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The International Magazine for the Wire & Cable Industries



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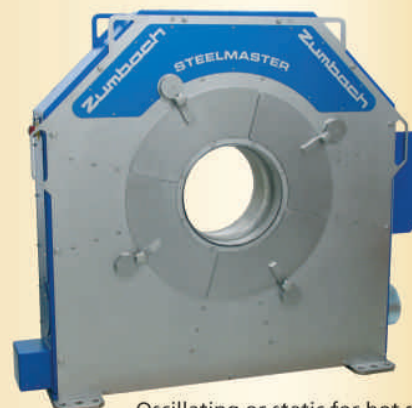


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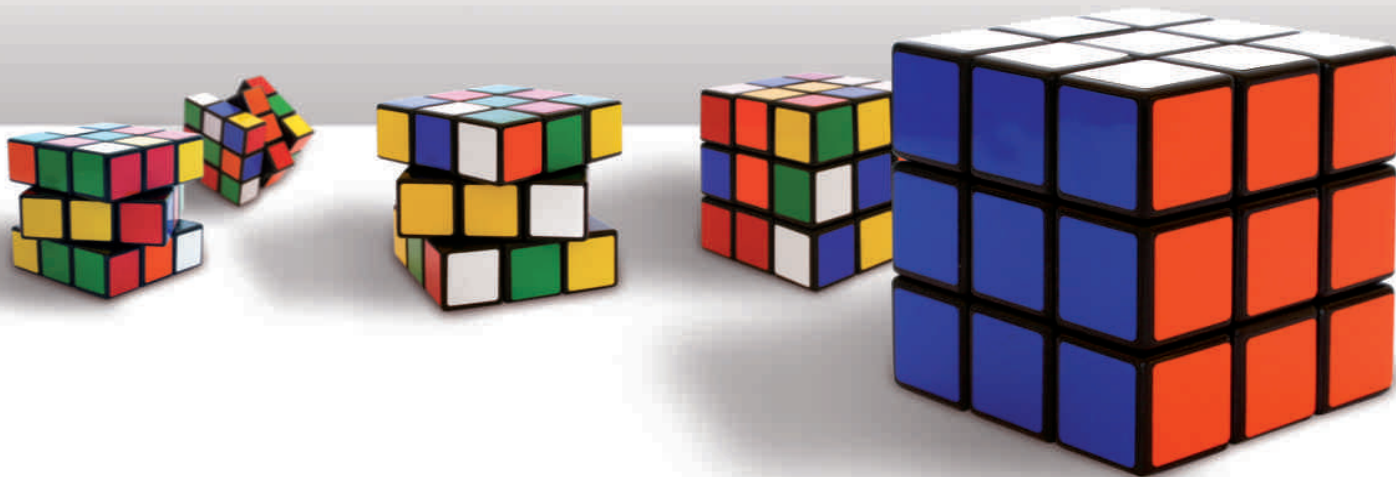
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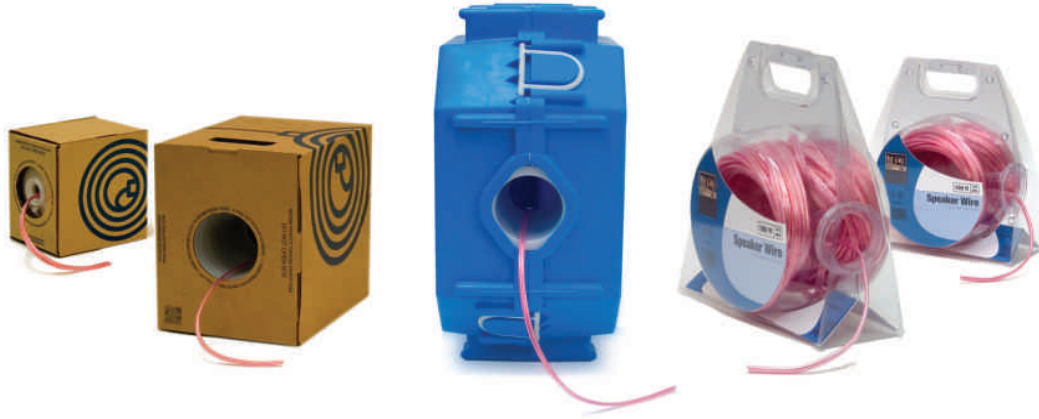
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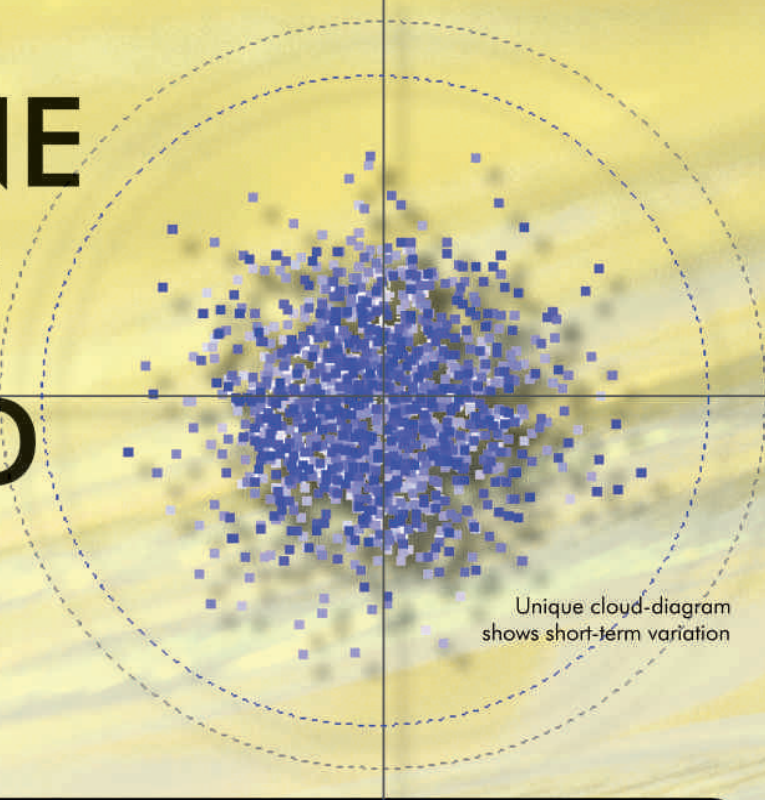
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The winds of change . . .

Britain's coastline will, if the Government gets its way, change beyond recognition by the year 2020.

The reason? Offshore wind turbines. All 7,000 of them. Stretched out, that's one turbine for every half mile of coastline around our little island.

The wind farms could, in just 13 years' time, be responsible for powering every house on our green and pleasant land.

Good for jobs and the economy, and an ideal use for the wind that washes daily over this part of the world. It would also mean that the Government hits the EU target of generating 20% of energy from renewable sources by 2020.

If the announcement by John Hutton, the secretary of state for business, comes true, it will make the UK's wind industry twice the size of any other country's.

Impressive, very commendable, and infinitely better than penalising the British motorist by forcing them to pay £1 per mile to travel on main roads throughout the country. (For those of you who do not reside on our island, that really was the idea to force us to use public transport!)

But larger countries – America and China, in particular – will eventually end up playing their part in the green battle.

Part of that, though, may well be a substantial increase in the cost of fuelling your chosen method of transport.

On my trip to the IWCS conference in America in November, a taxi driver was getting quite enraged by the fact that petrol had gone up to around \$3.20 (£1.60) a gallon.

When I told him we paid about £5 (\$10) a gallon, he nearly swerved off the freeway in shock in his high-powered cab.

China will also – at some point during its stratospheric economic boom – need to clip its wings to overcome the phenomenal amount of emissions it is pumping into the atmosphere.

I think until that point has arrived, several thousand wind turbines – although helpful – will make little impact overall.



David Bell

The International Magazine for the Wire and Cable Industries



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See page 108 for further details

EDITOR:.....David Bell
FEATURES EDITOR (USA):Dorothy Fabian
EDITORIAL ASSISTANT:Christian Bradley
DESIGN/PRODUCTION:.....Julie Tomlin
PRODUCTION:.....Lisa Benjamin
SALES MANAGER:.....Paul Browne
SALES & MARKETING:.....Giuliana Benedetto
(INTERNATIONAL)
Hendrike Griffin
Italian speaking sales
Linda Li
German speaking sales
Jeroo Vandrevala
Chinese speaking sales
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Indian sales

ADVERTISEMENT COORDINATOR:Liz Hughes
ACCOUNTS MANAGER:.....Richard Babbedge
SUBSCRIPTIONS:.....Liz Hughes
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: intras@intras.co.uk
Website: www.intras.co.uk
Website: www.read-eurowire.com

USA: **EDITORIAL**
Dorothy Fabian
272 First Avenue, Apt 12G
New York, NY 10009, USA
Tel: +1 212 614 9266
Fax: +1 212 614 9266
Email: dfabian@rcn.com

INDIA: **Jintras Ltd**, Jeroo Vandrevala
Subarna (Ground Floor)
P21/N, Block A, New Alipore
Kolkata 700 053, India
Tel: +91 33 2407 07 01
Fax: +91 33 2407 07 00
Email: jeroov@vsnl.com
Website: www.jintras.com

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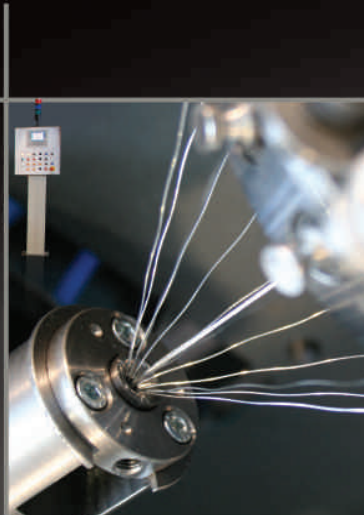
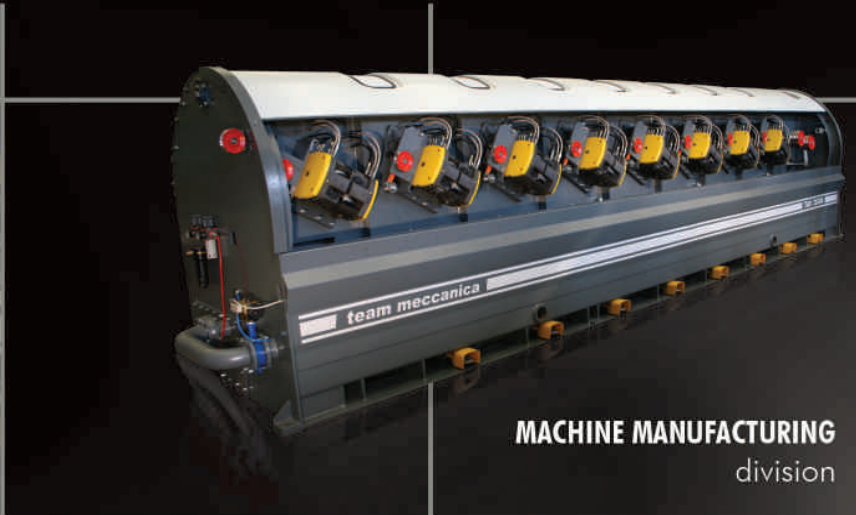
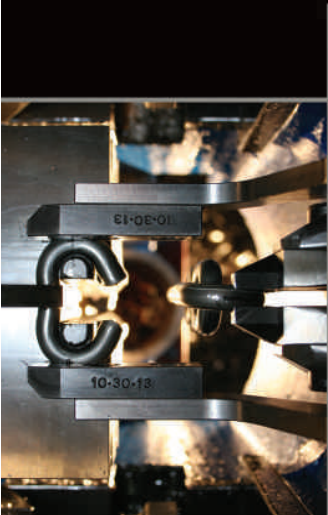
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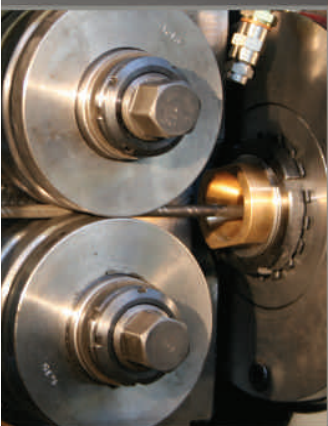
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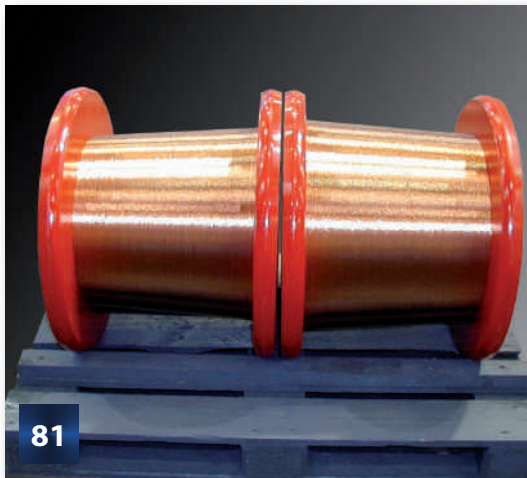


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June

7-11: **Wire Expo 2008** – trade exhibition – Pittsburgh, USA
Organisers: Wire Association Int
Fax: +1 203 453 8384
Email: info@wirednet.org
Website: www.wirednet.org

17-20: **Wire and Cable Kiev** – exhibition – Kiev, Ukraine
Organisers: TDS Expo
Fax: +380 445 269 374
Website: www.weldexpo.com.au

September

18-21: **Cablefair** – trade exhibition – Istanbul, Turkey
Organisers: MediaForce
Fax: +90 212 465 7417
Email: info@cablefair.com
Website: www.cablefair.com

23-26: **wire/Tube China** – trade exhibition – Shanghai, China
Organisers: Messe Düsseldorf China
Fax: +86 21 5027 8138
Email: info@mdc.com.cn
Website: www.messe-duesseldorf.de

October

21-25: **EuroBLECH** – trade exhibition – Hanover, Germany
Organisers: MackBrooks
Fax: +44 1727 814 401
Email: info@euroblech.com
Website: www.euroblech.com

November

9-13: **IWCS** – conference – Rhode Island, USA
Organisers: IWCS
Fax: +1 732 389 0991
Email: admin@iwcs.org
Website: www.iwcs.org

20-22: **Wire and Cable India** – trade exhibition – Mumbai, India
Organisers: Confederation of Indian Industry
Fax: +91 22 2493 9463
Email: darryl.dasilva@ciionline.org
Website: www.wirecableindia.com

May 2009

2-7: **Interwire** – trade exhibition – Cleveland, USA
Organisers: Wire Association Int
Fax: +1 203 453 8384
Email: info@wirednet.org
Website: www.wirednet.org

12-15: **wire Russia** – exhibition – Moscow, Russia
Organisers: Messe Düsseldorf GmbH
Fax: +49 211 45 6087 7793
Email: info@messe-duesseldorf.de
Website: www.messe-duesseldorf.de

March/April 2008

31-04: **wire Düsseldorf** – trade exhibition – Düsseldorf, Germany
Organisers: Messe Düsseldorf GmbH
Fax: +49 211 45 6087 7793
Email: info@messe-duesseldorf.de
Website: www.messe-duesseldorf.de

Jobs go as Carrington Wire closes Cardiff site

Up to 120 jobs were affected when Carrington Wire closed its Cardiff site at the end of December.

The company – which accounts for some 30% of the UK's wire and wire products market – is blaming competition from abroad for the decision to close the Cardiff site after 20 years. UK operations will continue from Leeds.

Part of the Severstal Group, Carrington Wire began the 90-day consultation period in June and has since been working with unions and training companies to help workers. Some Cardiff workers were expected to be offered positions at the Leeds site.

Carrington has customers in more than 50 countries worldwide in the construction and automotive industries.

"This operational restructuring is necessary for Carrington Wire Limited to strengthen its presence in increasingly competitive markets," said Andrew Parker, chief executive.

"The objective of group corporate strategy is to ensure sustainable and profitable growth."

In terms of ensuring a smooth transfer, Mr Parker advised that "the business is developing customer teams that will oversee the transfer programme, covering all aspects of the business. Customers will be fully briefed throughout the programme. "Their ongoing confidence in us is our utmost priority and I am confident that customer impact will be minimal."

Mr Parker expressed his "respect and gratitude for the professional manner in which the Cardiff colleagues continue to conduct themselves; their knowledge, commitment and work ethic continues to provide a benchmark for the group."

Carrington Wire Ltd – UK

Fax: +44 1422 315100

Email: info@carringtonwire.com

Website: www.carringtonwire.com



▲ Carrington Wire's Cardiff site

corporate at a glance

Nexans will supply 70km of subsea power cables for the Danish offshore wind farm, Horns Rev 2, to be completed by summer 2009.

Full story inside.



More than 7,000 trade visitors attended wire and Tube Southeast ASIA in October, making Bangkok THE hottest place to be in the industry.

Full story inside.



Eurolls celebrated its 20th anniversary with a spectacular party at Castle of Spessa, in Friuli Venezia Giulia, Italy.

Full story inside.



State-of-the-art facilities are the name of the game as Process Control Corporation opens its first site in Guangzhou, China.

Full story inside.



at a glance . . .

Celsa Nordic, part of Celsa Group, one of the most diversified European private steelmaking groups, is upgrading its Mo I Rana Norwegian plant, installing a new Tenova EAF-Consteel®.

Thanks to the installation of the Consteel® continuous scrap charging technology, the new EAF will increase productivity by 30% to 900,000 tons per year, although the existing transformer will decrease consumption considerably.

In spite of the increase of productivity the upgrade with the Consteel will guarantee a big reduction of the environmental impact.

A new innovative fume dedusting system has been designed by Tenova for the Mo I Rana plant in order to further lower the emissions.

Tenova – Italy
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AMI's Polyolefin Additives 2008 Conference – between 14-16th April at the Maritim Hotel, Cologne, Germany – is the place to network with top professionals from the polyolefin industry.

Technical experts from companies such as Borealis, Carmel Olefins, BASF, Cytec, Ciba, Rika, Albemarle, Rio Tinto Minerals, Timcal, Norner Innovation, DuPont, Wells Plastics, Songwon and Chemtura, will be attending the conference.

This event provides a forum to debate how to select the best mix of ingredients for the requirements of key polyolefin applications from packaging to automotive.

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Fastener Fair, Coventry, widely acknowledged as the meeting place for all the UK and Ireland's fastener and fixing professionals, will take place at Coventry's Ricoh Arena on Wednesday 11th and Thursday 12th June 2008.

The gala dinner, on Wednesday 11th June, features one of the UK's most in-demand comedians, John Moloney.

Fastener Fair Coventry – UK
Email: jerry@fastfair.net
Website: www.fastenerfair.com



▲ An artist's impression of the Horns Rev 2 windfarm

Nexans provides subsea cables for wind farm

Nexans has recently signed a contract with DONG Energy A/S, Denmark's largest energy supplier, to supply a total of 70km of medium-voltage (MV) subsea power cables for the Danish offshore wind farm Horns Rev 2 to be constructed over the next two years.

The cables will interconnect the wind turbines with each other, as well as with the central offshore transformer station, and will be laid in water depths of between 9 and 18m.

In addition to the subsea MV cables in three different diameters, Nexans will also provide power accessories and installation services. Cables and accessories will be manufactured in the Nexans plants based in Hanover (Germany) and Halden (Norway).

Deliveries should start in April 2008, while the installation work should begin in June 2008. The project is scheduled for completion by summer 2009.

DONG Energy awarded this extensive project to Nexans following the positive experience with the Horns Rev 1 project, for which Nexans supplied and installed all the subsea power cables.

For Horns Rev 2, as in the previous project, the Nexans Group will also supply the high-voltage (HV) subsea cable to connect the wind farm with the Danish onshore power grid.

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20th anniversary celebrations for Eurolls

More than 200 guests gathered for a gala dinner to celebrate Eurolls' 20th anniversary.

Well known for the production of rolls for hot and cold laminating, Eurolls president Renato Railz organised the party in the historic Castle of Spessa in one of the most beautiful areas of Friuli Venezia Giulia.

"Looking back I can say that ours has been an incredible entrepreneurial adventure. It has been a journey of continual growth, made up of great fulfilment and also moments of difficulty, which have always been brilliantly overcome," said Mr Railz.

"In fact, I would say that it was precisely the moments of difficulty that gave us the strength to grow even more," he added.

During the evening there were several meaningful moments for Eurolls: the projection of a film that led through the fundamental stages in the life of the company: from the start of business in a tiny warehouse in Attimis until the recent building of an industrial base at Valbrembo.



▲ An impressive light show at the gala dinner for Eurolls

The day after the celebrations the guests took part in a tour which visited the sites of the Friuli Venezia Giulia Group, from that in Villa Santina with its new thermal treatment plant, to Attimis which is completely mechanised, and finally to the machine division in Salt di

Povoletto where the prestigious lines for the production of lattice girders are conceived.

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Dow pulls out of market

The Dow Chemical Company is exiting the Zetabon™ coated metal armour business at the end of March 2008. Zetabon is made at the films and laminates manufacturing facility in Findlay, Ohio, USA.

Zetabon is used in wire and cable constructions to help protect insulation and delicate components from rodent bites and other incursions that can affect electrical or voice/data transmission performance.

Dow commercialised the product line in the mid-1960s and it enjoyed economic success until the early 2000s. At that time, a number of factors, including increases in raw material costs and decreasing suppliers of steel and aluminium, reduced the profitability of the business for Dow.

Dow has, over the last five years, executed every available option to reduce costs and raise the profitability of Zetabon to re-investment levels.

However, the product line failed to meet critical milestones, despite the efforts of the Findlay, Ohio, team.

The future for the Findlay, Ohio, team will be announced before the Zetabon business closes in March. Dow's intent is to use the site for another business opportunity currently under discussion.

The Dow Chemical Company – USA
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Increase profitability and speed up development

Metals and manufacturing businesses are being invited to take advantage of new rapid manufacturing technologies that are designed to speed up new product development and increase profitability.

The Rapid Manufacturing Programme (RAMP) is funded by Yorkshire Forward and is led by TWI from its base on the Advanced Manufacturing Park in Sheffield, UK, with support from Castings Technology International (Cti), NAMTEC (National Metals Technology Centre), the University of Sheffield IMPETUS Centre, Keyworth Institute at the University of Leeds and Materialise.

RAMP involves rapid prototyping of finished components using integrated computer aided design (CAD) or computer aided manufacture (CAM), which means that manufacturers can respond quickly to customer requirements, reduce production times and wastage and eliminate risk.

One very popular and successful technique in the programme is layer manufacturing, in which a shape can be produced in a single process by adding successive layers of materials.

New sales manager

Shaw Inspection Systems, specialists in real time, digital non-destructive testing systems, has appointed Stuart Wright to the newly created position of sales manager. In his new role he will be responsible for extending the company's international sales of sophisticated x-ray imaging and analysis systems for industrial NDT applications.

Shaw Inspection Systems Limited - UK

Fax: +44 1493 603 347

Email: sales@sis.shawcor.com

Website:

www.shawinspectionssystem.com

Kerry's new role

Central Wire Industries has appointed Kerry Buck to its sales department, responsible for internal and field sales for the greater Toronto area. Prior to joining Central, Buck held a similar position with Roehling Engineered Plastics.

Central Wire Industries Ltd - Canada

Fax: +1 613 267 5617

Email: info@centralwire.com

Website: www.centralwire.com

With layer manufacturing it is possible to produce the prototypes in a wider range of materials, with final products manufactured in a matter of days instead of weeks or even months.

This process is quicker and less expensive as it eliminates the need for tooling, setup and assembly processes, and can produce parts of superior quality and complexity to meet a customer's specific requirements.

Since layer manufacturing enables the integration of computer control into the manufacturing process through CAD and CAM, it is now possible to have a manufacturing cycle with seamless transition through computer design, simulation, modelling and fabrication.

NAMTEC - UK

Fax: +44 1709 724999

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Laser scanner for technical college

Laser Design Inc has sold an SLP®-250 laser scanner to York Technical College in Rock Hill, near Charlotte, North Carolina, USA.

The company's SLP laser scanners are fast, precise, lightweight, and USB compatible for plug-and-play convenience. Accurate to within $\pm 12\mu$, the SLP-250 laser scanners are an excellent choice for 3D laser scanning of small parts.

The York Technical College SLP-250 was retrofitted to a manual Mitutoyo CMM system. York Technical College is a community college with associate degree and certificate programmes. The Machine Tool Technology Department has built a worldwide reputation for excellence on the merits of its 3D centre's cutting-edge equipment and in-demand graduates.

York was the first school in North Carolina to be accredited by the National Institute for Metalworking Skills (NIMS). With more than 45,000ft², the department housed in the Institute for Manufacturing Productivity is home to many 3D measurement systems, including the new Laser Design laser scanner.

Laser Design Inc, has been the leading supplier of ultra-precise, 3D laser scanning systems and services for more than 20 years. Used for capturing the 3D shape of objects with complex geometries and



▲ The scanner installed at the college

free-form surfaces, Laser Design's Surveyor line of automated and portable scanning systems are ideal for 3D scanning applications involving inspection and reverse engineering of complex shaped plastic and metal parts.

The company's patented laser line-probe technology dramatically reduces scanning time by collecting data substantially faster and more accurately than conventional metrology technologies. Laser Design integrates Geomagic software with its laser scanners to provide complete solutions for reverse engineering and inspection applications.

Headquartered in Minneapolis, the company also has Regional Technical Services and Support Centers in Seattle and Detroit, and distributors throughout Europe and Asia.

Laser Design also operates GKS Inspection Services (www.GKS.com), an in-house service bureau division offering complete 3D scanning, reverse engineering, and dimensional inspection services.

Laser Design Inc – USA
Fax: +1 952 884 9653
Email: laser@laserdesign.com
Website: www.laserdesign.com

Looking forward after 50 years

50 years after it was founded, Danish-based cable solutions company Roblon is looking forward, not back, as it prepares to launch two new glass strength members and a new version of its high-speed, low-tension server for stranding aramid and glass yarns.

Plans to expand its R&D departments are also high on the agenda for Roblon, whose team of designers and developers will be strongly represented on the company's wire Düsseldorf stand. The first of the new products will be officially launched at wire Düsseldorf.

Extremely flexible, soft and wear-resistant, the new Roblon Glass Flex Strand strength member for optical fibre cables is suitable for use in servers and stranding machines.

A water-blocking version for dry optical fibre cables, Roblon WB Glass Flex Strand, will also be released in the spring.

A new version of Roblon HSLT, a combined high-speed, low-tension server, will also be showcased at the Düsseldorf show. Operating at speeds of up to 400rpm, Roblon HSLT strands aramid and glass yarns around cable centres.

Danish-based Roblon was founded when a young fishing fleet owner in a small harbour town bought post-war surplus parachute cords on impulse, and then came up with the idea of selling the three-metre-long nylon fibres to fishermen who could use them to make uniquely strong trawler nets.

When demand increased but surplus parachute supplies started to run out, he did research and development, bought his own braiding machines, and in 1957 opened his own manufacturing facility for making hard-wearing rope and industrial fibre products.

50 years on, Roblon A/S has a turnover of €30 million, is listed on the Copenhagen Stock Exchange and employs 150 staff at three locations in and around Frederikshavn, the seaside town where it all began.

Its industrial fibre product range includes glass and aramid strength members, standard and water-blocking binder yarns, tapes and ripcords. The range of machinery for high-speed, high-precision cable production includes servers, binders, pay-offs and winders.

Roblon A/S – Denmark
Email: info@roblon.com
Fax: +45 96 20 33 99
Website: www.roblon.com



Tenova Goodfellow secures third industrial partner

A memo of understanding has been signed with Ontario Power Generation (OPG) to install and demonstrate the Goodfellow EFSOP® system along with advanced optical sensors at the Atikokan Generating Station in Atikokan, Ontario, Canada.

This project will focus on the use of both conventional and next generation EFSOP® systems for monitoring and controlling combustion and related NOx & SOx emissions as part of the Ontario Ministry of Energy's Atikokan Bio-Energy Research Centre.

Holdsworth springs into action



▲ Elizabeth Holdsworth – new customer services administrator

Lesjöfors – one of the largest producers of springs in the automotive industry – has made a new appointment in its customer services operation.

Elizabeth Holdsworth has joined the company in its West Yorkshire-based UK headquarters as customer services administrator.

She will be involved in handling customer orders by telephone, fax and via the internet, as well as answering product-related queries and carrying out general sales office administration.

Lesjöfors Springs (UK) Ltd – UK
Fax: +44 1422 373336
Email: info.ell@lesjoforsab.com
Website: www.lesjoforsab.com

OPG is supporting the centre's research programme by hosting some of the projects at the Atikokan station. EFSOP® technology will be used to monitor and optimise coal-only and coal – biomass co-firing.

The Atikokan project is part of a three-tier demonstration project partially funded by Sustainable Development Technology Canada (SDTC), an arm's length, not-for-profit corporation created by the Government of Canada.

Through the Ontario Centres of Excellence (OCE), additional funding has been

secured from the province in support of the bio-mass power demonstration project at the Atikokan Generating Station.

OPG becomes the third industrial partner to sign on to this SDTC sponsored programme to test Goodfellow EFSOP® at combustion intensive industries, joining St Mary's Cement (Cement Kiln) and Hamilton Steel (BOF Steelmaking).

Tenova Goodfellow Inc – Canada

Fax: +1 905 567 3899

Email: goodfellow@ca.tenovagroup.com

Website: www.tenovagroup.com

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www.atom.com.tr
 atom@atom.com.tr



▲ Mark Weaver (left), marketing director, Weaver PLC, and Mike Golding, managing director, Fortress Interlocks

New HQ for Fortress Interlocks

Midlands construction group Weaver PLC has started work on a new £3 million state-of-the-art headquarters for market-leading safety interlocking specialists, Fortress Interlocks of Wolverhampton, UK.

Due for completion in March 2008 the 2,800m² project at Monmore Grange Estate includes a contemporary two-storey office building plus a steel-frame production and warehouse facility designed to enhance work practices and provide an improved working environment for the 56 employees.

Fortress Interlocks designs and manufactures specialist safety interlocking equipment for potentially hazardous workplaces. It was recently honoured in the Queen's Awards for Enterprise for its range of unique, modular interlocks which can be adapted to changing circumstances.

Established more than 40 years ago, the company has been based on Birmingham New Road since 1985.

Fortress Interlocks Ltd – UK
Fax: +44 1902 499 610
Email: sales@fortressinterlocks.com
Website: www.fortressinterlocks.com

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 email: anbao@anbao.net Website: www.anbao.com

New company set up to meet growing demand

Wire equipment specialist Meltech Engineering Ltd and continuous rotary extrusion equipment maker Confex Technology Ltd have formed a new company to meet the growing demand for extruded aluminium and copper profiles for electrical and automotive applications.

Called Meltech-Confex Ltd, the new company is based in Blackburn, Lancashire, UK, and has facilities in Blackburn and Wimborne, Dorset.

Faced with global shortages in aluminium, copper and other light metals, many companies are turning to continuous rotary extrusion.

This is a way of creating a production facility capable of producing high quality, technically demanding extrusions that optimise the use of available materials.

Meltech-Confex is able to offer complete lines combining the technical and manufacturing strengths of both companies.

The precision of the Confex rotary extruder, and Meltech Engineering's pre and post-processing ancillary equipment for handling complex and thin-walled profiles, gives manufacturers a completely integrated line for production of high quality copper, aluminium and alloy solid and hollow section.

Meltech-Confex Ltd – UK
Fax: +44 1254 680175
Email: sales@meltechconfex.com
Website: www.meltechconfex.com

Prysmian signs new telecom cables supply agreement with Telstra

Prysmian Cables & Systems has signed a three-year agreement to continue the supply of both fibre optic and metallic communication cables to Telstra, the largest telecommunications service provider in Australia.

The contract, based on a pre-existing agreement, has been secured by Prysmian Telecom Cables and Systems Australia Pty Limited.

Prysmian successfully completed a global tender process for this supply contract, the largest of its kind in Oceania, demonstrating competitiveness in price, product innovation and supply capabilities to maintain its long term commercial partnership with Telstra.

Prysmian has been the only contracted supplier of communications cable, since 1998, when the company operated as Pirelli Telecom Cables and Systems Australia Pty Limited.

The investment in the increased manufacturing capacity at Dee Why, to

be completed by early next year, provides Prysmian with the opportunity to offer greater flexibility of supply and to develop supply chain efficiencies for Telstra.

Prysmian is the only company in Australian and New Zealand producing a full range of communication cables and associated connectivity systems including optical fibre, Sirocco Blown Fibre systems, FTTP (Fibre to the Premises) solutions, metallic and premises/data cables.

Prysmian Cables and Systems Ltd – Italy

Email: info@prysmian.com

Website: www.prysmian.com

On the up...

Ugitech has increased its base prices by €50 per ton, for all products (bars, drawn wire and wire rod in stainless steel), for orders booked from January 2008.

The high worldwide demand and the low stock levels justify consolidating base prices.

Ugitech SA – France

Fax: +33 47989 3001

Email: info@ugitech.com

Website: www.ugitech.com

India-bound?

For four days in November 2008, wire and cable experts and exhibitors will descend on India for the MMMM 2008 Exhibition.

The 7th international exhibition on minerals, metals, metallurgy and materials, is being staged at the India Expo Centre in New Delhi.

Last held in 2006, more than 15,000 visitors attended the exhibition.

This is India's number one metallurgy industry exhibition and conference, drawing together metallurgical, technical and engineering personnel, including the financial and investment community, general management, technical management, plant management, purchasing and procurement, quality control, engineering (metallurgy), engineering (general), maintenance, research and development, consultancy and many other industry professionals.

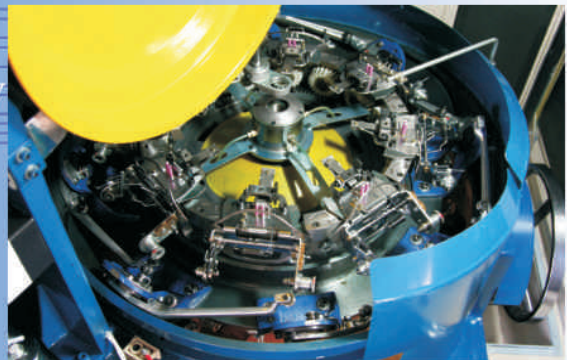
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wire SE Asia – THE platform!

wire and Tube Southeast ASIS certainly lived up to its reputation as THE region's platform for the wire, cable, tube and pipe industries.

The trade fairs attracted 7,038 trade visitors from more than 60 countries. 33% of the visitors came from overseas with a significant number from China, India, Malaysia, Singapore, Vietnam, Indonesia, Korea and the Middle East.

381 exhibiting companies from 30 countries, including national and group pavilions from Austria, China, France, Germany, Italy, Taiwan, United Kingdom and USA occupied a gross space of 15,000m². Visiting delegations from India, Vietnam and Malaysia added a further international feel to both trade fairs.

The trade fairs were opened by Khun Chakramon Phasukavanich, Permanent Secretary of Thailand's Ministry of Industry on 16th October. Khun Chakramon asserted in his opening address that the hosting of wire and Tube Southeast ASIA in Bangkok "is indeed timely with Thailand's aspiration to be 'The Hub of



▲ Exhibitors at the wire SE Asia show

Asia'.." and that both the trade fairs "will provide avenues for the various business sectors to work closely to tap the potentials arising from the regional integration initiatives as well as Thailand's own initiatives with existing and potential trading partners."

Organiser Messe Düsseldorf Asia's managing director, Mr Gernot Ringling, agreed with this statement and further mentioned that "Thailand's central location within the region is opening more trade and investment opportunities" and this bodes well with the staging of both the wire and tube trade fairs in Thailand.

Many exhibiting companies shared the same sentiment and expressed their satisfaction on their participation at the trade fairs.

The next show will be held in the last quarter of 2009.



▲ Gernot Ringling, managing director, Messe Düsseldorf Asia, left, with Chakramon Phasukavanich, Permanent Secretary, Ministry of Industry, Thailand, pictured at the ribbon cutting ceremony

Messe Düsseldorf Asia – Singapore

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Email: info@mda.com.sg

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Website: www.ajexdiamond.com

euroLITE is growing!

Following the successful premiere event last year, growth is the name of the game for the second international specialist trade fair for lightweight design – euroLITE.

Around 50% of the exhibition floor space used the previous year has already been assigned for the euroLITE 2008 being held from 24th-26th June in Salzburg, Austria. The exhibitor stands, which cover all the aspects of lightweight construction, will be supplemented with a theme park dealing with 'Joins and Connections'.

In addition, the Landshut Light Construction Cluster is again organising a three-day lightweight construction forum with presentations from the fields of design, materials and production technologies in German and English, which will be simultaneously interpreted.

H & K Messe GmbH & Co KG – Germany

Email: info@hundkmesse.de

Fax: +49 721 570 444 22

Website: www.hundkmesse.de



Process Control Corporation opens first Chinese facility

Based at Guangzhou, China Guangzhou Atlanta Process Control Equipment Company Limited is a wholly owned subsidiary of Process Control Corporation, an innovative manufacturer of auxiliary equipment and systems for the plastic processing industry.

As with other Process Control Corporation facilities in the United States and Europe, the China location will offer a full complement of customer support as well as state-of-the-art manufacturing capabilities.

On-site sales, project engineering, customer service, and technical service staff will be available to immediately meet customer needs.

Qi (Allen) Liang is the general manager of the China office.

"Our new Guangzhou facility is a strategic move towards globalisation necessitated by our growing customer base in Asia," said Steve Buckley, vice president of sales and marketing.



▲ PCC has expanded into China

"By building an integrated operation in Guangzhou, we are well positioned to develop efficient, long-term relationships with our customers and offer improved supply chain management."

The China offices will occupy approximately 655m² (7,050ft²). The Guangzhou facility will service the entire country, promoting the Process Control product line in the China market as

well as managing and supporting Asian distributors in the local markets of South Korea, Malaysia and Thailand. The address of the China office is: Room 202, No 232 Kezhu Road, Science City, Gangzhou, China. PC: 510660

Process Control Corporation – USA

Fax: +1 770 449 5445

Email: info@process-control.com

Website: www.process-control.com



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New sales engineer

Process Control Corporation has appointed Thomas Kegley as a new sales engineer.

At PCC, Tom will represent technical blending and systems solutions to maintain and increase market share in Ohio, Indiana, Michigan, Kentucky, West Virginia, western Pennsylvania and western New York, USA.

Tom has almost 20 years' experience in the plastics industry, specialising in solving customer problems.

Since beginning his career he has covered process engineer, sales engineer and sales management. His accomplishments include doubling annual sales over short-term periods.

Educated at Youngstown State University in Youngstown, Ohio, for Mechanical Engineering, Tom has been focused on the plastics industry for machinery sales and process engineering.

Process Control Corporation – USA

Fax: +1 770 449 5445

Email: info@process-control.com

Website: www.process-control.com



▲ The Nexans site in Japan where the cable will be manufactured

Nexans cables will join Balearic islands to mainland Spain

Nexans has signed a €146 million contract with REE (Red Electrica de España), the owner and operator of the largest part of Spain's power transmission grids.

Nexans will manufacture, transport and install a high voltage (250kV, 500MW) DC submarine power link between the Spanish mainland and the Balearic Islands as part of the COMETA (Conexión Mediterranea de Transporte de Alta tensión) project.

The COMETA cable project, worth €267 million in total, will be completed jointly by a consortium between Nexans and Prysmian.

The new link will be fed by Spain's 400kV grid and will connect a power conversion station located at Sagunto, north of Valencia on the Spanish mainland, to the west coast of Majorca. This link is also designed to supply other Balearic Islands through secondary 132kV and 33kV links, including the planned Majorca-Minorca and Majorca-Ibiza-Formentera links.

As part of this project, Nexans will supply 240km of high voltage (250kV-750mm² copper conductor) DC submarine power cable, protected by double galvanised steel wire armour in its deepwater section.

No offshore joints will be required as the cable will be armoured and delivered in a single length. Nexans will also supply 2x240km of fibre-optic cable (with 48 fibres).

The selected sub-sea route for the new link has a maximum depth of 1,410m and over 145km of Nexans' 240km share of the cable will lay at below 800m deep. The cables will be buried down to 800m of water depth in order to protect them against the hostile environment.

The high voltage submarine cable should be manufactured by Nexans' new plant in Japan's Tokyo Bay area, which specialises in the production of submarine power cables. Installation is expected to start in autumn 2010, with the whole project to be completed by mid-2011.

Nexans Deutschland Industries GmbH & Co KG – Germany

Fax: +49 511 676 3777

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Website: www.nexans.com

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 info@zwickroell.eu



Intelligent testing



Esteves acquires Temsa-Diamond Die Division SA

Esteves-DWD (Spain) SA and Temsa Diamond Die Division SA, both of Cervello, Spain, have reached an agreement whereby Esteves has acquired most of the assets and the business of Temsa Diamond.

The managing director of Temsa-Diamond, Jaume Cabrera, has also joined the Esteves sales team at the same date.

"I am very happy to return to the company where I have worked for many years and I am looking forward to continue to be active in the die business, serving customers all over the world," said Mr Cabrera. "I see this as a very positive move for our customers who will be able to benefit from the resources of a much larger company."

Mr Jordi Roger, sales manager of Esteves, said: "The acquisition of the Temsa Diamond business is an important step for our company.

"We are excited about the possibilities to serve an expanding customer base.

"At the same time we welcome Mr Cabrera back to our company."

Esteves-DWD – Spain

Fax: +34 93 684 1080

Email: info@esteves-pdt.com

Website: www.esteves-pdt.com

New general manager

The InterWire Group has announced the appointment of Dan Sinclair as general manager of the Michigan distribution centre in Kentwood.

With 15 years' experience in the metal and wire business, Mr Sinclair started his career in the metal industry as a branch account representative for Carpenter Technology before moving to Ulbrich Specialty Metals in 1996.

Married with three children, he joined Rolled Metal Products in 2003, building the Michigan territory from \$230,000 to \$8 million in annual sales in four years.

InterWire – USA

Fax: +1 914 273 6848

Email: info@interwiregroup.com

Website: www.interwiregroup.com

Techint's new order for Russia

A new prestigious order has been awarded to LOI Italimpianti by Magnitogorsk (MMK), Russia, within their overall revamping of the existing hot strip mill.

LOI Italimpianti's order includes the engineering, whole supply, training, supervision to erection and commissioning relevant to three new walking beam furnaces (370t/h capacity each).

The start up is scheduled at the beginning of 2010.

Tenova – Italy

Fax: +39 02 469 3026

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Two appointments to executive board

Murray International Holdings (MIH) has announced two senior appointments as part of its ongoing strategic business development programme.

Chief Executive of Murray Metals Group, Graeme Hill, and Head of Legal, David Horne, have both joined the executive board.

Hill is the chief executive of the Murray Metals Group which he joined in 1988. Since 2005 he has reshaped MMG and substantially increased both turnover and profit.

Horne is the MIH Group Company Secretary and Head of Legal and joined MIH in 1993. He has successfully managed the Group's legal function over a number of years and has played a key role in the Group's numerous corporate transactions.

Horne was the first in-house lawyer to be named Scottish Corporate Lawyer of the Year in 2005.

Ken Cockburn has remained a non-executive director of MIH since the sale of Murray International Metals (now

called Edgen Murray) in December 2005 and since then has provided strategic support and advice to MMG. He is the managing director of Edgen Murray.

As Hill and Horne join the executive board of MIH, Ken Cockburn and Harvey Rose have taken the decision to step down as non-executive directors.

Murray International Holdings – UK
Fax: +44 131 317 7111
Email: info@murray-international.co.uk
Website: www.murray-international.co.uk

At a glance . . .

Continuus-Properzi has launched a new 25 tons per hour copper rod line in Europe.

Production will start in early 2008 near Barcelona, and will run side-by-side with the existing 15 tons per hour La Farga Lacambra, a unique facility dedicated to copper scrap recycling into FRHC rod with a 110 ton a day reverberatory furnace and with the continuous Cosmelt process.

The new plant, named La Farga Rod, will focus on high quality electrolytic rod for the Catalan and nearby market.

Continuus-Properzi and La Farga Group are about to celebrate the 20th anniversary of their collaboration.

Continuus-Properzi SpA – Italy
Fax: +39 02 98849 2313
Email: sales@properzi.it
Website: www.properzi.it



In response to customer requests to have direct access to the technical team in the UK, Applied Scintillation Technologies (AST) will be handling enquiries from the United States directly from its UK headquarters.

AST supplies advanced imaging and detection solutions using phosphor and scintillation technology.

With new marketing collateral in preparation which has been designed to help customers through the process of specifying scintillator and phosphor coating requirements, the direct sales initiative in the US will serve to streamline the whole procedure.

Applied Scintillation Technologies – UK
Fax: +44 1279 413679
Email: ast@appscintech.com
Website: www.appscintech.com



▲ NME managing director Michael Dalal in his new office (the picture in the background is Walter Niehoff, the founder of Maschinenfabrik Niehoff)

New Dubai office for Niehoff

Maschinenfabrik Niehoff officially opened its new sales and service centre in Dubai in July. The office, headed by Michael Dalal, is called Niehoff of the Middle East (NME).

Niehoff has long maintained good and close relationships with wire and cable manufacturers in the countries of the Middle East. Prior to the foundation of NME, customer service was provided from the headquarters in Schwabach, Germany.

Hans-Joachim Melcher, who is responsible for this area, will retire next year. His successor is Michael Dalal, who will be working directly in the office as the managing director of NME.

Mr Dalal worked as a manufacturing engineer for power cable manufacturer The Okonite Company between 1988

and 1996, and joined Niehoff in 1996 as a regional sales manager. Born in Lebanon, he is highly familiar with the language and customs of the Arab world. He is married with three children.

Niehoff of the Middle East (NME) is responsible for the following countries: Bahrain, Egypt, Jordan, Kuwait, Lebanon, Libya, Oman, Saudi Arabia, Qatar, Syria, United Arab Emirates and Yemen. It is also planned for a service engineer to become part of NME.

Maschinenfabrik Niehoff GmbH & Co KG – Germany
Fax: +49 9122 977 155
Email: info@niehoff.de
Website: www.niehoff.de

Niehoff of the Middle East (NME) – Dubai
Fax: +971 4 2045154
Email: m.dalal@niehoff.de
Website: www.niehoff.de

New 'green' HQ for Panduit

Panduit, a global supplier of network and cabling infrastructure, has bought a site in Tinley Park, Illinois, USA, for its new corporate headquarters.

The facility will be constructed on an intelligent building design and will showcase the Panduit Connected Building Solution, which enables the convergence of a building's facility systems onto a single network for improved control, communication, and management.

As part of the commitment Panduit has to the environment and sustainability, the company intends to achieve Leadership in Energy and Environmental Design (LEED) Gold certification with the new building.

The LEED Gold standard will be an independent guarantee that Panduit will reduce construction pollution and deliver significant energy savings.

The new location is approximately six kilometres from the existing headquarters on Ridgeland Avenue in Tinley Park.

The planned development includes a 23,000m² (250,000ft²) facility, in a 21 hectare (52 acre) campus environment.

Foundation laying of the new corporate headquarters is targeted to begin in spring 2008 and occupancy of the building in the summer 2009.

Panduit Europe Ltd – UK Fax: +44 208 601 7220
Email: cs-emea@panduit.com
Website: www.panduit.com

Wafios becomes major shareholder

Wafios took over the major shareholding in Swiss company Mewag Maschinenfabrik AG in January.

The merging of the two leading technical manufacturers of tube and profile bending machines will strengthen the quality and leadership of both companies.

The production of special high-quality machines will continue in both plants in Germany and Switzerland.

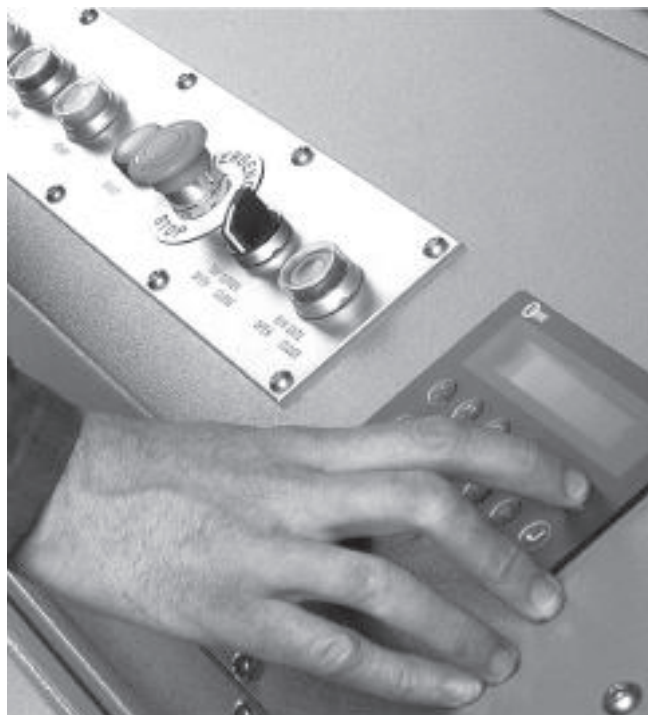
Customers of both companies will benefit as future common sales activities and hand-in-hand cooperation in development, purchasing and production, set the course for ideal, high-tech tube and profile bending solutions.

The deal will also mean a considerable jump in sales for Wafios, especially of large-diameter tube benders.

Further information is available at www.wafios.de or www.mewag.com

Wafios AG – Germany Fax: +49 7121 491209
Email: info@wafios.de **Website:** www.wafios.de

Mewag Maschinenfabrik AG – Switzerland
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E-mail: pwm@btinternet.com

Murray General Steels acquires Parson and Crosland

Murray General Steels (MGS) has bought Parson and Crosland Ltd for an undisclosed sum.

MGS is part of Murray Metals Group, the UK's largest independent steel stockholder and processor of both general steel and specialist metals.

This latest deal by the bespoke general steels division follows the recent acquisitions of Tipton and Mill Steels and Newton Steel Stock.

Parson and Crosland Ltd, based in Middlesbrough, Teesside, was established in 1926 and employs 47 people.

David Lawson, managing director of Murray General Steels, said: "It is a successful, long-established business that has built a reputation within the industry for excellence in customer service and delivery."

He added: "We are delighted to have reached an agreement to acquire Parson

and Crosland. It is a highly-respected, well-run business with a strong management team and customer base."

Edward Bilcliffe, managing director of Parson and Crosland, said: "This is an important deal and one that brings us into the fold of an expanding group of ambitious businesses.

"Being part of Murray General Steels and the wider Murray Metals Group will help us to continue to develop our business with increased speed and confidence."

Murray Metals Group itself is part of rapidly-expanding Murray International Holdings (MIH), a multi-faceted business employing 4,000 people across the world and with interests in metals, property, private equity, outsourced services and football.

Murray International Holdings – UK

Fax: +44 131 316 4343

Email: info@murray-international.co.uk

Website: www.murray-international.co.uk

Expanding into Latin America

Expanding its strong technical and service presence in Latin America, Dow Wire and Cable has added a number of experienced personnel and a new structure that will offer direct local support for customers and end users throughout the region.

"As a long-standing business member in Latin America, we have gained significant experience with regional industry needs and practices," said marketing manager Adolfo Nieto.

Dow Wire and Cable brings the broad portfolio of products and services offered by the Dow Chemical Company and its subsidiaries for the transmission, distribution and consumption of power, voice and data, to a local level, offering improved efficiency and time to market along with ongoing product improvements based on specific Latin America needs.

Dow Wire and Cable – USA

Fax: +1 713 978 2189

Email: info@dow.com

Website: www.dow.com

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EBNER Industrieofenbau 10A 40-05

EDER Engineering 10A 40-02

GEBAUER & GRILLER 10A 40-04

ISOVOLTA 10A 44-03

LENZING Plastics 10A 44-09

MAG 10A 40-03

MALI 10A 40-10

MEDEK & SCHOERNER 10A 44-01

UNITEK 10A 44-8

V A AUSTRIA DRAHT 10A 40-06

Four members will be individual exhibitors:

K D S Knill Group 9A-74

ROSENDAHL (+Nextrom) 9A-74

EVG + Filzmoser 10G-04 + 10H-18

Fortuna Federn 14B-23

Other Austrian companies exhibiting:

E.Eisenbeiss Soehne GmbH 10A 40-08

Joh. PENGG AG 10A 44-07

LUMPI-BERNDORF GmbH 10A 44-04

SCC GmbH 10A 44-02

MTT Machinery Technology

Trading 10A 40-09

For further information on Austrian exhibitors or any sourcing enquiries address to AWCMA. E kurt.eder@awcma.com

Award-winners!

Tenova Goodfellow has been recognised by the Canadian Engineering Community for the process control technology work conducted at the Toyohashi Factory, Topy Industries Ltd, plant in Japan.

This project involved the successful transfer of Canadian technology and engineering skills in the International Category.

The merits of this project were improved environmental benefits which include a 45% reduction in the use of kerosene, 13% reduction in carbon consumption along with reductions in greenhouse gas emissions (specifically 5% CO, 18% CO₂ and 7% H₂).

The overall success of this project has provided for a cleaner environment along with an annual cost savings of \$1.5M for the client.

The Canadian Consulting Engineers of Canada Awards, launched 39 years ago, are the most important national mark of recognition for projects recently completed by Canadian consulting engineering firms.

This award represents the second Award of Excellence in 2007 for project work completed at Toyohashi Factory, Topy Industries Ltd, Japan with the first award being received from the Consulting Engineers of Ontario (CEO) in May 2007.

The company has also finalised contract negotiations to apply the Goodfellow EFSOP® process control technology as part of Wheeling-Pittsburgh's 270 ton Consteel® installation at Steubenville/Mingo Junction, Ohio, USA.

This furnace is unique in the industry due to its capacity to charge hot metal and scrap simultaneously.

The scope of work for the project includes providing process technology and equipment to sample and analyse the off-gas (CO, CO₂, O₂ and H₂) from the electric arc furnace.

Specific benefits include safety (maximised post combustion plus CO and HH₂ measurements in the off-gas); energy efficiency improvements which will include identifying periods of low energy transfer (energy waste) in the EAF; tracking the efficiency of oxygen injection operations to aid in adjustment of lancing profiles and monitoring carbon recovery to aid in the adjustment of carbon injection profiles.

EFSOP® will also be utilised to recognise and track changes in the scrap quality.

Tenova Goodfellow Inc – Canada

Fax: +1 905 567 3899

Email: goodfellow@ca.tenovagroup.com

Website: www.tenovagroup.com

Joining forces in the Chinese auto market

Radici Group Plastics and Lati Industria Termoplastici SpA have signed a letter of intent to form a 50-50 joint venture to develop the Chinese engineering plastics market.

The constant growth of this Asian market offers attractive opportunities for businesses with a strong international presence and a wide range of products.

The booming Chinese auto industry, the huge potential arising from the modernisation of the electric power grid and electrical equipment, the growing pool of domestic appliance buyers, the large investments in infrastructure and the increasing hunger for high quality goods are the factors that will have an increasing influence on Chinese growth.

Lati SpA is among the world leaders in self-extinguishing compounds for the electrical and household appliance sectors.

In the plastics sector, RadiciGroup is a leader in engineering plastics for automotive applications.

The joint venture's headquarters and production base will be in Suzhou, 80km from Shanghai, at the RadiciPlastics Suzhou Co Ltd compounding plant.

The joint venture will manufacture and sell a broad range of engineering plastics under their corresponding brand names in the Southeast Asian market — China, Hong Kong, Taiwan and Singapore, in particular.



▲ The production base at Suzhou near Shanghai, China

Radici Partecipazioni SpA – Italy

Email: info@radicigroup.com

Fax: +39 035 715477

Website: www.radicigroup.com

New name, same excellent service

Scapa has introduced a new cable division – Scapa Cable Solutions.

Under the new name, Scapa will bring together its extensive range of cable wrapping tapes and components, whilst continuing to develop and invest in new products and technologies to add to the current portfolio of cabling solutions.

Scapa UK Limited – UK

Email: marketing@scapa.com

Fax: +44 161 3017 445

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E-Mail: office@eder-eng.com
Website: www.eder-eng.com

IWCS conference a great success – organisers

Perfect weather proved not to be a distraction as 900 delegates were kept busy at this year's 56th IWCS Conference in Orlando, Florida, USA.

More than 105 papers were presented by their authors, with the consensus of the organising committee being that the overall quality was excellent, with many break-through technologies in evidence.

The Focus Suppliers Exhibition made certain that there was no 'down time' for delegates as 110 industry suppliers provided information on their latest products and technologies.

The Executive Forum once again provided information of strategic value to the leadership in the wire and cable industry, including a view of future technologies being delivered today.

The professional development courses experienced their highest enrolment in several years, with nearly 130 courses subscribed by attendees.

Now the challenge is to maintain the momentum generated as planning begins for the 2008 event, scheduled for 9th-12th November at the Rhode Island Convention Center in Providence RI.

IWCS – USA

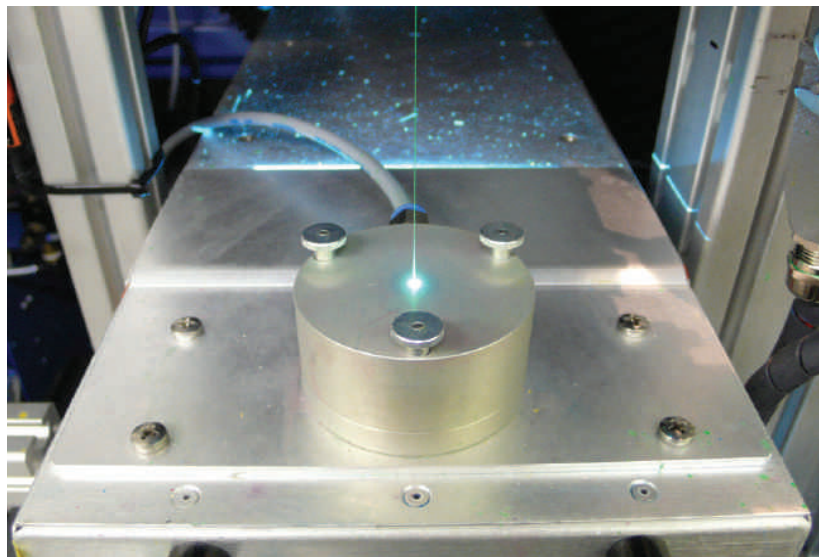
Fax: +1 732 389 0991

Email: info@iwcs.org

Website: www.iwcs.org



▲ Visitors at the 56th IWCS Conference in Orlando



▲ Rosendahl and Nextrom showed off their latest developments at IWCS

Latest on show from Rosendahl and Nextrom

Nextrom and Rosendahl presented their latest wire, fibre and cable developments including ribbon colouring systems at this year's IWCS conference.

Wide ranging interest was received for dry tube process improvements to SZ stranding for tight buffered products.

Additionally LAN cable upgrades and process improvements for value-added upgrades in the area of gas injection systems for both plenum and non-plenum grades gained interest.

Besides the two technical papers presented, one educational short course about 'extrusion technology and equipment for the wire and cable industry' was held.

Rosendahl Nextrom Technologies – USA

Fax: +1 828 328 4956 **Email:** mkos@knillusa.com

Websites: www.rosendahlaustria.com - www.nextrom.com





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CRU conference heads for Barcelona

After the success of the first World Wire and Cable Conference in June this year, CRU Events' 2nd World Wire and Cable Conference will once again bring together senior-level decision makers in the wire and cable community from around the world.

The conference – being held in Barcelona, Spain from 1st-3rd June – provides a unique opportunity to meet with senior representatives from cable manufacturers, cable users, materials and equipment suppliers and financial institutions.

The conference will feature a comprehensive programme of presentations, with the theme of satisfying customers throughout the supply chain.

Day one of the conference will cover: Routes to market; contribution of suppliers to the cablemakers; copper and fibre issues. Day two consists again of parallel tracks. Delegates have the option to attend different sessions from each track, giving a broader industry perspective.

Eurowire and Wire and Cable ASIA are the official media partners for the event.

CRU Events – UK

Fax: +44 207 903 2432

Email: marilyn.portner@crugroup.com

Website: www.cruvents.com

€1 million deal for Nexans

Nexans has signed a two-year frame agreement with AB Stokab, the owner of Stockholm's 'Citynet' broadband infrastructure, to deliver fibre optical equipment worth approximately €1 million for the city's FTTH (fibre-to-the-home) programme.

In order to house and support the vast number of optical fibres that have to be installed and managed in often confined spaces, Stokab has selected Nexans' N3S High Density fibre system.

The Nexans N3S System (3S = SSS = Space Saving Solution) allows installation and handling of a large number of optical cross-connections in a very small space (footprint), which is necessary to enable every apartment in a dense city environment to be provided with its unique pair of fibres.

This agreement is an important breakthrough for Nexans' approach to the construction of the physical infrastructure for FTTH projects. Stokab, the sole Citynet owner in Stockholm, will use the Nexans equipment for the planned expansion of the city's WAN (wide area network) into network access structures that will connect directly to fibre LANs (local area networks) in residential buildings.

Nexans has been a regular, major supplier to Stokab for more than 10 years.

In addition to this frame agreement, Nexans will also deliver approximately 1,500km of fibre optic cables as part of its previous projects with Stokab.

These optical cables, manufactured at Nexans plant in Grimsås, use ribbon fibre technology which is also an efficient and space saving solution.

Nexans – France

Email: nexans.web@nexans.com

Fax: +33 15669 8484

Website: www.nexans.com



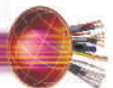
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**Congressional committee:
Wars in Iraq and Afghanistan are far
costlier than most Americans realise**

According to a new study that includes 'hidden costs' in its estimate of how much the US is paying to wage war in the Middle East, the total is approximately \$1.5 trillion. A 21-page draft report of 'The Hidden Costs of the Iraq War' was obtained by the *Washington Post* on 12th November, a day in advance of publication. Prepared by the Democratic staff of the Joint Economic Committee of Congress, it estimates that the two wars had to that point cost the average US family of four more than \$20,000.

The report posted a total nearly double the \$804 billion the White House has expended or requested to fund the wars through the end of 2008 by including such items as higher oil prices, the expense of treating wounded veterans, and interest payments on the money borrowed to pay for the wars.

It declares: "The full economic costs of the war to the American taxpayers and the overall US economy go well beyond even the immense federal budget costs already reported."

Writing in the *Post* on 13th November, Josh White noted the assertion in the report that war funding is diverting billions of dollars away from 'productive investment' by American businesses in the United States. It also claims that the conflicts are pulling reservists and National Guardsmen away from their jobs, resulting in economic disruptions for US employers that the report estimates at \$1 billion to \$2 billion. ('Hidden Costs Double Price of Two Wars, Democrats Say')

The committee which produced the report includes House and Senate members from both parties. But it is chaired by a Democrat and its conclusions are certain to be challenged by the Republican administration of President George W Bush. Some early grumbling struck the familiar note that criticism of Mr Bush's war policies is the sign of the quivering.

A spokesman for Senator Sam Brownback, of Kansas, the committee's senior Republican senator, told the *Post*: "It sure seems that the [Democratic] Senate leadership is trying to protect their continual proclamations of defeat instead of working for bipartisan progress."

The committee's chairman, Sen Charles E Schumer, Democrat of New York, was less interested in attitudes than in the statistics. In a statement on the eve of the report's publication Mr Schumer said: "What [it] makes crystal clear is that the cost to our country in lives lost and dollars spent is tragically unacceptable."

✱ The *Washington Post's* Josh White provided some comparisons of the costs of US participation in recent wars. According to Congressional Research Service reports, the Vietnam War cost \$600 billion in today's dollars; the 1991 Persian Gulf War, \$80 billion. World War II is estimated to have cost \$4.9 trillion in today's dollars.

The California fires

**Downed power lines were responsible
for some of the worst blazes,
but the cost of subterranean lines is steep**

The wildfires that raged through Southern California last fall claimed their 10th victim on 13th November, with reports of the death of a Mexican man who died of burns sustained in an effort to cross the US border illegally. In just four days in late October, the blazes burned 410,000 acres and forced at least a half-million people to flee their homes – the largest evacuation in California history. The economic toll is yet to be fully reckoned; but, calculated on the basis solely of property destroyed, the fires caused at least \$1 billion in damage in San Diego County alone. That figure – which is expected to rise – does not include business and commercial losses.

In the *Los Angeles Times*, staff writer Joe Mozingo said that downed power lines were suspected of having caused at least five of the 12 major fires, including the notorious Witch fire that burned nearly 200,000 acres, destroyed 1,041 houses, and killed two people. He framed a pertinent question in stark terms: Should utilities do more to prevent failures, particularly in wild-land areas prone to high wind? And are rate payers willing to pay the bill? ('Downed Power Lines: a Fiery Culprit Only Money Can Stop,' 4th November)

The danger inherent in above ground high-voltage lines is obvious. The lines can start fires when they cross, touch tree branches, or hit the ground, causing the electrical current to arc in explosions of sparks. High winds and dry weather heighten the danger. But the subject is apparently not much discussed among people accustomed to ignoring threats to the SoCal lifestyle. Los Angeles County supervisor Zev Yaroslavsky told the *Times*: "The utilities and the public sector need to come to the mountain and realise there is an issue here that needs to be addressed!"

California does require utilities to clear brush and meet pole strength standards to help prevent downed power lines. But according to Mr Mozingo regulators say the only sure-fire way to remove the fire threat is to replace overhead lines with underground lines. Both Southern California Edison and San Diego Gas & Electric told him this would cost a minimum of \$1 million a mile, and much more in remote, rocky areas.

Some money is earmarked by regulators for burying lines, but the allotment falls far short of the need. Mr Mozingo noted that Edison alone has more than 70,000 miles of overhead lines in its 50,000m² service area, which covers all or parts of 11 counties in Southern and Central California. Burying those lines would ensure safety from power-line fires stoked by high winds. But even in one of the highest-income areas in the country, it comes down to money – and public will.

✱ The concentration of news coverage on the loss of life and private property to the wildfires tended to obscure the danger to the manufacturing sector, which is crucial to the economy of the five counties that make up Southern California.



Transatlantic Cable

Taken by itself, the SoCal manufacturing base would rank third among states, after California as a whole and Texas. According to the Los Angeles County Economic Development Corp, the 808,000 factory jobs in Southern California account for just over 11% of total employment in the region.

Los Angeles County itself is the nation's largest manufacturing centre, and its 462,300 jobs in the sector top the Chicago-area total by more than 72,000. These manufacturers are primarily small businesses. More than two-thirds of all manufacturing jobs in Los Angeles County are at companies with fewer than 250 employees.

California has suffered from the nationwide attrition in manufacturing in recent years, having lost a net 464,000 factory jobs since 1990. Almost 350,000 of these losses were in Southern California, according to the California Economic Forecast, a private economic research firm based in Santa Barbara.

Automotive

General Motors hits a massive speed-bump along the road to recovery

After three straight quarters of profitability, the Detroit auto giant General Motors Corp on 7th November posted a stunning third-quarter 2007 loss of \$39 billion. By way of comparison, its year-earlier loss was \$147 million.

The results were all the more startling for their emergence from a stream of good news for GM last year. Not only had the company taken back its position as the world's biggest car maker from Toyota Motor Corp, of Japan; it had also concluded a landmark labour deal with the United Auto Workers that would greatly ease a crushing burden of responsibility for long-term health care for retirees.

Almost all of the staggering loss – some \$38.6 billion – was attributed by GM to the loss of deferred tax assets in the US, Canada, and Germany. To qualify for deferred tax assets, a company must be reasonably confident it will have taxable income. GM could not give that assurance, its confidence having been shaken by slow earnings growth in its core North American market and in its lending unit.

Overall, the company sold 4% more cars and trucks in the third quarter, raising its automotive revenue to \$43.1 billion from \$39.6 billion in second-quarter 2007. GM linked the rise to 'exceptionally strong' demand in emerging markets and improving developed-market demand.

GM's adjusted net income in the Asia Pacific region rose to \$138 million in the quarter from \$57 million, on strong export growth from GM Daewoo, continued strong sales and profitability in China, and improved earnings in India and Australia.

Even after the third-quarter results were posted, not all industry servers soured on General Motors.

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Taking a broader view, Deutsche Bank analyst Rod Lache said that he was standing firm on his buy rating on GM stock, telling clients he was surprised by the strength on the auto side of the business. (*MarketWatch*, 7th November)

"North America and Latin America were significantly better than expected," Mr Lache told *MarketWatch* reporter Shawn Langlois in San Francisco. "Asia was on target. Europe was disappointing."

Landing-gear accidents move Scandinavian Airlines to ground planes from Canadian maker Bombardier

The Stockholm-based carrier SAS AB has stopped using its Dash 8 Series 400 planes from Bombardier Inc after three crash landings in six weeks. The Q400's in the fleet, all 27 of them, were grounded as of 28th October, Scandinavia's biggest airline said in a statement. Bombardier, a Canadian conglomerate based in Montreal, Quebec, is a large manufacturer of regional and business aircraft and transportation equipment.

As reported by *Bloomberg News*, SAS had once before taken the turboprops out of service over landing gear-related accidents, but had phased them back into the fleet.

On 9th September, an SAS Q400 caught fire in Aalborg, Denmark, after its landing gear failed. Five of the 69 passengers were injured. Three days later, part of the landing gear of an SAS Q400 collapsed upon touchdown in Vilnius, Lithuania. ("SAS Will Stop Using Q400 Planes after Crash Landing," 28th October)

Bloomberg's Christian Wienberg and Niklas Magnusson wrote that SAS was trying to lease planes to limit cancellations, which totalled 53 for the single day on 28th October. SAS said it would claim at least \$157 million from Bombardier as compensation for lost revenue and damage to its reputation. "Confidence in the Q400 has diminished considerably," Chief Executive Officer Mats Jansson said in the SAS statement. "Our customers are becoming increasingly doubtful about flying in this type of aircraft."

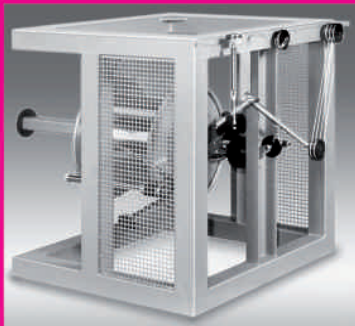
SAS was in cancellation difficulties even before the accidents, having had to scratch more than 2,000 flights as a result of staff walkouts in Sweden, Denmark, and Spain – at a cost of about \$47 million in earnings in the second-quarter 2007. As for Bombardier, Dan Solon, an independent airline analyst in Barcelona, told *Bloomberg* by telephone, "This is a massive blow to [the Canadian company]."

"One of their important customers has displayed lack of confidence in their product, and that's the worst thing that can happen to an aircraft maker."

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Telecommunications

▶ Europe activates its inquiry into Qualcomm royalty fees

After two years of apparent inactivity on the case, the European Commission on 1st October, revived its anti-trust investigation of Qualcomm (San Diego, California), assigning priority status to it. In October 2005, six telecommunications companies accused Qualcomm of anti-trust violations in the licensing of its mobile phone technology. Qualcomm makes chips for cellphones and charges royalties to handset makers and chip makers that use technology covered by its patents.

The petitioners – Broadcom and Texas Instruments (both US), Ericsson (Swedish), NEC and Panasonic Mobile Communications (both Japanese), and Nokia (Finnish) – claimed that Qualcomm's royalty fees for next-generation mobile phone chips were excessive and an infringement of agreements to keep fees at reasonable levels.

The EC said in Brussels that its in-depth investigation would focus on whether or not the licensing terms and royalties imposed by Qualcomm are 'fair, reasonable, and nondiscriminatory.' The move must not be taken to mean that it has proof of an infringement, the EC cautioned. But, fresh from its victory over Microsoft in September, the regulatory commission gave a strong impression of an agency in fighting trim.

As noted by Dow Jones (2nd October), if the commission does find against Qualcomm, it could fine the company as much as 10% of annual revenue and force it to change its licensing practices.

▶ Europe and America inch closer on international standards of accountancy

International accounting standards are gaining acceptance in many countries and the US is considering adopting them beginning in early 2009. Meanwhile, on 18th October, the body that governs the International Accounting Standards Board appointed a new chairman: Gerrit Zalm, who served as finance minister of the Netherlands from 1994 to 2002. Mr Zalm took office at the board, an independent accounting standard-setter based in London, as of the New Year.

Backers of the standards board say they believe that it must be – and must be seen to be – an independent body that sets standards based on principles, not through a consensus of interested parties. That was the view of Paul A Volcker, a former chairman of the US Federal Reserve, who was the first chairman of the International Accounting Standards Committee Foundation.

When Mr Volcker stepped down in 2005, the trustees of the foundation, which appoints members of the standards board and raises money for its operations, began a search for a chairman with a similar mind-set who was moreover known and respected by European governments. Two interim chairmen filled the post between Messrs Volcker and Zalm.

An early challenge for the new standards chief will be the insistence of some governments on exceptions to the international accounting standards that they accept in broad outline. Acting at the request of French banks, the European Commission decided that European companies could ignore a section of one standard, dealing with derivatives. The EC charged the standards board with working out a compromise that would satisfy the banks. No compromise emerged from several rounds of talks.

Academia

▶ Foreign students at American colleges and universities contribute heavily to the US economy

According to a new report published on 13th November by the Institute of International Education (IIE), foreign students in their growing numbers in the US are becoming an increasingly important economic force in the host country.

The report found that, in the 2006-2007 academic year, the net contribution to the US economy of international students at American colleges and universities was nearly \$14.5 billion – up a billion dollars from the previous year and the largest annual increase to date.

Writing in the *New York Times* ('Study: Foreign Students Added to Economy', 12th November), Tamar Lewin noted these highlights of the report *Open Doors 2007*, which was largely financed by the US Department of State:

- * The number of foreign students in American institutions of higher education, from community college to graduate school, increased 3% over the previous (2005-2006) school year, to 582,984. This followed three years of decline, and brought the total back to almost exactly the number of students who came to the United States for the 2001-2002 year, just before the 9/11 attacks;
- * Those enrolling in the United States for the first time surged 10% in 2006, a statistic considered important because those students are likely to study in the US for several years;
- * Overall, foreign students spent more than \$20 billion in 2006-2007, about half on tuition and fees and half on living expenses. An estimated \$14.5 billion came from the students' home countries, mostly from personal and family sources. Fewer than one-third got their primary financing from US sources;
- * The Institute of International Education is a non-profit organisation, based in New York, for the promotion of international study. Allan E Goodman, the IIE president, told Ms Lewin that students from overseas are a 'huge factor' in many American cities. For New York, where *EuroWire* has its US headquarters, Dr Goodman construed the importance of the visiting students in sports terms: "They contribute about \$1.5 billion [to the city], more than the Yankees, the Mets, the Rangers, the Knicks, and the Giants combined."



Interest in Asian, Mideast languages surges on US campuses

According to survey results released 13th November by the Modern Language Association, interest in non-European languages is definitely strengthening in the US. The MLA, with headquarters in New York, said that more college students across the country are enrolling in language classes across the spectrum, but especially in the Asian and Middle Eastern languages.

Since the last MLA survey four years before, Arabic language classes grew 126% (to nearly 24,000), Chinese 51%, Korean 37%, American Sign Language 30%, and Japanese 27%. Persian language classes nearly doubled nationally over the period, to around 2,300. European languages are seeing enrolments increasing at much lower rates: for example, 10% for Spanish, 2% for French, and 3.5% for German.

Although total numbers for the up-and-coming languages are small vis-à-vis more traditional language studies, Susan Kinzie of the *Washington Post* perceives in the enrolment trend 'a new sense of urgency' on the part of students to prepare themselves for a rapidly changing world. The impulse has received encouragement from, of all people, President George W Bush, who earlier last year

announced federal funding to prompt more students to learn strategic languages such as Arabic and Mandarin. ('Looking to Adopt a Foreign Tongue,' 14th November)

Ms Kinzie also described a culture of learning that goes well beyond the intensive vocabulary and grammar work of conventional language studies. Citing the growing Persian language programme at the University of Maryland, she wrote: "Students are speaking the language, reciting poetry by Rumi and other Persian writers, watching Iranian movies, and, sometimes, debating [Iran's] politics and its fractious relationship with the United States." A student interviewed by the *Post* expressed this double perspective. "I'm really glad that I took Persian," the University of Maryland junior told Ms Kinzie. "What once seemed obscure now seems increasingly important, with Iran constantly in the news. It's really necessary in today's world. And it's a beautiful, beautiful language."

A member of the rapidly growing Arabic and Islamic Studies department at Georgetown University, in Washington DC, is more inclined to the view of American language students as mainly pragmatic. If they see a vital need, in terms of national interest or a career, this teacher told Ms Kinzie, they are willing to invest time and effort in acquiring language skills.

Dorothy Fabian – USA Editor

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Plugging in for power – thanks to Nexans

Nexans has developed an innovative hybrid MV (medium voltage) ship-to-shore connection cable that enables ships berthed in port to cut their engines and plug into the local power grid, as well as providing an integrated data and telecommunications link.

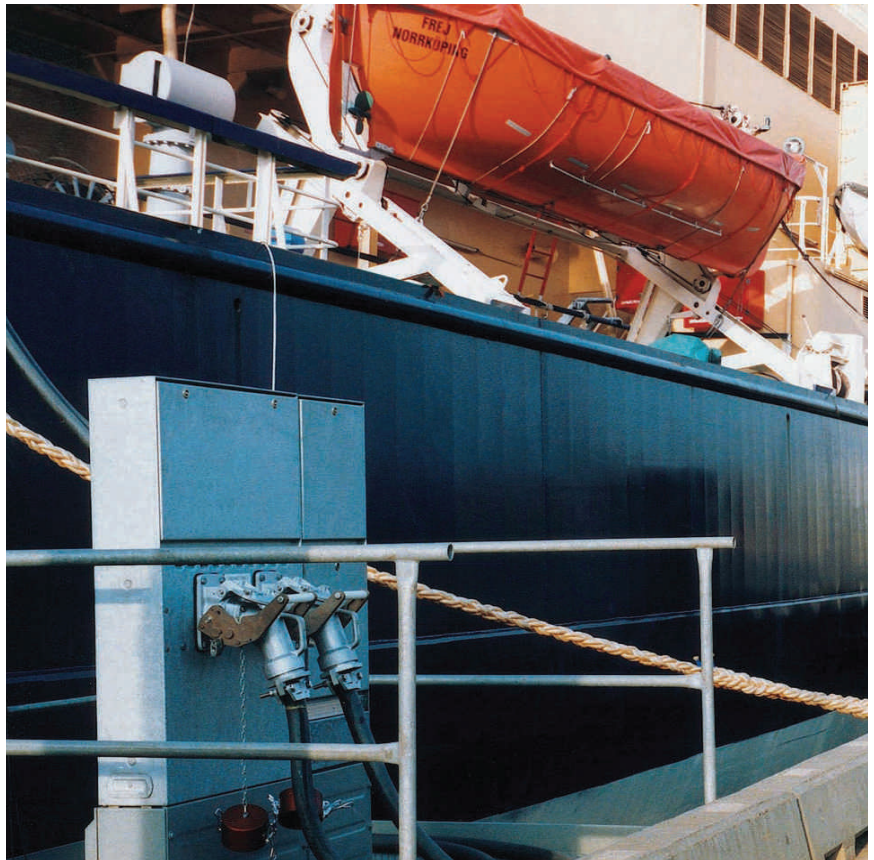
Environmental issues are now a key priority for the shipping industry and port authorities, and this cable will help large ships to make use of AMP (alternative maritime power) systems that effectively eliminate the production of greenhouse gases while in port, as well as reducing noise emissions and saving on fuel costs.

The Nexans hybrid ship-to-shore connection cable, branded Rheyfirm (RS), is aimed mainly at the new generation of large container vessels, LNG tankers, ferries and cruise ships, which require vast quantities of electric power (typically 1 to 5MW and currents of over 300A) to support heating, air conditioning, lighting and computer control systems.

The Rheyfirm ship-to-shore cable integrates MV (6/10kV) power supply, control cores and optical fibres for data transmission such as telephone and internet in a single, rugged, cable designed to be easy to reel either from onboard or from portside.

It has been developed in conjunction with SAM Electronics in Hamburg, Germany, one of Nexans' leading shipboard cable customers, while Cavotec has designed the matching reels, plugs and connectors to create a complete connection system.

Rheyfirm (RS) cable is around 80mm in diameter and comprises three 185mm² phase conductors and two earthing



▲ The new ship-to-shore connection cable from Nexans

conductors that provide an effective cross-section of 95mm² – as well as five control cores and 12 optical fibres.

Around 2,000m of the cable has already been delivered for 10 container ships, and Nexans, SAM Electronics and Cavotec are now promoting the system globally to meet the needs of busy ports and superports.

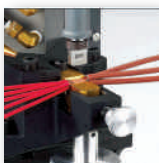
Nexans Germany took part in a working group to create the first draft of a standard for this new type of cable, and this is now being discussed on an international basis.

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Fax: +49 511 676 3777
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Website: www.nexans.com

technology at a glance

Sonobond Ultrasonics' new technology can help reduce splicing time by up to 60%.

Full report inside



Sikora has an advanced and unique method of optimising the production process.

Full report inside



A new hand held portable diameter control unit is available from Klaus Jakob.

Full report inside





New all round device for resistance measurement from Burster

Resistance measurement and Resistomat® are terms that belong together.



▲ The new Resistomat® 2316

Burster has launched a new Resistomat® 2316 – a tough, universal and compact resistance measurement device that suits all applications in industry surroundings as well as in laboratory conditions.

The new measurement device combines precision as well as easy handling and system integration capability quite perfectly.

The instrument measures resistances in the range of 2,0000 mΩ up to 200,00 kΩ with an accuracy of 0.03 % rdg, with the resolution in the smallest range reaching 0.1 μΩ.

A specially developed measurement input protection allows the measurement of inductive samples like electric motors and transformers as much as coils with iron cores.

The measurement of heating elements, fuses, switch and relay contacts or cables and wires are just a few further application fields.

Autorange, temperature compensation of the test sample, cable fraction detection and thermovoltage compensation are self-evident.

For the integration into fully automatic test stations the instrument features a PLC and RS232/USB interface.

Thanks to the large and backlit LCD display, the measuring value can be easily read from a major distance in dim production halls, as well as in direct sunlight.

The simply designed choice of the different measuring parameters is affected via an elaborate operation menu that provides five languages – English, French, Spanish, Italian and German.

Burster GmbH & Co KG – Germany
Fax: +49 7224 64588
Email: info@burster.de
Website: www.burster.de

Tenova's new slab furnace in operation

After the successful completion of the erection and start up phase – jointly carried out by Tenova LOI Italimpianti, Techint and Ternium Hylsa – the new slab reheating furnace at the Ternium steel plant in Monterrey, Hylsa, Mexico, has been put into operation.

The new furnace features the latest-generation technology using the new FlexyTech® Tenova flameless burners that combines reduced consumption and extremely low emissions with a reheating quality at today's highest levels.

These burners have already been successfully installed by Tenova LOI Italimpianti on recent high capacity reheating furnaces.

The new furnace will replace the old battery of pit furnaces, currently in the dismantling phase, guaranteeing an increase in production capacity.

The contract for engineering work and supply of the advanced technology plant components was awarded to former Techint Technologies Furnace Business Unit based in Genoa (Italy), now Tenova LOI Italimpianti, which completed the project on schedule. The contract covered support for plant installation, testing, start-up, and related services.

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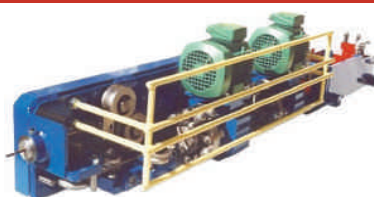
Rod dry preparation enables high-speed frictionless drawing

Decalub, France, has introduced the new generation DCCD (dry cleaning, coating and drawing) process which eliminates the most costly parameters in the wire drawing process, including elimination of acid and pre-coating chemicals.

As a consequence, the new process offers significant downstream benefits enabling the users to target a total saving of 50-65% in production costs of drawn wire.

The system allows immediate substantial cost savings in the most demanding drawing applications, including spring wire, high-tensile rope wire, bead wire, PC strand wire, AL clad wire, plating wire, bright wire, CO₂ welding wire, etc.

Following the scale cracking by rod reverse bending and rod smooth brush cleaning, upon automatically controlled brush pressure, the powerful multi-function LVC/PDH system, installed in the first draft, permits in-line high-performance dry coating and lubrication of H/C or L/C mechanically descaled bare rod, with liquefied standard dry lubricants the viscosity of which is automatically controlled during the drawing operation,



▲ Rod cleaning and wire drawing by DCCD process

completely eliminating traditional wet pre-coating chemicals.

One of the typical applications of the DCCD process consists in direct drawing from 5.5mm diameter mechanically descaled bare rod, with 0.83/0.88% carbon content, without pre-coating, with an output of 2.2 tons per hour and with a die life of 200 tons per die in the first draft.

Full lubricant film achieves frictionless drawing by physical separation of wire-die contact in all drafts, enabling die wear of 0.30 micron per ton of wire drawn, with virtually no speed limitation, dependent mainly on rod pay-off and wire take-up modes.

Decalub – France
Fax: +33 1 60 20 20 21
Email: info@decalub.com
Website: www.decalub.com

Gearboxes upgrade from CMS

CMS has recently supplied a set of gearboxes for an Indian steel rolling mill upgrade through its Shackleton Engineering Gearbox Division.

The key objective for the project was to upgrade the gearboxes in the steel rolling mill with the minimum of downtime and disruption to production.

The drive system for the steel rolling mill comprised: 5.5 ton gearbox for the main coiler rated at 17kW; 2.5 ton gearbox for the slitter rated at 55kW; 2.5 ton gearbox for the shear drive rated at 55kW; 0.4 ton gearbox for the die set drive rated at 62kW and a 0.2 ton gearbox for the leveller rated at 200 kW.

The gearboxes were all designed to the high quality case hardened and ground gear standard (DIN 3990-5). The external dimensions were specified as direct replacements for existing gearboxes to minimise replacement time and eliminate any foundation work in a production environment.

The gearboxes were manufactured, assembled and fully tested in-house



▲ The Shackleton gearbox Slitter Main Drive 55 kW 2.5 ton with change speed

before customer inspection and shipping. Since installation, the customer has experienced increased productivity and reliability from this production line.

Shackleton gearboxes are installed worldwide and have an enviable reputation for reliability and long service in a broad range of industrial applications.

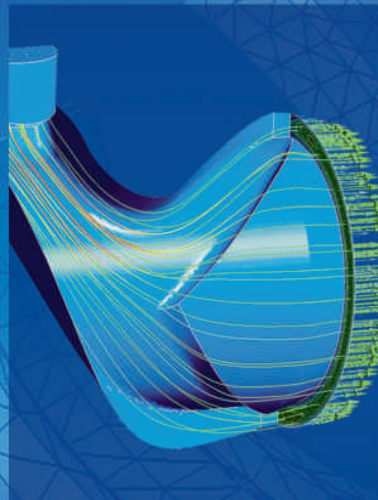
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Stronger welding

Gemlux's Genoa Mk II is a machine dedicated to automatically cutting and welding wire rope into a tapered and twisted end configuration at both ends. This ensures that the welding is stronger due to the smaller welding area, and the tapered configuration will guarantee an easy insertion of the cable into any product.

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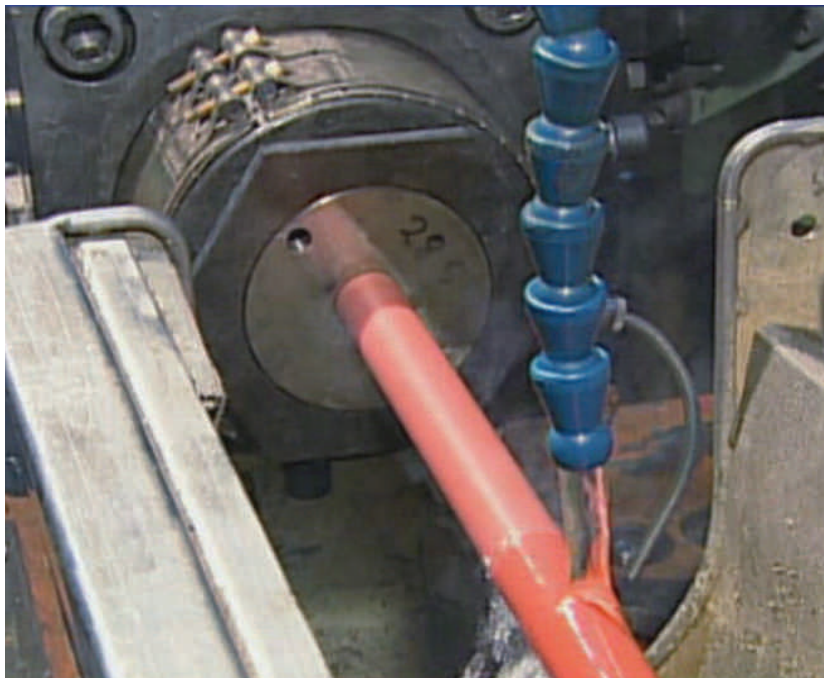
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▲ The concept of the Virtual Gauge Technology

With the state-of-the-art Virtual Gauge Technology (VGT), Sikora has an advanced and unique method to optimise the production process, to minimise the material over-consumption and to simplify the operation of a production line.

This quickly and easily provides precise measurements, even under the most extreme conditions and in the smallest spaces.

Virtual Gauge Technology is the next chapter of measuring technology for the wire and cable sector.

This technology, developed by Sikora, controls the wall thickness of the product quickly and precisely at the requested nominal value even though a measurement of the wall thickness immediately after the extruder does not occur. The virtual measurement is still authentic.

Previously lines with a relatively low haul-off speed could not control the extruder from the end of the line due to the dead time resulting from the distance of the measuring device to the extruder.

VGT eliminates this lag time and shows even during the start of the production the expected cold wall thickness, despite the product not having arrived at the end of the cooling section.

The measuring device is installed at the end of the cooling section for this method. Issues such as contamination, water influence or mechanical load, all of which occur with placement directly after the extruder, are eliminated.

The extruder can be controlled by the VGT during the starting phase to the calculated rpm that is necessary in order to achieve the entered cold nominal wall thickness.

The specification of a cold wall thickness value is a decisive advantage over conventional methods where the extruder rpm is entered and as a result a wall thickness value is achieved.

Control of the extruder is in consideration of the inserted haul-off speed. The virtual measuring gauge head calculates the extruder rpm to realise the specified wall thickness.

The measuring device after the cooling section balances the actual wall thickness against the predicted one and controls the extruder to the requested wall thickness as necessary.

Sikora AG – Germany
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Website: www.sikora.com

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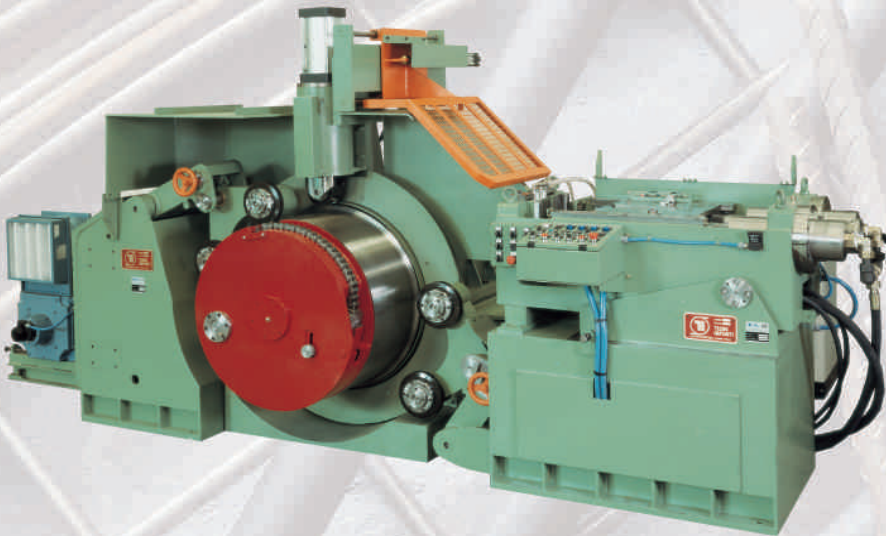
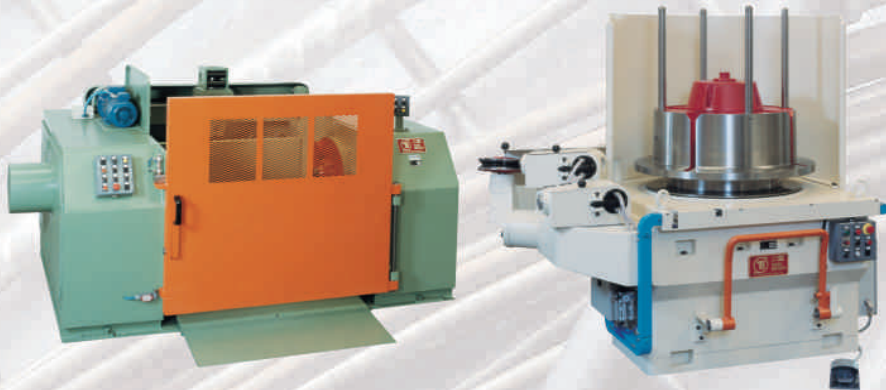
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Extension to pulsed laser product range

SPI Lasers has launched an extension to its pulsed laser product range for marking solutions.

The 10 & 20W – RM (restricted modulation) pulsed laser modules are the newest members of its marking product family, providing a value-engineered solution that is ideally suited to high volume, single application operations.

The newly introduced 10 & 20W modules bring the total to four pulsed lasers within the current range, providing the laser marking market with complete coverage. The flexible and feature rich 12W and 20W G3 models have successfully served the marking and micro machining markets, respectively, securing volume orders in a wide variety of applications such as metal and plastics marking, paint on plastic removal, ID card marking, and thin film ablation.

However, feedback from customers with marking systems dedicated to a single application on materials such as metal reported feature redundancy when using the 12W.

The new 10W and 20W lasers offer an equivalent performance to the best fibre lasers on the market today, focusing on sub-100kHz marking applications.

The 12W and 20W full feature lasers open up new marking and processing opportunities requiring over 100kHz repetition rates competing across the entire spectrum of fibre and vanadate lasers.

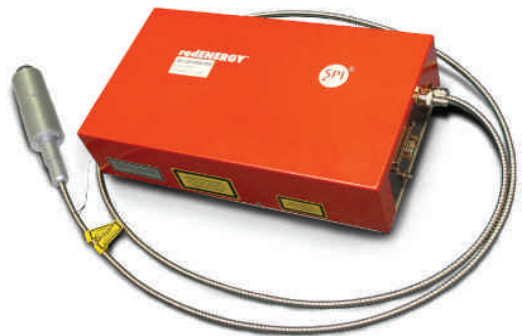
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As well as being a major manufacturer of Sony Ericsson and Motorola OEM earphone cables, the company mainly exports to the USA, Canada, Italy, Japan and other countries in south east Asia. With more than 20 years' experience in manufacturing cable products, Perfect Fortune is able to deliver OEM and ODM cables to match customers' specifications.

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New tester from Rigon

Specialising in the design and manufacture of a whole range of enamelled wire testing equipment for the determination of mechanical, electrical, thermal and chemical features, Italian-based company Rigon Instruments has introduced its latest breakdown voltage tester.

The tester is available in a wide range of models to meet customer requirements.

The main target during the development of the breakdown voltage tester was to enclose in one instrument the ability to carry out tests in accordance with different methods and regulations, maintaining at the same time the simplicity of use, reliability and completeness of accessories.

The new model RDT2 allows tests according to all main international regulations such as IEC 60851-3.4 and NEMA MW 1000.

The wide ambient temperature test chamber allows the insertion of electrodes for the whole production range.

Model RDT includes more features than the model RDT2 and could include an



▲ The model RDT2 voltage tester

air draught oven to carry out tests at temperatures up to 250°C.

Rigon Instruments SAS – Italy

Fax: +39 011 248 0012

Email: rigon@rigon.it

Website: www.rigon.it

A world first ...

DSE is introducing the first new high voltage continuity tester covering the full surface of a rectangular wire.

After introducing a new range of high voltage continuity (HVC) testers last year, DSE has now added a new type of HVC tester made for rectangular wire – HVC 360 PF Flexible – the first in the world.

The HVC tester is a highly useable tool for adjusting the processes and surveying the production of enamelled wire. The high voltage control circuit is designed with an advanced current control system to avoid spark damage of the wire insulation or electrode system.

Based on the most advanced software platform on the market, the HVC test system is applicable for testing all types of wire insulation with a test voltage up to 6kV. The use of conductive brushes makes it possible to make a full 360° test of the surface.

DSE A/S – Denmark

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New hardness tester for 'one-stop-shop'

Deutsche Edelstahlwerke in Stuttgart, Germany is a member of the Schmolz + Bickenbach AG group of companies which, with 150 years of experience, 11,000 employees and sales exceeding €4 billion, is the world's largest producer, processor and distributor of special steel long products.

The company offers customers a 'one-stop-shop' for heat treatment processes including plasma nitriding.

Leading major German automotive sports car manufacturers rank amongst their list of clients, and Zwick has equipped the laboratory with all of its hardness testers – the most recent being the premier ZHU250 TOP Universal Hardness Tester.

This machine has expanded the capability of the laboratory to carry out Rockwell, Vickers, and Brinell tests, and includes an innovative revolver system incorporating four indenters.

Similar systems require three or more objective lenses to cover the application range but, due to Zwick's unique digital zoom technology, the ZHU250 requires only two.

This enables a fast throughput of tests, and many different types of test can be carried out on the same machine with very high accuracy and repeatability.

The test results are also sent to the host computer system via a computer interface.

Zwick Roell – Germany

Fax: +49 7305 10200
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Website: www.zwick.de

Two new hand tools

M J Mallis has introduced two brand new friction weld hand tools that have been developed especially with convenience and ease of use in mind.

The first new model, called Digit-Smart, boasts a digital control touch pad, ergonomic design and weighs just 3.8kg including battery.

Suitable for use with both polypropylene and polyester strapping, the Digit-Smart model features simple, reliable digital adjustment of strap tension and seal time, and is suitable for strap widths of 10mm-16mm (0.5mm-1mm thick).

Maximum tension is 2,000N. Well-balanced and self-supporting, to allow extremely comfortable single-handed operation, the Digit-Smart tool is ideal for use on all flat-pack type applications.

M J Mallis – UK

Fax: +44 1773 539090
Email: sales@mallis.co.uk
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▲ The ZHU250 TOP hardness tester

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BWE Ltd has been manufacturing Conform™ and Conklad™ continuous extrusions machines for more than 30 years. In 1976, BWE was awarded the original Conform patent licence from the inventors of the process (UKAEA), and has gone on to supply many machines for a wide range of different applications in the global non-ferrous and cable and wire industries.

BWE secured contracts for a range of small to large machines for copper applications such as rectangular wire (magnet wire), lightning conductors, bus bars, trolley wire and other sections to customers in Europe, the Far East and the Middle East.

Additionally, two large SheathEx™ machines (sheathing of high voltage power cables) and a Conklad 350 machine for ACSR applications, were supplied to three new Chinese customers in 2007.

BWE Shanghai Ltd, established in 1995, has been extremely successful in manufacturing cold pressure welders. In 2002, BWE Shanghai opened its new modern factory in Pu Dong and has since supplied a number of Conform machines to the Chinese domestic market.



▲ BWE's plant in China

BWE can now offer Conform machines built by BWE Shanghai Ltd to the world market at reduced prices.

These machines will be manufactured and assembled in China, under the supervision of BWE UK specialists and all machines will be subject to final inspection and CE certification in the UK. Standard design features a planetary gearbox to ensure long bearing life. To maintain high manufacturing standards, some equipment

such as heat exchangers and hydraulic pumps will be of European origin.

Initially, BWE will begin to offer and supply their popular Conform 315 machine, for small copper and aluminium applications. Other machines in the BWE range will follow in the future.

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SOMA AG join us at the **wire Düsseldorf** 31st March - 4th April 08 **hall 10 • booth G50**

The finest in fine wire technologies

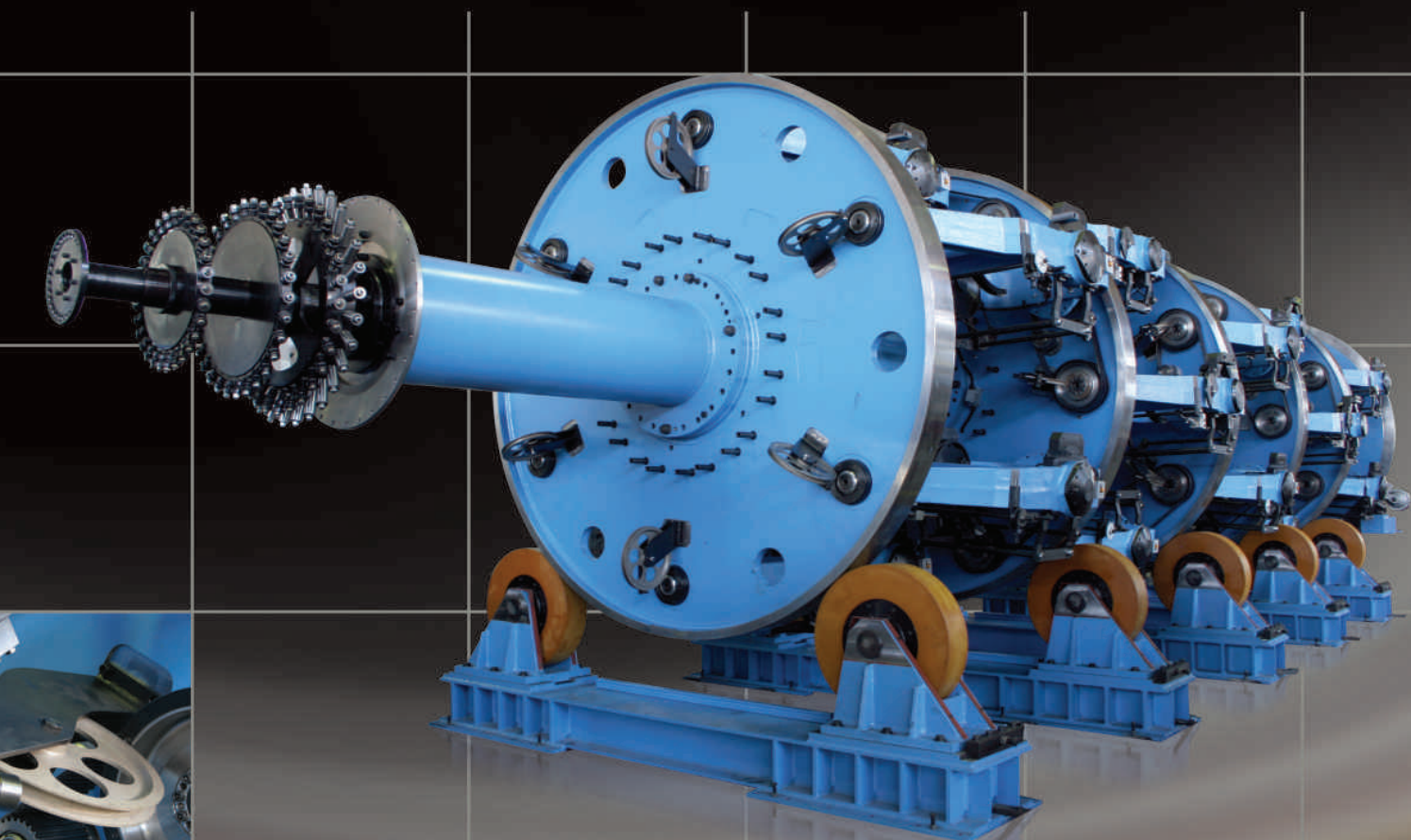
Soma is an international active system and machine manufacturer for the fine and ultrafine wire industry. With its high technology and complex products, Soma is one of the leading suppliers worldwide of wire drawing machines, coiling machines, specialised machines, as well as winding, take up and pay off systems.

Due to continuous improvement and expansion, the use of modern tools and an optimal deployment of SOMA's broad know how, our team is able to develop effective, customized and competitive solutions in a very short time.

Soma offers a **wide range of fine wire drawing, winding and re-winding machines.** (Wire range 1,5 - 0,01 mm = 0,06 - 0,0004 inch) All our machines are designed for a maximum production output with the highest possible quality. Process stability and optimized operating comfort are other key points of our product philosophy.

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Drop in splicing time using Sonobond technology

Sonobond Ultrasonics' splicing technology has significantly reduced production time for a major manufacturer of automotive wire harnesses.

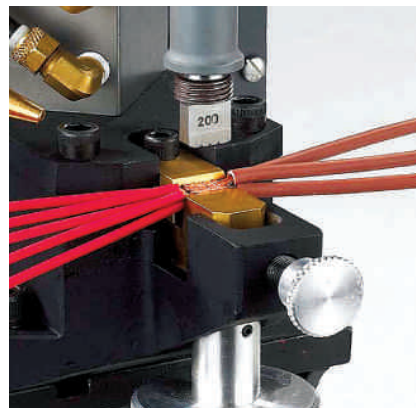
This is based on information received from Curt Reynolds, director of manufacturing, at J&M Products in San Fernando, California, USA. Reynolds reports that his company has cut splicing time by a dramatic 60% since installing Sonobond's SpliceRite™ ultrasonic wire splicers.

Prior to introducing Sonobond's ultrasonic splicing technology into its production process, J&M Products used a two-stage system of mechanical banding and soldering.

The Sonobond SpliceRite™ ultrasonic wire splicer offered J&M the practical, cost-effective solution it needed for faster, more reliable wiring harness assembly.

The company's research showed that this proven ultrasonic technology quickly splices wire bundles and creates a true metallurgical bond – without producing arcs, sparks, or fumes.

J&M Products also liked the fact that this Sonobond system eliminates any need to crimp, clip, solder, or dip in order to make strong, high-quality wire connections. And, unlike other ultrasonic welders, the



▲ Reduced production time from Sonobond

SpliceRite™ is able to bond wire bundles even if the wires are oxidised or tin plated.

The SpliceRite™ comes in both 1,500 and 2,500 watt capacity and utilises Sonobond's patented 'wedge-reed' system of high vibratory force and low amplitude coupling. Welds can be controlled by height, energy or time. The unit's microprocessor is able to interface with a computer via an RS232 port.

Sonobond Ultrasonics Inc – USA

Fax: +1 610 692 0674

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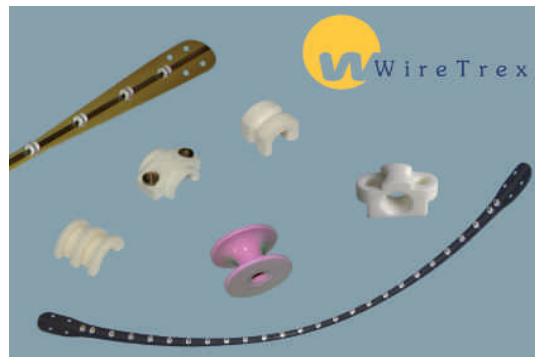
Help at hand from WireTrex

Design and selection of bows for bunching and stranding machines offer a variety of challenges to users and manufacturers.

Despite a relatively simple basic design concept and limited number of components, applicable materials and shapes allow for a multitude of combinations.

As a supplier of quality spare parts, WireTrex not only provides standard bow models specified by machine manufacturers but also numerous variations. The company offers a wide variety of ceramic and carbide bow guides as well as wear strips.

In addition, WireTrex is prepared to assist customers to find the right combination for their individual applications and help develop innovative solutions where needed.



▲ A selection of bows from WireTrex

WireTrex Ltd – Germany

Email: info@wiredtrex.com

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World leading supplier of Lead Sheathing Equipment to the cable industry!

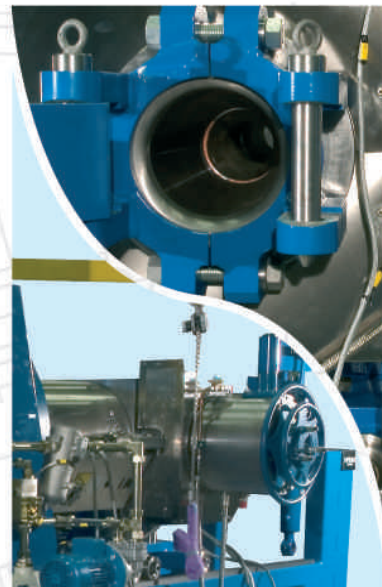
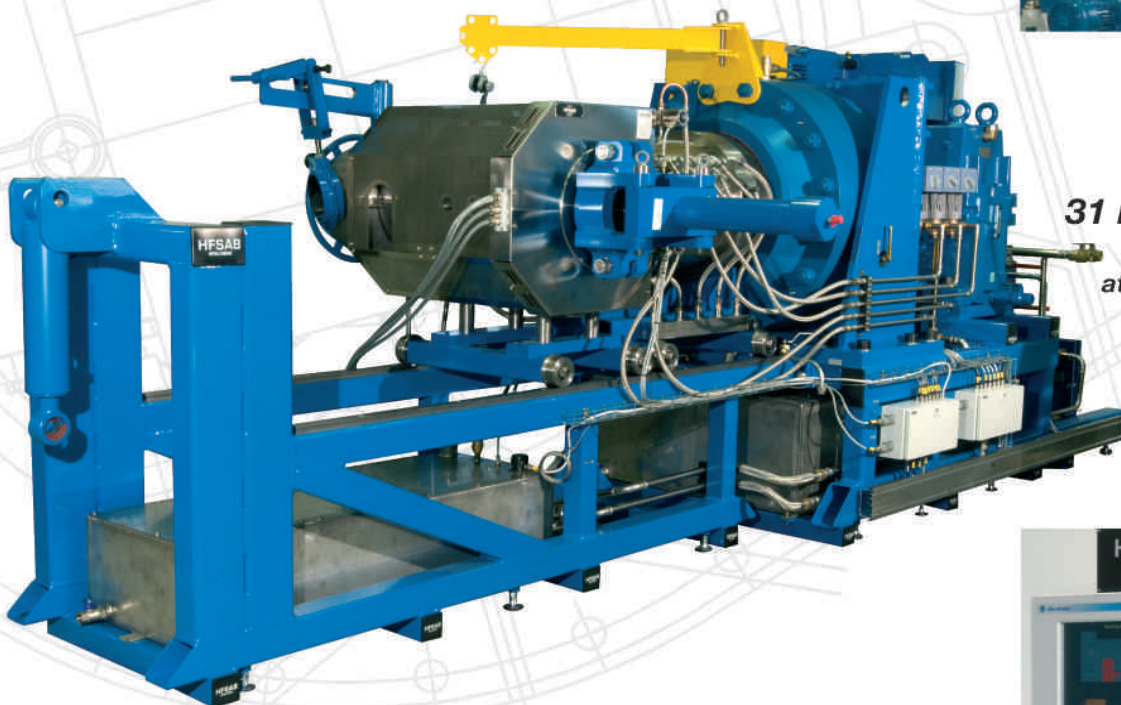
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31 March – 4 April 2008

Düsseldorf, Germany

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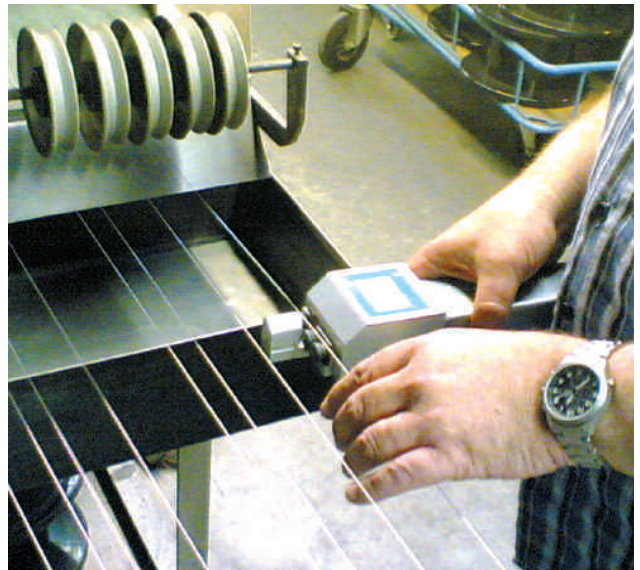


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Portable control from Klaus Jakob

The measuring technique based on the principals of laser scanners and diffraction for non contact and in-line measuring of diameters and cylindrical objects such as wire, enamelled wire and monofilaments, has been around for some time.



▲ *The new LMD HO1B addresses shortcomings*

So far however, usually firmly integrated or stationary systems are available. The new hand held portable diameter control unit LMD HO1B addresses this short coming.

It is now possible to obtain accurate diameter checks within seconds at virtually any point on or off line with the LMD HO1B.

The unit measures cylindrical objects in motion or at 0 speed ranging from 0.03mm to 1.30mm (0.00118" to 0.051") or 0.05mm to 1.8mm (0.00196" to 0.0708") (HO2B).

This handy unit with its small dimensions can be utilised wherever small diameters need to be checked.

It has proven to be quite useful specifically during the string up process, since the wire can be checked quickly and without effort, between the various drawing steps.

This ensures mistakes can be caught early, which otherwise would have led to wire breaks or early die wear.

Rapid wire checks before and after annealing will indicate tension respectively, stretching of the wire.

Quick and easy diameter checks during the magnet wire production and after each coating process are also possible.

The instrument comes equipped with a lithium battery, which provides extensive operating time and a very short recharging process.

Klaus Jakob Messtechnik AG – Germany

Fax: +49 06209 721116

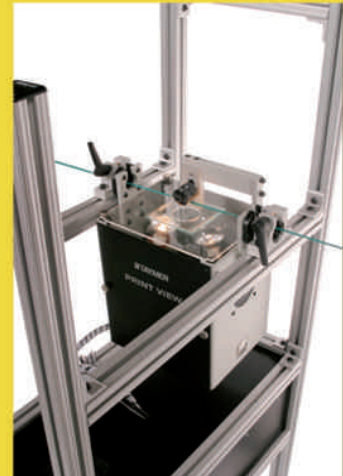
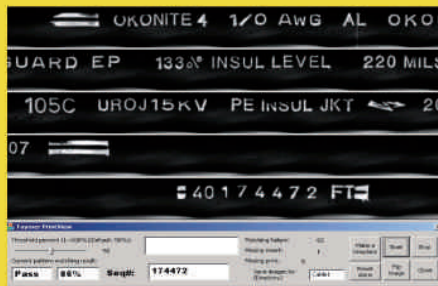
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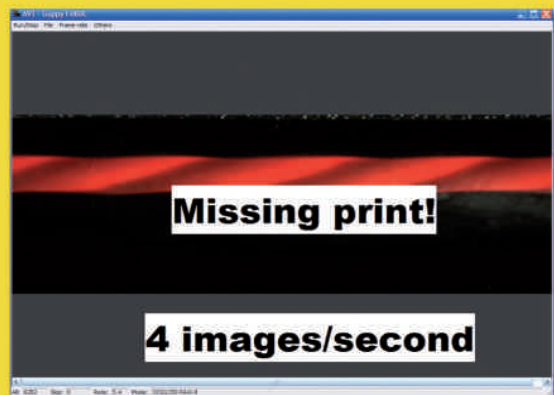
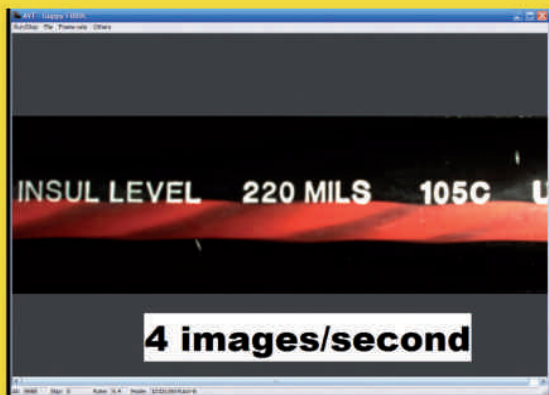
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New electric furnace

I LE S Srl has launched an electric furnace with horizontal chamber together with quenching tank and NC loading device, model 1.08.3+7.62+DCB.

The main characteristic is the innovative system of automatic loading / unloading / quenching system of interlocking to the furnace, named DCB.

This is made of a four-axe NC loading device that, using a personalised hooking device, allows the operator to work in a completely safe zone. The operator just has to do some simple operations to put the pieces in and out of the NC loading device.

To program the machine the operator only has to enter the data by means of the operator board and of the programmer of the thermal cycle.

I LE S Srl – Italy
Fax: +39 0373 750 110
Email: info@iles.it
Website: www.iles.it



▲ Electric furnace from I LE S

Double automatic spooling line from PS Costruzioni for Australian plant



▲ The PS400/14-B from PS Costruzioni

PS engineers have designed and installed a double automatic spooling line, Model PS400/14-B, featuring a double portal pay-off stand and automatic pallet units, at Prysmian Plant in Australia.

The double portal pay-off enables the line to produce spools continuously, without any time lost to changing cable reels. While the first reel is unwinding the second portal pay-off can be loaded with a new reel.

As soon as the first reel is empty, the operator moves the first portal pay-off aside and moves the second one into place, threads the cable end and re-starts the line operation.

The produced spools are labelled and conveyed automatically to the axis automatic pallet units.

The plant also features an incremental cable marking device, using an ink jet printer, which enables the cable to be cut on the 100m mark. The pay-offs accept reels with diameters from 1,000mm to 2,000mm, with a maximum weight of 7 tons.

Spool sizes range in outer diameter from 200mm to 400mm, with width of 100mm to 400mm, bore of 102mm, and maximum weight of 45kg. The line can accommodate multi-polar insulated flexible and semi-solid cables with outer diameter of 5-14mm, and semi-solid flat cables with dimensions from 4.12 x 6.06mm to 16.5 x 9.55mm.

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Bespoke and versatile Delisi . . .



▲ The model HS6H with hydraulic and flying shear cut for wires from 1.5 to 6mm

Founded in 1955, Delisi produces automatic straightening and cutting machines for smooth and ribbed wires from 1 to 20mm in diameter.

The most important characteristics of Delisi machines are the versatility and bespoke services.

The first improvement is when a new diameter must be prepared. The grooves of the rolls are positioned, with a handwheel, at the new diameter that must be worked. Slackening three bolts, changing the

straightening unit and tightening three bolts, the new diameter is programmed.

The spinner works at lower speed as the jaws have longer contact with the wire with the results being an increase in production and reduced noise. An electronic programmer and one or three lines of pneumatically tiltable arms can be supplied with the rod collection bed.

A total of 99 different lengths and 99 different quantities can be programmed and collected separately in one of the lines,

without stopping the machine and giving the operator the possibility to empty the lower line of tilting arms.

Delisi Srl – Italy

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Special drawing lubricants

Pan Chemicals produces special drawing lubricants and coatings for ferrous-non ferrous and stainless steel wire and equipment for the wire industry.

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- Wet drawing lubricants: Soluble lubricants, neat oils and greases.
- Products for surface treatment: Phosphate coatings, non reactive pre-coatings, pre-coatings for stainless steel.
- Auxiliary products for: Degreasing, surface treatment, pickling of stainless steel, special applications.

Equipment:

- Sanding belt descaler
- Deblaster TR 1 (single wheel shot blaster)
- Borax - coating and drying equipment
- Mechanical descalers
- Rotating pressure die boxes
- High-tech die reconditioning equipment

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5



4



5

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plating line

2

dry drawing machine

5

23 Wet drawing machine

4

double twisting strander

5

wet drawing machine

6

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6

Modern software tools help accelerate wire harness development

Today, many companies create their electrical systems and wire harness designs using general purpose drawing tools.

At first sight this seems sensible – such tools are usually flexible, inexpensive, easy-to-use, and can be used to create all the drawing sets typically associated with electrical design: wiring schematics, harness drawings, service diagrams and the like.

But general purpose tools are a false economy in electrical design, as they have no in-built intelligence of the real-world product – its electrical behaviour, manufacturing constraints, or costs.

The resultant design drawings are just that: two dimensional pictures containing lines, arcs and text but with no notion that these visual entities actually represent electrical objects (such as wires and connectors) that have specific electrical behaviours.

As a simple example, if the engineer moves a component in an electrical diagram, any connecting wires must each be moved or redrawn as well. And since no electrical information is incorporated into the drawing, parts lists and other reports must be created manually as a separate process.

By contrast, dedicated electrical tools allow the engineer to create designs using 'intelligent' representations of electrical objects, selected from an integrated components library.

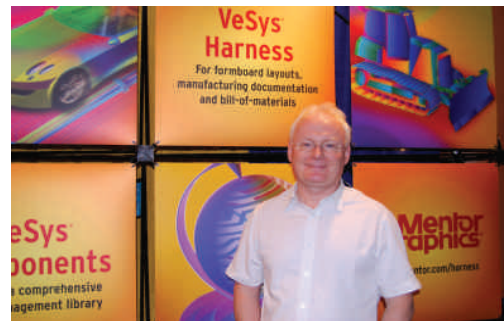
This provides multiple benefits. Drawing creation is faster – when the engineer moves the component the wires automatically move with it, remaining connected.

Correct component selection and compatibility can be guaranteed – because parts are selected from a library that contains detailed descriptions of compatibility and costs.

Electrical integrity can be validated because the electrical symbols on the drawing have in-built models that can check voltages, currents, fuse and wire ratings.

Costed bills of material, and other reports, can be generated automatically. In other words the software helps the engineer create lower cost, right-first-time designs, with less effort, because it supports the engineer in his or her design creation task by understanding the intent behind the task.

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► John Wilson, of Mentor Graphics

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or contact: kevinbeckett@bwe.co.uk

BWE Ltd

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Alphabetical list of Exhibitors

Please visit www.wire.de or email info@wire.de
(Exhibitors list correct at time of going to press – December 2007)

Company	Country	Stand
3View Com Inc	Korea	14D54
A 1 Fence Products Company	India	13D75A
A Appiani SRL	Italy	11G32
Aachener Maschinenbau GmbH	Germany	14E43
AB Hörle Trad	Sweden	12A36
Acciai Speciali Zorzetto Srl	Italy	12C17
Acciaierie Valbruna SpA	Italy	09B05
Acerinox (Inoxfil SA)	Spain	12C53
ACIMAF Italian Wire Machinery Manufacturers Association	Italy	11F21
ACM A/B	Sweden	09E38
ADC SARL Fabricant de Filières	France	09C02
Advaris Informationssysteme GmbH	Germany	10B22
AEI Compounds Ltd	UK	11F02
Aeroel Srl	Italy	09B55
AESA SA	Switzerland	10B38
Agibi Progetti srl unipersonale	Italy	14A58
Agir Technologies (Mouton-Rivom)	France	10G56
AGST Draht- & Biegetechnik GmbH	Germany	12C61
Aichelin GmbH	Austria	13A11
AIM Inc	USA	11A25
Ajex & Turner Wire Dies Co	India	11G02
Alcan Aviatube	France	10E68
Alecosa Aleados del Cobre SA	Spain	09A13
Jacques Allemann SA	Switzerland	12E53
Alloy Wire International Ltd	UK	11E28
Almetha GmbH	Germany	11J76
ALMT Corp	Japan	14A31
Alpaplastic snc	Italy	11G57
Alsafil filiale de Nexans	France	09C41
Altec Srl	Italy	11H25
Altrimex Packaging Equipment BV	Netherlands	14E21
Aluminium Pechniney Alcan Group	France	13B75
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Amic	France	10H22
Ampere GmbH	Germany	09A44
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Anceschi Srl	Italy	14D11
Anderson Machinery Handelsges GmbH	Germany	11E78
Angeli di Casadio Nerio & C Snc	Italy	11H32
Anu Extrusions Pvt Ltd	India	14C39
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Arcelor Mittal Long Carbon Europe	Luxembourg	12B17
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Arma Plus S A	France	13F87
Asahi Sunac Corporation	Japan	13D14
ASA-RT Srl	Italy	09F74
Asea Wire & Cable Machineries Spare Parts Pvt Ltd	Turkey	10C03
Asel Machine Production	Croatia	14A62
AstroPlast Kunststofftechnik GmbH & Co KG	Germany	11A78
AT Wire Profile & Draht	Germany	09F44
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ATR SpA	Italy	13B66
ATS Sp z oo	Poland	13A94
Aumann GmbH	Germany	10F43
Auserpolimeri Srl	Italy	13B78
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AW Machinery LLC	USA	09F15-03
AWM SpA Automatic Wire Machines	Italy	11A22
Axjo Plastic AB	Sweden	12E04
B + B Eisen- und Stahlhandel GmbH	Germany	12C77
Société des Filières Balloffet SA	France	10A18
Bamatec AG	Switzerland	14A58
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Carl Bechem GmbH	Germany	09F42
Becker & Bläser Draht GmbH	Germany	12A71
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Begra Granulate GmbH & Co	Germany	12A57
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that circled
the world...



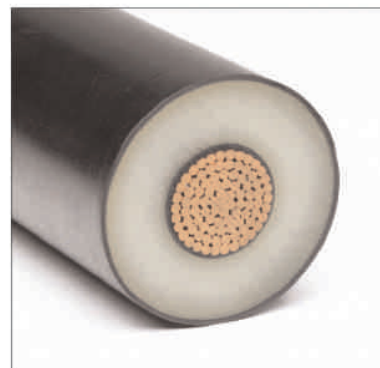
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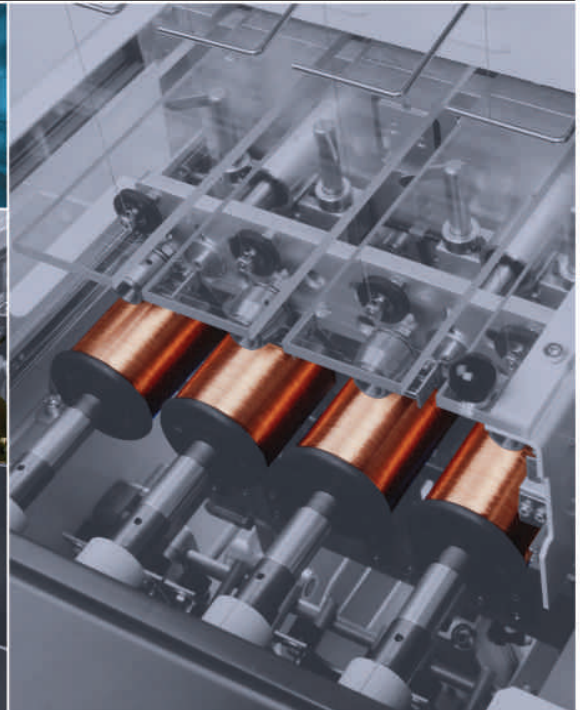
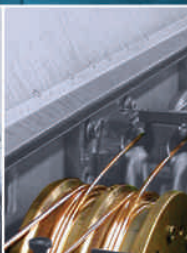


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Type KS 20



Colwelders for solid wires:

- Copper:0.15 – 8 mm Ø
- Aluminium:0.15 – 13 mm Ø

Type 1N V



Electric welders for solid wires:

- Steel:0.10 – 40 mm Ø
- Copper:0.10 – 30 mm Ø
- Aluminium:0.80 – 34 mm Ø

Type SE 300

For stranded conductors:

- Copper:0.08 – 1,200 mm²
- Aluminium:1.50 – 1,200 mm²



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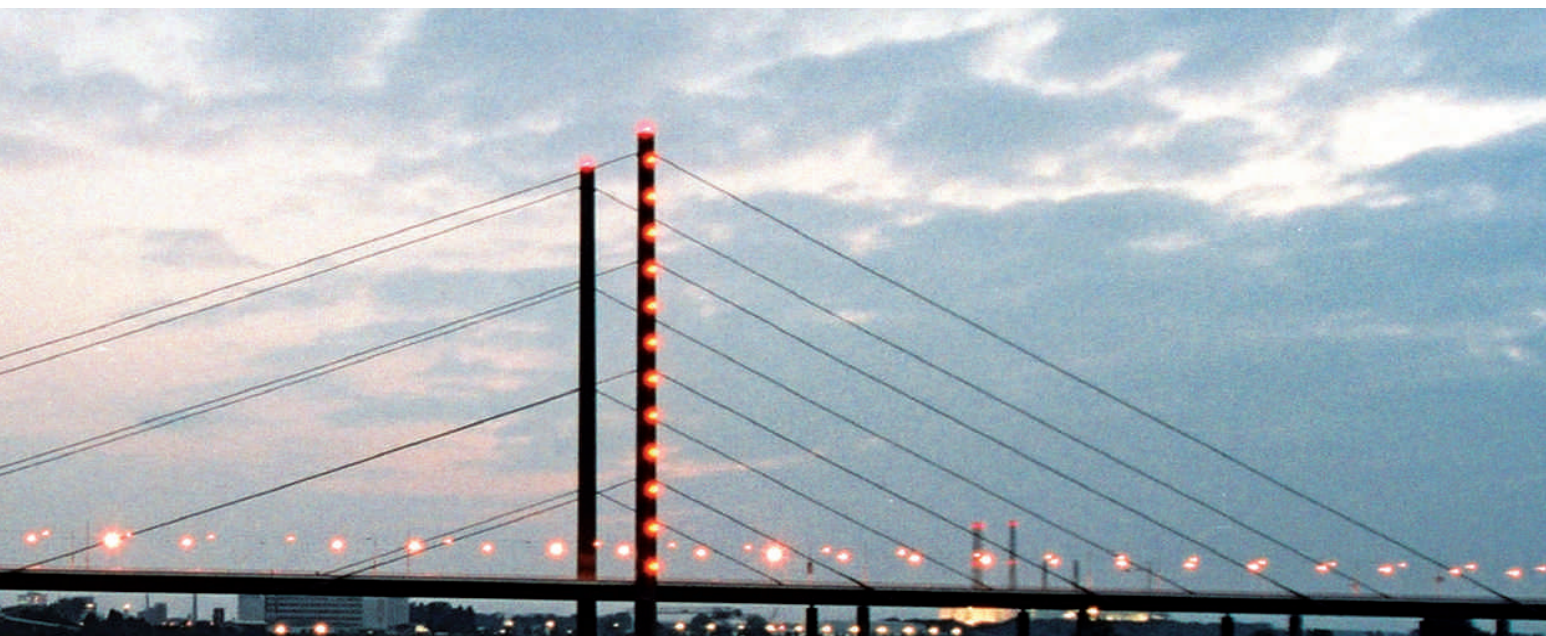
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Trafileria Lecchese Srl.....	Italy	13C55	Vaspo Vamberk sro.....	Czech Republic	12A60
Trafileria Manzoni Srl.....	Italy	13B52	Venus Wire Industries Pvt Ltd.....	India	09B02
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Feature

Reels & spools



These specialities belong to the end-game of wire manufacture. A mishap at any stage of a high-speed wire and cable making operation will impact productivity. But a strong case can be made that a late-day setback is costliest of all. Is an accident close to the finish line more of a heartbreaker than one that takes place at the opening gun? Most of us would say yes. It is the intention of the companies here that the question need never arise.

70th anniversary for Hamelin

Founded in 1938, Hamelin continues to evolve as a leading supplier of wood reels and related services in Canada and the United States. Hamelin supplies customers with plywood and nailed wood reels from plants in Boisbriand, Quebec, Bowmanville, Ontario, and Worcester, Massachusetts. Most customers today require the vendor to manage their reel inventory.

Hamelin does so with new reels and repaired and recycled reels. Canadian reels are returnable and in most cases two out of three reels are repaired. Hamelin is also located to a year-round deep sea port and supplies cable reel components

worldwide. The availability of Canadian timber and more than 70 years' experience allow Hamelin to be competitive in many different markets.

The business environment today requires constant innovation. Despite the product being an 'old' product Hamelin prides itself on creative thinking. Lumber, steel, reel design and exterior markings are but a few aspects being reviewed to reduce total costs to customers.

J Hamelin Industries – Canada

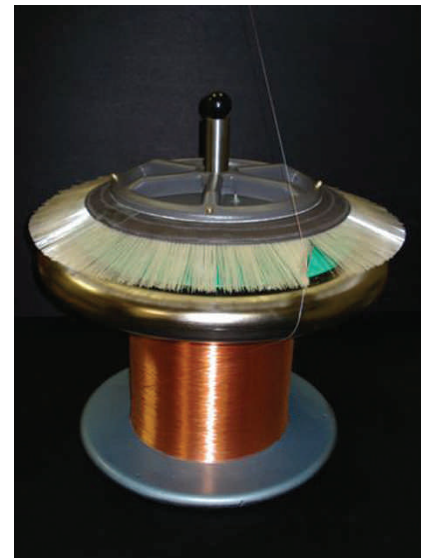
Fax: +1 450 435 1211 **Email:** dcatellier@jhamelin.com

Simple pay-off system from Wyrepak

If reels and spools are being used in a wire mill, there is a good chance there is a need to pay off wire to a processing operation such as extrusion, annealing, cutting, etc.

In most situations, the easiest and most economical pay-off system is Wyrepak's simple spool cap and tension brush, with the following characteristics:

- easy to install
- easy to operate
- works with most types of wire
- diameters from 0.002" up to 0.130", single strand (0.051 to 3.3mm)
- spool sizes from 6" to 49" (152 to 1,245mm)



▲ Economical system from Wyrepak

Tension brushes are made from a special, very tough nylon monofilament and are sized according to the wire type and size for longest life.

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reels & spools

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▲ A reel for drum twister application

With the recent agreement made with the Spanish company Bobinor SA, GMP Slovakia can now produce reels for cables with large dimensions. This kind of product is called CD-corrugated drum.

GMP Slovakia – Slovakia

Fax: +421 39 030 9579689

Email: info@gmp-slovakia.it **Website:** www.gmp-slovakia.it

Experience counts for Boxy

Boxy has been producing reels in steel, stainless steel and aluminium for wire, rope and cable to DIN standards and customer specification since 1969.

It also produces reels that can be assembled and disassembled mechanically, pneumatically and hydraulically and special equipment for handling reels and coils to customer specifications.

Boxy's position in the market has grown and consolidated over the years as they have expanded and improved sales and manufacturing units.

With a strong emphasis on research and development, the production process is controlled by CAD-CAM procedures, which monitor and control all machinery and parameters.

Boxy has possessed ISO 9001:2000 quality standard certification since 1993 for the design and production of fixed metallic reels, take-apart reels and special reel coiling and handling equipment.



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Pentre Group provides machinery manufacturers and wire and cable producers worldwide with individually tailored reel and drum processing technology and products.

With four manufacturing facilities in the UK and across Europe, multilingual staff, a highly skilled workforce, and prompt distribution resources in more than 50 countries, Pentre Group offers a comprehensive design, development, evaluation, and manufacturing capability.

All the technical departments run the latest CAD design packages. The plate material used is fully certified prime quality mild steel. All boss material is manufactured from ST52. The welds conform to International Standards and are applied using fully automatic, or semi-automatic machines.

Hearl Heaton, the Pentre affiliate, is recognised as a leader in the design and manufacture of ABS (plastic flanged) high-speed process reels. For the wire, cable, telecommunication, and fibre optic industry, the range of products includes process reels ranging from 250mm to 1,000mm Ø.

Manufactured either to customer specification or to DIN 46395 standard, these in-process reels are suitable for extrusion speeds up to 2,500m/min.



▲ A BP wire drawing reel from Pentre

ABS flanges are moulded from virgin material which has good impact properties and high rigidity. The bosses are manufactured in CNC to maintain an accurate and high tolerance component.

Pentre Group – Germany

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Steel reel specialists

Telmaksan specialises in the manufacture of steel reels and drums for the wire and cable industry and has over 25 years of experience in this field.

All reels are designed and manufactured according to DIN specifications and the company is also able to supply tailor made steel reels to meet customer specifications.



▲ *Telmaksan can also manufacture to customer specifications*

Telmaksan's portfolio includes fully machined reels for copper wire drawing as well as single and double wall reels designed for copper, steel wires or cables. Single wall reels can also be used for one way shipping. Cable drums starting from Ø800 up to Ø3250 and heavy duty reels can also be manufactured.

Telmaksan Ltd Şti – Turkey

Fax: +90 216 593 05 24

Email: telmaksan@telmaksan.com **Website:** www.telmaksan.com

Whole range from Alpaplastic

Alpaplastic produces plastic spools for the winding of metallic wire, cables and synthetic monofilament.

Alpaplastic continues to cooperate with its costumers to give them a better service, improve itself and increase the number of spools sold.

To help it achieve its goals, during December the company expanded its range of RS spools to include:

RS 100/40 – with a capacity of about 1kg of wire; RS 200 – with the capacity for 5kg of wire; RS 300/15 GL – with the capacity for 15kg of wire, made for wire by wire winding; RS 300/15 GZ – with the capacity for 15kg of wire, made for random winding; RS 300/15 GH – with the capacity for 15kg of wire, studied expressly for the winding of welding wire on automatic rewinding lines.

Alpaplastic snc – Italy

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Website: www.alpaplastic.com

Tangle-free alternative to spools and reels

Reelex is a patented method of winding cable or any cord-like product in such a way as to result in a reel-less, self-supporting coil. This unique coil dispenses from the inside-out without twists, tangles, snags or overruns. The packages are easy to handle, stack and palletise, are far lighter than reels and spools and are 100% environmentally friendly.



▲ *Reelex CP*

Sold under various brand names by the world's leading wire and cable manufacturers, Reelex has become the standard packaging system for 'last-mile' lengths of LAN and coaxial cable and is quickly becoming the preferred package for many other types of products like rope, building wire, plastic tubing, and more.

The Reelex coil is uniquely wound, using multiple crossovers and a low-tension pattern that creates a radial hole passing through the centre of the coil wall. The Reelex coil is essentially a figure-eight coil wrapped around a mandrel.

Reelex coiling machinery makes a series of these coils, each slightly offset from the previous coil to prevent the crossover points from lying directly on top of one another.

The equipment also leaves a hole in the coil wall to allow the product to exit the coil. The figure-eight geometric design cancels out any back twist that is found on normal coils.

Reelex Packaging Solutions Inc – USA

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Extension to FIC range

FIC Manufacturing Corporation specialises in contract manufacturing of custom injection moulding and automated and manual assembly, printing, sonic welding, packaging, importing and warehousing of plastic products.

FIC has also extended its range with the introduction to the current moulding capabilities of 2" – 48" plastic and wood spools.

All plastic spools are assembled using the latest automated spin welding technology and have been independently tested at a certified laboratory for weld strength and durability.

Located in Akron, Ohio, USA, FIC's new 100,000ft² manufacturing facility allows for round-the-clock moulding operation, maintaining stocks and eliminating lead-time anxiety associated with packaging demands.

FIC Manufacturing Corporation – USA
Fax: +1 330 564 1251
Email: info@foundationind.com
Website: www.foundationind.com



▲ A range of products from FIC

Durability from McCaskie

William McCaskie Inc was established in 1903 and is now one of the oldest continuously running suppliers of reels and spools to the wire and cable industry. McCaskie process reels and returnable shipping reels are known for their durability and concentricity.



Reels offered are plastic/metal, wood/metal with steel reinforced edges and all plastic reels in sizes ranging from 200mm to 1,220mm diameter. All manufacturing is done at McCaskie's Massachusetts, USA, facility.

William McCaskie Inc – USA
Fax: +1 508 636 5410
Email: info@mccaskiereels.com
Website: www.mccaskiereels.com

Experience counts

Established in 1979, Virendra Enterprises is now a recognised brand in the reels and spools market.



Virendra produces steel reels for wires, ropes and cables, either according to customers' specifications or DIN standards.

▲ Virendra – recognised brand on the market

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reels & spools



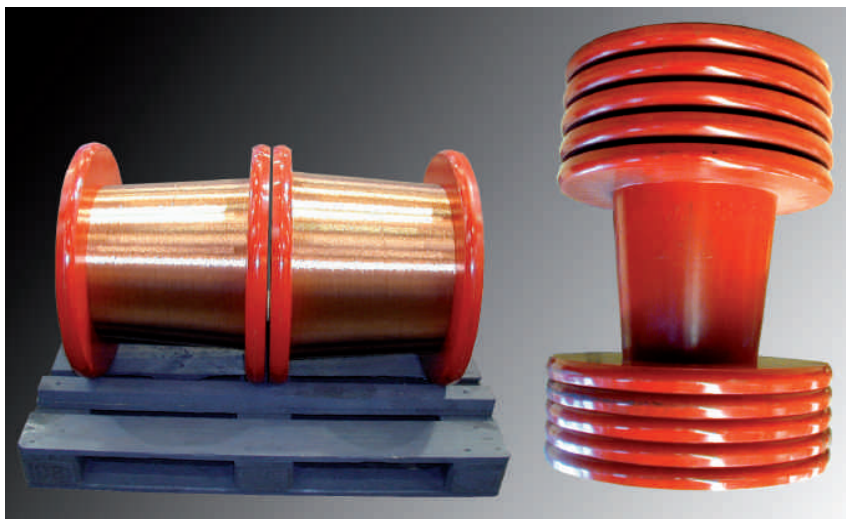
10 years and still going strong . . .

More than 10 years ago, Maschinenfabrik Niehoff introduced the Niehoff Package System (NPS), a handling system designed for cables, conductors and wires. The NPS are collapsible multi-way spools made of ABS plastic and special spoolers.

The applications of NPS spools are continually extended. One of the NPS spools is designed for the spooling and transportation of wire bundles and strands.

It features a correspondingly rugged and sturdy design and construction and is available in flange diameters of 630mm or 560mm.

Like all other NPS spools, the NPS strand spools can be fully dismantled when empty and stacked into each other, which means that an NPS strand spool takes up only a third of the space of a comparable conventional spool and needs much less return shipping space than traditional spools of the same capacity.



▲ The NPS spools can be fully dismantled when empty and need much less return shipping space than comparable traditional spools

For the application of the NPS strand spool, a return on investment calculation has proven that on the basis of a yearly production of 10,000 tons of copper conductor, a net weight of 430kg per spool and the use of NPS630 spools instead of DIN630 metal or plastic spools, the investment on NPS630 spools and the conversion of the bunching machines for automatic traverse and NPS630 take-up parts a return of investment of 1.7 years is possible.

Maschinenfabrik Niehoff GmbH & Co KG – Germany

Fax: +49 9122 977 155

Email: info@niehoff.de

Website: www.niehoff.de

Wide range of spools and reels

Sonoco Crellin offers a broad product line with an extensive range of spool and reel sizes, from small precision spools for wire as fine as 56 AWG to reels capable of carrying more than 1,000lbs (454kg).

Wire producers from around the world have relied on Sonoco Crellin's family of plastic spools and reels for more than six decades.

Sonoco Crellin's Reel Tough® revolutionary design has been applied to the large wire reel market product line. Beginning with the Reel Tough® DIN 630, made specifically for 630 bunchers, Sonoco Crellin's innovative design allows wire producers to maximise drawing and bunching machine capacity with smooth, trouble-free winding and pay-off.

Constructed of high strength, solid impact resistant polymers, Reel Tough reels feature a unique design which adds strength in the most important area, where the ribs and hub intersect.

Along with the DIN 630, the Reel Tough 22" and 30" reels offer an ideal replacement for steel reels used in drawing, bunching and stranding applications. At one-third cost and weight, Reel Tough offers superior performance, easy handling and substantial freight savings.

Sonoco Crellin is part of the moulded plastics division of Sonoco Products company, a \$4 billion global packaging leader.

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A novel aerial air-blown solution for FTTH networks using pre-terminated fibre and micro cables

By Anders Björk, Mårten Björs and Peter Lo Curzio, of Ericsson Network Technologies AB, Hudiksvall, Sweden; and Bill McGavin, Ericsson Communications Ltd, Auckland, New Zealand

1. Introduction

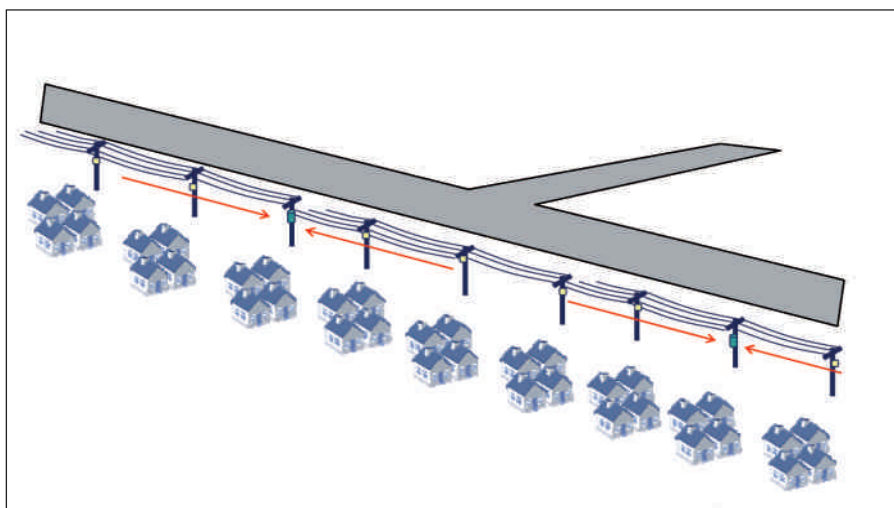
The advent of broadband technology delivering triple play services has revolutionised the way of modern business and home entertainment. To the communities that have these service facilities already, such services are now just a way of life.

A major reason why fibre-based broadband is not more universal is the high cost of the civil works for underground building. Heavily built-up areas and areas that are located on hard rock terrain are typical areas that operators try to avoid in their rollout of broadband services. In such areas aerial solutions can be an option, especially in cases where an existing aerial infrastructure already is in place, eg overhead power distribution or telephony.

Air-blown fibre and micro cables have been proven to be very efficient for fibre access network applications such as Fibre To The Home (FTTH). When using pre-terminated fibre, the installation time can be kept to a minimum compared with conventional cabling techniques. Furthermore, the air-blown technique enables a 'dynamic' network where fibres can be quickly and easily added, removed, replaced or re-routed without expensive civil works.

Aerial air-blown fibre installations have suffered in the past with regard to the aesthetics and practical installation.

Modern advances in fibre cable design, see^[3] and^[4], and installation practices have totally revolutionised aerial installation which will be discussed in this paper. We propose a novel technique for aerial installation of fibre using air-blown techniques describing these advances in both design and installation techniques.



▲ Figure 1: Pole line with distribution terminal closures on each 5th pole

2. Solution Description

The basic aerial air-blown system design is the same as for a traditionally underground system. However, some new products had to be developed, see section 3.

The solution is based on self-supporting ducts combining pre-terminated air-blown fibre units as well as air-blown micro cables. The technology is unique in many ways:

- a single duct assembly can be used for both the distribution and drop sections of a FTTH network. By sharing the same infrastructure for distribution cables and drop cables in a fibre access installation, considerable cost savings can be made. The installation cost for a single assembly is obviously lower than installing separate cables for feeder and drop sections of the network in parallel

- it also fully utilises the benefits of incremental fibre deployment, allowing new fibre to be installed quickly and at low cost when needed. Thus, it is possible to postpone costly investment in fibre for the future – 'pay as you grow'
- the solution is equally suitable for Passive Optical Networks (PON) as well as Point To Point Networks (P2P). In fact, both topologies can share the same physical infrastructure. A PON network can be upgraded to a P2P network without additional investment in ducts
- a general requirement for all products in this concept is small dimensions and low visual impact. The visual impact of aerial pollution is a key factor in the acceptance or rejection of such solutions by the community. Communities no longer allow installations that impact on their visual rights

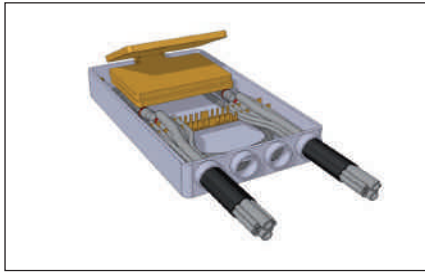


- few fibre splice and connection points, it is cost efficient to joint ducts and it also needs less skilled labour. Furthermore, a more reliable solution is achieved compared to a solution with optical connectors.

The solution is exemplified by the following scenario, shown in *Figure 1*. This is a typical residential area consisting of detached houses. In this scenario, only one fibre joint closure on every 5th pole is required. From this small closure, 20-24 homes are served. The network connecting the joint closures towards the splicing cabinet (with splitters) is referred to as the main distribution cabling. The drop cabling from the end user is carried out by installing single drop ducts connected to the main duct, see *Figure 2*. One simple duct joint, see 3.3, typically serves four subscribers from the closest pole. Note that no fibre splicing is done in the duct joint.

As described, this design enables a single duct assembly for feeding a long distance of poles. The number of fibre splices will be kept to a minimum since splicing between air-blown fibre and air-blown micro cable is only required on each 5th pole.

To reach all customers in the described scenario the distribution cable needs to be installed up to 1,000 metres and the drop



▲ **Figure 5:** Example of fibre joint closure with two main duct assemblies terminated



▲ **Figure 6:** Example of duct joint with four single duct assemblies jointed to one multi-duct assembly

cable only up to 200 metres. The blowing installation distances are further discussed under section 4.4.

3. Products

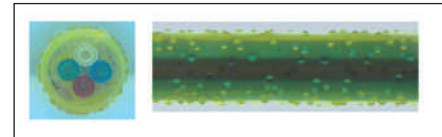
3.1 Duct assemblies

The duct assemblies are made in different configurations, see examples in *Figures 3* and *4*. The ducts are self supporting, either as figure-8 or with an under-sheath integrated strength member.

By combining both 10mm ducts for micro cable (distribution cable) and 5mm ducts for air-blown fibre (drop) in the same assembly, an installation of an access network with only one duct assembly between poles is possible.

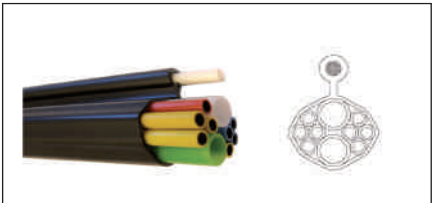


▲ **Figure 7:** Tension clamp for multi-duct assembly



▲ **Figure 8:** Four-fibre EPFU (Enhanced Performance Fibre Unit)

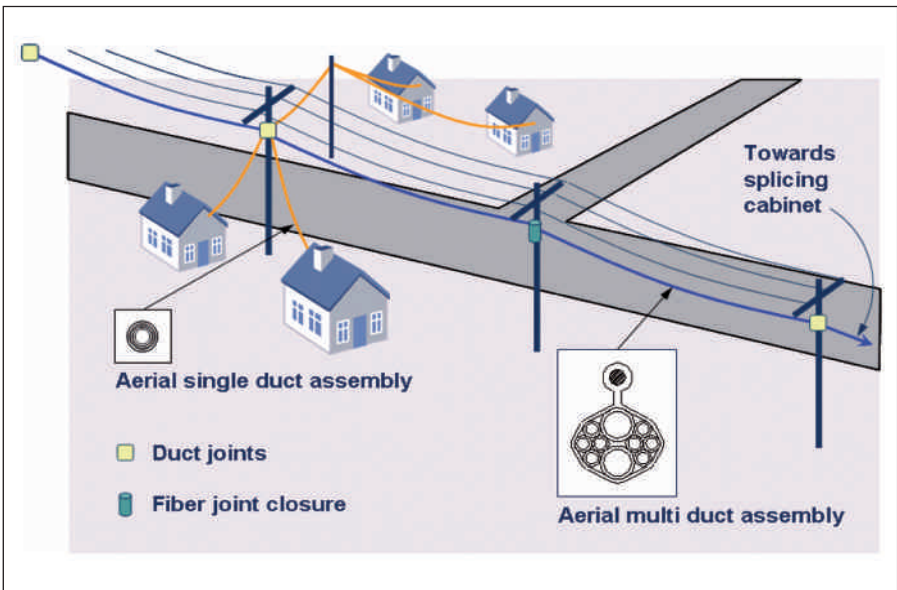
▼ **Figure 3:** Example of an aerial multi-duct assembly with 8 x 5mm ducts for air-blown fibre and 2 x 10mm ducts for micro cable



▼ **Figure 4:** Example of a self supporting drop duct with 1 x 5mm inner duct



▼ **Figure 2:** Installation example – Aerial installation of FTTH network with air-blown fibre and cable



3.2 Fibre joint closure

A fibre joint closure for this application is unique in many aspects. It must be able to handle several different features, such as ducts (both for blown fibre units and for micro cables), fibre management and splices, mid-span storage of micro cable fibre units and storage of blown fibre units. It should be pole mounted (and in some cases span-mounted).

Finally, all of this has to be squeezed into a small package, see *Figure 5*. Aesthetics are very important. The closure must be visually discreet. In principle, the closure does not exceed the width of the pole and as such is visually hidden from most views of the pole. The length of the closure is also important.

3.3 Duct joint

A duct joint is needed to branch out single ducts from the principle duct assembly to any premises requiring service. The duct joint is of a span-mounted design.

It typically enables four ducts to be accessed at every pole span, enabling access to the four premises serviced from that particular pole. The duct joint that provides for this distribution from the main duct assembly is a key design feature.

3.4 Fittings

The aerial duct support fittings are of the wedge clamp type and very easy to install,

see *Figure 7*. They are easily mounted to the duct assembly without any cutting or splitting. The fitting is very gentle to the ducts due to the length and shape of the wedge and provides for quick and easy installation. For each type of duct assembly suitable fittings have been selected and tested.

3.5 Blown fibre units and micro cable

A blown fibre unit, EPFU (Enhanced Performance Fibre Unit), consists of a number of fibres or ribbons encapsulated in two layers of UV-curable acrylates, see *Figure 8*.

The outer layer accommodates small glass beads on the surface to enhance the blow performance. For details see^[1]. The EPFU is used as a 'drop cable' from the end user termination point to a distribution point.

To minimise installation time and total cost of installation, the EPFU is delivered pre-terminated with optical connectors, factory-fitted in one end. The pre-terminated EPFU is delivered on small polystyrene reels and is available in different lengths.

The micro cable, *Figure 9*, is mainly designed for use in access and metropolitan networks. Here, the micro cable is used as 'feeder cable' from the distribution point. The micro cable consists of up to eight compact fibre units (CFU) with either 4 or 12 fibres per unit. This enables a fibre count from 4 to 96 fibres. For details see^[3].

The versatility of this cable design has enabled a very compact and small fibre cable that can be installed in ducts with a diameter of 7 or 10mm.

4. Installation

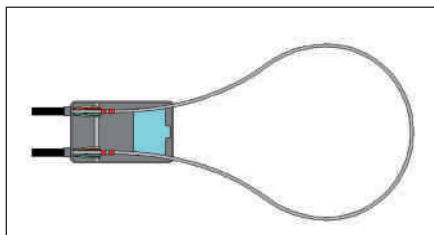
4.1 Aerial air-blown installation

Generally, aerial installed cables are the cable type subjected to the toughest conditions after installation.

▼ **Figure 9:** A 24-fibre micro cable



▼ **Figure 11:** Temporary connection tube attached to duct ends in fibre joint closure



▲ **Figure 12:** Micro cable blowing

Snow, ice, temperature differences and wind will affect the cable or, in the worst case, all of those at the same time. The span length for the air-blown concept is typically 30-60 metres, but limited to a maximum of 60 metres. One reason is that the fibres are installed with no excess length in the tube, which gives fibre strain at any extra cable load (in contradiction with traditional optical cables). However, there is no fibre strain at the installation load case.

Another reason is that for longer spans the 'figure-8' shape tends to be more sensitive to galloping effects at certain wind speeds. Due to the relative short span lengths the concept is best suited for the access network. The concept has been installed in three continents under three different environmental conditions.

Load calculations, including parameters such as maximum wind and ice loads, temperature changes and span lengths, show that the fibre strain in these conditions reaches a level corresponding to a decreased fibre life time.

▼ **Figure 10:** Installation of aerial multi-duct assembly



However, if unexpected loads occur and the fibre is damaged, eg due to a falling tree, it is easy to remove the fibre and replace it with a new one.

This aerial air-blown system is easy to install. The combination of lightweight duct assemblies and quick install fittings allows the system to be installed with very few tools, see *Figure 10*.

The dielectric design of the duct assemblies enables installation along existing power distribution lines. It can be installed as standard ADSS cables, pulled out on installation rollers. Since it is often quite short distances and low weight it can also just be pulled out on the ground and afterwards lifted up pole by pole.

Due to the low weight the duct assemblies can even be tensioned by hand. Ordinary tensioning tools can, of course, be used as well.

4.2 Installation of main distribution cabling

The main multi-duct assembly, as described in section 3.1, is installed along a street. In selected poles it is terminated in joint closures.

After the tube ends are installed in the closure, a temporary tube is connected between the terminated duct ends which make it possible to install the micro cable a longer distance, see *Figure 11*.

The micro cable is installed by blowing technique, using compressed air supported by additional mechanical pushing, see *Figure 12*. The temporary tubes in the joint closures are then removed immediately giving the correct over length of micro cable for mid-span access. One or more of the fibre units (CFUs) are branched at this point.



4.3 Installation of drop cabling

Aerial single ducts are installed as drops from the nearest pole to a wall socket at the customer's premises. If necessary, the duct can easily be jointed to an indoor duct. Each single duct is then connected to a specific tube in the main duct assembly by a duct joint, see 3.3.

The pre-terminated EPFU is blown from the customer to the fibre joint closure, see Figure 13, where it is spliced to the branched CFUs from the micro cable.

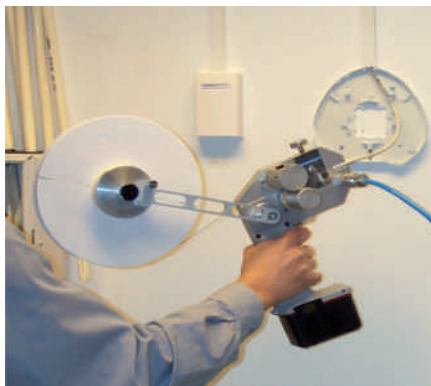
4.4 Installation requirements

Experience shows that aerial air-blown installation performance is comparable with the performance in an underground installation. Under good conditions it is possible to blow a 24-fibre micro cable at least 2,000 metres and 96-fibre cable 1,000 metres.

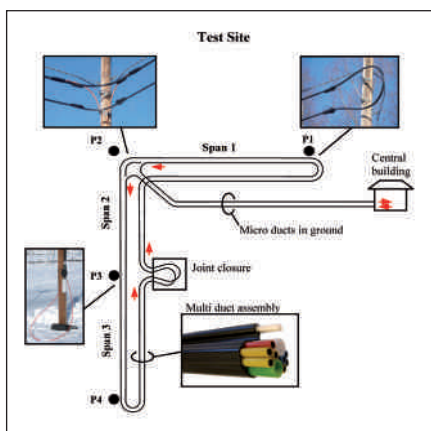
This is more than enough in a normal installation case. In cases where longer distances are needed for the main distribution cable, cascade installation can be performed.

The drop cable distance, from the customer to the fibre joint closure, is typically a maximum of 100-200 metres long which can be installed in just a few minutes. Normally blown fibres can be installed up to 1,000 metres without problems, see^[2].

▼ Figure 13: Installation of pre-terminated EPFU



▼ Figure 14: Test site



Span	Route	Length [m]
Micro duct in ground	Central building – pole 2	105
Span 2, aerial duct	pole 2 – pole 3	60
Span 3, aerial duct	pole 3 – pole 4	60
Span 1, aerial duct	pole 1 – pole 2	75

▲ Table 1

5. Micro cable blowing at test site

To demonstrate the performance of aerial air-blown installation a test has been performed. A 96-fibre micro cable (distribution cable) was installed in a test track located outside the cable plant, see Figure 14.

The test result can be seen in Figure 15. The micro cable was blown the total length of 1,050m in just over 30 minutes.

The test result demonstrates the feasibility of aerial air-blown installation as described in this paper.

6. Conclusions

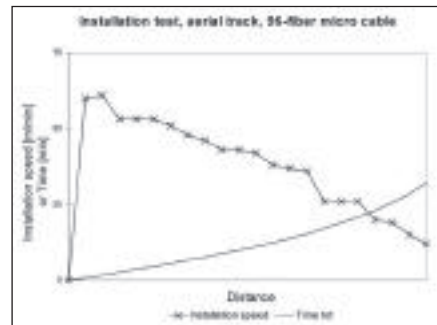
A novel and innovative concept for aerial installation of fibre, developed for FTTH applications is introduced. The technique is based on using pre-connected air-blown fibre and high fibre count micro cables. The performance of the system has been verified in several environmental conditions by installation tests and field trials.

The technique has several major advantages:

- low installation cost. Use of existing pole infrastructure. The minimum amount of fibre splices is required
- quick installation. Pre-terminated fibre eliminates the fitting of connectors during installation
- scalability. 'Pay as you grow', fibres can be installed when needed. A PON network can be upgraded to a P2P network without additional investment in ducts
- low visual impact. Only one duct assembly between poles is needed. Compact design and small dimensions on all components reduces the visual impact

7. Acknowledgments

Leif Jawerth, Anders Johansson, Lars-Göran Andersson, Tomas Jendel, Jörgen Lundberg and John Eriksson are acknowledged for their contribution to this paper. ■



▲ Figure 15: Graph showing test result from blowing of micro cable in aerial test track

8. References

- [1] T Jendel et al, 'Design and high-speed processing of new advanced blown fibre units (EPFU's); International Wire and Cable Symposium 2002, (November 2002)
- [2] T Jendel et al, 'Installation performance of EPFU MkII blown fibre units; International Wire and Cable Symposium 2003, (November 2003)
- [3] T Jendel, B Arvidsson, T Cedervall, 'Micro cables with new Acrylate-based compact fibre units (CFU); International Wire and Cable Symposium 2004, (November 2004)
- [4] Willem Griffioen et al, 'Experience in application of various micro-duct cable designs; International Wire and Cable Symposium 2005, (November 2005)

Ericsson Communications Ltd
 Ericsson House
 Level One
 105 Carlton Gore Road
 Newmarket
 Auckland
 New Zealand
Fax: +64 9 355 55 01
Email: info@ericsson.com
Website: www.ericsson.com

Ericsson Network Technologies
 Kabelvägen 1
 82482 Hudiksvall
 Sweden
Fax: +46 650 362 00
Email: info@ericsson.com
Website: www.ericsson.com

Eine neue luftgeblasene Lösung für Freileitungen bei FTTH-Netzen im Einsatz vorverbundener Fasern und Mikrokabeln

Von Anders Björk, Mårten Björs und Peter Lo Curzio, Ericsson Network Technologies AB, Hudiksvall, Schweden; und Bill McGavin, Ericsson Communications Ltd, Auckland, Neuseeland

1. Einleitung

Das Aufkommen der Breitbandtechnologie, die Triple-Play-Dienste anbietet, hat das moderne Geschäfts- und Privatleben total verändert. Für die Gemeinden, die bereits über diese Serviceeinrichtungen verfügen gehören diese Einrichtungen schon längst zum täglichen Leben. Ein Hauptgrund, wieso faserbasierter Breitband nicht noch weiter verbreitet ist, liegt an den hohen Kosten der Tiefbauunternehmen. Dicht bebaute Gebiete und Gebiete mit hartem und steinigem Boden haben in der Regel Gebiete die bei der Verlegung von Broadband besonders gemieden werden. In diesen Gebieten eignen sich Freileitungslösungen, insbesondere dort wo bereits eine Freileitungsinfrastruktur vorhanden sind., z. B. Freileitungsmaste für Stromversorgung oder Telephonie.

Luftgeblasene Fasern und Mikrokabeln haben sich als sehr effizient für Faser-Zugangsnetzanschlüssen erwiesen, wie z. B. Fiber To The Home (FTTH). Beim Einsatz vorverbundener Fasern können im Vergleich zu konventionellen Verkabelungstechniken die Installationszeiten auf ein Minimum reduziert werden. Darüber hinaus ermöglicht die Luftblastechnik ein „dynamisches“ Netz, da Fasern schnell und einfach hinzugefügt, beseitigt, ersetzt oder wiederverlegt werden können, ohne teure Tief- und Hochbauten.

Die Installationen von luftgeblasenen Freileitungsfasern haben in der Vergangenheit in Bezug auf Optik und der praktischen Installationsmöglichkeiten gelitten.

Die hier beschriebenen modernen Fortschritte im Faserkabelaufbau – siehe^[3] und^[4] – und die Installationspraxis haben die Freileitungsinstallation völlig revolutioniert. Wir schlagen eine neue Technik für die Freileitungsinstallation von Fasern mittels einer Luftblastechnik vor.

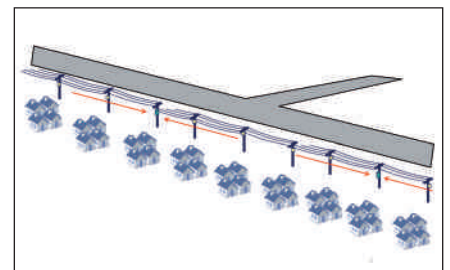
Die Fortschritte werden sowohl in Hinblick auf die Aufbau- wie auf die Installationstechnik beschrieben.

2. Lösungsbeschreibung

Der Grundaufbau des luftgeblasenen Freileitungssystems gleicht dem eines traditionellen erdverlegten Systems. Dennoch mußten einige neue Produkte entwickelt werden – siehe Abschnitt 3.

Die Lösung basiert auf selbsttragenden Leitungen, die vorverbundene luftgeblasene Fasereinheiten sowie luftgeblasene Mikrokabel kombiniert. Die Technologie ist in vielen Richtungen einzigartig:

- Der Einzel-Leitungsaufbau kann sowohl für die Verteilungs- wie für Drop-Abschnitte eines FTTH-Netzes eingesetzt werden. Durch die gemeinsame Benutzung derselben Infrastruktur für Verteiler- und Drop-Kabel in einer Faserzugangsinstallation können erhebliche Kosten eingespart werden. Die Installationskosten für einen Einzel-Aufbau sind eindeutig niedriger als jene einer Installation getrennter Kabel für die Parallel-Versorgungs- und Drop-Abschnitte des Netzes



▲ Bild 1: Mastleitung mit Verteilungs-Endabschlüssen alle 5 Masten

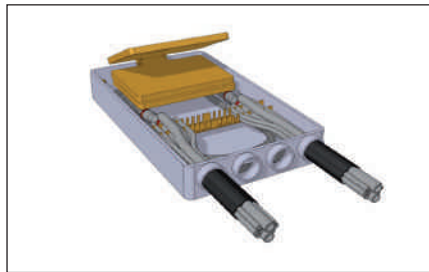
- Außerdem werden dadurch die Vorteile der zunehmenden Anwendung von Fasern voll ausgenutzt, indem neue Fasern schnell und, falls erforderlich, zu niedrigen Kosten installiert werden können. Demzufolge können teure Investitionen im Bereich Faser in die Zukunft verschoben werden – nach dem Motto „pay as you grow“
- Die Lösung eignet sich sowohl für Passive Optische Glasfasernetze (PON) wie auch für Punkt-zu-Punkt-Netzwerke (P2P). In der Tat können beide Netzstrukturen dieselbe physische Infrastruktur gemeinsam benutzen. Ein PON-Netzwerk kann zu einem P2P-Netzwerk umgerüstet werden, ohne daß dabei eine zusätzliche Investition in Leitungen erforderlich ist
- Eine generelle Anforderung für alle Produkte dieses Konzepts sind kleine Abmessungen und eine geringe optische Wirkung. Die optische Wirkung der durch Freileitung verursachten Belastung ist ein Schlüsselfaktor bei der Akzeptanz oder Ablehnung dieser Art Lösung seitens der Gemeinde. Gemeinden genehmigen keine Installationen mehr, die sich auf deren optische Rechte auswirken



- Weniger Faserspleiß- und Verbindungsstellen, es ist kostengünstiger Leitungen zu verbinden und darüber hinaus sind weniger qualifizierte Arbeitskräfte erforderlich. Außerdem wird eine zuverlässigere Lösung, im Vergleich zu einer Lösung mit optischen Steckverbindern, erzielt

Die Lösung wird durch das im *Bild 1* dargestellte Szenario erläutert. Es handelt sich dabei um ein typisches Wohngebiet, bestehend aus Einzelhäusern.

Bei diesem Szenario ist nur ein Faserverbindungsabschluß an jedem 5. Mast erforderlich. Dank dieses kleinen Abschlusses werden 20 bis 24 Häuser bedient. Das Netzwerk, das die Verbindungsabschlüsse Richtung Spleißschrank verbindet (mit Verteilern) wird als Hauptverteilungsverkabelung bezeichnet. Die Drop-Verkabelung vom Endnutzer erfolgt durch die Installation einzelner Drop-Leitungen, die mit der Hauptleitung verbunden sind, siehe *Bild 2*. Eine einfache Leitungsverbindung, siehe 3.3, dient in der Regel vier Benutzern des am nächsten liegenden Masts. Zu bemerken ist, daß in der Leitungsverbindung keine Faserspleißung erfolgt. Wie bereits beschrieben, kann dieser Entwurf eines Einzel-Leitungsaufbaus über einen weiten Abstand Maste versorgen.



▲ **Bild 5:** Beispiel eines Faserverbindungsabschlusses mit zwei damit verbundenen Hauptleitungsaufbauten

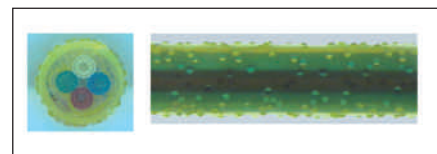


▲ **Bild 6:** Beispiel einer Leitungsverbindung mit vier Einzel-Leitungsaufbauten, die an einem Multi-Leitungsaufbau verbunden sind

Die Anzahl an Faserspleißungen wird auf ein Minimum reduziert, da die Spleißung zwischen luftgeblasenen Fasern und Mikrofasern lediglich an jedem 5. Mast Mikrokabel erforderlich ist. Um alle Benutzer des beschriebenen Szenarios zu erreichen, muß das Verteilungskabel bis auf 1.000 Meter und das Drop-Kabel lediglich bis auf 200 Meter installiert werden. Die Abstände der Blasinstallation werden im Abschnitt 4.4 weiterbehandelt.



▲ **Bild 7:** Spannklemme für den Multi-Leitungsaufbau



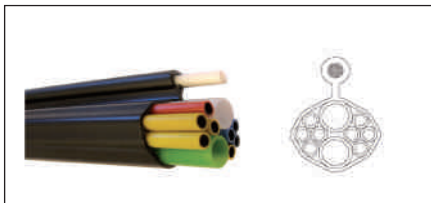
▲ **Bild 8:** Vier-Faser-EPFU (Fasereinheit mit erhöhter Leistung)

3. Produkte

3.1 Leitungsaufbau

Die Leitungsaufbauten bestehen aus verschiedenen Konfigurationen, siehe

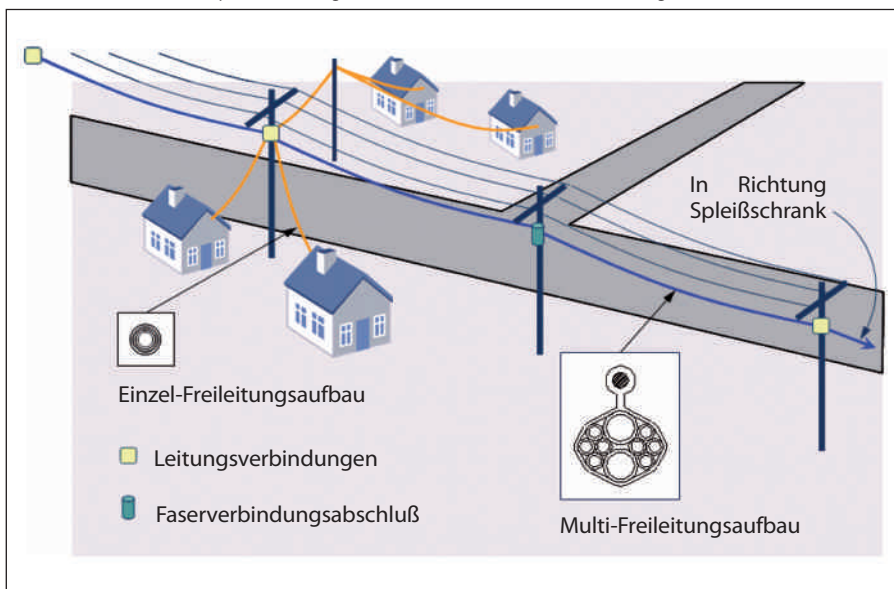
▼ **Bild 3:** Beispiel eines Multileitungsaufbaus für Freileitungen mit 8 x 5mm Leitungen für luftgeblasene Faser und 2 x 10mm Leitungen für Mikrokabel



▼ **Bild 4:** Beispiel einer selbsttragenden Drop-Leitung mit 1 x 5mm Innenleitung



▼ **Bild 2:** Installationsbeispiel – Freileitungsinstallation eines FTTH-Netzwerks mit luftgeblasenen Fasern und Kabeln



Beispiel in *Bild 3* und *4*. Die Leitungen sind selbsttragend, wie im *Bild 8* dargestellt, oder sind mit einem festen unter dem Mantel eingefügten Element ausgestattet.

Durch die Vereinigung im gleichen Aufbau von 10mm Leitungen für Mikrokabel (Verteilerkabel) und 5mm Leitungen für luftgeblasene Fasern (Drop), wird die Installation eines Zugangsnetzes mit lediglich einem Leitungsaufbau zwischen den Masten ermöglicht.

3.2 Faserverbindungsabschluß

Ein Faserverbindungsabschluß für die hier beschriebene Anwendung ist in mehrfacher Hinsicht einzigartig, denn er muß mehrere unterschiedliche Eigenschaften behandeln können, wie z. B. Leitungen (für geblasene Fasereinheiten sowie Mikrokabel), Fasermanagement und -spleißen, mittlere Spannweiten-Lagerung von Mikrokabel-Fasereinheiten und Lagerung von geblasenen Fasereinheiten.

Außerdem müßte er am Mast (und in einigen Fällen nach Spannweiten) montiert werden. Schließlich muß dies alles in eine kleine Packung gepresst werden, siehe *Bild 5*. Die Ästhetik ist sehr wichtig. Der Abschluß muß optisch unauffällig sein.

Grundsätzlich überschreitet der Abschluß nicht die Breite des Masts und ist daher optisch von den meisten Ansichten des Masts versteckt. Die Länge des Abschlusses ist ebenfalls wichtig.

3.3 Leitungsverbindung

Eine Leitungsverbindung wird benötigt um Einzel-Leitungen vom Hauptleitungsaufbau zu allen Einrichtungen die diese Dienste benötigen abzuzweigen.

Die Leitungsverbindung weist einen Spannweiten-Entwurf auf. In der Regel wird somit an allen Masten-Spannweiten der Zugang zu vier Leitungen ermöglicht bzw. zu den vier von dem besonderen Mast versorgten Werken. Die Leitungsverbindung, die diese Verteilung vom Hauptleitungsaufbau bietet, ist ein wesentliches Entwurfsmerkmal.

3.4 Anschlußstücke

Bei den Stütz-Anschlußstücke der Freileitungen handelt es sich um Klemmentypen, die sehr leicht installiert werden, siehe *Bild 7*. Sie werden einfach am Leitungsaufbau montiert ohne dabei geschnitten oder geteilt werden zu müssen. Dank der Länge und Form der Klemme beschädigt das Anschlußstück nicht die Leitungen und sorgt darüber hinaus für eine schnelle und einfache Installation. Je Leitungsaufbautyp wurden geeignete Anschlußstücke ausgewählt und geprüft.

3.5 Geblasene Fasereinheiten und Mikrokabel

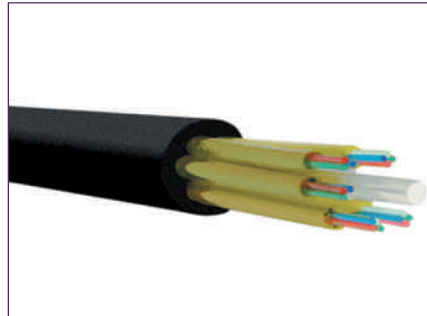
Eine geblasene Fasereinheit, EPFU (Fasereinheit mit erhöhter Leistung), besteht aus einer Anzahl von Fasern oder Bändern, die in zwei Schichten von UV-beständigen Acrylaten eingekapselt sind, siehe *Bild 8*.

An der Außenschicht sind kleine Glaskugeln auf der Oberfläche angebracht, um die Blasleistungen zu steigern. Für Details siehe^[1]. Die EPFU wird als „Drop-Kabel“ von der Endnutzer-Anschlußstelle zu einem Verteilungspunkt benutzt.

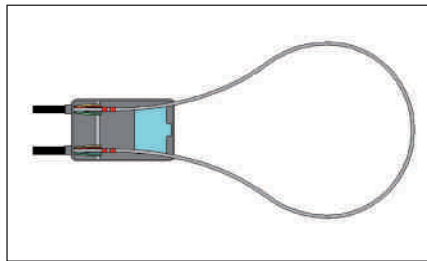
Um die Zeiten und Gesamtkosten der Installation zu minimieren, wird die EPFU vorverbunden mit optischen Steckverbindern geliefert, ab Werk bereits an einem Ende angepaßt. Die vorverbundene EPFU wird auf kleinen Polystyrolspulen geliefert und steht in verschiedenen Längen zur Verfügung. Das Mikrokabel, *Bild 9*, ist vorwiegend für den Einsatz in Zugangs- und Großstadtnetzen entworfen. Hier wird das Mikrokabel als „Speisekabel“ vom Verteilungspunkt verwendet.

Das Mikrokabel besteht aus bis zu acht kompakten Fasereinheiten (CFU) entweder mit 4 oder 12 Fasern je Einheit. Damit wird ermöglicht, daß eine Fasereinheit 4 bis 96 Fasern enthält. Für Details siehe^[3].

Dank der Vielseitigkeit dieses Kabelaufbaus wird ein sehr kompaktes und kleines Faserkabel erzielt, das in Leitungen mit einem Durchmesser von 7 oder 10mm installiert werden kann.



▲ Bild 9: Ein 24-Faser-Mikrokabel



▲ Bild 11: Vorläufiges Anschlußrohr, an den Leitungsenden im Faserverbindungsabschluß verbunden



▲ Bild 10: Installation eines Multi-Leitungsaufbaus für Freileitungen



▲ Bild 12: Mikrokabelblasen

4. Installation

4.1 Luftgeblasene Freileitungsinсталlation

Im allgemeinen handelt es sich bei Freileitungskabeln um Kabel, die nach der Installation härtesten Bedingungen ausgesetzt sind. Schnee, Eis, Temperaturunterschiede und Wind werden das Kabel beeinflussen und im schlimmsten Fall, alle diese gleichzeitig.

Die Spannweitenlänge für das Luftblaskonzept entspricht in der Regel 30 bis 60 Meter, wobei 60 Meter die Obergrenze darstellt. Ein Grund dafür ist daß die Fasern ohne Überlänge im Rohr installiert werden, was bei jeglicher Kabelbelastung eine Faserdehnung sichert (im Gegensatz zu traditionellen Lichtwellenleiterkabel). Jedoch besteht keine Faserdehnung im Belastungsfall der Installation. Ein weiterer Grund besteht darin, daß für längere Spannweiten die im Bild 8 dargestellte Form dazu neigt bei bestimmten Windgeschwindigkeiten in Hinblick auf den sog. „Galoppiereffekt“ empfindlicher zu sein. Wegen der relativ kurzen Spannweitenlängen eignet sich dieses Konzept ideal für das Zugangsnetz.

Das Konzept wurde in drei Kontinenten installiert unter drei unterschiedlichen Umweltbedingungen. Die Berechnungen der Lasten, einschließlich Parameter wie z. B. Höchstwind- und Eislasten, Temperaturunterschiede und Spannweitenlängen, zeigen daß die Faserdehnungen unter diesen Bedingungen ein Niveau erreichen, das einer reduzierten Faserlebensdauer entspricht. Wenn jedoch

unerwartete Belastungen auftreten und die Faser beschädigt wird, wie z. B. durch den Sturz eines Baumes, kann die Faser einfach beseitigt und durch eine neue Faser ersetzt werden.

Das luftgeblasene Freileitungssystem kann leicht installiert werden. Die Kombination leichter Leitungsaufbauten und schnell zu installierenden Anschlußstücke ermöglicht es, daß zur Installation des Systems sehr wenige Werkzeuge erforderlich sind, siehe *Bild 10*. Dank des dielektrischen Entwurfs der Leitungsaufbauten wird eine Installation entlang vorhandener Stromversorgungsleistungen ermöglicht. Es kann als Standard ADSS-Kabel installiert werden, die von Installationsrollen ausgezogen werden. Da oft ein ziemlich kurzer Abstand und ein geringes Gewicht vorhanden sind, kann es auch einfach am Boden ausgezogen werden und danach Mast für Mast gehoben werden. Durch das geringe Gewicht können die Leitungsbauten auch mit der Hand gespannt werden. Natürlich können dabei auch normale Spannwerkzeuge benutzt werden.

4.2 Installation der Hauptverteilungsverkabelung

Der Haupt-Multileitungsaufbau, wie im Abschnitt 3.1 beschrieben, ist der Straße entlang installiert. An ausgewählten Masten wird dieser mit Verbindungsabschlüssen verbunden. Nachdem die Leitungsenden am Abschluß installiert wurden, wird eine vorläufige Leitung zwischen den verbundenen Leitungsenden angeschlossen, um das Mikrokabel über einen langen Abstand hinaus installieren zu können, siehe *Bild 11*.

Das Mikrokabel wird durch die Blastechnik installiert, mit Einsatz von Druckluft und durch zusätzliche mechanische Stöße, siehe *Bild 12*.

Die vorläufigen Leitungen in den Verbindungsabschlüssen werden dann sofort beseitigt und verleihen dem Mikrokabel die richtige Überlänge für den mittleren Spannweiten-Zugang. Eine oder mehrere Fasereinheiten (CFU) werden an dieser Stelle abgezweigt.

4.3 Installation der Drop-Verkabelung

Einzel-Freileitungen werden als Drop-Leitungen vom am nächsten liegenden Mast zu einer Wandsteckdose in den Gebäuden der Kunden installiert. Falls erforderlich kann die Leitung leicht mit einer Innenleitung verbunden werden.

Jede Einzel-Leitung wird dann an ein spezielles Rohr im Hauptleitungsaufbau mittels Leitungsverbindung verbunden, siehe 3.3. Vom Kunden zum Faserverbindungsabschluß wird die vorverbundene EPFU geblasen, siehe *Bild 13*, wo sie dann zu der abgezweigten CFU vom Mikrokabel gespleißt wird.

4.4 Installationanforderungen

Die Erfahrung zeigt, daß die Leistungen der luftgeblasenen Freileitungsinstallationen mit deren erdverlegter Installationen verglichen werden können. Bei guten Bedingungen ist es möglich ein 24-Faser-Mikrokabel von mindestens 2.000 Meter und ein 96-Faserkabel von 1.000 Metern zu blasen. Das ist mehr als genug bei normalen Installationsfällen. Dort wo dagegen längere Abstände für das Hauptverteilungskabel erforderlich sind, kann eine stufenförmige Installation durchgeführt werden.

Der Abstand des Drop-Kabels, vom Kunden zum Faserverbindungsabschluß, ist in der Regel höchstens 100-200 Meter lang und kann in wenigen Minuten installiert werden. Normalerweise können geblasene Fasern problemlos bis zu 1.000 Meter installiert werden, siehe^[2].

▼ **Bild 13:** Installation vorverbundener EPFU



Spannweite	Route	Länge (m)
Erdverlegte Mikroleitung	Zentralgebäude - Mast 2	105
Spannweite 2, Freileitung	Mast 2 - Mast 3	60
Spannweite 3, Freileitung	Mast 3 - Mast 4	60
Spannweite 1, Freileitung	Mast 1 - Mast 2	75

▲ **Tabelle 1**

5. Mikrokabelblasen bei der Prüfstelle

Um die Leistungen der luftgeblasenen Freileitungsinstallation zu demonstrieren wurde ein Test durchgeführt. Ein 96-Faser-Mikrokabel (Verteilerkabel) wurde in eine Teststrecke installiert, die sich außerhalb der Kabelanlage befand, siehe *Bild 14*.

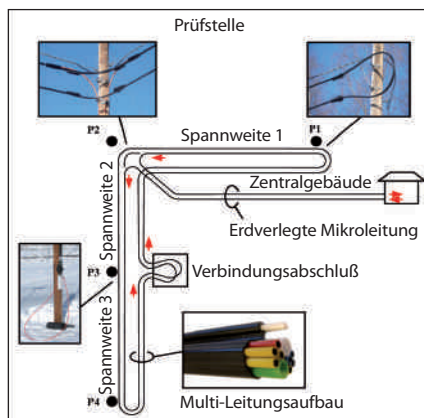
Das Mikrokabel wurde über die gesamte Länge von 1050m in lediglich 30 Minuten geblasen. Das Prüfergebnis beweist die Durchführbarkeit der luftgeblasenen Freileitungsinstallation, wie in dieser Arbeit beschrieben.

6. Schlussfolgerungen

Ein neues und innovatives Konzept der Freileitungsinstallation von Fasern, für FTTH-Anwendungen entwickelt, wird eingeführt. Die Technik basiert auf dem Einsatz vorverbundener luftgeblasener Fasern und Mikrokabeln mit hoher Faserzahl. Die Leistung des Systems wurde unter verschiedenen Umweltbedingungen durch Installations- und Feldtests geprüft. Die Technik weist viele wichtige Vorteile auf:

- Niedrige Installationskosten. Einsatz vorhandener Mastinfrastrukturen. Minimale Anzahl an Faserspleißungen nötig
- Schnelle Installation. Vorverbundene Fasern machen die Anpassung von Steckverbindern während der Installation überflüssig

▼ **Bild 14:** Prüfstelle



- Skalierbarkeit. "Pay as you grow"-Fasern können erst dann installiert werden wenn der Bedarf danach besteht. Ein PON-Netzwerk kann zu einem P2P-Netzwerk umgerüstet werden, ohne daß dabei eine zusätzliche Investition in Leitungen erforderlich ist
- Niedrige optische Wirkung. Zwischen den Masten ist lediglich ein Leitungsaufbau erforderlich. Kompakter Entwurf und kleine Abmessungen aller Bestandteile verringern die optische Wirkung

7. Danksagungen

Leif Jawerth, Anders Johansson, Lars-Göran Andersson, Tomas Jendel, Jörgen Lundberg und John Eriksson wird für deren Beitrag zu dieser Arbeit gedankt. ■

8. Literatur

- [1] T Jendel et al, 'Design and high-speed processing of new advanced blown fibre units (EPFU's), International Wire and Cable Symposium 2002, (November 2002).
- [2] T Jendel et al, 'Installation performance of EPFU MkII blown fibre units', International Wire and Cable Symposium 2003, (November 2003).
- [3] T Jendel, B Arvidsson, T Cedervall, 'Micro cables with new Acrylate-based compact fibre units (CFU)', International Wire and Cable Symposium 2004, (November 2004).
- [4] Willem Griffioen et al, 'Experience in application of various micro-duct cable designs', International Wire and Cable Symposium 2005, (November 2005).

Ericsson Communications Ltd

Ericsson House
Level One
105 Carlton Gore Road
Newmarket
Auckland
Neuseeland
Tel: +64 9 355 55 00
Fax: +64 9 355 55 01
Website: www.ericsson.com

Ericsson Network Technologies

Kabelvägen 1
82482 Hudiksvall
Schweden
Tel: +46 650 360 00
Fax: +46 650 362 00
Website: www.ericsson.com

Новое решение для пневматической прокладки воздушного кабеля для сетей «оптоволокну до дома» с использованием предварительно оконцованных оптоволоконных кабелей и микрокабелей

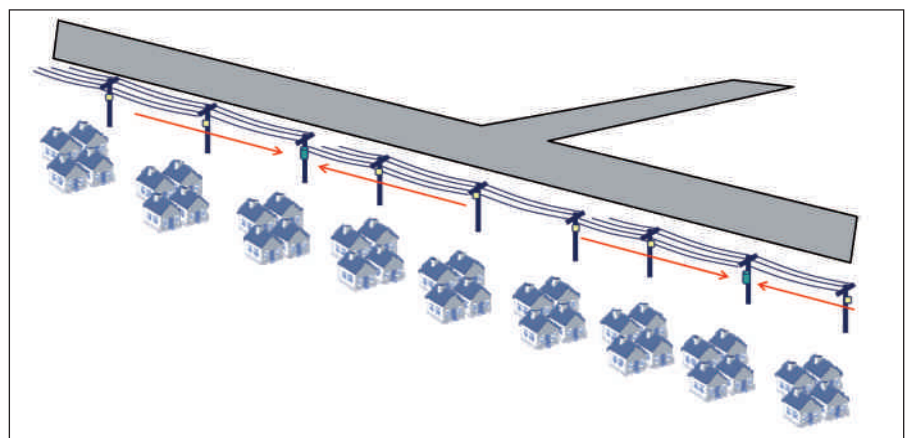
Андерс Бьёрк, Мортен Бьёрс и Питер Лоу Курцио, компания «Эрикссон нетворк технолоджиз АБ» (Худиксвалл, Швеция); Билл Макгэвин, компания «Эрикссон комьюникейшнз лтд» (Окленд, Новая Зеландия)

1. Введение

Наступление эры широкополосной технологии связи с предложением «тройных услуг» революционизировало способы предоставления деловых презентаций и домашних развлечений в наши дни. Для тех, кому эти возможности доступны уже сейчас, их использование стало еще одной приметой нового образа жизни.

Основной причиной того, почему широкополосный доступ на основе оптоволокну не получил более широкого распространения, является высокая стоимость подземных строительных работ. Районы с плотной застройкой и районы, расположенные на скальном грунте, – вот типичные примеры мест, которых операторы, предоставляющие услуги широкополосной связи, стараются избегать. В таких местах решением проблемы может быть воздушный кабель, особенно там, где уже существует соответствующая инфраструктура, например, система воздушных силовых или телефонных линий.

Вдуваемые волоконно-оптические кабели и микрокабели доказали свою высокую эффективность для таких применений оптоволоконных сетей доступа, как «оптоволокну до дома» (FTTH). При использовании предварительно оконцованного оптоволоконного кабеля время, затрачиваемое на монтаж, может быть сведено к минимуму по сравнению с обычными технологиями прокладки кабеля. Более того, использование



▲ Рис. 1. Воздушная линия передачи с опорами и разветвительными коробками, установленными на каждой пятой опоре

технологии пневматической прокладки кабеля позволяет создать «динамическую» сеть, в которой оптоволоконный кабель можно быстро и легко добавлять, убирать, менять или направлять по другой трассе без проведения дорогостоящих строительных работ.

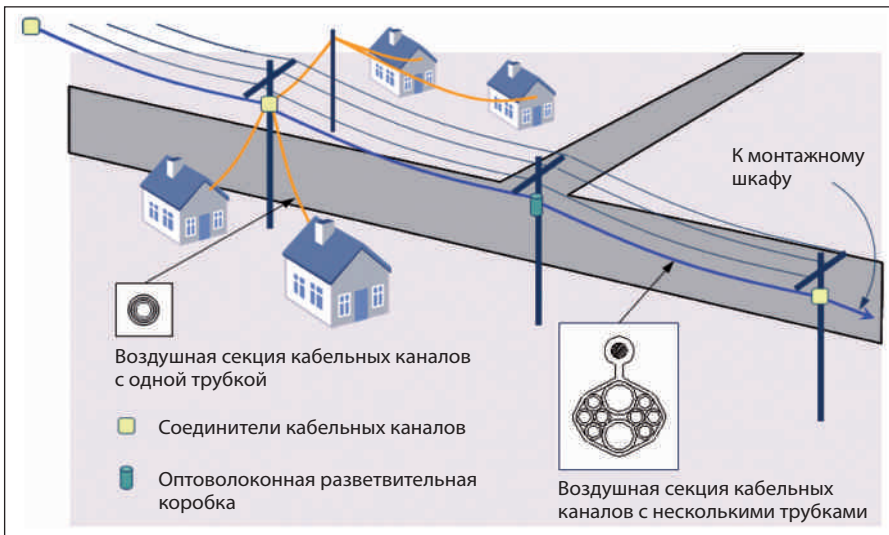
Сети из пневматически прокладываемых воздушных оптоволоконных кабелей в прошлом не пользовались популярностью из-за своего внешнего вида и нерешенных практических вопросов их монтажа.

Современные достижения в конструкции оптоволоконного кабеля (см. [3] и [4]) и методике монтажа полностью революционизировали подвесную прокладку, которая будет описана в данной работе.

Мы предлагаем новейшую технику подвесной прокладки оптоволокну с использованием технологии вдувания и опишем достижения как в конструкции, так и в технике монтажа.

2. Описание решения

Базовая конструкция подвесной сети, прокладываемой методом вдувания, та же, что и у обычной подземной сети. Тем не менее, в последнее время возникла необходимость разработки новых изделий (см. раздел 3). Предлагаемое решение основано на использовании самонесущих кабельных каналов, в которых совместно прокладываются предварительно оконцованные вдуваемые оптоволоконные модули и вдуваемые микрокабели.

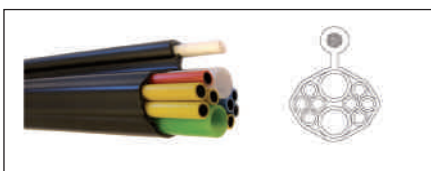


▲ Рис. 2. Пример монтажа: монтаж воздушной сети FTTH с вдуваемым оптоволокном и кабелем

Данная технология уникальна во многих аспектах:

- одна секция кабельных каналов может использоваться как для распределительного, так и для отводного участков сети FTTH. Используя одну и ту же инфраструктуру для распределительных и отводных кабелей оптоволоконной сети доступа, можно добиться значительной экономии. Стоимость монтажа одной секции кабельных каналов безусловно меньше стоимости параллельного монтажа отдельных кабелей для магистрального и отводного участков сети;
- технология также в полной мере использует преимущества поэтапного развертывания оптоволоконной сети, позволяя прокладывать новый кабель быстро, с минимальными затратами и тогда, когда это необходимо. Таким

▼ Рис. 3. Примерный вид подвесной секции из нескольких кабельных каналов (8 каналов диаметром 5 мм для вдуваемого волокна и 2 канала диаметром 10 мм для микрокабеля)



▼ Рис. 4. Примерный вид самонесущего отводного кабельного канала с одной внутренней трубкой диаметром 5 мм

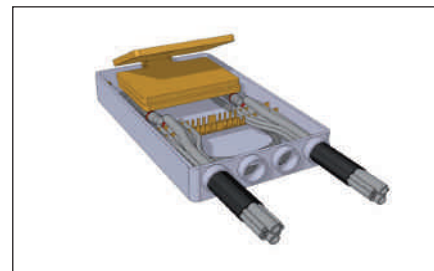


образом, становится возможным перенести крупные затраты на организацию оптоволоконной сети на будущее, т.е. «платить по мере роста»;

- данное решение одинаково подходит как для пассивных оптических сетей (ПОС), так и для сетей двухточечной связи (P2P). Более того, обе топологии могут использовать одну и ту же физическую инфраструктуру. Сеть ПОС может быть модернизирована до сети двухточечной связи без дополнительных затрат на кабельные каналы;
- общее требование для всех изделий в рамках данной концепции – малые размеры и низкое визуальное воздействие. Ключевым фактором в принятии или непринятии таких решений населением является визуальный эффект антропогенной нагрузки на воздушное пространство. Люди больше не хотят мириться с объектами, нарушающими их зрительную свободу;
- при наличии меньшего количества сращиваний и соединений волокон сращиваний и соединений волокон экономически эффективно и не требует высококвалифицированной рабочей силы. Кроме того, данное решение обеспечивает более высокий уровень надежности по сравнению с решением, в котором используются оптические разъемы.

Предлагаемое решение проиллюстрировано сценарием, представленным ниже на рис. 1. Это – типовой жилой квартал, состоящий из отдельно стоящих зданий.

В соответствии с этим сценарием необходима всего лишь одна разветвительная коробка для



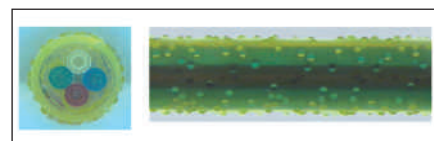
▲ Рис. 5. Примерный вид оптоволоконной разветвительной коробки с двумя подсоединенными основными секциями кабельных каналов



▲ Рис. 6. Примерный вид соединителя кабельных каналов с четырьмя одноканальными секциями, подсоединенными к одной секции кабельных каналов из нескольких трубок



▲ Рис. 7. Натяжной зажим для секции кабельных каналов из нескольких трубок



▲ Рис. 8. Четырехволоконный модуль ВМУХ (волоконный модуль с улучшенными характеристиками)

волоконно-оптического кабеля на каждой пятой опоре. Эта небольшая коробка позволяет обслуживать от 20 до 24 зданий.

Сеть, соединяющая разветвительные коробки с монтажным шкафом (с разделителями), называется главной распределительной кабельной системой.

Отвод кабеля от конечного потребителя выполняется при помощи монтажа одного отводящего кабельного канала, подсоединяемого к основному кабельному каналу (см. рис. 2). Простой соединитель кабельных каналов (см. раздел 3.3) обычно используется для

подключения четырех пользователей от ближайшей опоры. Следует учесть, что оптоволоконно в месте соединения каналов не сращивается.

Как уже говорилось, данная конструкция позволяет использовать одну секцию кабельных каналов на большом участке линии опор. Число сращиваний оптоволоконных кабелей сводится к минимуму, так как сращивание прокладываемых с помощью сжатого воздуха оптоволоконных кабелей и микрокабелей необходимо выполнять лишь на каждой пятой опоре.

Для того чтобы охватить всех пользователей, в описываемом сценарии необходимо проложить до 1000 м распределительного кабеля и всего около 200 м отводного кабеля. Расстояния, на которые может осуществляться прокладка методом вдувания, более подробно рассматриваются в разделе 4.4.

3. Изделия

3.1 Секции кабельных каналов

Секции кабельных каналов выполняются в различных конфигурациях (см. примеры на рис. 3 и 4). Кабельные каналы являются самонесущими и могут быть выполнены сечением в виде восьмерки или с силовым элементом, встроенным под оболочкой.

Путем сочетания в одной секции кабельных каналов 10-мм каналов для микрокабеля (распределительного кабеля) и 5-мм каналов для оптоволоконного кабеля, прокладываемого с помощью сжатого воздуха (отводного кабеля), можно смонтировать сеть доступа, в которой используется всего одна секция кабельных каналов, подвешиваемая между опорами.

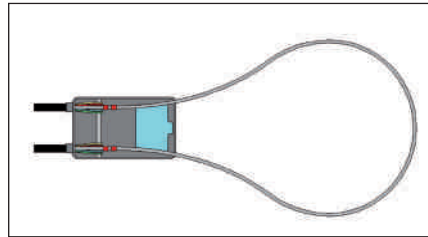
3.2 Оптоволоконная разветвительная коробка

Оптоволоконная разветвительная коробка, применяемая в данной технологии, во многом необычна. Она должна одновременно выполнять различные задачи: соединять

▼ Рис. 12. Вдувание микрокабеля



▲ Рис. 9. 24-волоконный микрокабель



▲ Рис. 11. Временная соединительная трубка, подсоединенная к концам кабельных каналов в оптоволоконной разветвительной коробке



▲ Рис. 10. Монтаж подвесной секции кабельных каналов из нескольких труб

кабельные каналы (как для вдуваемых оптоволоконных кабельных модулей, так и для микрокабелей), служить для кроссировки кабелей и их сращивания, для укладки в межпролетных секциях запасов длин оптоволоконных микрокабельных модулей, а также для размещения вдуваемых оптоволоконных кабельных модулей.

Она должна монтироваться на опоре (а в некоторых случаях – в пролете между опорами). При этом все компоненты должны размещаться в небольшом объеме (см. рис. 5). Очень важным является внешний вид коробки. Она должна обладать низким визуальным воздействием. В принципе, ширина коробки не превышает ширину столба, и из большинства точек она не видна. Важным аспектом также является длина коробки.

3.3 Соединитель кабельных каналов

Соединитель кабельных каналов необходим для отвода отдельных каналов от основной секции к любому помещению, где требуется подключение услуги. Соединитель подвешивается на кабеле между опорами. Обычно он обеспечивает ответвление четырех кабельных каналов в каждом межопорном пролете к четырем помещениям, обслуживаемым с данной опоры. Соединитель, используемый для такого ответвления от основной секции кабельных каналов, является основным конструктивным элементом.

3.4 Крепежные детали

Крепления воздушных кабельных каналов представляют собой клиновые зажимы и легко монтируются (см. рис. 7). Они легко устанавливаются на секцию кабельных каналов, и их не нужно разрезать или разделять. Крепление не повреждает кабельные каналы благодаря длине и форме клина и позволяет осуществить монтаж быстро

и легко. Для каждого типа секции кабельных каналов были подобраны и испытаны соответствующие крепления.

3.5 Вдуваемые волоконные модули и микрокабель

Вдуваемый волоконный модуль – ВМУХ (волоконный модуль с улучшенными характеристиками) – состоит из нескольких волокон или лент, заключенных в два слоя УФ-отверждаемых акрилатов (см. рис. 8). На поверхности наружного слоя имеются микроскопические стеклянные шарики, которые обеспечивают более высокую эффективность технологии вдувания (подробнее см. [1]).

Модуль ВМУХ используется в качестве «отводного кабеля» от места подключения конечного потребителя до распределительной точки сети. Чтобы свести к минимуму продолжительность и общую стоимость монтажных работ, модуль ВМУХ поставляется предварительно оконцованным оптическими разъемами, которые устанавливаются на заводе с одного конца кабеля. Предварительно оконцованный модуль ВМУХ поставляется на небольших полистироловых бобилах и выпускается в различных длинах.

Микрокабель (см. рис. 9) преимущественно предназначен для использования в сетях доступа и общегородских сетях. В рассматриваемом случае микрокабель используется в качестве «магистрального кабеля», идущего от распределительного узла.

Микрокабель содержит до восьми компактных волоконных модулей (КВМ), при этом каждый модуль состоит из 4 или 12 волокон. Таким образом, общее число волокон варьируется от 4 до 96 единиц (подробнее см. [3]).

Такое адаптивное техническое исполнение позволило создать очень компактный оптоволоконный кабель малого диаметра, который можно прокладывать в каналах диаметром 7 или 10 мм.

4. Монтаж

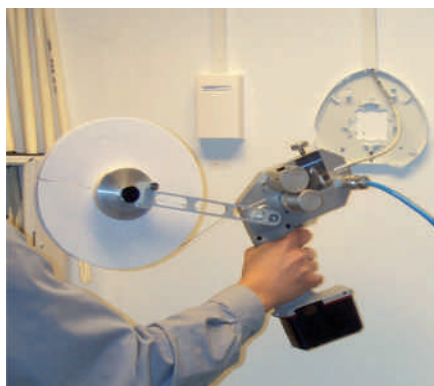
4.1 Пневматическая прокладка воздушного кабеля

В общем случае именно подвесные кабели после их прокладки подвергаются самым жестким испытаниям. Снег, лед, колебания температуры и ветер воздействуют на кабель по отдельности, а в самых тяжелых случаях – и все вместе.

Длина пролета для вдуваемого кабеля обычно составляет 30-60 метров, но не должна превышать 60 метров. Одной из причин такого ограничения является то, что волокна в трубке прокладываются без запаса длины, что приводит к возникновению напряжения в волокне при любой дополнительной нагрузке на кабель (в отличие от традиционных оптических кабелей). Однако при монтажных нагрузках напряжения в волокне не возникает. Другая причина заключается в том, что при более длинных пролетах кабельные каналы в виде восьмерки более чувствительны к эффекту пляски проводов при определенных скоростях ветра. Из-за относительно короткой длины пролета эта модель лучше всего подходит для сетей доступа.

Данная модель монтажа применялась на трех континентах для трех различных категорий климатических условий. Расчеты нагрузок, принимающие во внимание такие параметры, как максимальная ветровая нагрузка и нагрузка от обледенения, температурные колебания и длина пролета, свидетельствуют, что напряжения в волокне при таких условиях достигают уровня, соответствующего

▼ Рис. 13. Монтаж предварительно оконцованного модуля ВМУХ



уменьшенному сроку службы волокна. Тем не менее, в случае возникновения непредвиденных нагрузок и повреждения волокна, например, в результате падения дерева демонтировать волокно и заменить его новым не представляет сложности.

Предлагаемая подвесная вдуваемая система легко монтируется. Сочетание легких секций кабельных каналов и быстро устанавливаемых крепежных элементов позволяет смонтировать ее с применением малого набора инструмента (см. рис. 10). Диэлектрическое исполнение конструкции кабельных каналов позволяет устанавливать их на существующих линиях электропередач. Систему можно устанавливать как обычный кабель ОКСН, протягиваемый на монтажных роликах. При прокладке на небольшие расстояния малый вес конструкции позволяет сначала разложить систему на земле, а затем поднимать ее от опоры к опоре. Небольшой вес позволяет даже подтягивать секции кабельных каналов вручную. Разумеется, можно также использовать обычные натяжные инструменты.

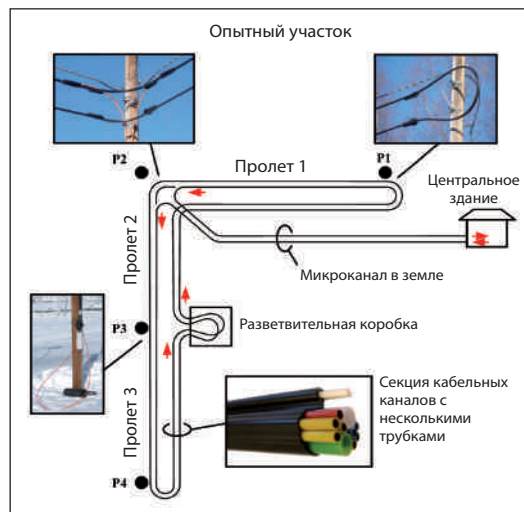
4.2 Монтаж кабеля главной распределительной линии

Основная секция кабельных каналов с несколькими трубками, описанная в разделе 3.1, монтируется вдоль улицы. На выбранных опорах она выводится на разветвительные коробки. После того, как концы трубок подсоединены к коробке, кабельные каналы соединяются между собой с помощью временной трубки, что позволяет проложить микрокабель на большее расстояние (см. рис. 11).

Микрокабель прокладывается методом вдувания с использованием сжатого воздуха и с помощью дополнительного механического проталкивания (см. рис. 12). Временные трубки в разветвительных коробках затем немедленно удаляются, при этом обеспечивается необходимый припуск по длине микрокабеля для доступа в середине пролета. В этой точке производится ответвление одного или нескольких оптоволоконных модулей (КВМ).

4.3 Монтаж отводного кабеля

Одиночные воздушные кабельные каналы устанавливаются в качестве ответвлений от ближайшей опоры до стенной розетки в помещении абонента. При необходимости кабельный канал можно легко подсоединить к кабельному каналу внутри помещения.



▲ Рис. 14. Опытный участок

Затем каждый отдельный кабельный канал подсоединяется при помощи соединителя кабельных каналов к соответствующей трубке основной секции кабельных каналов (см. раздел 3.3). Предварительно оконцованный модуль ВМУХ вдувается от помещения абонента к оптоволоконной разветвительной коробке (см. рис. 13), где он сращивается с модулями КВМ, которые отводятся от микрокабеля.

4.4 Требования к монтажу

Опыт показывает, что эффективность пневматической прокладки воздушной сети сопоставима с эффективностью прокладки подземной сети. При благоприятных условиях методом вдувания можно проложить 24-волоконный микрокабель, как минимум, на 2000 метров, а 96-волоконный кабель на 1000 метров. Обычно этого более чем достаточно.

В тех случаях, когда основной распределительный кабель нужно проложить на большее расстояние, прокладка может осуществляться каскадным методом. Длина отводного кабеля на участке от потребителя до оптоволоконной разветвительной коробки, как правило, не превышает 100-200 метров, и он может быть проложен за несколько минут. Обычно волокно на расстояние до 1000 метров можно проложить методом вдувания без каких-либо трудностей (см. [2]).

5. Прокладка микрокабеля методом вдувания на опытном участке

Для демонстрации эффективности прокладки воздушной сети методом

Пролет	Трасса	Длина (м)
Микроканал в земле	Центральное здание – опора 2	105
Пролет 2, подвесной канал	опора 2 – опора 3	60
Пролет 3, подвесной канал	опора 3 – опора 4	60
Пролет 1, подвесной канал	опора 1 – опора 2	75

▲ Таблица 1

вдувания были проведены испытания. 96-волоконный микрокабель (распределительный кабель) был проложен на испытательной линии, расположенной около завода по производству кабеля (см. рис. 14). Результаты испытаний приведены на рис. 15. На прокладку микрокабеля методом вдувания на общее расстояние в 1050 м потребовалось лишь немногим более 30 минут. Результаты испытаний свидетельствуют о целесообразности пневматической прокладки воздушной сети, рассматриваемой в настоящей работе.

6. Выводы

Представлена новая передовая концепция прокладки воздушного

оптоволоконного кабеля, разработанная для сетей FTTH.

В основе технологии лежит использование предварительно оконцованных вдуваемых волоконных кабелей и многоволоконных микрокабелей.

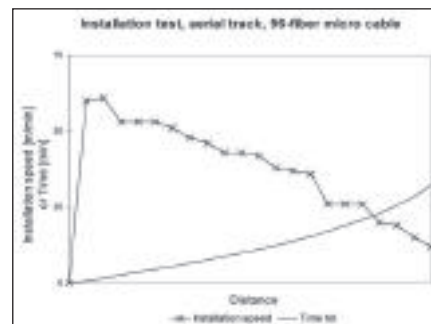
Эксплуатационные характеристики системы подтверждены пробными прокладками и полевыми испытаниями в различных климатических условиях.

Основными преимуществами данной технологии являются:

- низкая стоимость монтажа; использование существующей инфраструктуры (опор); минимальное количество необходимых точек срачивания волокон;
- оперативность прокладки; отсутствие необходимости в соединительных муфтах при монтаже за счет использования предварительно оконцованного оптоволоконного кабеля;
- расширяемость; «оплата по мере роста»: оптоволоконный кабель может прокладываться по мере необходимости; сеть ПОС может быть модернизирована до сети двухточечной связи без дополнительных затрат на кабельные каналы;
- малое визуальное воздействие: между опорами требуется разместить всего одну секцию кабельных каналов; компактность конструкции и малые размеры всех компонентов уменьшают визуальный эффект.

7. Выражение признательности

Авторы выражают признательность Лейфу Яверту, Андерсу Йохансону, Ларсу-Герану Андерсону, Томасу Йенделю, Йоргену Лундбергу и Йону Эрикссону за их вклад в написание настоящей статьи. ■



▲ Рис. 15. График результатов пробного вдувания микрокабеля на испытательной воздушной линии

8. Справочная литература

- [1] T Jendel et al, 'Design and high-speed processing of new advanced blown fibre units (EPFU's)', International Wire and Cable Symposium 2002, (November 2002).
- [2] T Jendel et al, 'Installation performance of EPFU MkII blown fibre units', International Wire and Cable Symposium 2003, (November 2003).
- [3] T Jendel, B Arvidsson, T Cedervall, 'Micro cables with new Acrylate-based compact fibre units (CFU)', International Wire and Cable Symposium 2004, (November 2004).
- [4] Willem Griffioen et al, 'Experience in application of various micro-duct cable designs', International Wire and Cable Symposium 2005, (November 2005).



PENTRE GROUP

Бюро • Германия
 Тел.: +49 36762 33404
 Факс: +49 36762 33405
 Адрес электронной почты:
 Pentre_hjv@t-online.de
 www.pentregroup.com

HEARL HEATON

«Эрикссон сетворк технолоджиз»
 Швеция, г. Худиксвалл, 82482,
 Кабельваген, 1
 Факс: +46 650 362 00
 Адрес электронной почты:
 info@ericsson.com
 Web-страница: www.ericsson.com

«Эрикссон комьюникейшнз лтд»
 Новая Зеландия, г. Окленд,
 Ньюмаркет,
 Карлтон Гор Роуд, 105
 «Эрикссон Хаус», этаж 1
 Факс: +64 9 355 55 01
 Адрес электронной почты:
 info@ericsson.com
 Web-страница: www.ericsson.com



Nouvelle solution soufflée aérienne pour réseaux FTTH utilisant des fibres optiques pré-raccordées et des microcâbles

Par Anders Björk, Mårten Björs et Peter Lo Curzio, de Ericsson Network Technologies AB, Hudiksvall, Suède et Bill McGavin, Ericsson Communications Ltd, Auckland, Nouvelle Zélande

1. Introduction

L'apparition de la technologie à bande large pour les services "Triples" a révolutionné le monde moderne du commerce et du divertissement à domicile, en se transformant en un mode de vie pour ceux qui déjà exploitent ces services. La raison principale empêchant la diffusion globale de la bande large basée sur la fibre optique est représentée par le coût élevé des travaux de génie civil pour l'installation souterraine. Les zones hautement urbanisées ou situées sur des terrains de roche dure sont généralement évitées par les opérateurs lors de l'installation des services de bande large. Dans ces cas, les solutions aériennes peuvent représenter une alternative, spécialement lorsqu'il existe déjà des infrastructures aériennes comme par exemple les lignes aériennes d'alimentation électrique ou téléphonique.

L'utilisation de fibres optiques et de microcâbles soufflés s'est avérée plus efficace pour les réseaux d'accès à fibres optiques, comme par exemple dans le cas d'applications FTTH (Fibres Jusqu'à Domicile). L'utilisation de fibres optiques pré-raccordées permet de réduire au minimum le temps d'installation par rapport aux techniques de câblage conventionnelles. En outre, la technique de soufflage permet d'obtenir un réseau "dynamique" où les fibres peuvent être rapidement ajoutées, retirées, remplacées ou réacheminées sans entraîner des travaux de génie civil coûteux.

Dans le passé les installations de fibres soufflées aériennes ont présenté des problèmes esthétiques et pratiques lors de l'installation.

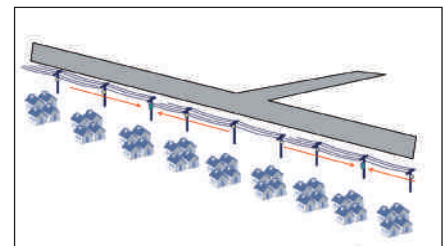
Les récents développements en matière de conception des câbles à fibres optiques (voir^[3] et^[4]), et les nouvelles méthodes d'installation ont totalement révolutionné les applications aériennes. Ce sujet sera traité dans le présent article qui propose une nouvelle méthode d'installation aérienne des fibres optiques utilisant des techniques de soufflage et décrit les progrès réalisés du point de vue de la conception et de l'installation.

2. Description de la solution

Le système de base pour installer les câbles soufflés aériens est le même que le système souterrain conventionnel, mais il a été nécessaire de développer de nouveaux produits (voir section 3).

La solution est basée sur des conduits autoporteurs associant des unités de fibre soufflées pré-raccordées et des microcâbles soufflés. Il s'agit d'une technologie unique sous plusieurs aspects:

- Il est possible d'utiliser un seul conduit pour la section de distribution et pour les sections de dérivation d'un réseau FTTH. Les câbles de distribution et de dérivation, en partageant la même infrastructure dans une installation d'accès de fibres optiques, permettent de réaliser une réduction considérable des coûts. L'utilisation d'un seul conduit résulte plus économique que l'installation de câbles séparés pour les sections d'alimentation et de dérivation de réseaux en parallèle
- Il est également possible d'augmenter la quantité de fibres installée de façon



▲ **Figure 1:** Ligne de poteaux avec boîtiers de distribution tous les 5 poteaux

rapide et à un coût réduit en fonction des nécessités. Par conséquent, les investissements coûteux en fibres peuvent être renvoyés dans le futur ('pay as you grow')

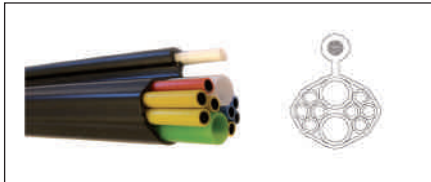
- La solution est pareillement applicable aux réseaux optiques passifs (PON) et aux réseaux point à point (P2P). En effet, les deux types peuvent partager la même infrastructure physique. Un réseau PON peut être converti en un réseau P2P sans exiger aucun investissement additionnel en conduits
- Les spécifications requises des produits utilisés pour ce type d'installation sont les dimensions réduites et un impact visuel réduit. L'impact visuel des installations aériennes est un facteur fondamental pour l'acceptation ou le rejet de ces solutions par la collectivité. La collectivité n'accepte plus d'installations ayant un impact visuel élevé
- Les fibres caractérisées par une quantité réduite d'épissures et de points de connexion, représentent une solution économiquement rentable pour unir les conduits et exige également une main d'œuvre qualifiée réduite. En outre, on obtient un système plus fiable par rapport à la solution utilisant des connecteurs optiques

La solution est illustrée à la *Figure 1*. Il s'agit d'une zone résidentielle typique constituée de maisons indépendantes. Dans ce cas, une seule boîte de jonction de fibres optiques tous les 5 poteaux suffit. Avec cette petite boîte il est possible de brancher de 20 à 24 habitations. Le réseau reliant les boîtes de jonction vers la cabine d'épissure (avec séparateurs) est le câblage de distribution principal.

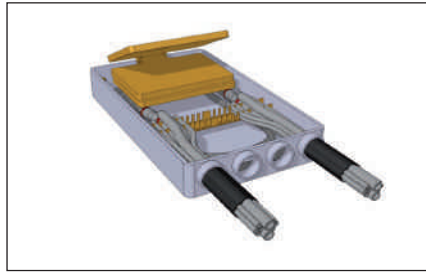
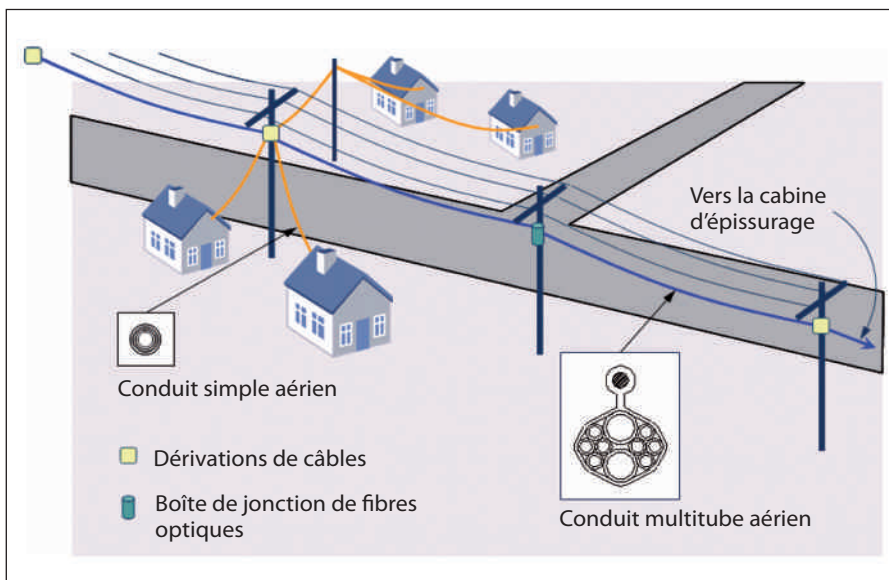
Le câblage de dérivation de l'utilisateur final est réalisé en installant des conduits de dérivation simples branchés au conduit principal (voir la *Figure 2*). Généralement, un seul dispositif de dérivation (voir 3.3), dessert quatre abonnés du poteau le plus proche. Il faut remarquer qu'aucun épissure de fibre n'est effectué dans le dispositif de dérivation.

Comme décrit précédemment, cette conception permet d'utiliser un seul conduit pour alimenter une distance considérable entre les poteaux. Le nombre d'épissures de fibre sera réduit au minimum, l'épissure entre la fibre soufflée et le microcâble soufflé n'étant nécessaire que sur le 5^{ème} poteau. Afin d'atteindre la totalité des clients dans le scénario illustré, il est nécessaire d'installer le câble de distribution à une distance arrivant jusqu'à 1 000 mètres, tandis que la distance du câble de dérivation peut arriver jusqu'à 200 mètres.

▼ **Figure 3:** Exemple de conduit aérien multitube avec tubes de 8 x 5mm pour fibre soufflée et tubes de 2 x 10mm pour microcâbles



▼ **Figure 2:** Exemple d'installation – Installation aérienne du réseau FTTH avec fibre optique et câble soufflés



▲ **Figure 5:** Exemple de boîte de jonction de fibres optiques avec deux conduits principaux raccordés



▲ **Figure 6:** Exemple de dispositif de dérivation avec quatre conduits simples raccordés à un conduit multitube

Les distances de l'installation de soufflage sont traitées plus en détail dans la section 4.4.

3. Produits

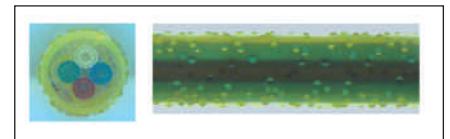
3.1 Conduits

Les conduits peuvent présenter différentes configurations (voir les exemples aux *Figures 3* et *4*). Les conduits sont auto-porteurs (comme à la figure 8), ou peuvent inclure une armature intégrée sous la gaine. En combinant des tubes de 10mm pour les microcâbles (câbles de distribution) et des tubes de 5mm pour la fibre optique soufflée (branchement) dans le même conduit, il est possible de réaliser une installation de réseau d'accès avec un seul conduit entre deux poteaux.

▼ **Figure 4:** Exemple de conduit de dérivation autoporteur avec tube interne de 1 x 5mm



▲ **Figure 7:** Bride de serrage pour conduit multitube



▲ **Figure 8:** EPFU (Enhanced Performance Fibre Unit) à quatre fibres

3.2 Boîte de jonction de fibres optiques

La boîte de jonction de fibres optiques pour cette application est unique sous plusieurs aspects. Elle doit répondre à différentes exigences telles que la présence de conduits (pour unités de fibre soufflée et microcâbles), la gestion des fibres et des épissures, le stockage intermédiaire d'unités de fibres optiques des microcâbles et le stockage des unités de fibres soufflées. En outre elle doit pouvoir être installée sur les poteaux (et dans certains cas entre deux poteaux). De plus ce matériau doit être pressé dans un petit conteneur (voir la *Figure 5*).

L'impact esthétique est très important: la boîte doit être esthétiquement discrète. Généralement, la boîte ne dépasse pas la largeur du poteau, et par conséquent elle n'est pas visible. La longueur de la boîte est également importante.

3.3 Dispositif de dérivation

Un dispositif de dérivation est nécessaire pour brancher les conduits simples en partant du conduit principal jusqu'aux habitations exigeant le service. La conception du dispositif de dérivation permet l'installation entre les poteaux. Normalement, le dispositif permet l'accès à quatre conduits pour toute portée existant entre les poteaux, en permettant ainsi l'accès aux quatre habitations desservies par un poteau spécifique.

Le dispositif de dérivation permettant cette distribution du conduit principal est une caractéristique essentielle de la conception.

3.4 Accessoires

Les accessoires de support du conduit aérien sont du type à bride de serrage à coins et d'installation simple (voir la Figure 7). Ils peuvent être facilement installés dans le conduit sans exiger aucune coupe ni épissure. L'accessoire n'endommage pas les conduits grâce à la longueur et à la forme du coin et permet une installation rapide est facile.

Des accessoires appropriés à chaque type de conduit ont été sélectionnés et testés.

3.5 Unités à fibres optiques soufflées et microcâble

Une unité de fibre soufflée à performance améliorée EPFU (Enhanced Performance Fibre Unit), consiste en un nombre de fibres ou de rubans encapsulés dans deux couches de résine acrylique vulcanisables à UV (voir la Figure 8). La couche extérieure contient de petites billes de verre sur la surface pour améliorer les performances de soufflage. Pour plus de détails, voir⁽¹⁾.

L'unité de fibre à performance améliorée EPFU s'utilise comme «câble de dérivation» du point de raccordement au point de distribution. Pour réduire au minimum le temps d'installation et les coûts totaux d'installation, l'unité EPFU est fournie pré-raccordée avec des connecteurs optiques, installée en usine à une extrémité. Fournie sur des dévidoirs de polystyrène de petites dimensions, l'unité EPFU pré-raccordée est disponible dans différentes longueurs.

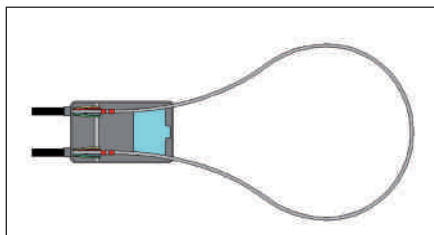
Le microcâble (Figure 9) est principalement conçu pour des réseaux d'accès et des réseaux métropolitains. Dans ces cas, le microcâble est utilisé en tant que «câble d'alimentation» du point de distribution.

Le microcâble est constitué de huit unités de fibres compactes (CFU) avec 4 ou 12 fibres par unité.

▼ Figure 9: Microcâble à 24 fibres



▼ Figure 11: Tube de connexion provisoire aux extrémités du conduit dans la boîte de jonction



Cela permet de maintenir un nombre de fibres de 4 à 96. Pour plus de détails voir⁽³⁾. La versatilité de cette conception de câble a permis d'obtenir un câble à fibres optiques plus compact et de dimensions réduites pouvant être installé dans des tubes d'un diamètre de 7 ou 10mm.

4. Installation

4.1 Installation soufflée aérienne

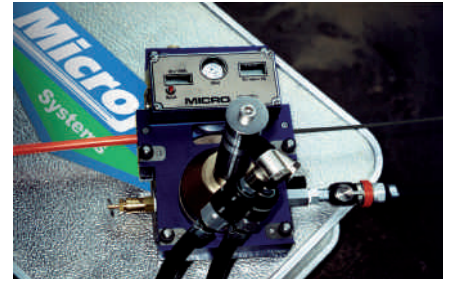
Généralement les câbles aériens sont sujets à des conditions extrêmement difficiles après leur installation. Le câble est influencé par la neige, par la glace, par les différences de température et de vent ou, dans le pire des cas, par la totalité de ces conditions en même temps.

La longueur de portée dans le cas des câbles soufflés varie généralement de 30 à 60 mètres, mais cette longueur ne peut dépasser les 60 mètres. L'une des raisons consiste en le fait que les fibres s'installent dans le conduit sans aucune longueur excédante à l'intérieur du conduit, ce qui engendre des contraintes dans la fibre optique à toute charge supplémentaire du câble (contrairement aux câbles optiques traditionnels).

Toutefois, la fibre n'est sujette à aucune contrainte si l'on respecte la charge d'installation. Une autre raison réside dans le fait qu'en cas de portées supérieures, le type de câble de la Figure 8 a tendance à être plus sensible aux "effets galopants" à certaines vitesses du vent. Le système est plus approprié aux réseaux d'accès du fait des dimensions relativement réduites des portées.

Ce système a été installé dans trois continents, présentant trois conditions environnementales différentes. Les calculs de charge, y compris les paramètres tels que le vent maximum et les poussées de la glace, les changements de température et les longueurs de portée, montrent que les contraintes supportées par la fibre dans

▼ Figure 10: Installation aérienne d'un conduit multitube



▲ Figure 12: Soufflage du microcâble

ces conditions atteignent un niveau qui réduit la vie de la fibre optique. Toutefois, dans le cas de charges imprévues et de dommage de la fibre, par exemple à cause de la chute d'un arbre, la fibre peut être aisément retirée et remplacée par une nouvelle fibre.

Ce système aérien soufflé est facile à installer. La combinaison de conduits et d'accessoires d'installation légers permet d'installer le système avec une quantité d'outils inférieure (voir la Figure 10). La conception du diélectrique des conduits permet l'installation le long des lignes de distribution de l'énergie. Les conduits peuvent être installés comme les câbles standard ADSS, tirés sur les rouleaux d'installation. Les longueurs de câble étant souvent courtes et légères, le conduit peut être simplement posé sur le sol et ensuite soulevé poteaux par poteaux. Grâce à leurs poids réduits, les conduits peuvent être également tendus manuellement. Il est bien entendu possible d'utiliser également des dispositifs de tension.

4.2 Installation du câblage de distribution principal

Le conduit multitube principal, décrit dans la section 3.1, est installé le long d'une route. Dans certains poteaux il est raccordé dans des boîtes de jonction. Une fois terminée l'installation des extrémités des conduits dans la boîte, un tube provisoire est branché entre les extrémités des conduits raccordés, ce qui permet d'installer le microcâble à une distance supérieure (voir la Figure 11).

Le microcâble est installé grâce à la technique de soufflage, en utilisant de l'air comprimé et une poussée mécanique (voir la Figure 12). Ensuite, les conduits provisoires sont immédiatement retirés des boîtes de jonction en laissant la longueur excédante du microcâble nécessaire à l'accès à mi-portée. Une ou plusieurs unités de fibre optique compactes (CFUs) sont branchées dans ce point.

4.3 Installation du câblage de dérivation

Les conduits simples aériens sont installés comme câbles de dérivation allant du poteau le plus proche à une prise de courant murale des locaux du client. Si nécessaire, le conduit peut être facilement raccordé à un autre conduit interne.

Ensuite, chaque conduit simple est branché à un tube spécifique dans le conduit principal au moyen d'un dispositif de dérivation (voir point 3.3).

L'unité EPFU pré-raccordée est soufflée à partir de l'installation du client jusqu'à la boîte de jonction de la fibre optique (voir la Figure 13), où il est épissé aux unités CFU dérivées du microcâble.

4.4 Spécifications d'installation

L'expérience montre que les performances des installations aériennes soufflées sont comparables aux performances de l'installation souterraine.

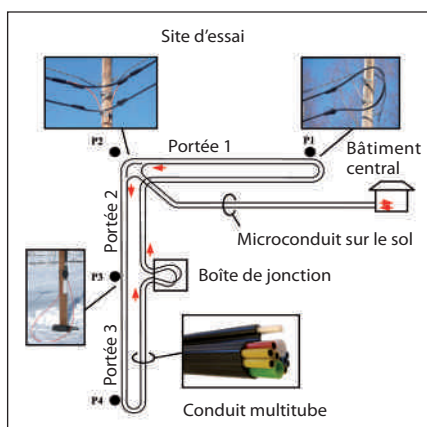
Dans des conditions favorables il est possible de souffler un microcâble de 24 fibres pour au moins 2 000 mètres et un câble de 96 fibres à 1 000 mètres, ce qui est plus que suffisant dans le cas d'une installation normale. Lorsque des longueurs supérieures sont requises pour le câble de distribution principal, il est possible de réaliser une installation en cascade.

La distance du câble de dérivation, du client à la boîte de jonction de la fibre, est généralement de 100-200 mètres max. et l'installation peut être effectuée en quelques minutes. Normalement, il est possible d'installer des fibres soufflées à une distance maximale de 1 000 mètres sans aucun problème (voir⁽²⁾).

▼ **Figure 13:** Installation d'une unité EPFU pré-raccordée



▼ **Figure 14:** Site de l'essai



Portée entre poteaux	Parcours	Longueur (m)
Microconduit sur le sol	Bâtiment central – poteau 2	105
Portée 2, conduit aérien	poteau 2 – poteau 3	60
Portée 3, conduit aérien	poteau 3 – poteau 4	60
Portée 1, conduit aérien	poteau 1 – poteau 2	75

▲ **Tableau 1**

5. Soufflage de microcâbles dans le site d'essai

Un essai a été effectué pour démontrer les performances de l'installation soufflée aérienne. Un microcâble de 96 fibres (câble de distribution) a été installé sur un parcours d'essai à l'extérieur de l'installation des câbles (voir la Figure 14).

Le résultat de l'essai est illustré à la Figure 15. Le microcâble a été soufflé à une longueur totale de 1 050m pendant juste plus de 30 minutes.

Le résultat de l'essai démontre la faisabilité de l'installation soufflée aérienne décrite dans le présent article.

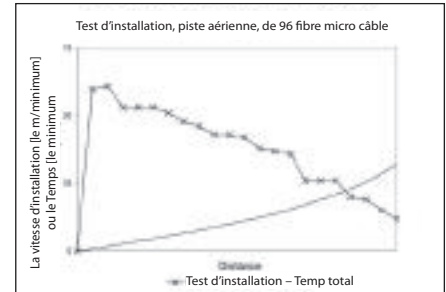
6. Conclusions

Le présent article illustre un concept innovant en ce qui concerne l'installation aérienne des fibres, développé pour les applications FTTH.

La technique est basée sur l'utilisation de fibres optiques pré-raccordées et de microcâbles HFC de fibres soufflés. Les performances du système ont été examinées dans différentes conditions environnementales en effectuant des essais d'installation et des essais pratiques.

La technique présente plusieurs avantages importants:

- Coûts d'installation réduits. Utilisation de l'infrastructure des poteaux existant déjà. Quantité minimale d'épissures de fibres requise
- Installation rapide. La fibre pré-raccordée n'exige pas l'utilisation de connecteurs durant l'installation
- Échelonnabilité. "Pay as you grow": les fibres optiques peuvent être installées lorsque nécessaire. Un réseau PON peut être converti en un réseau P2P sans exiger d'investissements supplémentaires dans les conduits
- Impact esthétique réduit. Un seul conduit est nécessaire entre les poteaux. Conception compacte et dimensions réduites de la totalité des composants réduisant l'impact esthétique



▲ **Figure 15:** Graphique illustrant le résultat de l'essai en soufflant un microcâble dans un parcours d'essai aérien

7. Remerciements

Nous souhaitons remercier MM. Leif Jawerth, Anders Johansson, Lars-Göran Andersson, Tomas Jendel, Jörgen Lundberg et John Eriksson pour leur collaboration au présent article. ■

8. Références

- ⁽¹⁾ T Jendel et al, 'Design and high-speed processing of new advanced blown fibre units (EPFU's); International Wire and Cable Symposium 2002, (November 2002).
- ⁽²⁾ T Jendel et al, 'Installation performance of EPFU MkII blown fibre units; International Wire and Cable Symposium 2003, (November 2003).
- ⁽³⁾ T Jendel, B Arvidsson, T Cedervall, 'Micro cables with new Acrylate-based compact fibre units (CFU); International Wire and Cable Symposium 2004, (November 2004).
- ⁽⁴⁾ Willem Griffioen et al, 'Experience in application of various micro-duct cable designs; International Wire and Cable Symposium 2005, (November 2005).

Ericsson Communications Ltd

Ericsson House
Level One
105 Carlton Gore Road
Newmarket
Auckland
Nouvelle Zélande
Tel: +64 9 355 55 00
Fax: +64 9 355 55 01
Website: www.ericsson.com

Ericsson Network Technologies

Kabelvägen 1
82482 Hudiksvall
La Suède
Tel: +46 650 360 00
Fax: +46 650 362 00
Website: www.ericsson.com



Nuova soluzione aerea mediante soffiatura per reti FTTH basata su fibre ottiche preterminate e microcavi

A cura di Anders Björk, Mårten Björs e Peter Lo Curzio, di Ericsson Network Technologies AB, Hudiksvall, Svezia e Bill McGavin, Ericsson Communications Ltd, Auckland, Nuova Zelanda

1. Introduzione

L'avvento della tecnologia a banda larga per i servizi triple play ha rivoluzionato il mondo moderno del commercio e dell'intrattenimento a domicilio, trasformandosi in uno stile di vita per coloro che già utilizzavano questi servizi.

La ragione principale che impedisce la diffusione globale della banda larga basata su fibra ottica è l'elevato costo dei lavori civili per l'installazione sotterranea. Le aree altamente urbanizzate o situate su terreni di roccia dura vengono generalmente evitate dagli operatori nell'installazione di servizi di banda larga. In questi casi, le soluzioni aeree possono rappresentare un'alternativa, specialmente quando già esistono delle infrastrutture aeree come ad esempio linee aeree d'alimentazione elettrica o telefonica.

L'utilizzo di fibre ottiche e di microcavi soffiati si è rivelata molto efficace per le reti di accesso a fibre ottiche come ad esempio nei casi di applicazioni FTTH (fibra fino a casa dell'utente). L'utilizzo di fibre ottiche preterminate consente di ridurre al minimo i tempi d'installazione rispetto alle tecniche di cablaggio tradizionali. Inoltre, la tecnica di soffiatura permette di ottenere una rete "dinamica" ove le fibre possono essere rapidamente aggiunte, rimosse, sostituite o nuovamente dirottate senza richiedere costosi lavori civili. In passato le installazioni di fibre soffiate per applicazioni aeree hanno presentato problemi estetici e pratici al momento dell'installazione.

I recenti sviluppi nella concezione dei cavi a fibre ottiche (rif. [3] e [4]), e i nuovi metodi d'installazione hanno rivoluzionato completamente le applicazioni aeree. Questo argomento sarà discusso nel

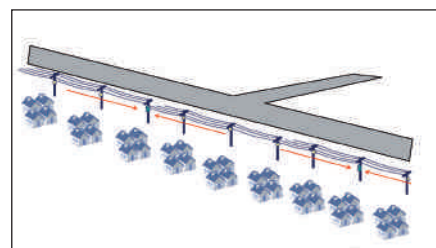
presente articolo che propone un nuovo metodo d'installazione aerea delle fibre ottiche mediante l'utilizzo di tecniche di soffiatura e descrive i progressi realizzati in termini di progettazione e d'installazione.

2. Descrizione della soluzione

Il sistema di base per installare i cavi soffiati aerei è lo stesso che viene utilizzato per i sistemi sotterranei tradizionali, ma è stato necessario sviluppare nuovi prodotti (rif.: sezione 3).

La soluzione si basa su condotti autoportanti che associano unità di fibre soffiate preterminate e microcavi soffiati. Si tratta di una tecnologia unica sotto vari aspetti:

- È possibile utilizzare un solo condotto per la sezione di distribuzione e per le sezioni di derivazione di una rete FTTH. I cavi di distribuzione e di derivazione, condividendo la medesima infrastruttura in un'installazione di accesso di fibre ottiche, consente una notevole riduzione dei costi. L'utilizzo di un solo condotto risulta più economico dell'installazione di cavi separati per le sezioni di alimentazione e di derivazione della rete in parallelo
- È inoltre possibile aumentare la quantità di fibre installate in maniera rapida e ad un costo ridotto secondo le necessità. Di conseguenza, costosi investimenti in fibre possono essere rinviati in futuro ('pay as you grow')
- La soluzione è analogamente applicabile alle reti ottiche passive (PON) e alle reti punto a punto (P2P). Infatti, entrambe le tipologie possono condividere la medesima infrastruttura fisica



▲ **Figura 1:** Fila di pali con cassette di distribuzione ogni 5 pali

Una rete PON può essere convertita in una rete P2P senza richiedere alcun investimento aggiuntivo in condotti

- Le specifiche richieste dei prodotti utilizzati per questo tipo di installazione sono dimensioni ridotte ed un basso impatto visivo. L'impatto visivo delle installazioni aeree è un fattore fondamentale per l'accettazione o il rifiuto di queste soluzioni da parte della collettività. La collettività non accetta più installazioni ad elevato impatto visivo
- Le fibre caratterizzate da una bassa quantità di giunzioni e punti di connessione, rappresentano una soluzione economicamente vantaggiosa per il collegamento di condotti e richiede anche una minore manodopera qualificata. Inoltre, si ottiene un sistema più affidabile rispetto alla soluzione che utilizza i connettori ottici

La soluzione è illustrata alla *Figura 1*. Si tratta di una classica zona residenziale composta da abitazioni indipendenti. In questo caso, una sola cassetta di connessione di fibre ottiche è sufficiente ogni 5 pali.

Con questa piccola cassetta è possibile collegare da 20 a 24 abitazioni. La rete che collega le cassette di connessione verso

la cabina di giunzione (con separatori) è costituita dal cablaggio della distribuzione principale. Il cablaggio di derivazione dall'utente finale viene realizzato installando condotti di derivazione singoli collegati al condotto principale (rif.: Figura 2).

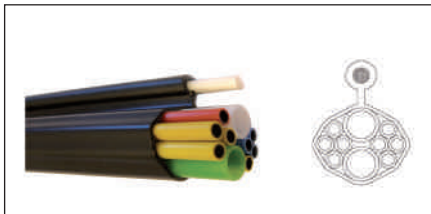
Generalmente, un solo dispositivo di derivazione (rif.: 3.3), assicura il servizio a quattro abbonati dal palo più vicino.

Va sottolineato che nessuna giunzione di fibra viene eseguita nel dispositivo di derivazione.

Come descritto in precedenza, questa concezione permette di utilizzare un solo condotto per alimentare una distanza consistente fra pali. Il numero di giunzioni delle fibre sarà ridotto al minimo, poiché la giunzione fra la fibra soffiata e il microcavo soffiato è necessaria solo ogni 5 pali.

Per poter raggiungere tutti i clienti nel caso illustrato, è necessario installare il cavo di distribuzione ad una distanza massima di 1000 metri, mentre la distanza del cavo di derivazione può arrivare solo fino a 200 metri. Le distanze dell'installazione di soffiatura sono trattate più diffusamente nella sezione 4.4.

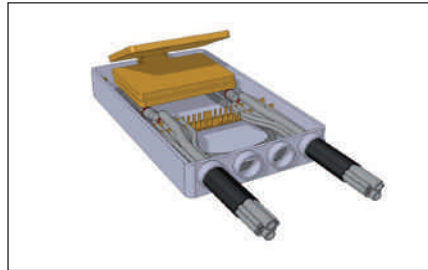
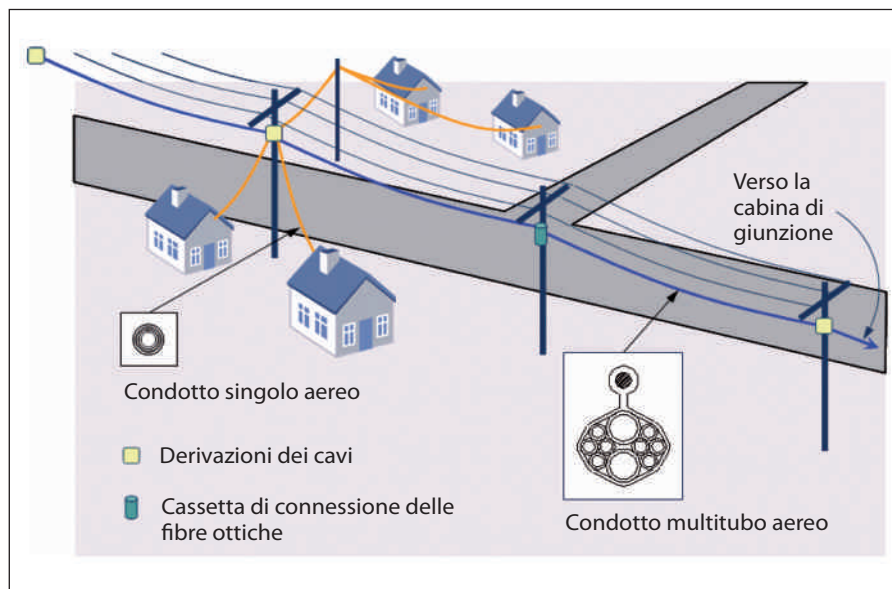
▼ **Figura 3:** Esempio di condotto aereo multitubo con tubi da 8 x 5mm per fibre soffiate e tubi da 2 x 10mm per microcavi



▼ **Figura 4:** Esempio di condotto di derivazione autoportante con tubo interno da 1 x 5mm



▼ **Figura 2:** Esempio d'installazione – Installazione aerea della rete FTTH con fibra ottica e cavi soffiati



▲ **Figura 5:** Esempio di cassetta di connessione di fibre ottiche con due condotti principali collegati



▲ **Figura 6:** Esempio di dispositivo di derivazione con quattro condotti singoli collegati ad un condotto multitubo

3. Prodotti

3.1 Condotti

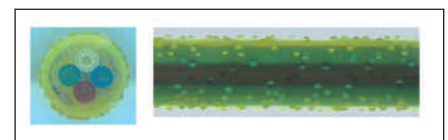
I condotti possono presentare diverse configurazioni (si vedano gli esempi alle Figure 3 e 4).

I condotti sono autoportanti (come alla Figura 8), o possono comprendere un'armatura integrata sotto la guaina.

Associando tubi da 10mm per i microcavi (cavi di distribuzione) e tubi da 5mm per la fibra ottica soffiata (derivazione) nello stesso condotto, è possibile realizzare un'installazione di rete d'accesso con un solo condotto fra due pali.



▲ **Figura 7:** Dispositivo di tensionamento per condotto multitubo



▲ **Figura 8:** EPFU (Enhanced Performance Fibre Unit) a quattro fibre

3.2 Cassetta di connessione di fibre ottiche

La cassetta di connessione di fibre ottiche per questa applicazione è unica sotto vari aspetti. Deve soddisfare diverse esigenze quali la presenza di condotti (sia per unità di fibre soffiate sia per microcavi), la gestione delle fibre e delle giunzioni, lo stoccaggio al centro della campata di unità di fibre ottiche dei microcavi e lo stoccaggio di unità di fibre soffiate.

Dovrebbe inoltre poter essere installata sui pali (e in alcuni casi fra due pali). Infine questo materiale deve essere pigiato in un piccolo contenitore (Figura 5). L'impatto estetico è molto importante: la cassetta deve essere esteticamente discreta. Generalmente, la cassetta non supera la larghezza del palo, e di conseguenza non è visibile dalla maggior parte delle angolazioni del palo. Anche la lunghezza della cassetta è importante.

3.3 Dispositivo di derivazione

Per realizzare il collegamento di condotti singoli partendo dal condotto principale fino alle abitazioni che richiedono il servizio è necessario un dispositivo di derivazione. La struttura del dispositivo di derivazione consente l'installazione fra i pali. Normalmente, il dispositivo permette l'accesso a quattro condotti in ciascuna campata fra i pali, nonché l'accesso alle quattro abitazioni servite da un determinato palo.

Il dispositivo di derivazione che consente questa distribuzione del condotto principale è una caratteristica essenziale della struttura.

3.4 Accessori

Gli accessori di supporto del condotto aereo sono del tipo a morsa a cuneo e di semplice installazione (rif.: *Figura 7*). Possono essere facilmente installati nei condotti senza richiedere alcun taglio né giunzione. L'accessorio non danneggia i condotti grazie alla lunghezza e alla forma del cuneo e consente un'installazione rapida e semplice.

Per ciascun tipo di condotto sono stati selezionati e testati accessori appropriati.

3.5 Unità di fibre ottiche e microcavi soffiati

Un'unità di fibra soffiata con prestazioni migliorate EPFU (Enhanced Performance Fibre Unit), è costituita da un certo numero di fibre o di nastri incapsulati in due strati di acrilati vulcanizzabili a raggi ultravioletti (rif.: *Figura 8*). Lo strato esterno contiene delle piccole biglie di vetro sulla superficie per migliorare le prestazioni di soffiatura. Per ulteriori dettagli, vedere⁽¹⁾.

L'unità di fibre con prestazioni migliorate EPFU si utilizza come "cavo di derivazione" dal punto di connessione ad un punto di distribuzione.

Per ridurre al minimo il tempo ed i costi d'installazione, l'unità EPFU viene fornita preterminata con connettori ottici, installata in officina ad una estremità. Fornita su aspi di polistirene di piccole dimensioni, l'unità EPFU preterminata è disponibile in diverse lunghezze.

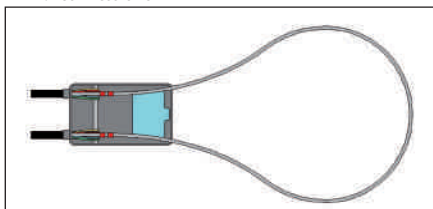
Il microcavo (*Figura 9*) è principalmente progettato per reti di accesso e reti metropolitane. In questi casi, il microcavo viene utilizzato come "cavo di alimentazione" dal punto di distribuzione.

Il microcavo comprende fino a otto unità di fibre compatte (CFU) con 4 o 12 fibre

▼ **Figura 9:** Microcavo a 24 fibre



▼ **Figura 11:** Tubo di connessione provvisorio attaccato alle estremità del condotto nella cassetta di connessione



per unità. Ciò consente di mantenere un numero di fibre da 4 a 96. Per ulteriori dettagli, vedere⁽³⁾.

La versatilità di questa struttura di cavo ha permesso di ottenere un cavo a fibre ottiche più compatto e di dimensioni ridotte che può essere installato in tubi del diametro di 7 o 10mm.

4. Installazione

4.1 Installazione aerea mediante soffiatura

Generalmente i cavi aerei sono soggetti a condizioni estreme dopo l'installazione. Il cavo è influenzato dalla neve, dal ghiaccio, dalle differenze di temperatura e di vento o, nel peggiore dei casi, da tutte queste condizioni contemporaneamente.

Generalmente, la lunghezza della campata nel caso di cavi soffiati varia da 30 a 60 metri, ma tale lunghezza non può superare i 60 metri.

Una delle ragioni è costituita dal fatto che le fibre sono installate senza alcuna lunghezza eccedente all'interno del condotto, generando sollecitazioni sulla fibra ottica a qualsiasi carico supplementare del cavo (al contrario dei cavi ottici tradizionali). Tuttavia la fibra non è soggetta ad alcuna sollecitazione se viene rispettato il carico d'installazione.

Un'altra ragione è data dal fatto che nel caso di campate più lunghe, il tipo di cavo della *Figura 8* tende ad essere più sensibile agli "effetti galoppanti" a determinate velocità del vento. Il sistema è più adatto alle reti di accesso date le dimensioni relativamente ridotte delle campate.

Questo sistema è stato installato in tre continenti, in tre diverse condizioni ambientali. I calcoli del carico, compresi i parametri quali il vento massimo e le spinte del ghiaccio, le variazioni di temperatura e le lunghezze di campata, dimostrano che

▼ **Figura 10:** Installazione aerea di un condotto multitubo



▲ **Figura 12:** Soffiatura del microcavo

le sollecitazioni sopportate dalla fibra in queste condizioni raggiungono un livello che accorcia la vita della fibra ottica. Tuttavia, nel caso di carichi non previsti e di danni della fibra, ad esempio a causa della caduta di un albero, la fibra può essere facilmente rimossa e sostituita con una nuova fibra.

Questo sistema aereo mediante soffiatura è facile da installare. La combinazione di condotti e di accessori leggeri permette d'installare il sistema con meno strumenti (*Figura 10*). La concezione dielettrica dei condotti consente l'installazione lungo le linee di distribuzione dell'energia esistenti. I condotti possono essere installati come cavi standard ADSS, estratti da rulli d'installazione.

Essendo le lunghezze di cavo spesso corte e di peso leggero, il condotto può essere semplicemente tirato sul suolo e quindi sollevato palo per palo. Grazie al peso ridotto, i condotti possono essere anche tesi manualmente. Ovviamente, si possono utilizzare anche dispositivi di tensionamento.

4.2 Installazione del cablaggio di distribuzione principale

Il condotto multitubo principale, descritto nella sezione 3.1, è installato lungo una strada. Su alcuni pali viene terminato nelle cassette di connessione. Una volta completata l'installazione delle estremità dei condotti nella cassetta, viene collegato un tubo provvisorio fra le estremità dei condotti collegati, consentendo l'installazione del microcavo ad una distanza maggiore (*Figura 11*). Il microcavo si installa mediante la tecnica di soffiatura, utilizzando aria compressa ed una spinta meccanica (*Figura 12*).

Successivamente, i condotti provvisori vengono immediatamente rimossi dalle cassette di connessione lasciando la lunghezza eccedente del microcavo necessaria ad accedere al centro della campata. Una o più unità di fibre ottiche (CFU) vengono collegate in questo punto.

4.3 Installazione del cablaggio di derivazione

I condotti aerei singoli vengono installati come cavi di derivazione dal palo più vicino ad una presa murale nei locali del

cliente. Se necessario, il condotto può essere facilmente collegato ad un altro condotto interno. Quindi, ciascun condotto singolo è collegato ad un tubo specifico nel condotto principale mediante un dispositivo di derivazione (vedere punto 3.3).

L'unità EPFU preterminata viene soffiata partendo dall'installazione del cliente fino alla cassetta di connessione della fibra ottica (Figura 13), dove viene effettuata la giunzione alle unità CFU derivate dal microcavo.

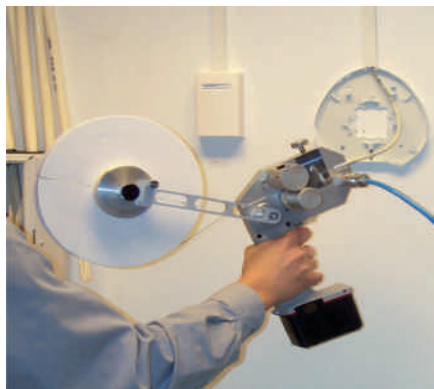
4.4 Specifiche d'installazione

L'esperienza mostra che le prestazioni delle installazioni aeree mediante soffiatura sono paragonabili alle prestazioni delle installazioni sotterranee.

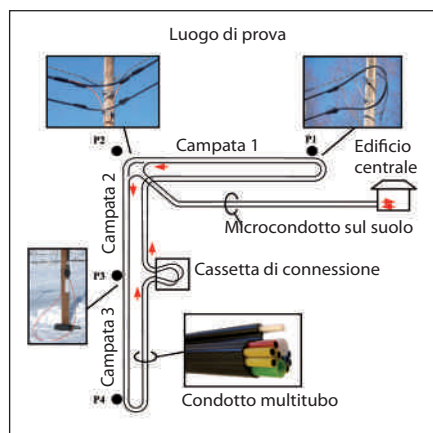
In condizioni favorevoli è possibile soffiare un microcavo da 24 fibre per almeno 2000 metri ed un cavo di 96 fibre a 1000 metri, il che è più che sufficiente nel caso di un'installazione normale. Quando sono necessarie lunghezze maggiori per il cavo di distribuzione principale, è possibile realizzare un'installazione a cascata.

La distanza del cavo di derivazione dal cliente alla cassetta di connessione della fibra, è generalmente di 100-200 metri max. e l'installazione può essere effettuata in pochi minuti.

▼ **Figura 13:** Installazione di un'unità EPFU preterminata



▼ **Figura 14:** Luogo della prova



Campata	Percorso	Lunghezza (m)
Microcondotto sul suolo	Edificio centrale – palo 2	105
Campata 2, condotto aereo	palo 2 – palo 3	60
Campata 3, condotto aereo	palo 3 – palo 4	60
Campata 1, condotto aereo	palo 1 – palo 2	75

▲ **Tabella 1**

Normalmente, è possibile installare fibre soffiate ad una distanza massima di 1000 metri senza problemi (rif.: [2]).

5. Soffiatura di microcavi sul luogo di prova

È stata eseguita una prova per dimostrare le prestazioni dell'installazione aerea mediante soffiatura. È stato installato un microcavo da 96 fibre (cavo di distribuzione) in un percorso di prova all'esterno dell'installazione dei cavi (Figura 14).

Il microcavo è stato soffiato ad una lunghezza totale di 1050m in poco più di 30 minuti. Il risultato della prova dimostra la fattibilità dell'installazione aerea mediante soffiatura descritta nel presente articolo.

6. Conclusioni

Il presente articolo illustra un concetto innovativo per quanto riguarda l'installazione aerea delle fibre, sviluppato per le applicazioni FTTH. La tecnica si basa sull'utilizzo delle fibre ottiche preterminate e di microcavi HFC soffiati.

Sono state esaminate le prestazioni del sistema in diverse condizioni ambientali effettuando delle prove d'installazione e delle prove pratiche.

La tecnica presenta numerosi vantaggi importanti:

- Costi d'installazione ridotti. Utilizzo dell'infrastruttura di pali già esistente. Quantità minima di giunzioni di fibre
- Installazione rapida. La fibra preterminata non richiede l'utilizzo di connettori durante l'installazione
- Scalabilità. "Pay as you grow": le fibre ottiche possono essere installate quando necessario. Una rete PON può essere convertita in una rete P2P senza investimenti aggiuntivi nei condotti
- Ridotto impatto estetico. È necessario solamente un condotto fra i pali. Struttura compatta e dimensioni ridotte di tutti i componenti che riducono l'impatto estetico

7. Ringraziamenti

Esprimiamo il nostro ringraziamento a Leif Jawerth, Anders Johansson, Lars-Göran Andersson, Tomas Jendel, Jörgen Lundberg e John Eriksson per la loro collaborazione al presente articolo. ■

8. Riferimenti

- [1] T Jendel et al, 'Design and high-speed processing of new advanced blown fibre units (EPFU's); International Wire and Cable Symposium 2002, (November 2002).
- [2] T Jendel et al, 'Installation performance of EPFU MkII blown fibre units; International Wire and Cable Symposium 2003, (November 2003).
- [3] T Jendel, B Arvidsson, T Cedervall, 'Micro cables with new Acrylate-based compact fibre units (CFU); International Wire and Cable Symposium 2004, (November 2004).
- [4] Willem Griffioen et al, 'Experience in application of various micro-duct cable designs; International Wire and Cable Symposium 2005, (November 2005).

Ericsson Communications Ltd

Ericsson House
Level One

105 Carlton Gore Road
Newmarket
Auckland

Nuova Zelanda

Tel: +64 9 355 55 00

Fax: +64 9 355 55 01

Website: www.ericsson.com

Ericsson Network Technologies

Kabelvägen 1
82482 Hudiksvall
Svezia

Tel: +46 650 360 00

Fax: +46 650 362 00

Website: www.ericsson.com



Nueva solución aérea soplada para redes FTTH utilizando fibra óptica preconectorizada y microcables

Por Anders Björk, Mårten Björs y Peter Lo Curzio, de Ericsson Network Technologies AB, Hudiksvall, Suecia y Bill McGavin, Ericsson Communications Ltd, Auckland, Nueva Zelanda

1. Introducción

El desarrollo de la tecnología de banda ancha para servicios "Triple Play" ha revolucionado el mundo moderno del comercio y del ocio en el hogar convirtiéndose en una forma de vida para los que ya disfrutan de estos servicios.

La razón principal que impide la difusión global de la banda ancha sobre fibra óptica es el coste elevado de las obras civiles para su instalación subterránea.

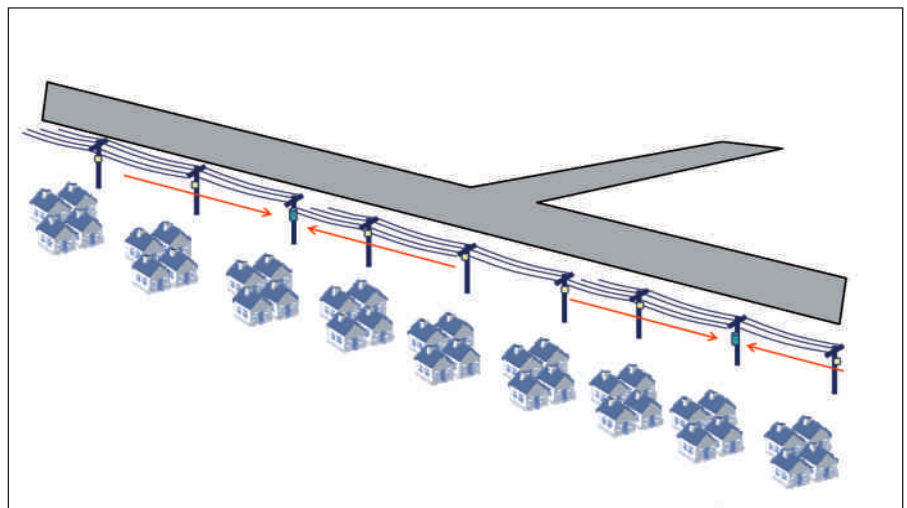
Las áreas altamente urbanizadas o ubicadas en terrenos duros suelen ser evitadas por las operadoras a la hora de desplegar sus servicios de banda ancha.

Las soluciones aéreas pueden ser una alternativa en estos casos, especialmente cuando ya existen infraestructuras, como por ejemplo las líneas aéreas de suministro eléctrico o telefónico.

El uso de fibra óptica y microcables soplados se ha revelado muy eficiente para las redes de acceso de fibra óptica, como por ejemplo en el caso de instalaciones de Fibra Hasta el Hogar (FTTH).

El uso de fibras ópticas preconectorizadas permite reducir al mínimo los tiempos de instalación respecto a las técnicas de cableado convencionales. Además, con la técnica de instalación asistida por aire comprimido se obtiene una red "dinámica", que permite incrementar, quitar, cambiar o redireccionar las fibras de manera rápida y fácil sin necesidad de costosas obras civiles.

Antes las instalaciones de fibra soplada tenían problemas estéticos y prácticos a la hora de instalarlas.



▲ **Figura 1:** Línea de postes con cajas de distribución cada 5 postes

Los adelantos recientes en el diseño de los cables de fibra óptica, véase^[3] y^[4], y las nuevas prácticas de instalación han revolucionado completamente la instalación aérea y esto es lo que se tratará en este trabajo, donde se propone una técnica nueva para la instalación aérea de fibra óptica, que utiliza técnicas de instalación asistida por aire comprimido y se describen los adelantos en el diseño y en las técnicas de instalación.

2. Descripción de la solución

El sistema de base para instalar cables soplados aéreos es el mismo que el sistema convencional subterráneo, pero ha sido necesario desarrollar algunos productos nuevos (véase la sección 3). La solución se basa en conductos autoportantes

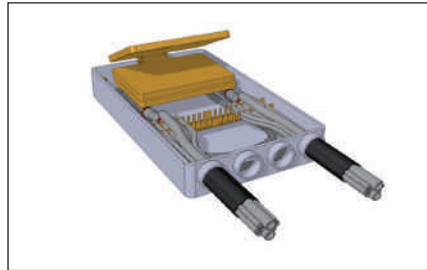
que combinan unidades de fibra preconectorizada soplada y microcables soplados. Esta tecnología es única en muchos aspectos:

- Se puede usar un sólo conducto tanto para la sección de distribución como para la sección de bajada de una red FTTH. Los cables de distribución y de bajada, compartiendo la misma infraestructura en una instalación de acceso de fibra óptica, ofrecen un considerable ahorro económico. El uso de un sólo conducto resulta más barato que instalar cables separados en paralelo para la instalación de alimentación y de bajada
- Se puede incrementar perfectamente la cantidad de fibra instalada de manera rápida y a bajo coste, cuando sea necesario. Por lo tanto, las inversiones costosas en fibras pueden ser aplazadas para más adelante – "pague a medida que crezca"

- La solución es aplicable tanto para redes ópticas pasivas (PON) como para redes punto a punto (P2P). De hecho, ambos tipos pueden compartir la misma infraestructura física. Una red PON puede ser convertida en red P2P sin necesidad de invertir en más conductos
- Los requisitos de base para todos los productos utilizados para este tipo de instalaciones son las dimensiones pequeñas y el bajo impacto visual. El impacto visual de las instalaciones aéreas es un factor fundamental para la aceptación o el rechazo de la colectividad. La colectividad ya no permite más instalaciones que tengan impacto visual
- Fibra con pocos empalmes y puntos de conexión; la unión de conductos es una solución rentable y necesita menos mano de obra especializada. Además, se obtiene un sistema más fiable respecto a la solución que utiliza conectores ópticos

La solución está ilustrada en la *Figura 1*. Se trata de una típica zona residencial formada por casas independientes.

En este caso, es suficiente una sola caja de empalme de fibra óptica cada 5 postes. Con esta caja pequeña se pueden enlazar de 20 a 24 hogares.



▲ **Figura 5:** Ejemplo de caja de empalme de la fibra óptica con dos conductos principales conectorizados



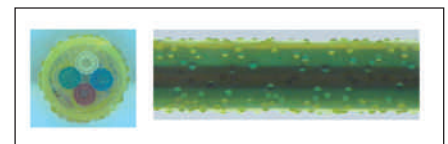
▲ **Figura 6:** Ejemplo de derivación con cuatro conductos simples unidos a un conducto multitubo

La red que conecta las cajas de empalme hacia la cabina de conexión (con separadores) es el cableado de distribución principal. El cableado bajante desde el usuario final se realiza instalando conductos simples de bajada conectados al conducto principal (véase la *Figura 2*). Un solo dispositivo de derivación (ver 3.3) suele ser suficiente para cuatro abonados desde el poste más cercano. Nótese que no hay empalmes de fibra óptica en el dispositivo de derivación.

Como se ha dicho antes, este diseño permite usar un sólo conducto para alimentar un tramo largo entre postes. El número de empalmes de fibra será minimizado, dado que se necesita un solo empalme entre fibra soplada y microcable soplado cada 5 postes.



▲ **Figura 7:** Abrazadera de tensado para conducto multitubo



▲ **Figura 8:** EPFU (Enhanced Performance Fibre Unit) de cuatro fibras

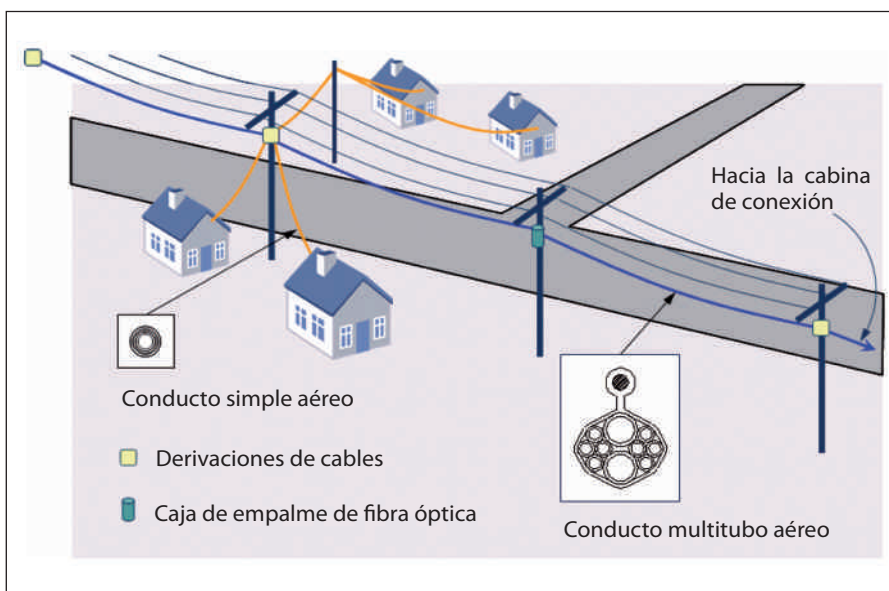
▼ **Figura 3:** Ejemplo de conducto aéreo multitubo con tubos de 8 x 5mm para la fibra soplada y tubos de 2 x 10mm para microcables



▼ **Figura 4:** Ejemplo de conducto de bajada autoportante con tubo interno de 1 x 5mm



▼ **Figura 2:** Ejemplo de instalación – Instalación aérea de red FTTH con fibra óptica y cable soplados



Para llegar hasta los clientes en la situación ilustrada, es necesario instalar el cable de distribución a lo largo de una distancia de tendido que puede alcanzar hasta 1000 metros, mientras que la distancia de tendido del cable de bajada puede alcanzar hasta 200 metros. Las distancias de instalación asistida por aire comprimido serán tratadas en el apartado 4.4.

3. Productos

3.1 Conductos

Los conductos pueden tener varias configuraciones (véase los ejemplos en las *Figuras 3* y *4*). Los conductos son autoportantes (como en la *Figura 8*), o pueden incluir un elemento de refuerzo en la cubierta. Combinando tubos de 10mm para microcables (cables de distribución) y tubos de 5mm para la fibra óptica soplada (de bajada) en el mismo conducto, se puede realizar una instalación de red de acceso con un solo conducto entre postes.

3.2 Caja de empalme de la fibra óptica

La caja de empalme de la fibra óptica para esta solución es única en muchos aspectos. Debe cumplir varias funciones como admitir tanto fibra soplada como microcables, permitir la gestión de la fibra y de los empalmes, el almacenamiento de las unidades de fibra óptica de los microcables entre postes y el almacenamiento de las unidades de fibra soplada.

Debe poderse montar en los postes (y en algunos casos entre dos postes). Además, todo esto debe caber en una caja pequeña (ver la *Figura 5*). El impacto estético es muy importante. La caja debe ser estéticamente discreta. Normalmente, la caja de empalme no excede el ancho del poste y por lo tanto no se ve. La longitud de la caja también es importante.

3.3 Derivación de los cables

Es necesario un dispositivo de derivación para llevar los conductos simples desde el conducto principal hacia los hogares que requieren el servicio. El diseño del dispositivo de derivación permite montarlo entre postes. Normalmente, permite tener acceso a cuatro conductos en cada tramo entre postes, permitiendo acceso a los cuatro hogares servidos por dicho poste. La derivación que permite esta distribución desde el conducto principal es una característica fundamental del diseño.

3.4 Accesorios

Los accesorios de soporte del conducto aéreo son de tipo de abrazadera con cuña, fáciles de instalar (ver la *Figura 7*). Pueden ser montados fácilmente en el conducto sin cortes ni empalmes.

El accesorio no daña los conductos gracias a la longitud y la forma de la cuña y permite una instalación rápida y fácil. Se han seleccionado y probado accesorios adecuados a cada tipo de conducto.

3.5 Unidades de fibra óptica soplada y microcable

Una unidad de fibra soplada de rendimiento mejorado EPFU (Enhanced Performance Fibre Unit), consiste en un número de fibras o cintas encapsuladas en dos estratos de acrilato curable con UV (ver la *Figura 8*). La capa externa contiene pequeñas gotas de vidrio en la superficie para mejorar las prestaciones de soplado. Para detalles véase⁽¹⁾. La unidad de fibra de rendimiento mejorado EPFU se usa como "cable de bajada" desde el punto de conectorización del usuario final al punto de distribución.

Para reducir al mínimo el tiempo de instalación y los costes totales de instalación, se proporciona el EPFU preconectorizado con conectores ópticos, instalados en fábrica una extremidad. El EPFU preconectorizado se suministra en carretes de poliestireno pequeños y está disponible en tramos de varias longitudes.

El microcable (*Figura 9*) está diseñado principalmente para redes de acceso y metropolitanas. En estos casos el microcable se usa como "cable de alimentación" desde el punto de distribución. El microcable consiste en hasta ocho unidades de fibra compactas (CFU) con 4 ó 12 fibras por unidad. Esto permite tener un número de fibras de 4 a 96. Para detalles véase⁽³⁾. La versatilidad de este diseño de cable ha permitido obtener un cable de fibra óptica muy compacto y pequeño que puede ser instalado en tubos con un diámetro de 7 a 10mm.

4. Instalación

4.1 Instalación aérea asistida por aire comprimido

Generalmente los cables aéreos están sometidos a las condiciones más duras después de su instalación. Nieve, hielo, cambios de temperatura y viento afectarán al cable o, en el caso peor, todos juntos al mismo tiempo. El tramo de instalación en el caso de cables soplados suele ser entre 30 y 60 metros, pero esta longitud no puede superar los 60 metros. Una de las razones es que las fibras se instalan en el conducto sin longitud en exceso, lo cual genera tensiones en la fibra óptica con cada carga adicional (al contrario de los cables ópticos convencionales). Sin embargo, la fibra no sufre tensiones si se respeta la carga de instalación. Otra razón es que para tramos más largos, el tipo de cable de la *Figura 8* tiende a ser más sensible a los "efectos galopantes" a ciertas velocidades de viento. Debido a la longitud relativamente corta de los tramos, el sistema es más adecuado para redes de acceso.



▲ **Figura 12:** Soplado del microcable

Este sistema ha sido instalado en tres continentes, en tres condiciones ambientales diferentes. Los cálculos de la carga, incluidos los parámetros como viento máximo y cargas debidas al hielo, cambios de temperatura y longitudes de instalación, muestran que las tensiones soportadas por la fibra en estas condiciones alcanzan un nivel que acorta la vida de la fibra óptica. Sin embargo, si se presentan cargas inesperadas y la fibra se daña, por ejemplo por un árbol que se cae, es fácil quitar la fibra y cambiarla por una nueva.

Este sistema aéreo soplado es fácil de instalar. La combinación de conductos y accesorios de instalación rápida ligeros permite instalar el sistema con pocas herramientas (véase la *Figura 10*). El diseño del dieléctrico de los conductos permite la instalación a lo largo de las líneas de suministro eléctrico. Los conductos pueden ser instalados como los cables estándares ADSS (cables auto-sustentados totalmente dieléctricos), desenrollados de carretes de instalación. Dado que a menudo se trata de tramos cortos y ligeros, el conducto puede ser simplemente apoyado en el suelo y luego levantado poste por poste. Gracias a su peso limitado, los conductos suelen ser tensados manualmente. Obviamente, se pueden usar también herramientas de tensado.

4.2 Instalación del cableado de distribución principal

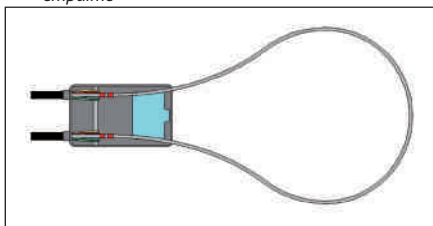
El conducto multitubo principal, descrito en la sección 3.1, es instalado a lo largo de una carretera. En algunos postes termina en cajas de empalme. Después de instalar las extremidades de los conductos en la caja, se conecta un tubo provisional entre las extremidades de los conductos conectorizados que permiten instalar el microcable a una distancia más larga (véase la *Figura 11*). El micro cable se instala con la técnica de soplado, usando aire comprimido y empuje mecánico (ver la *Figura 12*).

Luego, se quitan inmediatamente los conductos provisionales de las cajas de empalme dejando el tramo en exceso del microcable necesario para el acceso a mitad del tramo de instalación. En ese punto se derivan una o más unidades de fibra óptica compactas (CFUs).

▼ **Figura 9:** Un microcable de 24 fibras



▼ **Figura 11:** Tubo de conexión temporal conectado a las extremidades del conducto en la caja de empalme



▼ **Figura 10:** Instalación aérea de un conducto multitubo



4.3 Instalación del cableado de bajada

Se instalan conductos simples aéreos como línea bajante desde el poste más cercano a la toma de la pared de la casa del cliente.

Si es necesario, el conducto puede ser fácilmente empalmado a otro conducto de la instalación de la casa. Luego, cada conducto simple es conectado a un tubo específico en el conducto principal por medio un dispositivo de derivación (véase 3.3).

Se sopla un EPFU preconectorizado desde la instalación del cliente hasta la caja de empalme de fibra óptica (véase la Figura 13), donde es empalmado a las unidades CFU derivadas del microcable.

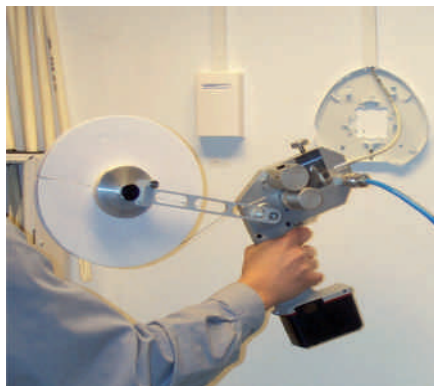
4.4 Requisitos de instalación

La experiencia demuestra que las prestaciones de las instalaciones sopladas aéreas son comparables a las prestaciones de una instalación subterránea.

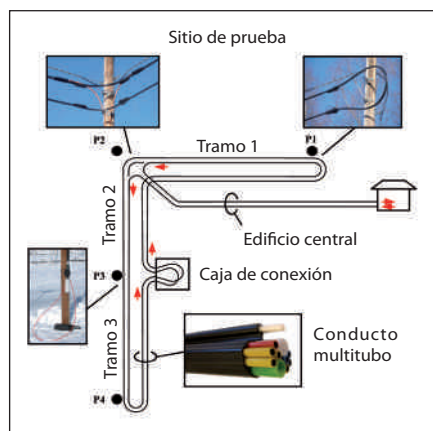
En condiciones favorables se puede soplar un microcable de 24 fibras por lo menos a 2000 metros y un cable de 96 fibras a 1000 metros.

Esto es más que suficiente para una instalación normal. Cuando se necesitan tramos más largos para el cable de distribución principal, se puede utilizar una instalación en cascada.

▼ **Figura 13:** Instalación de EPFU preterminado



▼ **Figura 14:** Sitio de la prueba



Distancia entre postes	Recorrido	Longitud (m)
Microconducto en el suelo	Edificio central – poste 2	105
Tramo 2, conducto aéreo	poste 2 – poste 3	60
Tramo 3, conducto aéreo	poste 3 – poste 4	60
Tramo 1, conducto aéreo	poste 1 – poste 2	75

▲ **Mesa 1**

La distancia del cable de bajada, desde el cliente hasta la caja de empalme de fibra óptica, suele ser de hasta 100-200 metros como máximo, y la instalación requiere unos minutos. Normalmente se pueden instalar fibras sopladas a una distancia de hasta 1000 metros sin problemas, véase^[2].

5. Soplado de microcables en el sitio de prueba

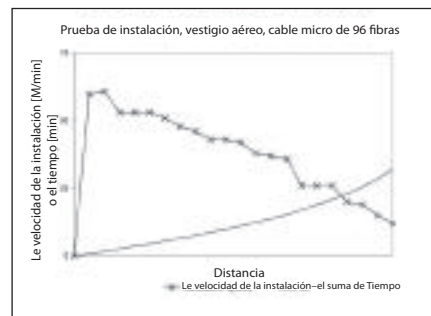
Para demostrar las prestaciones de la instalación soplada aérea se ha realizado un ensayo. Se ha instalado un microcable de 96 fibras (cable de distribución) en un recorrido de prueba externo a la instalación de cables (véase la Figura 14). El resultado del ensayo está ilustrado en la Figura 15. El microcable ha sido soplado a una longitud total de 1050m en poco más de 30 minutos. El resultado de la prueba demuestra la factibilidad de la instalación soplada aérea descrita en este trabajo.

6. Conclusiones

Se presenta un concepto innovador para la instalación aérea de la fibra óptica para aplicaciones FTTH. La técnica se basa en el uso de fibra óptica preconectorizada y microcables de alta densidad de fibras soplados.

Se han examinado las prestaciones del sistema en varias condiciones ambientales efectuando pruebas de instalación y pruebas en campo. La técnica presenta varias ventajas importantes:

- Instalación de bajo coste. Uso de la infraestructura de postes existente. Mínima cantidad de empalmes requerida.
- Instalación rápida. La fibra preconectorizada no requiere el uso de conectores durante la instalación.
- Escalabilidad. "Pague a medida que crezca": las fibras ópticas pueden ser instaladas cuando sea necesario. Una red PON puede ser convertida en red P2P sin necesidad de invertir en más conductos.
- Bajo impacto estético. Es suficiente un sólo conducto entre postes. Diseño compacto y dimensiones reducidas de todos los componentes que reducen el impacto visual.



▲ **Figura 15:** Gráfico que ilustra el resultado de la prueba soplado microcable en un recorrido de prueba aérea

7. Agradecimientos

Expresamos nuestro agradecimiento a Leif Jawerth, Anders Johansson, Lars-Göran Andersson, Tomas Jendel, Jörgen Lundberg y John Eriksson por su colaboración en este trabajo. ■

8. Referencias

- [1] T Jendel et al, 'Design and high-speed processing of new advanced blown fibre units (EPFU's); International Wire and Cable Symposium 2002, (November 2002).
- [2] T Jendel et al, 'Installation performance of EPFU MkII blown fibre units; International Wire and Cable Symposium 2003, (November 2003).
- [3] T Jendel, B Arvidsson, T Cedervall, 'Micro cables with new Acrylate-based compact fibre units (CFU); International Wire and Cable Symposium 2004, (November 2004).
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Ericsson Communications Ltd

Ericsson House, Level One
105 Carlton Gore Road
Newmarket, Auckland
Nueva Zealand
Tel: +64 9 355 55 00
Fax: +64 9 355 55 01
Website: www.ericsson.com

Ericsson Network Technologies

Kabelvägen 1
82482 Hudiksvall
Suecia
Tel: +46 650 360 00
Fax: +46 650 362 00
Website: www.ericsson.com

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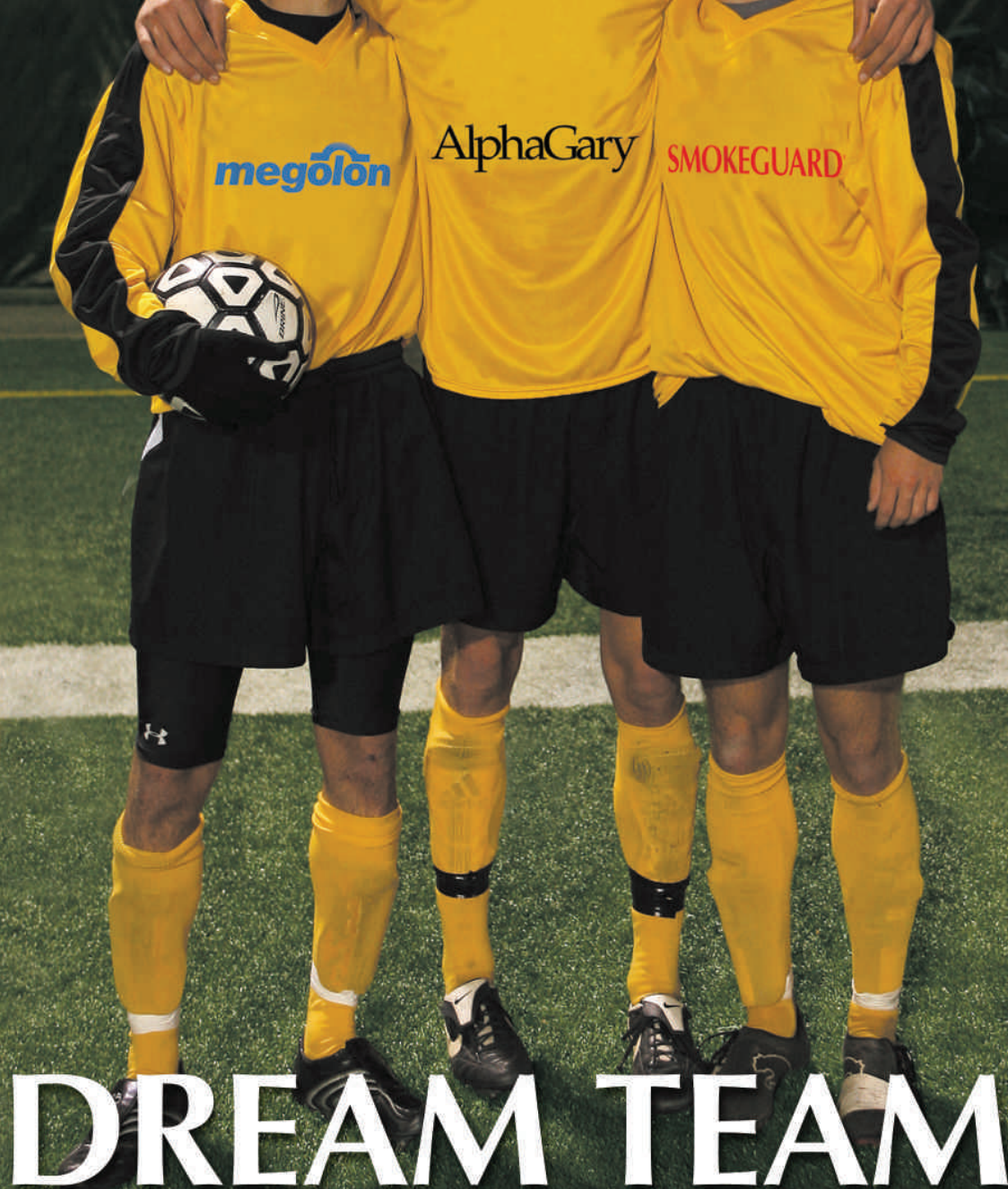
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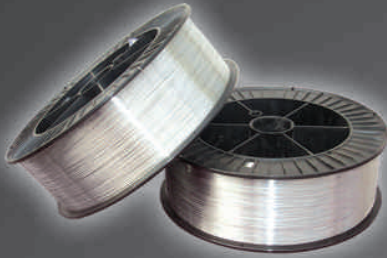
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170 Pioneer Drive
Leominster MA 01453 USA
+1 (978) 537-8071

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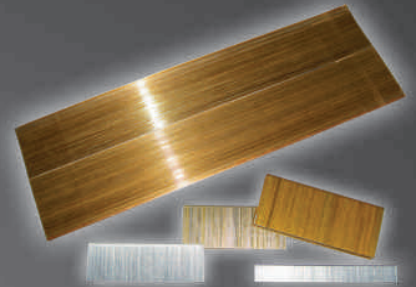
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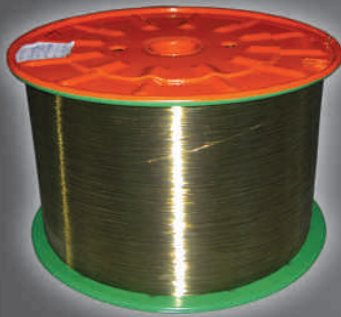
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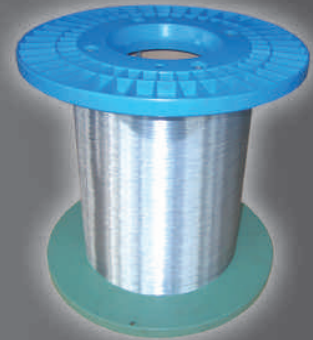
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