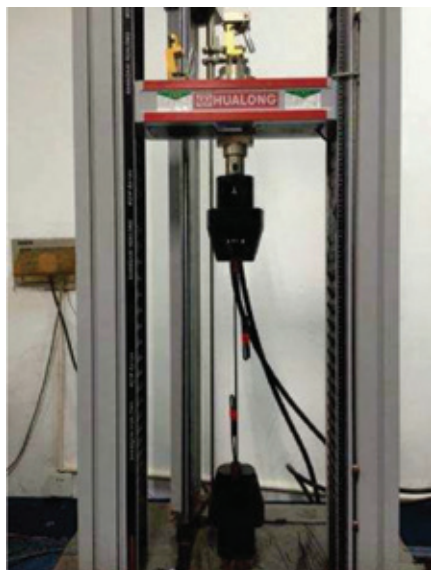
То есть, три различные комбинации материала элементарного пучка и наружной оболочки. Первой комбинацией были полиэтилен высокой плотности в качестве материала наружной оболочки и поливинилхлорид для элементарного пучка.

Второй комбинацией были материал с низким дымовыделением с нулевым

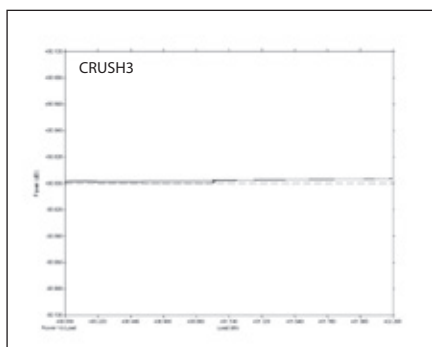
содержанием галогенов для внешней оболочки и поливинилхлорид для элементарного пучка. И последней комбинацией были материал с низким дымовыделением с нулевым содержанием галогенов для внешней оболочки и материал с низким дымовыделением с нулевым содержанием галогенов для элементарного пучка.

После установления кабельной конструкции форма была спроектирована в соответствии с поведением материалов и параметрами обработки, постоянно адаптирующимися для решения различных проблем, возникающих при обработке кабеля.

Затем была проведена повторная проверка, и было обнаружено, что первый и второй варианты кабеля могут соответствовать требованиям зачистки.



▲ Рисунок 3. Испытание на предел растяжения кабеля



▲ Рисунок 4. Характеристика разрушения кабеля

То есть, абонентский кабель с полиэтиленом высокой плотности в качестве материала наружной оболочки и поливинилхлоридом для элементарного пучка, или с материалом с низким дымовыделением с нулевым содержанием галогенов для внешней оболочки и поливинилхлоридом для элементарного пучка могут обеспечивать отсутствие адгезии элементарного пучка и наружной оболочки после 20-30 см зачистки наружной оболочки.

При последнем варианте, материале с низким дымовыделением с нулевым содержанием галогенов для внешней оболочки и материале с низким дымовыделением с нулевым содержанием галогенов для элементарного пучка материалы легко прилипали друг к другу.

Хотя в данном случае можно было произвести небольшое количество образцов для соблюдения требований к зачистке, целостность и постоянство обработки невозможно было гарантировать, поэтому рекомендуется принимать данную конструкцию.

4 Основные характеристики абонентского кабеля

4.1 Требования к эксплуатации

Все технические требования к абонентскому кабелю определены установкой и использованием кабеля. В таблице 1 представлена краткая информация по требованиям к кабелю.

После целостности и постоянства обработки абонентского кабеля было проведено строгое измерение характеристик двух кабелей надлежащего качества в соответствии с таблицей 1. В следующих разделах указаны все испытания и их результаты.

4.2 Результаты испытаний

4.2.1 Характеристика проводимости

Характеристика проводимости кабеля была измерена оптическим рефлектометром для измерения коэффициента отражений в соответствии с IEC 60793-1-40. После испытания показатели затухания абонентского кабеля с двумя различными конструкциями были ниже пределов, то есть затухание абонентского кабеля составляло не более 0,4 дБ/км при 1310 нм, и не более 0,3 дБ/км при 1550 нм.

4.2.2 Механические характеристики

Следующие механические испытания были проведены в соответствии со стандартами IEC 60794-1-2 и IEC 60794-1-22 для проверки соответствия всех параметров техническим условиям и полного удовлетворения требований и потребностей клиента. Основной ряд проведенных испытаний на растяжение и на разрушение были выполнены, а соответствующие результаты указаны на Рисунках 1 и 4.

4.2.2.1 Испытания на растяжение

Требованиями клиента к характеристикам растяжения было максимальное растяжение волокна в 0,6% и максимальное увеличение затухания в 0,1 дБ при необходимой нагрузке 1350Н в течение 1 мин. Кроме того, не должно было произойти повреждения наружной оболочки кабеля. Результаты испытания показали, что максимальная нагрузка волокна составляла 0,235%, как указано на Рисунке 1.

Кроме того, было также обнаружено, что максимальное кратковременное дополнительное затухание составило всего 0,005 дБ, а максимальное остаточное дополнительное затухание было только 0,003 дБ.

При проведении испытания на предел растяжения кабеля использовался особый анкерный зажим, как показано на Рисунке 2. Кабель был нагружен на станке для испытаний на растяжение, и была применена сила до возникновения разрыва, как показано на Рисунке 3. Разрыв возник при силе до 2300 Н, а данный показатель намного превосходил требования пользователей.

4.2.2.2 Испытания на разрушение

В данном испытании примененная сила разрушения составляла 500 Н, а время действия давления составило 1 мин. Результат, полученный при нагрузке 500 Н, показан на Рисунке 4, где почти не наблюдалось изменения затухания во время испытания, даже при большой нагрузке. Дополнительное затухание было обратным, а разрушения внешней оболочки кабеля почти не произошло.

4.2.3 Экологические характеристики

Испытания влагопроницаемости и испытания на стойкость к термоциклированию были проведены в соответствии с IEC 60794-1-22 F5 and IEC 60794-1-22 F1, а результаты показаны в следующих разделах.

4.2.3.1 Испытания влагопроницаемости

Испытания влагопроницаемости были проведены на 3-х метровом образце абонентского кабеля, кабель должен был выдерживать нахождение в воде глубиной 1 м на протяжении 24 часов. После этого не должно было быть проникновения воды. Пять образцов были разрезаны для проверки характеристик проникновения воды в кабель, и все пять образцов прошли испытание.

4.2.3.2 Испытание термоциклирования

В соответствии с требованиями клиентов абонентский кабель прошел испытание термоциклирования от 20°C до +60°C и в течение 12 часов при -20°C и +60°C, соответственно. Все испытания термоциклирования были проведены в два этапа. После завершения эксперимента было проведено испытание дополнительного затухания абонентского кабеля, а результаты показали, что оно составило гораздо меньше, чем 0,1 дБ, что являлось критериями приемки от клиента.

4.2.4 Испытание огнестойкости

Разработанный абонентский кабель в основном использовался для волоконного доступа, а элементарный пучок должен соответствовать требованиям к огнестойкости. Было проведено испытание вертикального распространения пламени для одного образца в соответствии со стандартом IEC 60332-1-2. После применения пламени в течение 60 секунд расстояние между нижней границей и верхней опорой, а

также появление обугливания составило 120 мм. Иными словами, вертикальный кабель, продемонстрированный в данной работе, безопасен для применения с волоконным доступом.

5 Заключение

Как первый, так и второй варианты абонентских кабелей могут иметь надлежащие характеристики обработки, а результаты испытаний показали, что они также могут обладать отличной передачей, экологическими и огнестойкими характеристиками.

Два данных вида абонентского кабеля могут применяться для полностью волоконного доступа для предоставления оператору большего выбора в данном применении. ■

6 Благодарность

Авторы хотели бы поблагодарить персонал FiberHome Telecommunication Technologies Co Ltd за оказание поддержки.

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- ^[1] Qingqing Qi, Kai Fu "A new all-dielectric aerial cable for FTTH access network," Proceedings of 63rd IWCS (2014).
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Qin Yu, Fei Qian, Liming Chen, Qingqing Qi, Shiyang Wang, Huiping Shi, Cheng Liu
FiberHome Telecommunication Technologies Co Ltd
Wuhan, Hubei, China
Тел: +86 27 87420569
Email: qyu@fiberhome.com

Nouvelle conception de filières rotatives en ligne ou à tête transversale permettant des vitesses allant jusqu'à 1 000 tours par minute

GUILL Tool ha lancé une nouvelle conception pour ses modèles rotatifs à haute vitesse, du type en ligne et du type à tête transversale.

Un doublement de la vitesse, avec des modèles fonctionnant à 1 000 tours par minute en fonction de l'application, sont maintenant disponibles dans la ligne des modèles de pointes et filières tournantes brevetées par Guill.

En faisant tourner l'outillage en fonction du flux du matériau, une tête rotative augmente la résistance de la paroi d'un produit en phase d'extrusion, en permettant ainsi d'obtenir une paroi plus mince avec moins de matériel et de réduire les coûts correspondants pour l'utilisateur. Les applications typiques pour têtes rotatives comprennent des tubes pour applications médicales et multi-lumen ainsi que diverses extrusions haut de gamme exigeant des couches de verrouillage ou des bandes multiples.

Les caractéristiques offertes sur ces nouvelles filières d'extrusion rotatives comprennent: pointes et filières de contre-rotation, pointes et filières de co-rotation, filières rotatives avec pointe traditionnelles, pointe tournante avec filière classique, à tête transversale ou en ligne, multicouche, bandes, certains profils et cartouches à changement rapide en option, qui minimisent les temps d'arrêt de nettoyage.

En utilisant les filières rotatives, les extrudeuses peuvent réaliser une économie des coûts grâce à l'élimination des processus secondaires, l'amélioration esthétique du produit final avec l'élimination des lignes de soudure ou de séparation, ainsi que la réduction ou l'élimination complète de l'ovalisation.

Guill Tool offre ses nouveaux modèles rotatifs à haute vitesse



▲ Nouvelle conception pour les modèles rotatifs haute vitesse de Guill

sous forme de paquets clés en main, complets de chariot porte-filière, des outils et tous les accessoires pour l'installation et la maintenance.

Guill Tool & Engineering – États-Unis
Website: www.guill.com

Un nouveau président à la barre

Magnetic Analysis Corp (MAC) a récemment promu M. Dudley M Boden au poste de président et directeur général.

Après avoir passé 15 ans en tant que vice-président de MAC (ventes et marketing), M. Boden apporte une connaissance approfondie des systèmes d'essai de l'entreprise et des exigences de contrôle du client. Il est actuellement concentré sur l'élargissement de l'offre de produits de l'entreprise afin d'exploiter les nouvelles opportunités qui se sont manifestées.

"Le concept chez MAC, en tant que société, est le fait d'être plus qu'un simple fabricant d'équipements," a déclaré M. Boden. "Pour exploiter les contrôles non destructifs, il faut aussi bien du matériel que du personnel. La combinaison de ces deux composantes

est notre point fort. Nous travaillons en partenariat avec les clients pour comprendre leurs exigences réelles et quel est l'équipement approprié pour leur application.

"Ensuite, nous travaillons ensemble pour configurer le système d'essai et pour l'exploiter d'une manière appropriée et avantageuse pour les clients," a déclaré William S Gould 3ème président de MAC.

Avant de se joindre à MAC, M. Boden a été administrateur et directeur général de la Division des systèmes d'instruments auprès de Minolta Corporation.

Pendant cette période, il était responsable de la production et de la vente d'équipements de contrôle de la qualité. Il est titulaire d'un



▲ Le nouveau président Dudley M Boden

diplôme en Sciences Photographiques et Instrumentation de l'Institut de Technologie de Rochester.

Magnetic Analysis Corporation – États-Unis
Website: www.mac-ndt.com

Nouvelle brochure technique

Alloy Wire International a lancé la revue spécialisée concernant les fils ronds, les fils à profil façonné, les câbles métalliques et les fils de résistance électrique, ce qui démontre bien le grand succès obtenu auprès des clients.

La société a utilisé sa récente apparition à wire 2016 pour présenter sa nouvelle brochure, une publication de 84 pages recensant plus de 60 types d'alliages différents de nickel exotiques, y compris Inconel®, Nimonic®, Hastelloy® et Ni-Span C902®.

Cette brochure fournit les fiches de données de spécification de chaque alliage, détaillant les informations utiles concernant les directives pour le traitement post-thermique et les propriétés mécaniques, toutes les deux utiles aux clients lors de la conception de formes de fil.

Plus de 300 exemplaires ont été recueillis



▲ La nouvelle brochure de Alloy Wire

directement ou distribués aux clients existants déjà et aux clients potentiels des secteurs automobile, aérospatiale, de la défense, du pétrole et du gaz, médical et nucléaire.

Même la publication de luxe sous le format A4 est actuellement distribuée à travers le monde, d'Istanbul à Nairobi, Sydney et Shanghai.

"La brochure technique d'Alloy Wire est toujours très bien accueillie, mais cette année, elle a dépassé nos attentes," a

déclaré Mark Venables, directeur général.

"Un certain nombre de clients attendent l'impression de la brochure, car elle leur fournit une gamme définitive d'informations concernant la totalité des alliages que nous fournissons dans un seul lieu."

Alloy Wire, qui célèbre cette année sa 70ème année d'activité, fournit 4 000 clients dans 15 secteurs dans le monde entier sur le marché de la fabrication de fil. La société a récemment élargi sa vaste gamme de produits avec des alliages haute performance Nitronic 50 (de 0,025 à 5,50mm) et Super Duplex (de 0,025 à 6,50mm) et elle est actuellement en mesure d'effectuer le tréfilage à partir de 21mm dans un grand nombre d'alliages différents.

Alloy Wire International – Royaume-Uni
Website: www.alloywire.com

Un logiciel avancé qui offre une rapidité et une fiabilité supérieures

LA société Whitelegg Machines est spécialisée dans la fabrication de machines de formage de fils 2D avec soudure en bout automatique depuis plus de 30 ans. Utilisés dans le monde entier, les équipements de la série CFM offrent exactitude, répétabilité et précision à la production de composants de fils et de bandes et de sous-ensembles.

La gamme de CFM comprend un logiciel de pointe, une nouvelle tête de pliage et le contrôle intuitif et elle offre aux fabricants une rapidité et une fiabilité supérieures. Avec l'intégration d'une version de 16mm, utilisant les dernières technologies, Whitelegg a augmenté la versatilité de la gamme CFM.

Actuellement, grâce à l'exploitation assistée, au PC industriel avec écran tactile exécutant le logiciel de pointe "Allform 4", le CFM est en mesure de produire des pièces très précises et uniformes avec ou sans soudure bout à bout automatique.

Le fil ou la bande est retiré de la bobine, redressés et ensuite tirés à travers un système d'alimentation de haute précision à la tête de pliage librement programmable.

Il est possible de réaliser une grande variété



▲ Un panier à condiments en fil pour un client

de formes et, si nécessaire, les extrémités des fils peuvent être automatiquement soudées bout à bout. Des carrés, des rectangles, des ovales et des anneaux peuvent être ainsi fabriqués complets, sans exiger aucune opération auxiliaire.

Les machines CFM sont équipées de fonctions d'accès à distance permettant

aux ingénieurs d'accéder en ligne à la machine de manière à introduire aisément et efficacement, par exemple la mise à jour du logiciel.

Whitelegg Machines Ltd – Royaume-Uni
Website: www.whitelegg.com

Nouveau câble de dérivation plat d'intérieur/extérieur pour applications FTTH

Par Qin Yu, Fei Qian, Liming Chen, Qingqing Qi, Shiyong Wang, Huiping Shi, Cheng Liu
FiberHome Telecommunication Technologies Co Ltd

Résumé

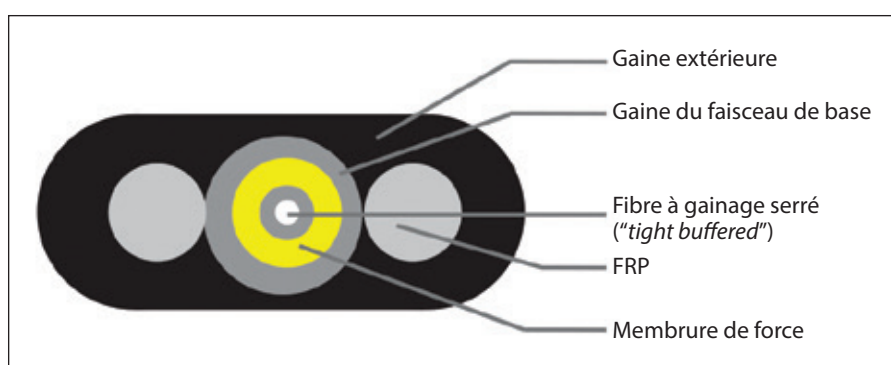
Cet article présente un nouveau câble de dérivation plat d'intérieur/extérieur conçu pour applications FTTH. Le câble plat est entièrement diélectrique, il présente une section oblongue et peut être installé dans des environnements difficiles caractérisés par une contrainte de flexion, une pression latérale ou une charge du vent considérables.

Par conséquent, le câble plat est utile pour la réalisation d'installations aériennes de grande portée et est particulièrement indiqué pour des applications telles que les câbles de dérivation d'intérieur et d'extérieur dans le réseau d'accès FTTH.

Cet article porte sur l'analyse de trois combinaisons différentes de matériaux pour vérifier les propriétés de performance pendant le traitement et les propriétés du matériau utilisé pour le câble. Autrement dit, les différentes combinaisons du matériau du faisceau de base et de la gaine extérieure. Finalement, il a été constaté que deux types de structure du câble pouvaient totalement satisfaire les besoins des utilisateurs et offrir d'excellentes caractéristiques mécaniques, ignifuges et de transmission, en pouvant ainsi être utilisés dans les applications FTTH.

1 Introduction

Dans le but de réaliser l'intégration de réseaux du type "triple-play" dès que possible, les opérateurs chinois continuent de promouvoir la construction du réseau FTTH à grande échelle. Le réseau FTTH peut non seulement fournir une bande passante supérieure, mais aussi améliorer les performances anti-interférence du réseau d'accès et la capacité d'accès intégré des services. Pour répondre aux besoins différents et incessants des utilisateurs en termes de coûts de construction, de pose des câbles



▲ Image 1: Section transversale du câble plat

pratique et rapide et de fiabilité des lignes de communication à fibres optiques, plusieurs types de câbles optiques FTTH ont été développés. Par conséquent, il est très important de choisir un câble approprié pour les différentes applications de dérivation.

2 Câbles de dérivations communs

En général, les câbles de dérivation présentent un nombre de fibres réduit avec des structures spécifiques, et la plupart ont une structure autoportante avec des fibres à gainage serré («tight buffer»). Les formes les plus courantes de câbles de dérivation sont: les câbles du type "bow" en forme de huit, les câbles ronds ou d'autres câbles de dérivation spécifiques, tels que le câble du type "bow" à faible frottement et le microcâble invisible etc.

Dans les applications de dérivation courantes, le câble du type "bow" en forme de 8 et le câble rond ont été largement utilisés. Comme dans le cas de nouveaux câbles de dérivation, un nombre croissant d'utilisateurs ont commencé progressivement à utiliser les câbles du type "bow" à faible frottement et les microcâbles invisibles.

Bien que les câbles de dérivation deviennent de plus en plus diversifiés, ils ont généralement les caractéristiques suivantes:

- structure diversifiée et rationnelle, pour satisfaire aux exigences spécifiques des utilisateurs
- dimensions plus réduites permettant d'économiser l'espace durant la pose
- branchement simple permettant d'économiser le temps et les coûts de construction
- fabrication facile permettant de maintenir la continuité et l'uniformité du traitement
- installation, entretien et remplacement simples

3 Structure du câble plat

3.1 Structure générale du câble plat

Le câble plat développé pour cet article devait satisfaire les exigences des clients pour les applications de câbles de dérivation d'intérieur et d'extérieur tant dans le cas d'installations aériennes que dans les conduits. Le câble devait avoir de bonnes propriétés de flexion directionnelle et d'excellentes capacités de résistance à la pression latérale. En outre, le câble plat avec le profil de section oblongue devait effectivement réduire la destructivité induite par la charge

du vent, et être adaptable à différentes conditions de construction difficiles et à des environnements complexes.

Compte tenu de l'environnement d'application spécifique, le câble plat a été conçu avec: une gaine extérieure, une gaine du faisceau de base, une fibre à gainage serré, FRP et une membrure de force. Voir l'Image 1.

3.2 Différentes combinaisons de matériaux du câble plat

Le câble plat est un câble à la structure adhérente, mais après avoir dénudé 20-30cm de la gaine extérieure, le câble du faisceau de base ne pouvait adhérer à la gaine extérieure. En outre, le câble plat devait satisfaire aux exigences de résistance à la flamme. Par conséquent, tant les matériaux de la gaine extérieure que ceux du faisceau de base devaient présenter la propriété ignifuge et la propriété de résistance aux températures élevées.

En considérant les exigences réelles des utilisateurs et l'environnement d'application du câble, trois combinaisons différentes de matériaux pour le câble plat ont été conçues pour vérifier les performances de traitement et les performances globales du câble. Autrement dit, on a analysé trois combinaisons différentes de matériau référées à la sous-unité et à la gaine extérieure. La première combinaison était composée du matériau de la gaine extérieure HDPE (polyéthylène haute densité) et du matériau du faisceau de base en PVC (chlorure de polyvinyle).

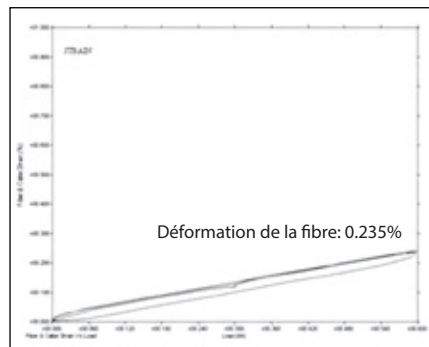
La deuxième combinaison était composée du matériau de la gaine extérieure LSZH (à faible émission de fumée et sans halogènes) et du matériau du faisceau de base en PVC. Enfin, la dernière combinaison était composée du matériau de la gaine extérieure LSZH et du matériau du faisceau de base LSZH.

Une fois la structure du câble déterminée, un moule a été conçu en fonction du comportement des matériaux et les paramètres de traitement ont été constamment ajustés pour résoudre les différents problèmes qui se sont présentés au cours du traitement du câble.

Ensuite, plusieurs vérifications du processus ont été effectuées, et il a été constaté que la première et la deuxième structure du câble pouvaient satisfaire aux exigences de dénudage. Autrement dit, le câble plat équipé de gaine extérieure HDPE et de sous-unité en PVC, ou de gaine extérieure LSZH et sous-unité en PVC était en mesure de garantir l'absence de toute adhérence du câble du faisceau de base à la gaine externe après le dénudage de 20-30cm.

Essai	Valeur spécifiée	Critères d'acceptation (1,550nm)
Atténuation du câble IEC 60793-1-40	1,310nm 1,550nm	$\alpha \leq 0.4\text{dB/km}$ $\alpha \leq 0.3\text{dB/km}$
Résistance à la traction IES 60794-1-2-E1	1,350N Pendant 1 min	$\Delta\alpha \leq 0.1\text{dB/km}$, Déformation de la fibre $\leq 0.6\%$, Aucun dommage à la gaine extérieure
Écrasement IEC 60794-1-2-E3	500N/10cm Pendant 1 min	$\Delta\alpha \leq 0.1\text{dB/km}$, Aucun dommage à la gaine extérieure
Étanchéité IEC 60794-1-22-F5	Échantillon de 3m, 1m de profondeur de l'eau pendant 24 heures	Aucune pénétration
Variation cyclique de la température IEC 60794-1-22-F1	-20°C/+60°C, deux cycles	$\Delta\alpha \leq 0.1\text{dB}$
Propagation de la flamme verticale pour échantillon individuel IEC 60332-1-2	Échantillon du faisceau de base de 600mm, application de la flamme pendant 60s	La distance entre le bord inférieur du support supérieur et le début de la partie carbonisée est supérieure à 50mm

▲ **Tableau 1:** Un aperçu des exigences sur le câble plat



▲ **Figure 1:** Performances de résistance à la traction du câble



▲ **Figure 2:** Pince d'ancrage utilisée pour fixer le câble

En ce qui concerne la dernière structure, les matériaux de la gaine extérieure LSZH et les matériaux du faisceau de base LSZH pouvaient aisément adhérer les uns aux autres. Bien que cela puisse produire une petite quantité d'échantillon pour répondre aux exigences de dénudage, il n'était cependant possible d'assurer la continuité et l'uniformité de traitement pour le câble, par conséquent, il n'a pas été recommandé d'adopter cette structure.

4 Principales caractéristiques du câble plat

4.1 Exigences de performance

Les spécifications du câble plat sont déterminées par l'installation et par l'utilisation du câble. Le *Tableau 1* présente un aperçu des exigences pour le câble. Une fois évaluées la continuité et l'uniformité de traitement du câble plat, des mesures rigoureuses des propriétés

des deux câbles sélectionnés ont été effectuées conformément au *Tableau 1*. Les relatifs essais et résultats sont décrits dans les sections suivantes.

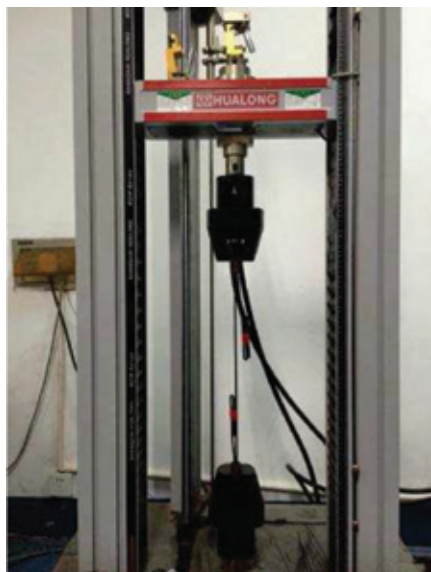
4.2 Résultats des essais

4.2.1 Propriété de transmission

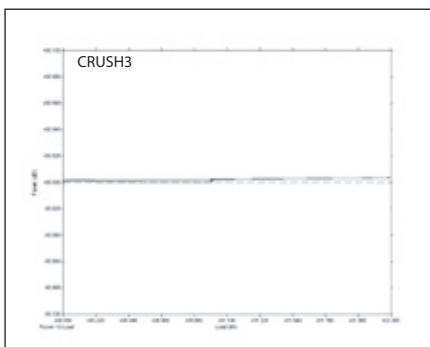
La propriété de transmission du câble a été mesurée par un OTDR (réflectomètre optique temporel) selon la norme IEC 60793-1-40. Après l'essai, les valeurs d'atténuation du câble plat avec deux structures différentes étaient inférieures aux limites, c'est-à-dire que l'atténuation du câble plat n'était pas supérieure à 0,4dB/km à 1 310nm, et à 0,3dB/km à 1 550nm.

4.2.2 Propriétés mécaniques

Les essais mécaniques suivants ont été effectués selon les normes IEC 60794-1-2 et IEC 60794-1-22, afin d'assurer que tous les paramètres étaient conformes aux spécifications et qu'ils satisfaisaient pleinement aux exigences et aux besoins du client.



▲ **Figure 3:** Essai de la limite d'élasticité du câble



▲ **Figure 4:** Performances de résistance à l'écrasement du câble

En outre, une série d'essais de traction et d'écrasement généraux a été effectué dont les résultats sont reportés aux Figures 1 et 4.

4.2.2.1 Essais de traction

Les exigences du client quant aux performances en termes de résistance à la traction spécifiaient une déformation maximale de la fibre de 0,6 pour cent et une augmentation maximale de l'atténuation de 0,1dB pour une charge de 1 350N appliquée pour 1 min. En outre, la gaine extérieure du câble ne devait pas résulter endommagée. Le résultat du test a montré que la déformation maximale de la fibre était de 0,235 pour cent, comme le montre la Figure 1.

En outre, il a également été constaté que l'atténuation maximale supplémentaire à court terme n'était que de 0,005dB et que l'atténuation supplémentaire résiduelle maximale était juste de 0,003dB.

Pour exécuter l'essai de la limite d'élasticité du câble, on a utilisé une pince d'ancrage spécifique pour fixer le câble, comme représenté à la Figure 2. Le câble a été chargé sur la machine d'essai de traction et on a appliqué une force jusqu'à la rupture du câble, comme le montre la Figure 3.

La rupture s'est vérifiée avec une force atteignant 2 300N, une valeur dépassant largement les spécifications des utilisateurs.

4.2.2.2 Essai d'écrasement

Dans cet essai, la force d'écrasement spécifiée était de 500N, et le temps de la pression imposée était de 1 min.

Le résultat obtenu pour la charge de 500N est illustré à la Figure 4, où il est possible de constater qu'aucun changement de l'atténuation ne s'est vérifié pendant l'essai, même à la charge élevée. L'atténuation supplémentaire était réversible et il n'y a eu aucun dommage à la gaine extérieure du câble.

4.2.3 Propriétés environnementales

L'essai de résistance à l'eau et l'essai de variation cyclique de la température selon les normes IEC 60794-1-22 F5 et IEC 60794-1-22 F1, respectivement, ont été effectués et les résultats sont présentés dans la section suivante.

4.2.3.1 Essai d'étanchéité à l'eau

L'essai d'étanchéité à l'eau a été réalisé sur un échantillon de câble plat de 3m; le câble a été immergé dans 1m d'eau pendant 24 heures. Une fois ce temps écoulé, aucune pénétration de l'eau ne devait se vérifier. Pour vérifier la prestation d'étanchéité à l'eau du câble, cinq échantillons ont été découpés et ils ont tous passé le test avec succès.

4.2.3.2 Essai de variation cyclique de la température

Selon les exigences des clients, le câble plat a été soumis à un essai de variation cyclique de la température de -20°C à +60°C, et gardé pendant 12 heures respectivement à -20°C et +60°C. L'essai de variation cyclique de la température comprenait deux processus de variation.

Une fois l'expérience terminée, l'affaiblissement supplémentaire du câble plat a été testé, et les résultats ont montré qu'il était considérablement inférieur à 0,1dB, valeur considérée comme critère d'acceptation par le client.

4.2.4 Essai de résistance aux flammes

Le câble plat conçu devait être principalement utilisé pour l'application de câbles de dérivation, et la sous-unité du câble devait satisfaire aux exigences ignifuges. Une propagation verticale de la flamme sur un seul échantillon selon la norme IEC 60332-1-2 a été réalisée.

Après l'application de la flamme pendant 60 secondes, la distance entre le bord inférieur du support supérieur et le début de la partie carbonisée était de 120mm. En d'autres termes, le câble d'ascension décrit dans le présent document est sûr pour l'application des câbles de dérivation.

5 Conclusions

La première et la seconde structure du câble plat ont offert de bonnes performances pendant le traitement, et les résultats des essais ont montré qu'elles présentaient également d'excellentes propriétés de transmission mécaniques, environnementales et ignifuges. Ces deux types de câble plat peuvent être utilisés pour les applications FTTH et peuvent offrir à l'opérateur des choix dans l'application des câbles de dérivation. ■

6 Remerciements

Les auteurs souhaitent remercier le personnel de Fiber Home Telecommunication Technologies Co Ltd pour leur soutien.

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- ^[1] Qingqing Qi, Kai Fu "A new all-dielectric aerial cable for FTTH access network," Proceedings of 63rd IWCS (2014).
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- ^[4] IEC 60794-1-22 Ed 1.0: Optical Fibre Cables-Part 1-22: Generic specification- Basic optical cable test procedures- Environmental test methods.
- ^[5] IEC 60332-1-2 Edition 1.0: Test on electric and optical fibre cables under fire conditions- Part 1-2: Test for vertical flame propagation for a single insulated wire or cable- Procedure for 1kW pre-mixed flame.

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Qin Yu, Fei Qian, Liming Chen, Qingqing Qi, Shiyong Wang, Huiping Shi, Cheng Liu
FiberHome Telecommunication Technologies Co Ltd
Wuhan, Hubei, China
Tel: +86 27 87420569
Email: qyu@fiberhome.com

Nuovo design di trafilanti rotanti in linea o con testa trasversale consente velocità fino a 1.000 giri al minuto

GUILL Tool ha lanciato un nuovo design per i suoi modelli rotanti ad elevata velocità sia del tipo in linea, sia del tipo con testa trasversale.

Un raddoppio della velocità, con modelli che arrivano fino a 1.000 giri al minuto a seconda dell'applicazione, sono ora disponibili nella linea dei modelli di punte e trafilanti rotanti brevettati da Guill.

Ruotando l'attrezzatura in funzione del flusso del materiale, una testa rotante aumenta la resistenza della parete di un prodotto in fase di estrusione, permettendo così di ottenere una parete più sottile con una quantità inferiore di materiale e una conseguente riduzione dei costi per l'utente. Le applicazioni tipiche di teste rotanti comprendono tubazioni per applicazioni medicali e multilumen nonché varie estrusioni di alta gamma che richiedono strati di interblocco o strisce multiple.

Le caratteristiche offerte su queste nuove trafilanti di estrusione rotanti includono punte e trafilanti contro-rotanti, punte e trafilanti co-rotanti, trafilanti rotanti con punte tradizionali, punte rotanti con trafilanti convenzionali, con testa trasversale o in linea, multistrato, nastri, alcuni profili e cartucce a cambio rapido in opzione che riducono al minimo i tempi passivi di pulizia.

Utilizzando le trafilanti rotanti, gli estrusori possono realizzare un risparmio di costi grazie all'eliminazione dei processi secondari, una valorizzazione estetica del prodotto finale con l'eliminazione delle linee di saldatura o di divisione, nonché la riduzione o la completa eliminazione dell'ovalità.

Guill Tool offre i suoi nuovi modelli rotanti ad alta velocità come pacchetti chiavi in mano, completi di carrello per



▲ Nuovo design per i modelli rotanti ad elevata velocità di produzione di Guill

trafilanti, strumenti e tutti gli accessori per l'installazione e la manutenzione.

Guill Tool & Engineering – Stati Uniti

Website: www.guill.com

Nuovo presidente al timone

Magnetic Analysis Corp (MAC) ha recentemente promosso Dudley M Boden a presidente e direttore generale.

Dopo aver trascorso 15 anni come vice presidente di MAC (vendite e marketing), Boden apporta una conoscenza approfondita dei sistemi di prova della società e delle esigenze di controllo del cliente. Egli è attualmente concentrato sull'ampliamento della gamma di prodotti della società, al fine di sfruttare le nuove opportunità che ne derivano.

"La filosofia di MAC in quanto società è il fatto di essere più di un semplice produttore di attrezzature," ha dichiarato Boden. "Per far funzionare i controlli non distruttivi sono importanti sia le attrezzature, sia il personale. La combinazione di queste due cose è il

nostro punto forte. Collaboriamo con i clienti per capire quali sono le loro reali esigenze e qual è l'equipaggiamento giusto per la loro applicazione. Poi lavoriamo insieme per configurare il sistema di prova e farlo funzionare in un modo che sia adatto e vantaggioso per i clienti," ha dichiarato William S Gould 3° presidente di MAC.

Prima di entrare in MAC, Boden è stato amministratore e direttore generale della divisione Instrument Systems presso Minolta Corporation. Durante quel periodo, è stato responsabile della produzione e della vendita di apparecchiature di controllo della qualità. Ha conseguito una laurea in Scienze e Strumentazioni Fotografiche presso il Rochester Institute of Technology.



▲ Il nuovo presidente Dudley M Boden

Magnetic Analysis Corporation – Stati Uniti

Website: www.mac-ndt.com

Nuova brochure tecnica

Alloy Wire International ha lanciato la rivista specializzata riguardante fili tondi, fili con profilo sagomato, funi metalliche e fili resistivi elettrici, pubblicazione che dimostra il notevole successo ottenuto presso i clienti.

La società ha utilizzato la sua recente apparizione a wire 2016 per presentare la sua nuova brochure, una pubblicazione di 84 pagine che elenca oltre 60 tipi diversi di leghe di nichel esotiche, tra cui Inconel®, Nimonic®, Hastelloy® e Ni-Span C902®.

Questa brochure fornisce le schede tecniche di ciascuna lega che specificano le informazioni utili relative alle direttive riguardanti il trattamento post-termico e le proprietà meccaniche, entrambi aspetti utili per i clienti nel momento della progettazione di forme di filo.

Oltre 300 copie sono state ritirate direttamente o distribuite ai clienti esistenti e ai clienti potenziali dei settori



▲ La nuova brochure di Alloy Wire

automobilistico, aerospaziale, della difesa, del petrolio e del gas, medico e nucleare.

Anche la pubblicazione patinata in formato A4 è attualmente distribuita in tutto il mondo, da Istanbul, a Nairobi, a Sydney e Shanghai.

“La brochure tecnica di Alloy Wire è sempre accolta con entusiasmo, ma quest’anno ha superato le nostre

aspettative,” ha spiegato il direttore generale Mark Venables.

“Un certo numero di clienti è in attesa della stampa della brochure in quanto essa fornisce loro una gamma definitiva di informazioni su tutte le leghe che forniamo in un unico luogo.”

Alloy Wire, che festeggia quest’anno il proprio 70° anno di attività, fornisce 4.000 clienti in 15 settori a livello mondiale nel mercato della produzione del filo.

La società ha recentemente ampliato la vasta gamma di prodotti aggiungendo le leghe ad alte prestazioni Nitronic 50 (da 0,025 a 5,50mm) e Super Duplex (da 0,025 a 6,50mm) ed è ora in grado di effettuare la trafilatura a partire da 21mm in numerose leghe diverse.

Alloy Wire International – Regno Unito
Website: www.alloywire.com

Software evoluto offre maggiore velocità e affidabilità

LA società Whitelegg Machines si è specializzata nella produzione di macchine per la formatura di filo 2D con saldatura di testa automatica da oltre 30 anni. Le macchine della serie CFM sono in uso in tutto il mondo e offrono accuratezza, ripetibilità e precisione per la produzione di componenti di filo e nastro e sottoinsiemi.

La gamma CFM comprende un software avanzato, una nuova testa di piegatura e comando intuitivo, offrendo ai produttori una velocità e affidabilità ancora maggiori. Con l’integrazione di una versione di 16mm che utilizza le tecnologie più recenti, Whitelegg ha aumentato la versatilità della gamma CFM.

Ora, grazie al funzionamento servoassistito, al PC industriale con schermo tattile che esegue il pacchetto software ‘Allform 4’ avanzato, il CFM è in grado di produrre componenti altamente precisi e uniformi con o senza saldatura di testa automatica.

Il filo o il nastro viene prelevato dalla bobina, raddrizzato e quindi tirato attraverso un sistema di alimentazione ad alta precisione fino alla testa di piegatura liberamente programmabile.



▲ Un cesto porta condimenti in filo per un cliente

È possibile realizzare una grande varietà di forme e, qualora richiesto, le estremità del filo possono essere automaticamente saldate testa a testa.

Così si possono realizzare quadrati, rettangoli, ovali e anelli completi, senza richiedere operazioni accessorie.

Le macchine CFM sono dotate di funzionalità di accesso remoto che consentono ai tecnici l’accesso on-line alla macchina; è così possibile, ad esempio, introdurre aggiornamenti software in modo facile ed efficace.

Whitelegg Machines Ltd – Regno Unito
Website: www.whitelegg.com

Nuovo cavo piatto di derivazione da interno/esterno per applicazioni FTTH

A cura di Qin Yu, Fei Qian, Liming Chen, Qingqing Qi, Shiyang Wang, Huiping Shi, Cheng Liu
FiberHome Telecommunication Technologies Co Ltd

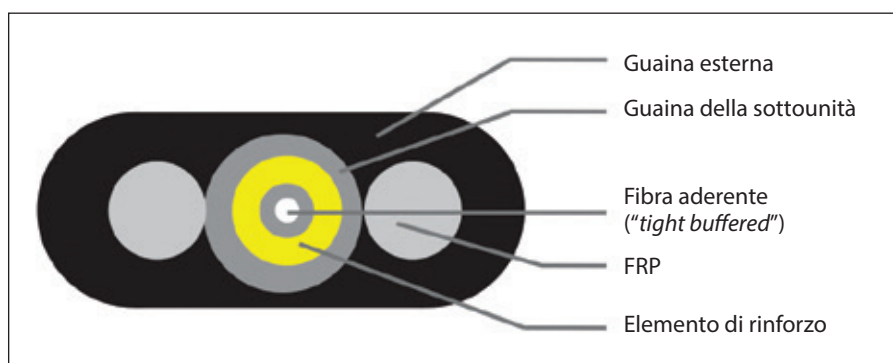
Riassunto

Questo articolo presenta un nuovo cavo piatto di derivazione per interno/esterno progettato per applicazioni FTTH. Il cavo piatto è completamente dielettrico, presenta una sezione trasversale oblunga e può essere installato in ambienti difficili caratterizzati da sforzo di flessione, pressione laterale o carico di vento elevati. Pertanto, il cavo piatto è utile per la realizzazione di installazioni aeree di grande portata ed è particolarmente adatto per applicazioni come cavi di derivazione per interno ed esterno in reti di accesso FTTH.

In questo articolo si analizzano tre diverse combinazioni di materiali allo scopo di verificare le prestazioni durante la lavorazione e le proprietà del materiale utilizzato per il cavo. In altre parole, si analizzano diverse combinazioni di materiale della sottounità e della guaina esterna. Infine, si è constatato che due tipi di struttura del cavo potevano soddisfare completamente le esigenze degli utenti e offrire ottime caratteristiche meccaniche, ignifughe e di trasmissione, potendo quindi essere utilizzati nelle applicazioni FTTH.

1 Introduzione

Al fine di realizzare l'integrazione di reti "triple-play" il più presto possibile, gli operatori cinesi continuano a promuovere la costruzione della rete FTTH su vasta scala. La rete FTTH non solo può fornire una maggiore larghezza di banda, ma anche migliorare le prestazioni anti-interferenza della rete di accesso e la capacità di accesso integrato dei servizi. Per soddisfare le diverse e incessanti esigenze degli utenti, quanto a costi di costruzione, posa dei cavi comoda e rapida e affidabilità delle linee di



▲ Immagine 1: Sezione trasversale del cavo piatto

comunicazione in fibra ottica, sono stati sviluppati molti tipi di cavi ottici FTTH. Pertanto, è molto importante scegliere il cavo adatto per le diverse applicazioni di derivazione.

2 Cavi di derivazione comuni

Generalmente, i cavi di derivazione presentano un ridotto numero di fibre con strutture speciali, e la maggior parte di essi hanno una struttura autoportante con fibre aderenti ("tight buffer"). Le forme più comuni di cavi di derivazione sono cavi del tipo "bow" a forma di otto, cavi tondi, o altri tipi di cavi di derivazione speciali, come il cavo tipo "bow" a basso attrito, il microcavo invisibile ecc.. Nelle attuali applicazioni di derivazione, sono ampiamente utilizzati il cavo tipo "bow" a forma di otto e il cavo tondo. Come nel caso dei nuovi cavi di derivazione, un numero crescente di utenti ha iniziato ad utilizzare gradualmente i cavi tipo "bow" a basso attrito e i microcavi invisibili.

Sebbene i cavi di derivazione disponibili siano sempre più diversificati, essi presentano le seguenti caratteristiche generali:

- struttura diversificata e razionale, per soddisfare le esigenze specifiche degli utenti
- dimensioni più ridotte che consentono di risparmiare spazio durante la posa
- facilità di derivazione con conseguente risparmio di tempo e denaro durante la costruzione
- facilità di fabbricazione che consente di mantenere la continuità e l'uniformità durante la lavorazione
- semplice installazione, manutenzione e sostituzione

3 Struttura del cavo piatto

3.1 Struttura generale del cavo piatto

Il cavo piatto sviluppato per il presente articolo doveva soddisfare le esigenze dei clienti per le applicazioni di cavi di derivazione per interno ed esterno sia nel caso di installazioni aeree che in tubazioni. Il cavo doveva avere buone proprietà di flessione direzionale ed eccellenti capacità di resistenza alla pressione laterale. Inoltre, il cavo piatto con profilo di sezione oblungo doveva effettivamente ridurre la distruttività indotta dal carico di vento, e adattarsi a diverse e difficili condizioni costruttive e ad ambienti complessi.

Dato lo specifico ambiente di applicazione, il cavo piatto è stato progettato con guaina esterna, guaina della sottounità, fibra di rivestimento aderente (*tight buffer*), FRP ed elemento di rinforzo. Si veda l'Immagine 1.

3.2 Diverse combinazioni di materiali del cavo piatto

Il cavo piatto era un cavo dalla struttura aderente, ma dopo la spelatura di 20-30cm dalla guaina esterna il cavo della sottounità non poteva aderire alla guaina esterna. Inoltre, il cavo piatto doveva soddisfare i requisiti di resistenza alla fiamma. Pertanto, sia i materiali della guaina esterna sia quelli della sottounità dovevano presentare proprietà ignifughe e di resistenza alle alte temperature.

Considerando le reali esigenze degli utenti e l'ambiente di applicazione del cavo, sono state progettate tre diverse combinazioni di materiali per il cavo piatto per verificare le prestazioni durante il processo e le prestazioni complessive del cavo.

In pratica, sono state analizzate tre diverse combinazioni di materiale della sottounità e della guaina esterna. La prima combinazione era composta dal materiale della guaina esterna HDPE (polietilene ad alta densità) e dal materiale della sottounità in PVC (cloruro di polivinile).

La seconda combinazione era composta dal materiale della guaina esterna LSZH (bassa emissione di fumo e zero alogeni) e dal materiale della sottounità in PVC. Infine, l'ultima combinazione era composta dal materiale della guaina esterna LSZH e dal materiale della sottounità LSZH.

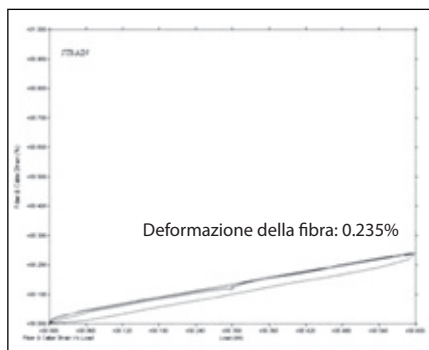
Una volta determinata la struttura del cavo, è stato progettato lo stampo in base al comportamento dei materiali e sono stati regolati costantemente i parametri di processo per risolvere i vari problemi che si presentavano durante la lavorazione del cavo. Successivamente, sono state effettuate varie verifiche del processo ed è stato constatato che la prima e la seconda struttura del cavo potevano soddisfare i requisiti di spelatura.

Vale a dire, che il cavo piatto dotato di guaina esterna HDPE e sottounità in PVC, o con guaina esterna LSZH e sottounità in PVC potevano entrambi assicurare l'assenza di aderenza del cavo della sottounità alla guaina esterna dopo averla spelata per 20-30cm.

Per quanto riguarda l'ultima struttura, i materiali della guaina esterna LSZH e i materiali della sottounità LSZH aderivano fra loro con facilità. Sebbene ciò producesse una piccola quantità del campione per soddisfare i requisiti di spelatura, non era tuttavia possibile

Prova	Valore specificato	Criteri di accettazione (1,550nm)
Attenuazione del cavo IEC 60793-1-40	1310nm 1550nm	$\alpha \leq 0.4\text{dB/km}$ $\alpha \leq 0.3\text{dB/km}$
Resistenza alla trazione IES 60794-1-2-E1	1350N Per 1 min	$\Delta\alpha \leq 0.1\text{dB/km}$, Deformazione della fibra $\leq 0.6\%$, Nessun danno alla guaina esterna
Schiacciamento IEC 60794-1-2-E3	500N/10cm Per 1 min	$\Delta\alpha \leq 0.1\text{dB/km}$, Nessun danno alla guaina esterna
Impermeabilità IEC 60794-1-22-F5	Campione di 3m, 1m di profondità dell'acqua per 24 ore	Nessuna penetrazione
Variazione ciclica della temperatura IEC 60794-1-22-F1	-20°C/+60°C, due cicli	$\Delta\alpha \leq 0.1\text{dB}$
Propagazione della fiamma verticale per campione singolo IEC 60332-1-2	Campione della sottounità da 600mm, applicazione della fiamma per 60s	La distanza tra il bordo inferiore del supporto superiore e l'inizio della parte carbonizzata è superiore a 50mm

▲ Tabella 1: Una panoramica dei requisiti sul cavo piatto



▲ Figura 1: Prestazioni di resistenza a trazione del cavo



▲ Figura 2: Forcella di ancoraggio utilizzata per fissare il cavo

garantire la continuità e l'uniformità di lavorazione per il cavo; pertanto non è stato consigliato di adottare questa struttura.

4 Caratteristiche principali del cavo piatto

4.1 Requisiti prestazionali

Tutte le specifiche del cavo piatto sono determinate dall'installazione e dall'utilizzo del cavo. La Tabella 1 mostra una panoramica dei requisiti del cavo.

Dopo aver misurato la continuità e l'uniformità della lavorazione per il cavo piatto, sono state effettuate rigorose misurazioni delle proprietà dei due cavi selezionati secondo la Tabella 1.

Nelle sezioni seguenti, vengono descritte tutte le prove e i risultati.

4.2 Risultati delle prove

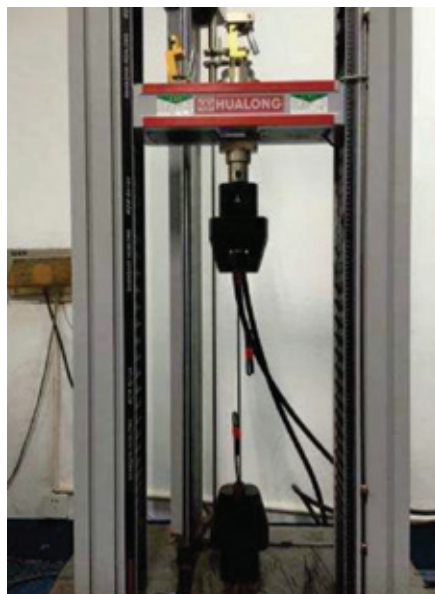
4.2.1 Proprietà di trasmissione

Le proprietà di trasmissione del cavo sono state misurate mediante un OTDR (riflettore ottico nel dominio di tempo) conformemente alla norma IEC 60793-1-40.

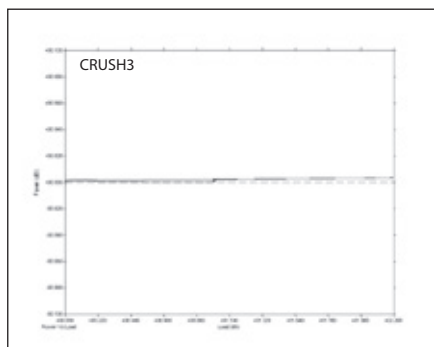
Dopo il test, tutti i valori di attenuazione del cavo piatto con due differenti strutture si collocavano al di sotto dei limiti, cioè l'attenuazione del cavo piatto non era maggiore di 0,4dB/km a 1310nm, e di 0,3dB/km a 1550nm.

4.2.2 Proprietà meccaniche

Le seguenti prove meccaniche sono state eseguite secondo le norme IEC 60794-1-2 e IEC 60794-1-22, per assicurarsi che tutti i parametri fossero conformi alle specifiche e che soddisfacessero completamente i requisiti e le esigenze del cliente. È stata inoltre realizzata una serie di prove di trazione e schiacciamento generali i cui risultati sono riportati nelle Figure 1 e 4.



▲ **Figura 3:** Prova del limite di elasticità del cavo



▲ **Figura 4:** Prestazioni di resistenza allo schiacciamento del cavo

4.2.2. 1 Prove di trazione

I requisiti del cliente per le prestazioni in termini di resistenza alla trazione specificavano una deformazione massima della fibra pari allo 0,6 per cento e un aumento massimo dell'attenuazione pari a 0,1dB per un carico richiesto di 1350N applicato per 1 min. Inoltre, la guaina esterna del cavo non doveva risultare danneggiata.

Il risultato delle prove ha mostrato che la deformazione massima della fibra era pari a 0,235 per cento, come illustrato nella *Figura 1*. Inoltre, è stato anche constatato che la massima attenuazione supplementare a breve termine era pari a solo 0,005dB e che la massima attenuazione supplementare residua corrispondeva solo a 0,003dB.

Per realizzare la prova del limite di elasticità del cavo, è stata utilizzata una speciale forcina di ancoraggio per fissare il cavo, come illustrato nella *Figura 2*. Il cavo è stato caricato sulla macchina di prova di trazione ed è stata applicata una forza fino alla rottura dello stesso, come illustrato nella *Figura 3*. La rottura si è verificata con una forza di 2.300N, valore che superava di gran lunga i requisiti degli utenti.

4.2.2.2 Prova di schiacciamento

In questa prova, la forza di schiacciamento specificata era pari a 500N, e il tempo di applicazione della pressione previsto era di 1 min.

Il risultato ottenuto per un carico di 500N è illustrato nella *Figura 4*, dove si può vedere che non si è verificato quasi alcun cambiamento per l'attenuazione durante la prova, anche a carico elevato.

L'attenuazione supplementare era reversibile e non ci sono stati danni alla guaina esterna del cavo.

4.2.3 Proprietà ambientali

Sono state eseguite la prova di impermeabilità e la prova di variazione ciclica della temperatura, rispettivamente secondo le norme IEC 60794-1-22 F5 e IEC 60794-1-22 F1, i cui risultati sono riportati nella sezione seguente.

4.2.3.1 Prova di impermeabilità

La prova di impermeabilità è stata effettuata su un campione di cavo piatto di 3m; il cavo è stato immerso in un 1m di acqua per 24 ore.

Dopo questo tempo non doveva verificarsi penetrazione di acqua. Per verificare le prestazioni di impermeabilità del cavo, sono stati tagliati cinque campioni, e tutti hanno superato la prova.

4.2.3.2 Prova di variazione ciclica della temperatura

Secondo i requisiti dei clienti, il cavo piatto è stato sottoposto a una prova di variazione ciclica di temperatura da -20°C a +60°C, e mantenuto per 12 ore, rispettivamente a -20°C e a +60°C. La prova completa di variazione ciclica della temperatura comprendeva due processi di variazione.

Una volta terminato l'esperimento, è stata provata l'attenuazione supplementare del cavo piatto, e i risultati hanno mostrato che questa era di gran lunga inferiore a 0,1dB, valore considerato come criterio di accettazione da parte del cliente.

4.2.4 Prova ignifuga

Il cavo piatto progettato si doveva utilizzare principalmente per l'applicazione di derivazione, e la sottounità del cavo doveva soddisfare i requisiti di resistenza alla fiamma. È stata eseguita una propagazione verticale della fiamma su un singolo campione secondo la norma IEC 60332-1-2.

Dopo l'applicazione della fiamma per 60 secondi, la distanza tra il bordo inferiore del supporto superiore e l'inizio della parte carbonizzata corrispondeva a 120mm. In altre parole, il cavo di distribuzione verticale descritto in questo documento è sicuro per l'applicazione di derivazione.

5 Conclusioni

La prima e la seconda struttura del cavo piatto hanno entrambe offerto buone prestazioni durante la lavorazione, e i risultati delle prove hanno mostrato che entrambe presentano anche eccellenti proprietà meccaniche, ambientali, ignifughe e di trasmissione. Questi due tipi di cavo piatto possono essere utilizzati per applicazioni FTTH e possono offrire all'operatore delle alternative nell'applicazione di cavi di derivazione. ■

6 Ringraziamenti

Gli autori desiderano ringraziare il personale di Fiber Home Telecommunication Technologies Co Ltd per il loro supporto.

Un particolare ringraziamento al personale IWCS per gli articoli pubblicati quest'anno.

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Qin Yu, Fei Qian, Liming Chen,
Qingqing Qi, Shiyang Wang,
Huiping Shi, Cheng Liu
**FiberHome Telecommunication
Technologies Co Ltd**
Wuhan, Hubei, China
Tel: +86 27 87420569
Email: qyu@fiberhome.com

Nuevas hileras giratorias en línea o de cabezal transversal que alcanzan las 1.000 rpm

GULL Tool ha presentado un nuevo diseño de hilera giratoria de alta velocidad en versión en línea y de cabezal transversal.

Ahora la línea de hileras y puntas giratorias patentadas de Guill está disponible al doble de velocidad, con modelos que llegan a las 1.000 r.p.m. dependiendo de la aplicación.

Girando la herramienta respecto al flujo del material, un cabezal giratorio aumenta la resistencia de la pared de un producto en fase de extrusión, lo que permite obtener una pared más fina con menos material y con el correspondiente ahorro de costes para el usuario. Entre las aplicaciones típicas de los cabezales giratorios está la fabricación de tubos multilumen y para uso médico, además de varias extrusiones de gama alta que requieren capas de interbloqueo (interlocking layers) o bandas múltiples (multiple striping).

Las nuevas hileras extrusoras giratorias pueden tener punta e hilera a contra rotación, punta e hilera que giran en el mismo sentido, hilera giratoria con punta tradicional, punta giratoria con hilera tradicional, cabezal transversal o en línea, multicapa, bandas, algunos perfiles y cartuchos de cambio rápido opcionales que minimizan las paradas de limpieza.

Usando hileras giratorias, los extrusores pueden obtener un ahorro de costes, ya que se eliminan los procesos secundarios, un mejor aspecto del producto final, ya que se eliminan las soldaduras o líneas de separación, y una reducción o eliminación total de la ovalidad.

Guill Tool ofrece sus nuevos modelos giratorios de alta velocidad en forma de paquetes llave en mano, completos con carro para



▲ Nuevo diseño de las hileras giratorias de alta velocidad de Guill

la hilera, herramientas y todos los accesorios para la instalación y mantenimiento.

Guill Tool & Engineering – Estados Unidos
Website: www.guill.com

Nuevo presidente al frente

Magnetic Analysis Corp (MAC) acaba de ascender a presidente y director ejecutivo a Dudley M. Boden.

Con 15 años de carrera profesional en MAC como vice presidente - ventas y marketing, el Sr. Boden conoce perfectamente los sistemas de prueba de la sociedad y las exigencias de inspección de los clientes. Ahora se está dedicando a ampliar la oferta de productos de la empresa para aprovechar las nuevas oportunidades que han surgido.

“La filosofía empresarial de MAC es que no somos un mero fabricante de equipos, comentó Boden. “Para que los sistemas de pruebas no destructivas funcionen se necesitan tanto equipos como personas. Nuestro fuerte es la combinación de estos dos factores. Seguimos al cliente

para averiguar cuáles son sus verdaderas exigencias y cuál es el equipo que mejor se adapta a su aplicación. Luego, trabajamos con él para configurar el sistema de prueba y hacerlo funcionar de manera apropiada y beneficiosa para él,” dijo el presidente de MAC William S. Gould 3°.

Antes de empezar a trabajar en MAC, Boden fue director y director general de la división de sistemas para instrumentos de Minolta Corporation. Allí trabajó de encargado de producción y venta de equipos de control de calidad. Es licenciado en Fotografía e Instrumentación por el Instituto de Tecnología Rochester.

Magnetic Analysis Corporation – Estados Unidos
Website: www.mac-ndt.com



▲ Nuevo presidente Dudley M. Boden

Nuevo folleto técnico

La publicación sobre alambre redondo perfilado y alambre de resistencia eléctrica para el sector industrial lanzada por Alloy Wire International está cosechando gran éxito entre los clientes.

La empresa aprovechó su última participación en wire 2016 para lanzar su nuevo folleto, que consiste en una publicación de 84 páginas en la que figuran más de 60 tipos distintos de aleaciones de níquel exóticas, tales como Inconel®, Nimonic®, Hastelloy® y Ni-Span C902®.

El folleto contiene hojas de datos de especificación de cada aleación, información detallada útil sobre cómo hacer un post tratamiento térmico y propiedades mecánicas, indicaciones todas ellas útiles para los clientes a la hora de diseñar formas de alambre.

Se han repartido y enviado más de 300 ejemplares a clientes actuales y



▲ Nuevo folleto de Alloy Wire

potenciales de los sectores automotriz, aeroespacial, defensa, petróleo y gas, médico y nuclear.

La lustrosa publicación en formato A4 está cruzando el mundo y llegando a lugares como Estambul, Nairobi, Sydney y Shanghai.

“El folleto técnico de Alloy Wire siempre es bien acogido, pero este año ha superado nuestras expectativas,”

comentó Mark Venables, director general.

“Una serie de clientes estaban esperando que hiciéramos el folleto, porque les proporciona información específica sobre todas las aleaciones que suministramos en un lugar.”

Alloy Wire, que celebra este año su 70º año de actividad en el sector, es proveedor de 4.000 clientes de 15 sectores en todo el mundo del mercado de la fabricación de alambre.

La empresa ha añadido recientemente a su gama de productos las aleaciones de alto rendimiento Nitronic 50 (de 0,025 a 5,50mm) y Super Duplex (de 0,025 a 6,50mm) y ahora puede estirar alambre de 21mm en numerosas aleaciones distintas.

Alloy Wire Internacional – Reino Unido
Website: www.alloywire.com

Software avanzado ofrece más velocidad y fiabilidad

WHITELEGG Machines se ha especializado en la fabricación de máquinas conformadoras de varilla 2D con soldadura a tope automática durante más de 30 años. Las máquinas CFM se usan en todo el mundo ofreciendo repetibilidad y precisión en la producción de componentes de varilla y de flejes y subconjuntos.

La gama de CFMs lleva un software avanzado, una nueva cabeza de doblado y un sistema de control intuitivo para el operador, y ofrece a los fabricantes incluso más velocidad y fiabilidad. Con la incorporación de la versión de 16mm, usando las últimas tecnologías, Whitelegg ha dado mayor versatilidad a la gama CFM.

Ahora, con todo el servo funcionamiento y con un PC industrial de pantalla táctil que funciona con el paquete software avanzado Allform 4, la CFM puede fabricar piezas con alta precisión y uniformidad, con o sin soldadura a tope.

La varilla o el fleje es tomado de la bobina, enderezado y seguidamente empujado mediante el sistema de alimentación de alta precisión a la cabeza de doblado de libre programación.

Es posible obtener una enorme variedad



▲ Cesta para condimentos de alambre para un cliente

de formas y, si se desea, se pueden soldar a tope las puntas de la varilla automáticamente. De este modo, las formas cuadradas, rectangulares, ovaladas y circulares se pueden completar sin necesidad de operaciones secundarias.

Las máquinas CFM están equipadas con

funciones de acceso remoto que permiten a los ingenieros tener acceso online a la máquina, así, por ejemplo, se puede actualizar el software de manera rápida y eficaz.

Whitelegg Machines Ltd – Reino Unido
Website: www.whitelegg.com

Nuevo cable de derivación plano de interior/exterior para aplicaciones FTTH

Por Qin Yu, Fei Qian, Liming Chen, Qingqing Qi, Shiyong Wang, Huiping Shi, Cheng Liu
FiberHome Telecommunication Technologies Co Ltd

Resumen

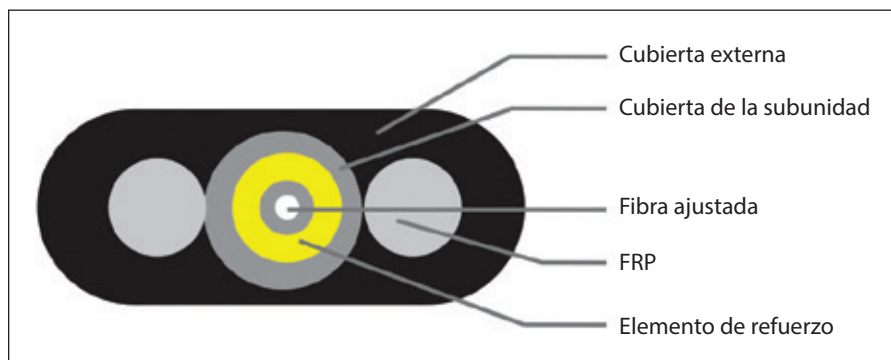
Este artículo presenta un nuevo cable de derivación (*drop cable*) de interior/exterior para aplicaciones FTTH. El cable plano es completamente dieléctrico, tiene una sección alargada y se puede instalar en entornos difíciles con considerable esfuerzo de flexión, presión lateral o carga debida a viento.

Por lo tanto, es útil para la realización de instalaciones aéreas de tramo largo y es particularmente adecuado como cable de derivación para interiores y exteriores en redes de acceso FTTH.

En este artículo se analizan tres diferentes combinaciones de materiales para verificar las prestaciones durante el procesamiento y las propiedades del material usado para el cable. Es decir, que se analizan distintas combinaciones de materiales de la subunidad y de la cubierta externa. Como resultado del análisis, se ha constatado que dos estructuras de cable pueden satisfacer totalmente los requisitos de los usuarios. Estas estructuras presentan excelentes características de transmisión mecánica y de retardo de llama, y, por lo tanto, se pueden usar en aplicaciones FTTH.

1 Introducción

Para realizar la integración de redes "triple-play" a la mayor brevedad posible, los operadores en China continúan promoviendo la construcción de la red FTTH a gran escala. La red FTTH, no solo puede proveer mayor ancho de banda sino también mejorar las prestaciones contra las interferencias de la red de acceso y la capacidad de acceso integrado del servicio. Para responder a las continuas y distintas demandas de los usuarios en cuanto a costes de construcción,



▲ Imagen 1: Sección transversal del cable plano

instalación de cables cómoda y rápida y fiabilidad de las líneas de comunicación de fibra óptica, se han desarrollado muchos tipos de cables ópticos FTTH. Por consiguiente, es muy importante seleccionar el cable apropiado para las diferentes aplicaciones de distribución.

2 Cables de derivación corrientes

En general, los cables de derivación tienen pocas fibras, presentan diseños especiales y la mayoría tienen una estructura autoportante, con fibra ajustada (*tight buffer*). Las formas más comunes de cables de derivación son de tipo "bow" (cables arqueados) en forma de ocho, cables redondos, u otros tipos especiales de cables de distribución, como el cable arqueado de bajo rozamiento, el microcable invisible y demás. En las aplicaciones de cables de derivación corrientes, se usan mucho los cables arqueados en forma de ocho y los cables redondos. Sin embargo, los cables de derivación nuevos, como los arqueados de bajo rozamiento y los microcables invisibles, han sido aceptados gradualmente y son utilizados por un número de usuarios cada vez mayor.

Aunque se encuentren cables de derivación cada vez más diversos, normalmente presentan las características siguientes:

- estructura diversificada y racional, para cumplir requisitos específicos de los usuarios
- tamaños más pequeños, para ahorrar espacio durante la instalación
- fácil derivación, para ahorrar tiempo de construcción y dinero
- fácil fabricación, para mantener la continuidad y la uniformidad del proceso
- fácil instalación, para facilitar el mantenimiento y la sustitución

3 Estructura del cable plano

3.1 Estructura general del cable plano

El cable plano desarrollado para este artículo debía cumplir los requisitos de los clientes para aplicaciones de derivación para interiores/exteriores para instalación ya sea aérea ya sea en conducto.

El cable debía tener buenas propiedades de flexión direccional y excelentes capacidades de resistencia a la presión lateral. Además, el cable plano con sección

alargada debía reducir efectivamente la capacidad destructora inducida por la carga del viento y adaptarse a varias condiciones de construcción difíciles y entornos complejos.

Dada la específica aplicación ambiental, el cable plano fue diseñado con cubierta externa, cubierta de la subunidad, fibra ajustada, FRP y elemento de refuerzo. Ver la *Figura 1*.

3.2 Diferentes combinaciones de materiales del cable plano

El cable plano era un cable de estructura ajustada, pero después de pelar 20-30cm de la cubierta externa, el cable de la subunidad no podía adherir a la cubierta externa. Además, el cable plano debía cumplir los requisitos de retardo de llama. Por lo tanto, la cubierta externa y los materiales de la subunidad debían tener propiedades de retardo de llama y de resistencia a las altas temperaturas.

Considerando las necesidades efectivas de los usuarios y el entorno de aplicación del cable, se diseñaron tres distintas combinaciones de materiales para el cable plano para verificar las prestaciones durante el procesado y el rendimiento general del cable. En concreto, se probaron tres distintas combinaciones de materiales de la subunidad y de la cubierta externa. La primera combinación de materiales era HDPE (polietileno de alta densidad) para la cubierta externa y PVC (policloruro de vinilo) para la subunidad.

La segunda combinación de materiales era LSZH (baja emisión de humo y sin alógenos) para la cubierta externa y PVC para la subunidad. La última combinación de materiales era LSZH para la cubierta externa y LSZH para la subunidad.

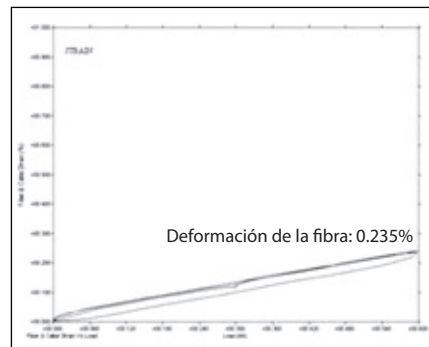
Después de determinar la estructura del cable, se diseñó el molde de acuerdo con el comportamiento de los materiales y se ajustaron los parámetros de procesado continuamente para resolver los distintos problemas que se presentaban durante el procesado del cable.

Luego, se efectuaron varias verificaciones del procesado y se observó que el primero y el segundo diseño podían cumplir los requisitos de pelado. Es decir, el cable plano con cubierta externa de HDPE y subunidad de PVC, o con cubierta externa de LSZH y subunidad de PVC podían asegurar ambos que el cable de la subunidad no se pegara a la cubierta externa después de pelarla por un 20-30cm.

Por lo que se refiere al último diseño, los materiales de la cubierta externa de LSZH y los de la subunidad de LSZH sí se pegaban fácilmente. Aunque se podía obtener un pequeño tramo de muestra

Ensayo	Valor especificado	Criterio de aceptación (1,550nm)
Atenuación del cable IEC 60793-1-40	1310nm 1550nm	$\alpha \leq 0.4\text{dB/km}$ $\alpha \leq 0.3\text{dB/km}$
Tracción IES 60794-1-2-E1	1350N durante 1 min	$\Delta\alpha \leq 0.1\text{dB/km}$, Deformación de la fibra $\leq 0.6\%$, Ningún daño a la cubierta externa del cable
Aplastamiento según IEC 60794-1-2-E3	500N/10cm durante 1 min	$\Delta\alpha \leq 0.1\text{dB/km}$, Ningún daño a la cubierta externa del cable
Penetración de agua IEC 60794-1-22-F5	Muestra de 3m, 1m de profundidad de agua durante 24 horas	Ninguna penetración
Variación cíclica temperatura IEC 60794-1-22-F1	-20°C/+60°C, dos ciclos	$\Delta\alpha \leq 0.1\text{dB}$
Propagación de llama vertical para una muestra IEC 60332-1-2	Muestra de la subunidad de 600mm, aplicación de la llama durante 60s	La distancia entre el borde inferior del soporte de arriba y el inicio de la parte carbonizada es más de 50mm

▲ **Tabla 1:** Resumen de los requisitos en el cable plano



▲ **Figura 1:** Resistencia mecánica a la tracción del cable



▲ **Figura 2:** Grapa de amarre usada para fijar el cable

que cumpliera los requisitos de pelado, no se podía garantizar la continuidad y la uniformidad en el procesado del cable. Por lo tanto, no era recomendable adoptar esta estructura.

4 Propiedades principales del cable plano

4.1 Requisitos de prestaciones

Todas las especificaciones del cable plano son determinadas en función de la instalación y el uso del cable.

La *Tabla 1* muestra una panorámica de los requisitos del cable. Después de examinar la continuidad y uniformidad de procesado del cable plano, se efectuaron mediciones estrictas de las propiedades de los dos cables seleccionados siguiendo los requisitos de la *Tabla 1*. En las secciones siguientes, se describen todas las pruebas y los resultados.

4.2 Resultados de las pruebas

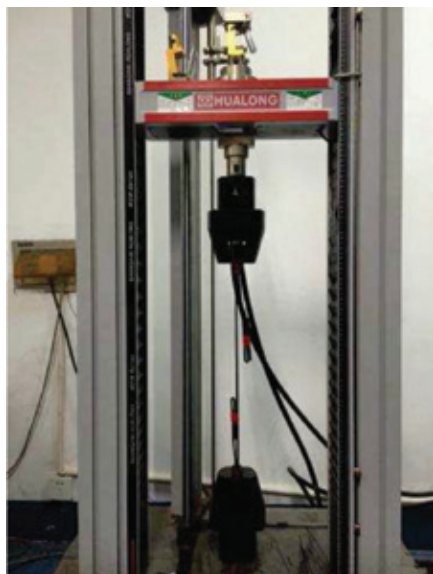
4.2.1 Propiedades de transmisión

Las propiedades de transmisión del cable fueron medidas mediante un OTDR (reflectómetro óptico en el dominio del tiempo) según la norma IEC 60793-1-40.

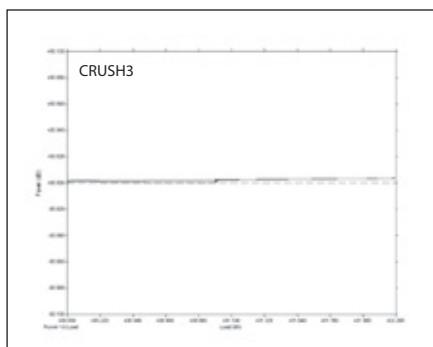
Después de las pruebas, todos los valores de atenuación del cable plano con dos estructuras diferentes estaban por debajo de los límites, es decir, que la atenuación del cable plano no era más de 0,4dB/km a 1310nm y de 0,3dB/km a 1550nm.

4.2.2 Propiedades de mecánicas

Se efectuaron las siguientes pruebas mecánicas según las normas IEC 60794-1-2 y IEC 60794-1-22 para asegurarse de que todos los parámetros fueran conformes con la especificación y que cumplieran totalmente los requisitos y las necesidades del cliente. Se realizó también una serie de pruebas de tracción y aplastamiento generales, cuyos resultados están ilustrados en las *Figuras 1 y 4*.



▲ Figura 3: Ensayo de límite elástico del cable



▲ Figura 4: Resistencia al aplastamiento del cable

4.2.2.1 Prueba de tracción

Los requisitos del cliente en términos de resistencia a la tracción especificaban una deformación máxima de la fibra de un 0,6 por ciento y un aumento máximo de la atenuación de 0,1dB para una carga de 1350N aplicada durante 1 min. Además, la cubierta externa no debía tener daños.

Los resultados de las pruebas mostraron que la deformación máxima de la fibra era un 0,235 por ciento, como se ilustra en la Figura 1. Se observó también que la atenuación adicional máxima a corto plazo era solamente 0,005dB y que la atenuación adicional residual máxima era solamente 0,003dB.

Para realizar la prueba de límite elástico del cable, se usó una grapa de amarre especial para fijar el cable, como se ilustra en la Figura 2. Se cargó el cable en la máquina de prueba de tracción y se aplicó la fuerza hasta que se rompió el cable, como se ilustra en la Figura 3. La rotura se produjo con una fuerza de 2.300N, y este valor superaba en mucho los requisitos de los usuarios.

4.2.2.2 Ensayo de aplastamiento

En esta prueba, la fuerza de aplastamiento especificada era 500N y el tiempo para aplicar la presión era 1 min.

El resultado obtenido para una carga de 500N se ilustra en la Figura 4, donde se puede ver que no hay casi cambio de atenuación durante la prueba, incluso aplicando una carga alta. La atenuación adicional era reversible y no se producían daños en la cubierta externa del cable.

4.2.3 Propiedades ambientales

Se realizaron pruebas de penetración de agua y de variación cíclica de la temperatura según las normas IEC 60794-1-22 F5 y IEC 60794-1-22 F1 respectivamente, cuyos resultados están ilustrados en la sección siguiente.

4.2.3.1 Prueba de penetración de agua

La prueba de penetración de agua fue efectuada en una muestra de cable plano de 3m. Para la prueba se sumergió el cable en 1m de altura de agua durante 24 horas.

Después de este tiempo no se debía haber penetración de agua. Se cortaron cinco muestras para analizar la penetración de agua del cable y las cinco muestras superaron el ensayo.

4.2.3.2 Ensayo de variación cíclica de la temperatura

De acuerdo con los requisitos de los clientes, el cable plano fue sometido a una temperatura de -20°C a +60°C, y mantenido 12 horas a -20°C y +60°C.

El ensayo completo incluía dos procesos de variación cíclica de la temperatura. Cuando se acabó el experimento, se probó la atenuación adicional del cable plano y los resultados mostraron que los valores eran mucho más bajos de 0,1dB, que era el criterio de aceptación del cliente.

4.2.4 Ensayo de retardo de llama

El cable plano diseñado se debía usar principalmente en aplicaciones de derivación y la subunidad del cable debía cumplir los requisitos de retardo de llama.

Se efectuó un ensayo de propagación de llama vertical en una muestra según la norma IEC 60332-1-2. Después de aplicar la llama durante 60 segundos, la distancia entre el borde inferior del soporte de arriba y el inicio de la parte carbonizada era 120mm. En otras palabras, el cable de derivación vertical (*riser*) estudiado en este artículo es seguro para aplicaciones de distribución.

5 Conclusiones

El primero y el segundo diseño del cable plano dieron buenos resultados durante el procesado y los resultados de los ensayos mostraron que estos cables presentan también excelentes propiedades de transmisión, mecánicas, ambientales y de retardo de llama.

Los dos cables planos se pueden usar para redes FTTH y proporcionan al operador una alternativa para las aplicaciones de distribución. ■

6 Agradecimientos

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Agradecimientos especiales al equipo de IWCS por los artículos publicados este año.

7 Referencias

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Qin Yu, Fei Qian, Liming Chen,
Qingqing Qi, Shiyang Wang,
Huiping Shi, Cheng Liu
**FiberHome Telecommunication
Technologies Co Ltd**
Wuhan, Hubei, China
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Add: Changzhou City, Jiangsu Province, China
Tel: +86-519-85268628 , +86-519-86230798
Fax: +86-519-86239398
Mobile: +86 13815079818

Skype: keke0345
Email: export@hdljx.com
Website: www.hdljx.com
www.hdljx.cn

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JCΦ90-Φ200 High efficiency extrusion line



JCΦ35-Φ80 High efficiency extrusion line



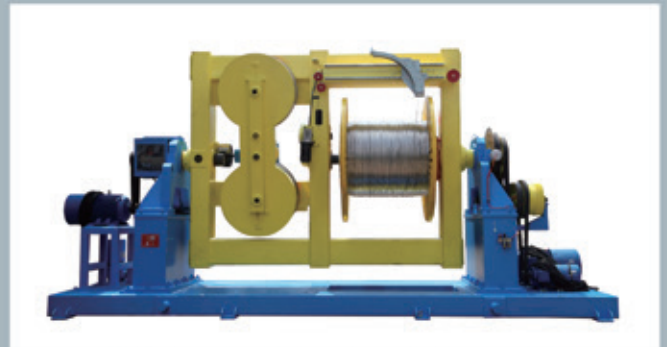
XBΦ500-Φ2500 Cantilever type single twisting machine



SJΦ1000-Φ2500 Double twist stranding machine



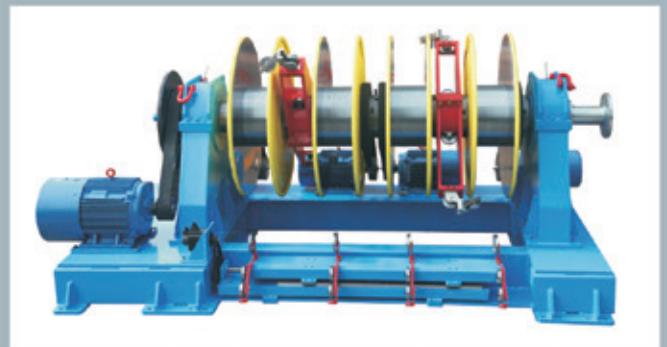
DJΦ630-Φ2500 A type Single twisting machine



DJΦ1000-Φ2000 Single twisting machine



Auto coiling and stacking line



TXJΦ1200 Concentric stranding machine



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UK +44(0) 1664 882462
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