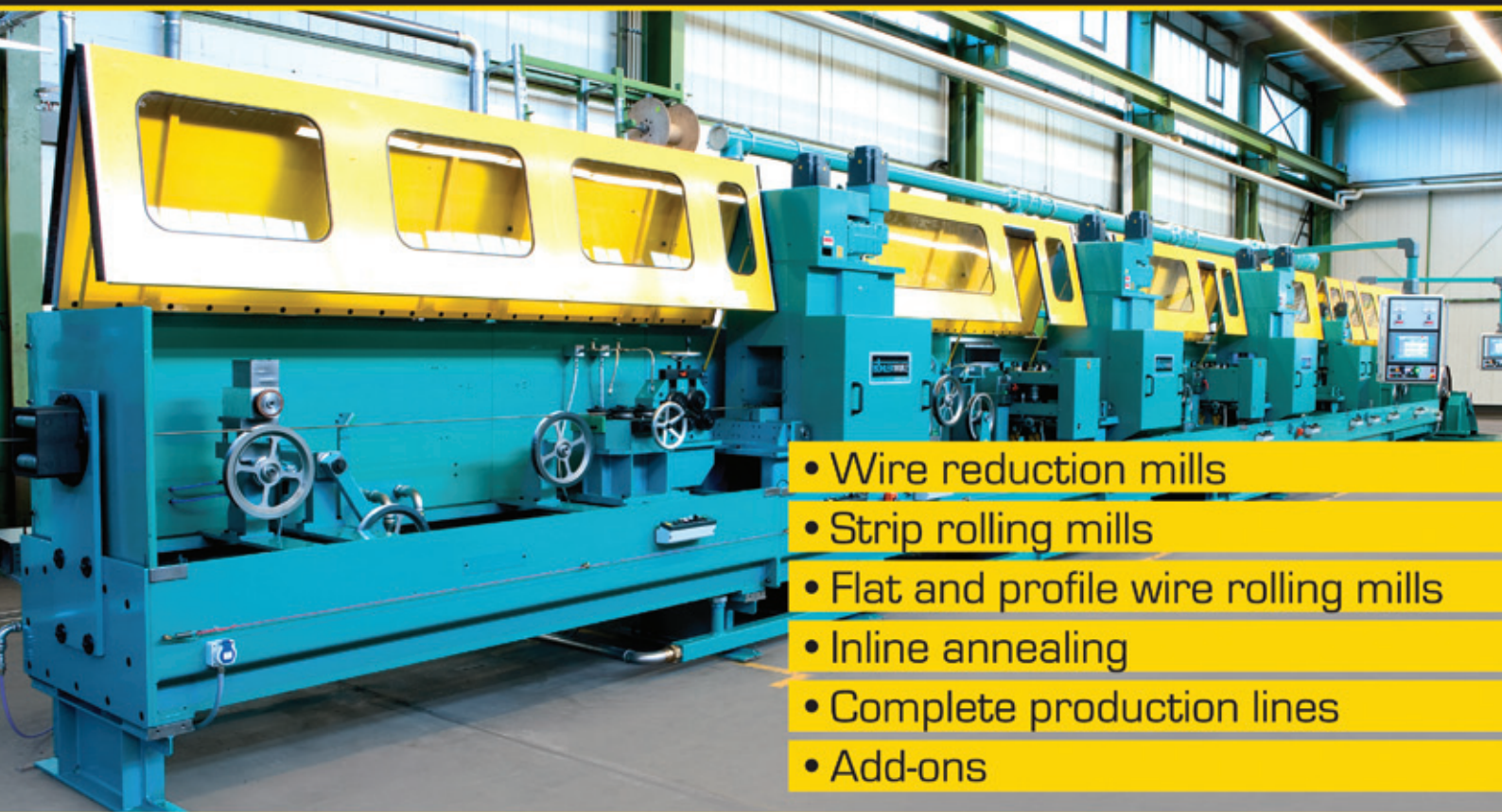


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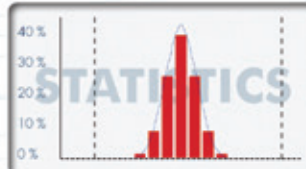


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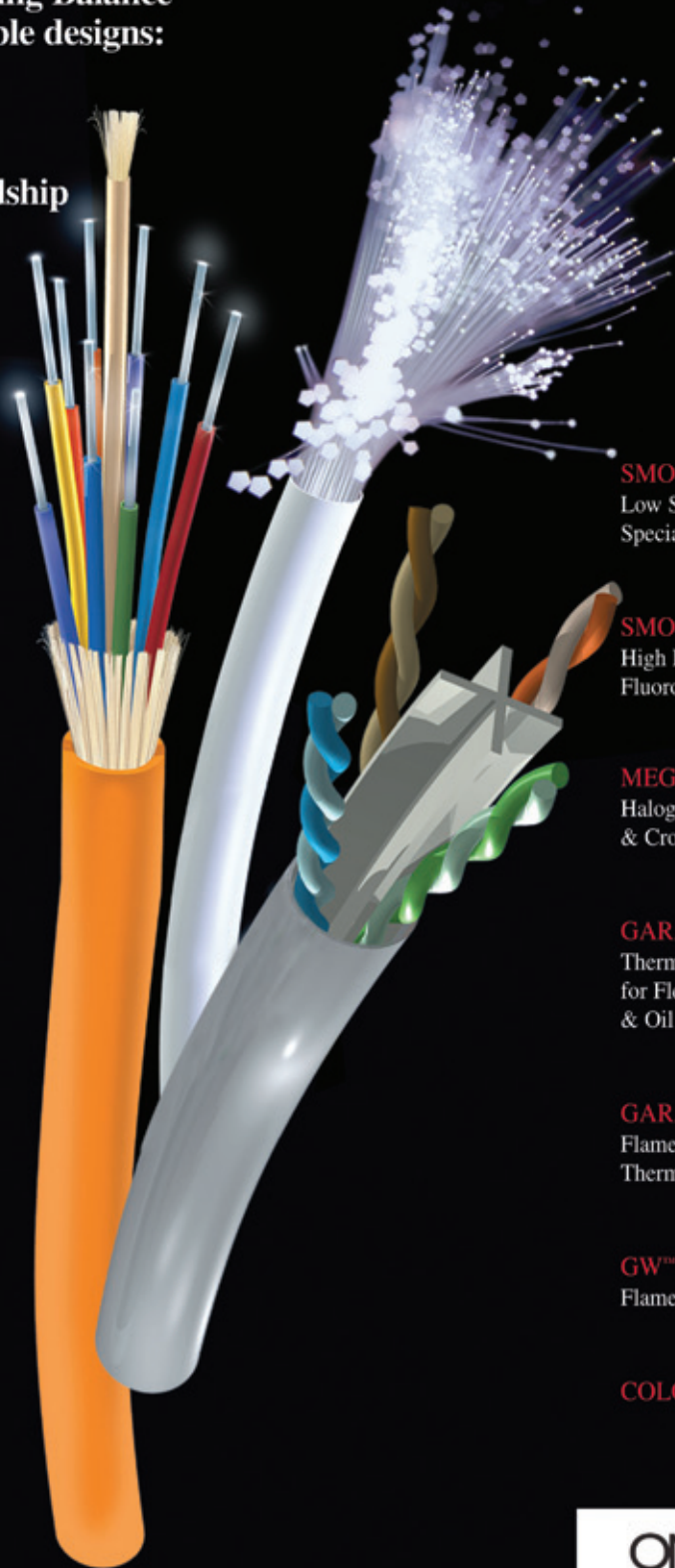
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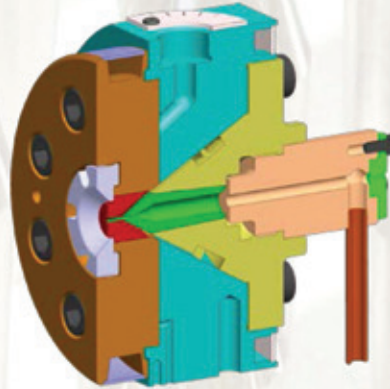


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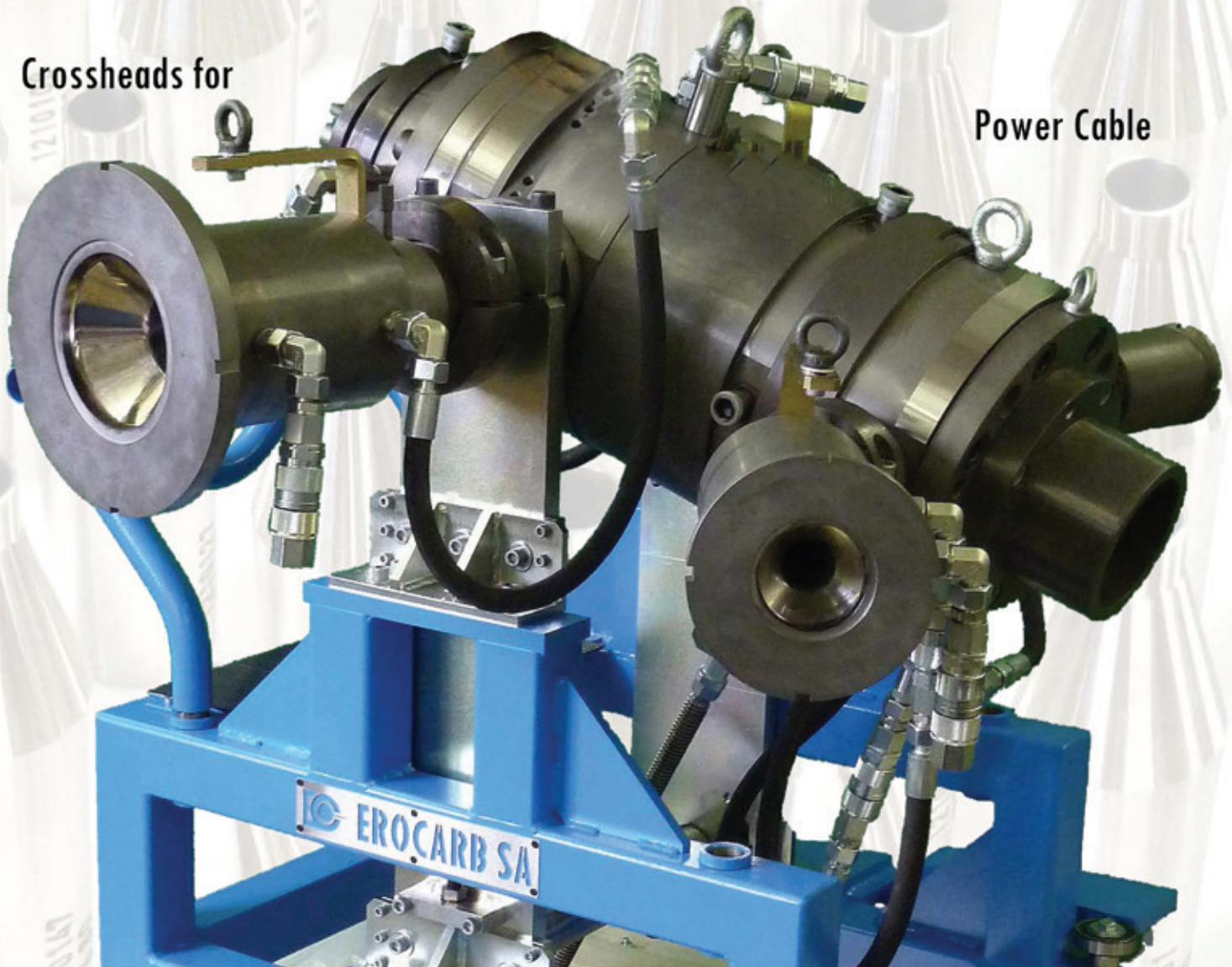
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The show rolls on as we 'go east' for wire Southeast Asia

'GO west, young man, and grow with the country.' It's a famous quote, often attributed to the wrong author.

However, with September now upon us it may well be time to exchange west for east.

For hot on the heels of a successful Interwire in May in Atlanta, it is the turn of the Asian market to flourish with wire Southeast Asia (page 52).

More than 200 companies will be heading to Bangkok for the area's leading exhibition for the wire and cable industry.

If Interwire proved a popular and optimistic hunting ground, Bangkok will certainly prove what the east has to offer, and provide a solid platform for growth.

Thailand is in the middle of a region that is booming – bucking the trend of caution that understandably exists in the UK and parts of Europe.

But European and American companies will be making the journey to the metropolis that is referred to as the 'city of angels', hoping to put their own stamp on a corner of Asia, increase exports and find their own niche in a burgeoning marketplace.

The refreshing and optimistic approach of these companies can be seen throughout the pages of this issue of *EuroWire*.

Doubling staff numbers (page 12), consulting company's US deals (page 13) and investment to boost production (page 17) are just three stories showing a commitment to growth.

And our feature on Fainplast (A passion for Plastics, page 24) tells the tale of solid and continuing investment being rewarded for a remarkable increase in turnover for a company still in its teenage years.



David Bell
 Editor



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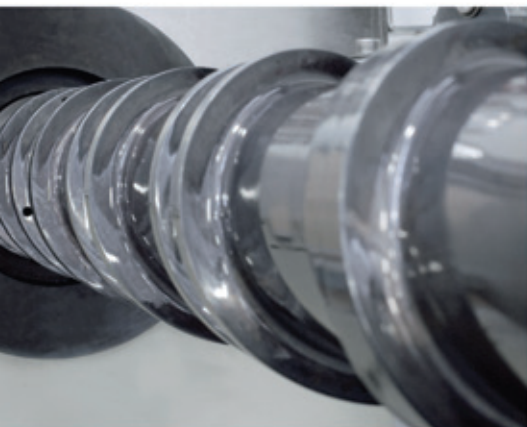
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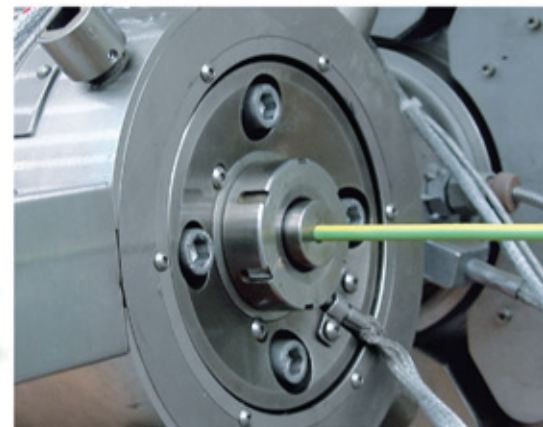
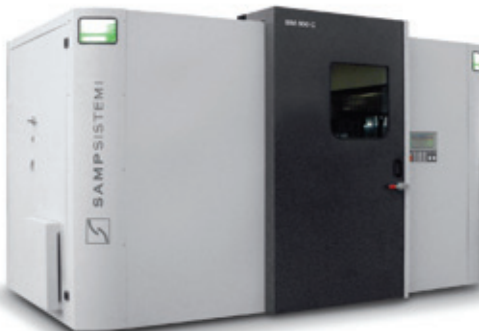
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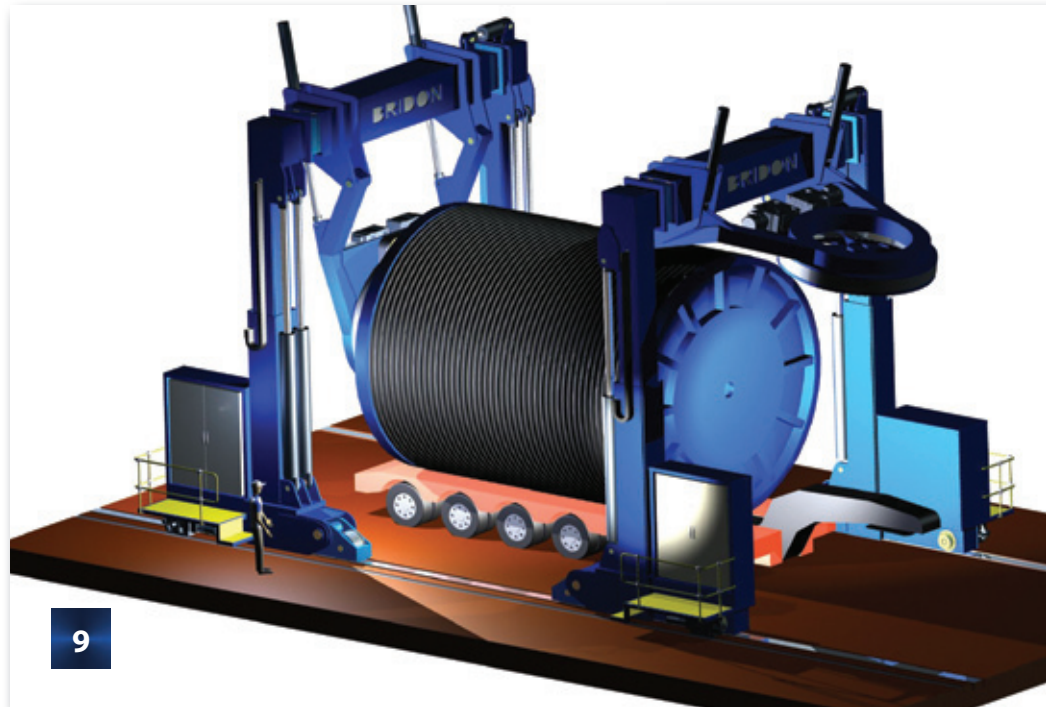
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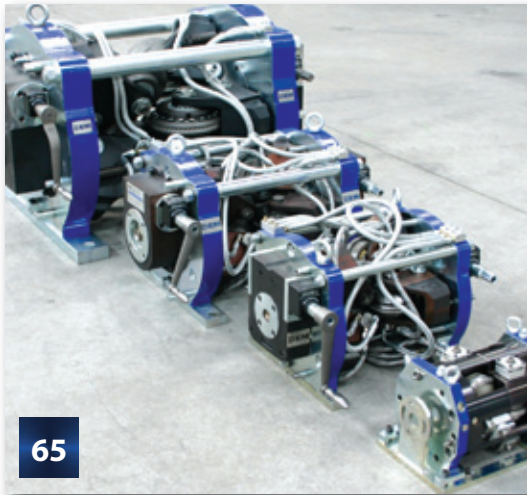
'Night view of Taskin Bridge in Bangkok' Photo credit - bigstockphoto.co

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wire Southeast Asia 2011

September 2011

13–15: **wire Southeast Asia** – trade exhibition – BITEC, Bangkok, Thailand

Organisers:

Messe Düsseldorf Asia Pte Ltd

Email: wire@mda.com.sg

Website:

www.wire-southeastasia.com

2011

October 2011

4–6: **WiCAB 2011** – trade exhibition – Centro de Exposições Imigrantes, São Paulo, Brazil

Organisers: Grupo CIPA, Brazil

Fax: +55 11 5585 4359

Email: feira@cipanet.com.br

Website: www.cipanet.com.br

November 2011

6–9: **IWCS 2011** – conference and symposium – Charlotte Convention Center, North Carolina, USA

Organisers: IWCS

Fax: +1 732 389 0991

Email: phudak@iwcs.org

Website: www.iwcs.org

2012

March 2012

26–30: **wire/Tube Düsseldorf** – trade exhibition – Düsseldorf, Germany

Organisers: Messe Düsseldorf

Fax: +49 211 45 60668

Email: wire@messe-duesseldorf.de

Website: www.wire.de

September 2012

25–28: **wire/Tube China** – trade exhibition – Shanghai, China

Organisers:

Messe Düsseldorf China Ltd

Fax: +86 216 169 8301

Email: www.shanghai@mdc.com.cn

Website: www.mdc.com.cn

October 2012

30–1 Nov: **wire and Cable India/Tube India** – trade exhibition – Mumbai, India

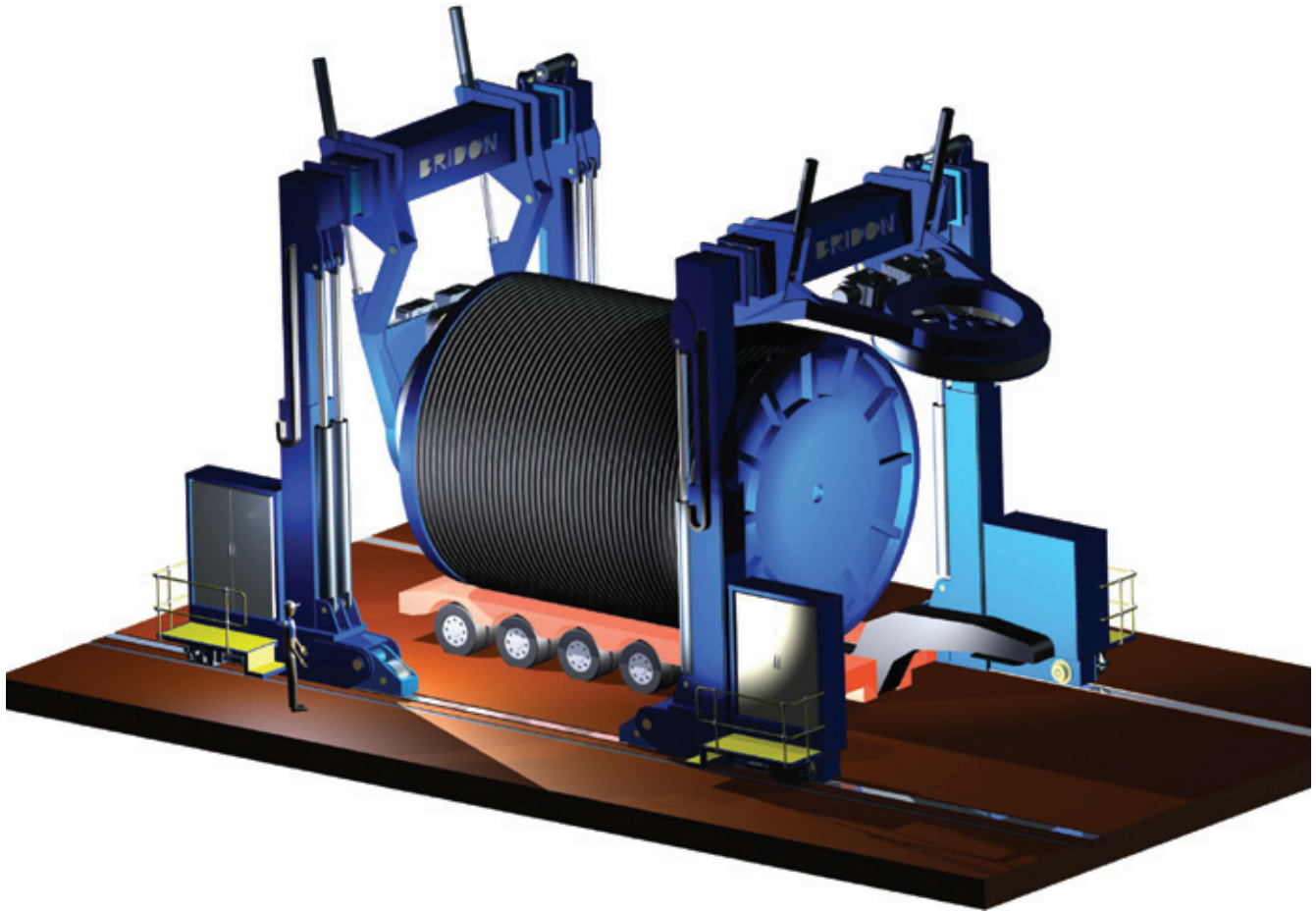
Organisers: Messe Düsseldorf India

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Email: info@md-india.com

Website: www.md-india.com





▲ An impression of the world's largest wire rope take-up stand with a lift capacity of 650 tonnes

World's largest wire rope take-up stand

PIPE Coil Technology Ltd has won a contract from Bridon International for the supply of two wire rope take-up stands, one of which will be the largest of its type in the world with a lift capacity of 650 tonnes.

The stands will form part of a new wire rope closing line which will produce some of the largest wire ropes in the world when the state-of-the-art facility goes into service in 2012 on Tyneside.

The innovative stand design allows full drums to be loaded and unloaded either directly from the factory floor or from a transport trailer without the need for an overhead crane.

This ability, combined with a lightweight design, offers significant operational benefits over the traditional style of large

take-up stands used in the wire rope sector and was the primary factor behind Bridon's selection of PCT as supplier on this flagship project.

Bridon's Colin Pratt said: "We awarded this contract after a rigorous six month tender process, during which PCT clearly demonstrated that their unique and innovative machine solution would meet Bridon's operational requirements."

The award is a testament to the technical innovation of the PCT design team and the proven ability of the company to deliver high quality, bespoke engineering solutions to global industry leaders in manufacturing sectors such as wire rope, sub-sea umbilical, power cable and flow-lines.

PCT Ltd is a privately owned company

based in Newcastle, UK, with subsidiaries in the USA and China.

The company designs and supplies coiling and packaging solutions for flexible products such as plastic pipe, sub-sea umbilical and power cables, flow-lines and steel wire rope.

Bridon International, headquartered in Doncaster, UK, operates nine manufacturing units worldwide with market focused technical and sales offices, supported by a global network of agents and distributors.

Pipe Coil Technology Ltd – UK
Fax: +44 191 295 9911
Email: sales@pipecoil.co.uk
Website: www.pipecoil.co.uk

Ethem scoops silver award

ETHEM Erdas, product manager for wire and cable applications at Beta LaserMike, has received the Silver Certificate award from the Wire Association International (WAI).

The prestigious award was given for Erdas's technical paper entitled "An in-process SRL predictor system for data cable manufacturing."

The award was presented during the Interwire 2011 Trade Exposition and WAI's 81st Annual Convention in Atlanta in May.

The paper illustrates the important role an in-process structural return loss (SRL) predictor system plays in data communication and the coaxial cable manufacturing process.

It covers various prediction and analysis methods currently in use in the industry and, using actual field data recorded by SRL Pro predictor, the paper illustrates the time and cost savings realised by various manufacturers.

Beta LaserMike – USA
Email: sales@betalasermike.com

Fax: +1 937 233 7284
Website: www.betalasermike.com

► Ethem Erdas, left, accepts his award at Interwire 2011 in Atlanta from Eric Macs



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www.supermacindia.com

Doubling staff numbers and tripling turnover

SKET Verseilmaschinenbau has enjoyed a very successful business period over the past few years – almost doubling its staff and tripling its turnover.

Whether it be as a supplier of individual machines, complete technological lines or complete works for the production of electric cable or steel wire rope, Sket is seen as a valued partner in the cable and wire rope industry in 35 countries on five continents.

Best selling machines for the cable industry are MKZS/T Central Stranders, MWR Drum Twisters and MKD Rigid Stranders, while SRW Tubular Stranders, MSDN Double Twist Bunchers and MKVS Planetary Stranders are SKET's main products in the steel sector.

Latest developments include:

- A new generation of central strander featuring a 500kg Al wire bobbin capacity
- Special-design large Planetary Stranders / Closers for submarine cable
- Long high-speed tubular strander and large cage-type stranding machine for making offshore and mining ropes

The company operates from a 40,000m² site where traditional and newly developed machine systems for cable and wire rope production are designed and manufactured.

Linked CAD/CAM work stations and fully integrated processes supported by a computerised production, planning and control system are standard.

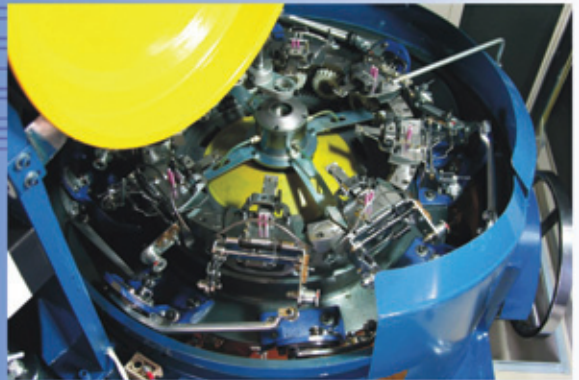
From beginning to end the quality management system is designed to ensure the highest quality of product and reliability of supply.

Not least among the reasons for the technological advances with Sket equipment is the traditionally close cooperation the company enjoys with universities and research foundations.

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▲ The Sartel Kablo factory

Low voltage cables from Turkey's Sartel

SARTEL Kablo operates from a 17,000m² factory in Nazilli, Turkey, and has the capacity to produce 30,000 tonnes of cable.

The company manufactures all low voltage energy groups like H07V-U/R, H07V-K, 6181Y, 6491X/B, H05VV-F, YVV and NVV, steel armoured cables, halogen free cables, flat cable, twin-earth cables, N2XY RO2V cables, submersible coil wire and many more.

Sartel Kablo produces the cables with Turkish and international standards, and

quality and system certificates such as TSE, ISO, HAR, CE from Turkey, BASEC from England, NF from France and international Standard certificates from Israel, Ukraine and Russia, are in place.

The company, formed in 1999, now exports to many countries across the globe and has a loyal customer base.

Sartel Kablo – Turkey
Fax: +90 256 316 2265
Email: sartelkablo@sartelkablo.com
Website: www.sartelkablo.com

Consulting company's US deals



▲ John Stanaway

Stanaway Wire Consulting has secured two major exclusive agency agreements and is now looking after the European sales and interests of two US-based companies, Leggett & Platt Wire Group (including L&P Wire International Europe and L&P Wire Tie Systems) and Mount Joy Corporation.

Owner John Stanaway has been involved in the wire industry in a career spanning five decades.

His open, ethical, integrous and honest approach to business has, he believes, won him the respect of colleagues, customers and competitors alike. John can be contacted on +44 7806 467 907 or via email at john@stanawaywireconsulting.com

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New chief at Atkore

ATKORE International has announced several executive organisational changes designed to more closely align its product offerings with end-market needs and enhance its customer support and service.

On 1st June John P Williamson became president and chief executive officer for Atkore International. He replaces Nelda Connors, who resigned to pursue other opportunities. Mr Williamson joins Atkore from ITT Corporation, where he held various leadership and management roles.

Prior to his time with ITT, Mr Williamson spent 17 years with Danaher Corporation, including a role as senior vice president global operations for the fluke division with worldwide manufacturing, supply chain, quality, IT, service and continuous improvement responsibilities.

"John brings a strong customer focus, global experience and a strong track record of outstanding results," said Philip Knisely, chairman. "His operational expertise and leadership skills in driving improvements in quality, delivery, cost

and innovation are well suited to helping Atkore reach its full potential. We are excited for John to join the team."

Mr Williamson earned a Bachelor of Arts in Business Administration from California State University Fullerton and holds a Certificate in Strategic Marketing Management from Harvard Business School.

Additionally, Ed Kurasz is appointed president of the Pipe, Tube & Conduit Division.

Bob Pereira is named president for the Cable Division with responsibility for pre-wired armoured and metal clad electrical cable, sold under the brand names of AFC Cable Systems and Kaf-tech. Mr Pereira has been with the company for 26 years and has served in a number of key management roles involving strategic planning, manufacturing, and distribution. Most recently, he was vice president AFC Cable division.

Steve Elsdon is named president for

the North America cable management systems division with responsibility for managing metal framing and cable tray systems sold under the brand names Unistrut, PowerStrut and TJ Cope. Mr Elsdon has more than 15 years' experience in the electrical industry, managing cross-functional organisations, including sales, marketing, customer service, operations and finance. Most recently he was responsible for sales and marketing at Columbia-MBF.

Roger Vaught is named vice president for the conduit and fittings product lines with responsibility for managing metal, aluminium and PVC conduit and associated fittings sold under the brands of Allied Tube & Conduit in the US and Mexico as well as Columbia MBF in Canada. Mr Vaught has more than 30 years' experience within the electrical industry, holding positions in national account, marketing and sales management.

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Website: www.atkore.com

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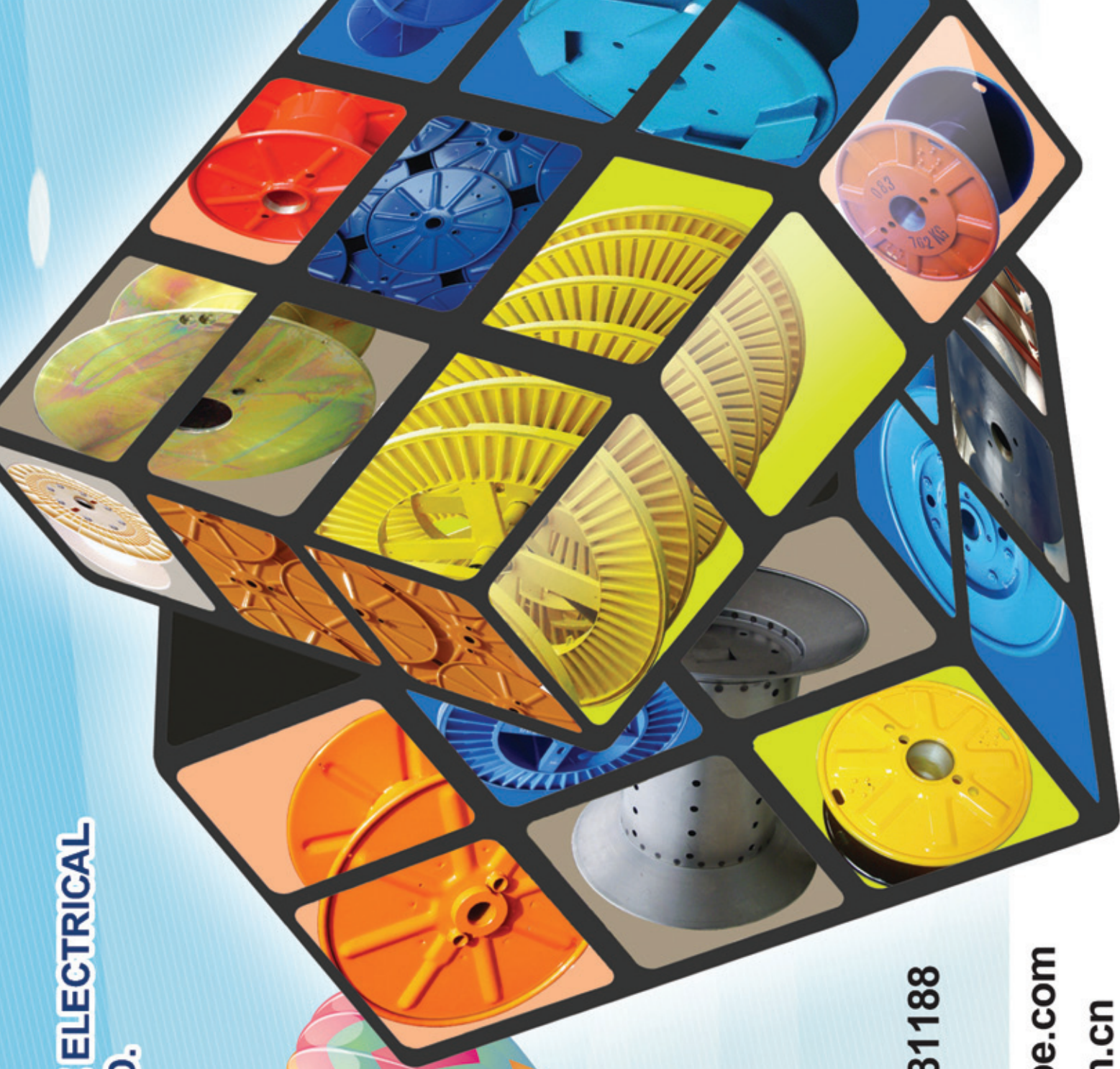


Continuous Aluminum Cladding Production Line for AS Wire, OPGW and Cable Sheath

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Niehoff donates aid for earthquake relief

GERMAN machinery manufacturer Niehoff has donated six million yen – around \$75,000 – in humanitarian aid for victims of the earthquake which struck Japan in March this year.

The Niehoff workforce, senior management team and shareholders are committed to actively helping people in Japan by providing financial assistance. The donation was passed on to the Japanese Red Cross in the hope that the aid will improve the situation of at least some of the people affected.

Niehoff has very strong ties with Japan. The company opened a sales office there in 1991 (Nippon Niehoff Co Ltd), and it has developed a very close relationship with Japanese customers over the years. Niehoff immediately contacted its staff in Japan as soon as media reports on the catastrophe began coming through.

Niehoff, headquartered in Schwabach, Germany, develops and produces machinery and production systems for cable and wire manufacturers in more than 100 countries. Founded in 1951, the company currently has around 700 employees.

Nippon Niehoff Co Ltd – Japan

Fax: +81 3 3257 0910

Email: s-kanazawa@nippon-niehoff.co.jp

Maschinenfabrik Niehoff GmbH & Co KG – Germany

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▲ Mr Kanazawa from Nippon Niehoff (left) presenting the donation to an officer of the Japanese Red Cross

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Investment to boost production

REPSOL is planning new investment at its Puertollano site to increase production of ethylene vinyl acetate copolymers (EVA).

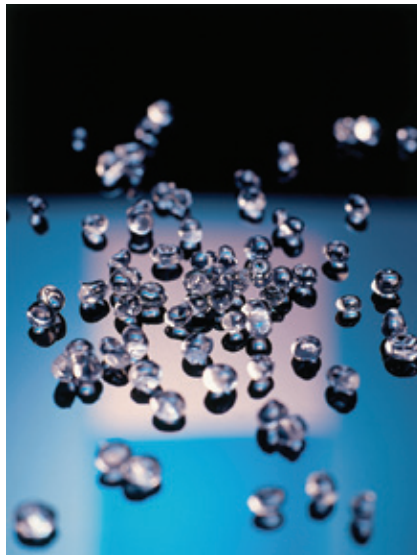
The new production unit will be able to produce 15,000 tonnes per year, with the possibility to achieve vinyl acetate (VA) contents exceeding 35%, meeting the needs of a wide range of differentiated applications.

This EVA capacity increase is one of a series of investments planned for Repsol's Puertollano production facility included in its strategy to maximise the production of high-value polyolefins.

During 2009, Repsol carried out the conversion of one of its EVA copolymer units (including 5% to 20% of VA content) to EVA resins (ranging from 20% to 40% of VA content). Additionally, in June 2010 Repsol implemented process changes in another of its EVA copolymer units, to adapt it to the quality demands of the specialised film converters. Because of this change and process improvement, the company has been able to reduce significantly the potential off-spec production associated with this type of film grade production.

Moreover, during 2010, Repsol consolidated its ethylene butyl acrylate copolymers (EBA) production capacity at its Sines site in Portugal, increasing the production of EBA copolymers as an alternative to the EVA copolymers production at Puertollano, due to the growing specialisation of the former towards the production of EVA resins.

The combined activity of the Puertollano and Sines production facilities, together



▲ The new plant will produce up to 15,000 tonnes of ethylene vinyl acetate copolymers each year

with the growing demand for these products has seen record production of EVA and EBA.

Repsol produces EVA and EBA copolymers and resins with comonomer contents that may range from 5% to 40%, and melt flow indexes (MFI) exceeding 800 dg/min. The company is present, amongst others, in the hot-melt adhesives, shoes, photovoltaic panels, cables and film market segments. The process and product development has been carried out internally at Repsol's Technology Centre in Madrid.

Repsol – Spain
Fax: +34 91 314 2821
Email: info@repsol.com
Website: www.chemicals.repsol.com

Dolder takes over marketing

Basle, Switzerland-based Dolder AG will take over the marketing of the Vestakeep® PEEK polymers produced by Essen, Germany-based Evonik Industries.

The marketing activities will focus in particular on small-volume sales in Europe. Ever since Vestakeep® was launched on the market, Dolder has acted as the distribution partner for Evonik's moulding compounds in Austria and Switzerland. This successful cooperation was extended to Germany at the end of 2009. For small customers in Europe, this means better product availability and more intensive customer support.

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Dealing with disasters

TO be able to use the Dorset County Council data centre as its disaster recovery location, Hampshire County Council needed to locate hardware and services in County Hall in Dorchester. Dätwyler was selected to supply its pre-terminated bespoke 'Trunk' cabling system which enables very short data centre installation times on site.

Hampshire County Council delivers its services from a single data centre located in Winchester. To prevent downtimes caused by disasters a second, remotely located data centre was required from which to recover services.

Each county council has the same mandate from the government to provide a means of recovery in the event of a major disaster. Hampshire County Council and Dorset County Council decided to use their own data centres as the remote disaster recovery (DR) location for the respective other site: the one at County Hall, Dorchester, as the DR location for the Winchester site, and vice versa.

Hampshire therefore needed to locate hardware and services in the Dorchester data centre to maintain the same standard of network and security architecture as hosted within their own location. Dätwyler was selected in an open, competitive tender process to provide the copper and fibre optic cabling solution to support the data centre installation.

Due to the limited installation time available on site, Dätwyler supplied a pre-terminated 'Trunk' cabling system. The tailor-made system solution comprises Cat.6a S/FTP multiple cable looms,



▲ Some of the installation from Dätwyler

terminated onto KS-T Cat.6a RJ45 modules, 24-core OM3 Multimode fibre optic cables, which were pre-terminated onto LC connectors, and all necessary patch panels. Dätwyler also worked with the client and cabling contractor throughout the pre-sales, installation and commissioning phases to ensure the project was completed to the satisfaction of Hampshire County Council.

The installation work was carried out

by G4 Networks Ltd, an experienced cabling contractor, in January 2011. The project ran for a month and involved the installation and commissioning of 384 pre-terminated copper and 576 pre-terminated fibre optic cabinet links within the Dorchester data centre.

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Website: www.wiresteel.be



New building dedicated

SIKORA has dedicated the newly built technology centre at its headquarters in Bremen-Mahndorf, Germany.

The new building with a total area of 2,500m² offers more space for research and development, sales, marketing and procurement on four floors.

"With the new building we did a strategically important step into the future," said Harry Prunk, chairman of Sikora AG.

"With the expansion we are able to further extend our innovation activities. We have more space for new employees and offer a modern and comfortable working atmosphere, in which creative ideas can grow."

He emphasised the new building was a "significant milestone in the 38-year history of the company."

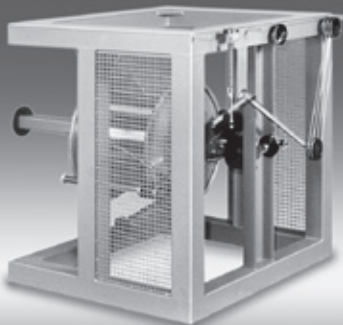
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▲ Sikora has dedicated its new technology centre



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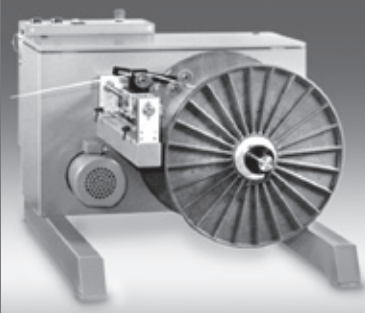
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A total solution from Roblon

ROBLON Industry is a total solution provider to the cable industry, focusing on cable-making machinery and industrial yarns for cables.

The company develops and manufactures high-tech industrial fibres such as glass and aramid strength members, binder yarns and ripcords (standard and water-blocking) and is ISO 9001 and 14001 certified.

It also develops and manufactures serving, binding, take-up and pay off equipment and is known for its high quality servers and binding machines, with more than 400 pieces of each operational worldwide.

Roblon composite glass is a hotmelt-coated glass strength member that is ideal for reinforcement of buried cables and short span aerial cables.

Roblon produces a range of composite glass strength members and offers specialised hotmelt formulations. One example is an extra adhesive version that transmits the force of the strength

members to the jacketing material, making it ideal for short span aerial cables.



▲ Roblon composite glass

The company has also developed a formulation particularly suitable for direct buried cables or cables placed in extreme environments such as sewer systems.

Roblon composite glass is a fully impregnated and extremely tough yarn, making it applicable in any production process, and can be stranded around the cable centre or applied longitudinally.

Roblon standard servers – SE-18 or SE-24 – have a proven track record and are used by OFC producers worldwide. These servers apply yarns to a cable winding off the material, making them ideal for yarn types such as the Roblon composite glass.

Tension is individually controlled during production by means of hysteresis brakes and state-of-the-art software. The Roblon servers can be easily integrated in both existing and new production lines.

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By David Bell

THE email came through. You have been invited on a press visit to Italy in June. "Do you want to go?" It's a little like asking a football fan if they want tickets to the World Cup final.

A visit to the Fainplast factory and a little sight-seeing was part of the package. How could I turn this down? I was fortunate to meet some very genuine and astute people who clearly cared about the company they worked for, and held a deep-rooted respect for its founder.

A passion for plastics

In the course of your life you come across few people who will be indelibly printed on your memory.

I don't mean if you're lucky enough to meet some of your sporting or musical heroes. I mean the man or woman in the street. You know. The one who enters a room and there is a presence around them.

A person that other people look up to, listen to. Not out of fear, but out of respect.

Step forward Signor Battista Faraotti, founder and president of Fainplast, a plastics compound manufacturer in Ascoli Piceno, a rather pleasant little city in Le Marche region of Italy.

It took me – despite the language barrier – just a few minutes to understand why his employees put him in this bracket. He is a self-made man. He loves, clearly, his home city. He supports a wide range of initiatives involving the community – and sport features heavily in his company's promotional activities.

His employees are looked after. They have modern facilities, a gym, and a flexible approach to a working environment that

Dateline

- 1993 – Fainplast founded and starts production in Assisi
- 1996 – The company moves to a new plant in Ascoli Piceno
- 1999 – The covered areas are doubled and new office premises are built
- 2001 – Production of halogen free compounds is started
- 2004 – Medical compounds production begins
- 2006 – Production of crosslinkable compounds starts

works for the company, management and the ground-floor operatives. In other words, he invests his time, money and effort in the people who work for him and the surrounding area in which they live.

I had been invited to spend three days on a fact-finding, factory-touring visit to discover everything about Fainplast. I saw everything from the testing stage – and there's a lot of that at the site on an industrial estate on the outskirts of the city – through to the final production.

These compounds – a staggering 620,000 tonnes each year – are then shipped off to customers who make everything from electric cables, for pipes and profiles extrusion and for shoes and medical devices.

Fortunately everyone at the company had gone out of their way to make this as un-technical as possible. To put it all into layman's terms, if you like.

And it is a clear testament to the owner, his shrewd management and his board that has led to a record-breaking year for the company founded just 18 years ago.

Since then they have become a major player in the market, the biggest in the region and – despite what has been a tough time in the industry – one of the largest plastic compound manufacturers in Italy.

In 2010 the company increased its turnover by some 45 per cent to €71.8m – up from €49.5m the year before. Some would argue that a refreshing attitude to investing in new production lines might just be the reason for that success.

Continued on page 27

◀ *Battista Faraotti, founder and president*

▼ *A warm welcome awaits at the Fainplast plant in Ascoli Piceno*





In addition to the investment in research and development, a further €3m can be expected for two new production lines, leading to a further 20 per cent increase in production and, no doubt, the creation of more job opportunities.

And that is something that the company expects to do every two years. Research the markets, invest and introduce new production lines to keep them one step ahead of the competition.

Given the economic climate experienced over the last few years, the figures make impressive reading for a company still in its teens.

Fainplast exports 40 per cent of its products and the market share on home soil is around 15 per cent. The growth it has seen offers employment opportunities for new staff – 10 have been recruited in the last year alone, taking it to an 85-strong workforce.

"Recently we are focusing on the sector of cables which connect solar panels to the grid," explained Signor Faraotti.

"These are products that must guarantee maximum performance, although they remain exposed to the elements for decades."

There is justifiable pride in the voice as he talks about those cables which form part of the range of halogen-free compounds (XLPO-HFFR) that Fainplast has recently launched onto the market.

This is in addition to the compounds produced for electric cables, pipes and profiles, for injection and blow moulding, and 'tailor-made' products giving the company – justifiably – the tag of 'specialist' producer. Flexibility is very much key as orders can be completed quickly, on time and very much to the customer's satisfaction.

That flexibility and speed is, as always, backed up by a relentless quality control and testing. Fainplast is certified UNI EN ISO 9001-2000 but more importantly, instilled in the employees is the point that customer is king. Without quality the customer would not return and a rapid growth of 20 per cent each year would certainly not be achieved.

As for the future. The plant (22,000m²) sits on a site a shade over double that size so there is plenty of room for expansion. I'm sure that's one thing Senor Faraotti ponders as he walks round his own corner of Ascoli Piceno.

Compounds produced

For electric cables

- PVC based
- Thermoplastic halogen free flame retardant (HFFR)
- Crosslinkable halogen free flame retardant (XL-HFFR)
- Polyethylene and Polypropylene-based compounds

For pipes and profiles extrusion

- PVC for rigid and flexible pipes

- PVC for shutters, electrical conduits and gaskets
- PVC for nets and fencing
- PVC for medical tubing

For injection and blow moulding

- PVC for junction boxes and fittings
- PVC for plugs
- PVC for shoes and other applications
- PVC for medical devices

◀ *The automatic feeding system, capable of running 24 hours a day, seven days a week*

▼ *Plastic compounds made at the site in Ascoli Piceno*

Fainplast Srl – Italy
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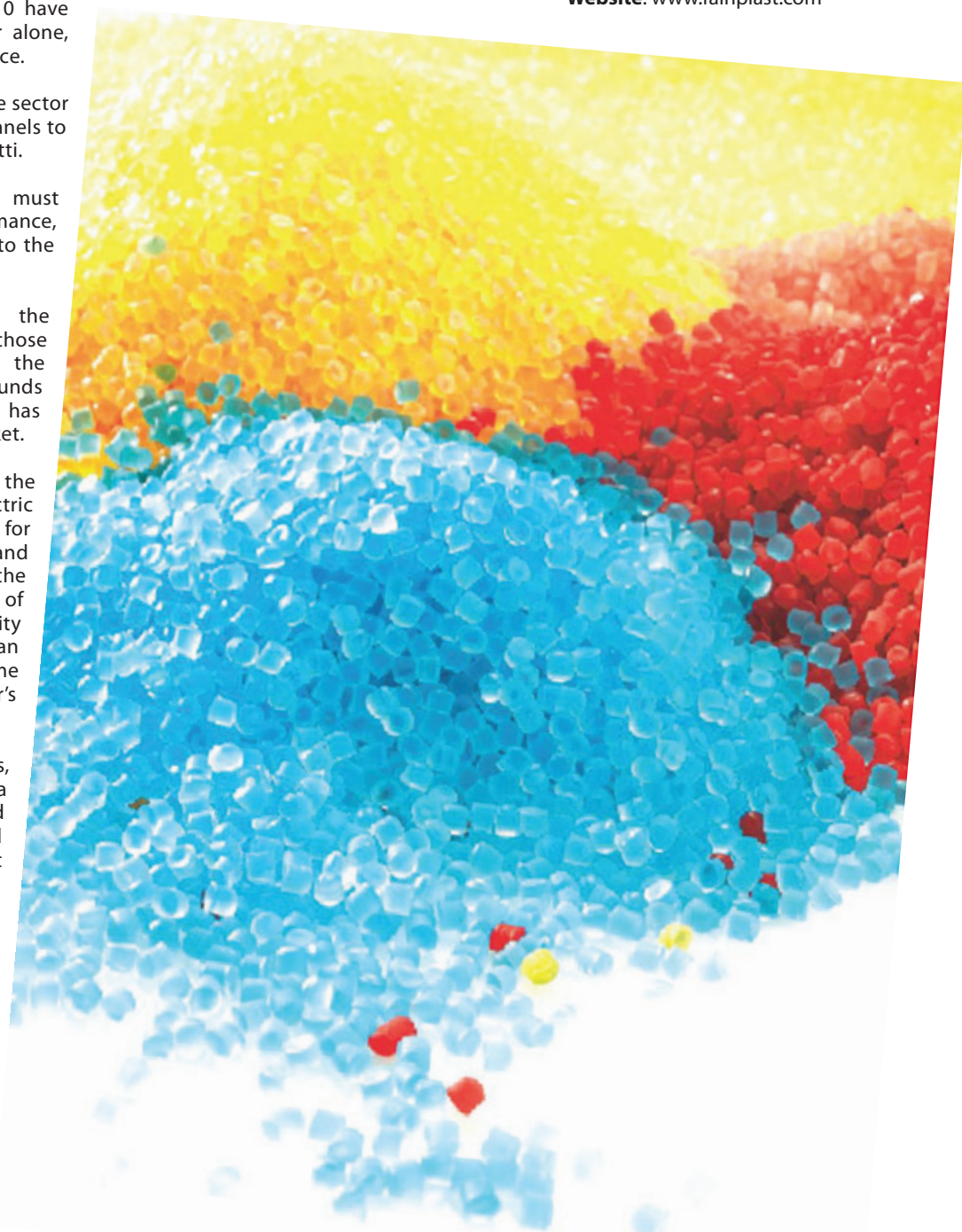
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Transatlantic Cable



Automotive



Italian car maker Fiat and the US government both claim to have gotten the better of the deal for Chrysler

Our founder, John C Hogg, once shared with a journalist his rule for analysing business transactions in high places: "Find out how they did their sums."

It is pleasant to imagine Mr Hogg applying his method to the purchase, by Fiat SpA, of the US government's remaining six per cent stake in Chrysler Group. On the same set of undisputed financial data, each of the parties to the deal is convinced of having struck a terrific bargain.

The facts are these. Turin, Italy-based Fiat has had management control of Chrysler since 2009, when it agreed to acquire a 35% stake in the Detroit-based auto maker. The administration of President Barack Obama tapped Fiat chief executive Sergio Marchionne to take over the foundering company.

On 2nd June of this year, the US Treasury Department agreed to sell its Chrysler stake to Fiat for \$500 million. Fiat will also pay an additional \$75 million (\$15 million of that to go to the Government of Canada) for rights to purchase Chrysler shares owned by a union trust of the United Automobile Workers. In the run-up to the sale, Chrysler had repaid loans totalling \$7.6 billion to the US and Canadian governments.

On the day after the sale, both sides were claiming victory. Why?

Aaron Kessler of the *Detroit Free Press* Washington staff noted that Treasury's deal with Fiat means that the Italian firm paid the US about \$83 million for each one per cent of Chrysler. Compare that with the cost to Fiat a week earlier, when it paid \$1.268 billion to take over 16% of the company: or about \$79 million for each one per cent of Chrysler.

Mr Kessler wrote: "Here's the catch. Because Fiat already owned 30% of Chrysler, the way new stock purchases work means shares get diluted – they're not worth as much. So to take control of another 16% of the company, Fiat actually had to buy more than just 16% of the total stock. ("Value of Fiat's Payment for Chrysler Stake Analyzed," 5th June)

To hit its 16% increase, what percentage of existing shares did Fiat in fact buy? According to two sources familiar with the deal, 24.6%. If Fiat paid \$1.27 billion for 24.6% of the shares, the Italian company paid the equivalent of \$52 million for each one per cent of Chrysler – not \$79 million.

That, said Mr Kessler, explains the government's excitement: "Had Fiat used the same math it did a week before, Treasury's six per cent stake would have rung in at \$309 million. Instead, Fiat offered \$500 million – a 60% premium."

* So why is Fiat happy? For the best reason of all: it bought Treasury's shares (ie shares held by American taxpayers) for less than what some analysts believe Chrysler is worth.

Richard Hilgert, who tracks the auto industry for the Chicago-based investment research company Morningstar, told Mr Kessler that his estimate of Chrysler's total equity is close to \$11 billion. That translates to \$110 million for each one per cent of the company. In the context of the 2nd June deal, Mr Hilgert would have priced Treasury's stake at about \$650 million.

"For Fiat, this was a great deal," Mr Hilgert told the *Detroit Free Press*. "For the government, they took what they took."

Fiat II: the human cost of a switch from one car nameplate to another.

Even as officials of the US government and of Fiat SpA congratulated themselves on their acumen, there were broken hearts on the outskirts of Milan: or one, at least. As reported by *Bloomberg News*, Fiat, the Italian auto maker which controls Chrysler, had "ended Paolo Mazzali's American dream."

Mr Mazzali, whose company owns three Chrysler showrooms near Milan, had spent ten years selling "American lifestyle" as embodied in Chrysler cars and minivans. Now, after a Fiat decision to convert Chrysler dealers to the Lancia marque, he must persuade his customers to buy Italian.

"We used to sell an emotional American brand, as American as a Harley Davidson motorcycle," Mr Mazzali told *Bloomberg* reporters Tommaso Ebhardt and Flavia Rotondi. "It's like giving up a piece of your heart to pitch something new."

Sergio Marchionne, chief executive officer of Fiat and Chrysler, stopped all sales of the American brand in continental Europe on 31st May, after four decades. The combination of Chrysler and Lancia is part of his plan to end losses in Europe and cut costs by \$2.2 billion by 2014. Under Fiat, Chrysler's sales dropped to about a quarter of their total before the company was offloaded by its German parent Daimler AG in 2007. ("Chrysler Brand Vanishes from Europe as Chief Marchionne Stems Losses," 31st May).

"We couldn't maintain the two brands everywhere so we had to decide," Olivier Francois, the Fiat executive who heads the Lancia and Chrysler brands, said in an interview with *Bloomberg*. "Lancia has a higher awareness in Europe while, for the US and the rest of the world, Chrysler is a more global brand."

Fiat, from its headquarters in Turin, consolidated Chrysler Group results as of May, an indication to *Bloomberg* of the rapid integration of the two car makers since Michigan-based Chrysler emerged from bankruptcy in June 2009. Fiat, which was initially granted a 20% stake by the US government, aims to acquire 57% of the third-biggest US auto maker by the end of 2011.

* But, however far Fiat takes Chrysler, Paolo Mazzali will not be of the party. A good soldier, he has spent just under \$3 million to prepare his shops for Lancia, a Turinese product with a mixed luxury/mass market character. Mr Mazzali told *Bloomberg News*, "We're ready for the change."



Transatlantic Cable

This is good, as the change is going ahead rapidly. Mr Ehardt and Ms Rotondi noted that, even as it re-badges Chrysler and Lancia products, Fiat is taking regional sensibilities into account. The Lancia version of the Chrysler 300 will feature leather from the high-end Milanese design and furnishings firm Poltrona Frau. Fiat is also bridging cultures with ads featuring Elisabetta Canalis, the Italian ex-girlfriend of American actor George Clooney, captioned "Italian character meets American glamor."

To one American observer, that tagline needs work. It may in fact need major surgery, as late word has it that Ms Canalis and Mr Clooney have ended their relationship.

Steel

▶ ArcelorMittal mulls a \$1 billion conversion of its Tubarao works in Brazil to produce rolled steel for that country's market

Reporting from the 22nd Brazilian Steel Conference, held 1st-3rd June in São Paulo, Diana Kinch of *MarketWatch* took note of an important piece of information from the sidelines of the Brazil Steel Institute event. The chief executive of Brazilian operations for Luxembourg-based ArcelorMittal said that the world's biggest steel maker is contemplating a \$1 billion investment in a new steel rolling mill in Brazil to supply the country's growing flat steel products market. According to CEO Benjamin Baptista Filho, a decision will be reached by the end of this year.

The ArcelorMittal Brasil chief said that, as of 2015, the project would add three million metric tonnes per year (mtpy) of hot coil rolling capacity at ArcelorMittal's Tubarao works in southeast Brazil. The basic idea, he said, "is to convert Tubarao one hundred per cent to rolled steel, principally for the domestic market, and stop exporting slabs." Given rising costs of steel production in Brazil, Mr Baptista Filho explained that it is no longer worth his company's while to produce slabs – a lower-value semi-finished form requiring further processing – for an export market in which prices are volatile.

Ms Kinch of *MarketWatch*, a Dow Jones publication, observed that the expansion planned for Tubarao signals an about-face for the European company. The works was set up in the early 1980s as a slabs exporter, eventually becoming Brazil's biggest steel mill with a capacity of 7.5 million mtpy. Recently ArcelorMittal installed 4 million mtpy of flat rolling capacity at Tubarao to turn out value-added product principally for the Brazilian market. The installation under consideration for the Tubarao works will process all slabs for use in Brazil. Currently, some rolled steel output is sent to ArcelorMittal's Vega do Sul steel galvanising and cold rolling works in southern Brazil for which, said Mr Baptista Filho, a \$300 million expansion is planned.

The company is tendering for a third, 550,000-mtpy, galvanising line for Vega do Sul. This would boost processing capacity there to over 2 million mtpy by late 2013, mainly for Brazil's automotive industry, the ArcelorMittal Brasil executive said.

* Mr Baptista Filho also said that he expects Brazil's steel market to grow six to seven per cent this year. He sees continued rising demand for flat rolled steel products for automotive, construction, and oil and gas applications.

Canada

* The United States government has quietly scrapped a popular exchange programme for Afghan teens after scores of students fled the US for Canada as refugees rather than return to Afghanistan. As reported by the *Toronto Star*, the defections from the US State Department's Youth Exchange and Study (YES) initiative have been occurring since 2005, the second year of the programme. But they reached the breaking point this year when more than half of the 40 Afghans brought in to attend American high schools vanished. A *Star* investigation disclosed that the newest arrivals are collecting welfare in Canada as they attend school and work their way through the Canadian immigration system.

Students accepted into the US programme were chosen from among more than 5,000 applicants across Afghanistan each year. They were deemed the brightest, the most articulate, and those most likely to become Afghanistan's future leaders.

Wrote Allan Woods of the *Star's* Ottawa bureau (11th June): "That made it a big problem in both Kabul and Washington when [the students] started using their stay in the States as a beachhead for asylum bids in Canada."

* The Canadian economy will continue to outperform others in the West over the next two years, even as the pace slows and risks mount, according to the International Monetary Fund. Julian Beltrame of the *Toronto Star* wrote (17th June): "The IMF's latest forecast presents Canada as a relative sea of tranquility amid rising global turbulence from European and US debt issues, the aftermath of Japan's natural disasters, and growing inflationary pressures."

The international financial organisation predicts 2.9% growth for Canada this year and 2.6% in 2012, virtually unchanged from its previous forecast.

Mr Beltrame noted that those numbers are identical to the Bank of Canada's call, made in April. The projections are also in line with a new forecast from Toronto-based TD Bank, which like the IMF sees the global economy slowing but Canada with 2.8% and 2.5% growth rates this year and next.

All the forecasters pointed to a soft spot in the Canadian economy at midyear, due in part to supply-chain disruptions deriving from the earthquake and tsunami that hit Japan in March.

Among the seven industrialised nations of the G-7 economic and political group, the IMF sees only Germany doing better than Canada, with an expected 3.2% expansion this year, slowing to 2% next year.



United and Continental

Not for the faint of heart: the combination of two carriers into the largest airline in the world

In an update to the merger in October 2010 of United Airlines and Continental Airlines, reporter Alison Grant of the Cleveland *Plain Dealer* detailed a joint effort to systematise their services to 144 million passengers boarding 1,262 aircraft in 62 countries each year.

The Herculean task has occupied 25 integration teams across the US, and the end is not yet. Until they get a single operating certificate from the US government, expected late this year, the two carriers are flying independently as subsidiaries of United Continental Holdings Inc. When the melding is complete, Chicago-based UCH will be the world's largest airline as measured by revenue passenger miles.

Scott O'Leary, the managing director of customer solutions, said at midyear that UCH was about halfway to goal. ("In United-Continental Merger, 1,000 Questions Remain," 27th June).

A United spokeswoman told the *Plain Dealer* that, between the two airlines, procedures on airport operations alone – exclusive of onboard services – fill 21 manuals of 800 to 1,200 pages each. Sherri Kawell, who heads the team overseeing airport operations and cargo, said she hopes that those combined procedures can be made to fit into seven manuals.

As announced in May at Chicago's O'Hare International Airport, United is scrapping "the tulip" – the iconic double-U logo created by design maven Saul Bass in 1973 – in favour of the Continental spinning globe. As explained by Ms Kawell: "One of the new airline's primary assets is its global route network, and this is a more fitting icon to represent that scope."

More pressing issues than logo design require attention. Meshing pilot teams and coordinating two networks of computers are two big challenges still to be met.

✱ Citing Cornell University research from 2008, and the view of some analysts that there has never been an indisputably successful airlines merger, Ms Grant took note of the industry's "spotty record" at consolidation. She wrote: "In the troubled union of US Airways and America West, company executives [still] speak of a 'west side' – the former America West – and an east, while flight crews operate totally separate fleets six years after the merger."

The purchase in 2008 of Northwest Airlines by Delta Air Lines went more smoothly, despite the enormity of the undertaking. A photograph released by Delta to the *Wall Street Journal* shows a planning board bristling with more than 300 coloured sticky notes, each representing a project that the *Journal* said could involve thousands of tasks.

✱ As for the United-Continental merger, Ms Grant said that no consideration will be given to at least one question that vexed the Delta-Northwest deliberations: how best to slice a lime. Ultimately the Delta 10-slice lime was chosen over Northwest's 16 slices.

Said Sherri Kawell, of United: "Not on our integration synergy checklist."

Elsewhere in the Plain Dealer . . .

✱ Also on 27th June, Cleveland-based Andrew John reported the activation of a giant (340-ft) wind turbine rising alongside the Lincoln Electric Co headquarters building in nearby Euclid. The 800,000lb turbine, imported from Germany two months before, is the biggest in the area and quickly became a notable feature of the skyline. If local elected officials have their way, the \$5.9 million project will be the first step in bringing cutting-edge energy sources to northeastern Ohio.

The turbine is expected to produce 2.5 megawatts of electricity for Lincoln, and cut a half-million dollars from its annual energy bill. Euclid's mayor Bill Cervenik, who envisions his city as a potential national symbol of clean alternative energy, said he helped the company secure a \$1 million federal stimulus grant to aid in financing the turbine. So far, Mr Cervenik told the *Plain Dealer*, he had received only one complaint about the towering structure: that it despoils the view of Lake Erie.

Technology

A self-trained metallurgist tweaks heating and cooling, produces a super-steel

"Steel is what we would call a 'mature technology,'" said Suresh Babu, an associate professor of materials science and engineering at Ohio State University, in Columbus. "We'd like to think we know almost everything about it."

To judge from his credentials, Prof Babu knows more than most. He also serves as director of the National Science Foundation (NSF) Center for Integrative Materials Joining for Energy Applications, headquartered at the university. For an amateur metallurgist claiming to have made an important discovery, Prof Babu is an obvious go-to person. "If someone invented a way to strengthen the strongest steels even a few per cent, that would be a big deal," Prof Babu told Pam Frost Gorder of the Web-based technology news service *PhysOrg.com*. "But seven percent? That's huge."

Seven percent is, in fact, routinely achieved by the inventor Gary Cola in his laboratory in Detroit. The steel he produces there, now trademarked Flash Bainite, has tested stronger and more shock-absorbing than most titanium alloys for common industrial uses. And, as Mr Cola demonstrated to the astonished professor and his students, the procedure takes only seconds. ("A New Way to Make Lighter, Stronger Steel – in a Flash," 9th June).

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In the heat treatment of steel, 900° Celcius over several hours is fairly typical. Mr Cola's method calls for major adjustments in temperature and timing.

The steel is rolled through a unit in which it is heated to 1,100°C (very hot: carbon steel melts at around 1,400°C) and immediately plunged into the cooling liquid bath. From start to quench: 10 seconds.

Science writer Kit Eaton of *FastCompany.com* has high expectations for the brainchild of the "do-it-yourself metalhead" from Detroit.

A stronger steel could be made thinner and yet carry the same load as more traditional steel. Lighter-weight cars and aircraft need not sacrifice strength for important gains in fuel efficiency.

The Cola process is simple, speedy, and doesn't require exotic materials or treatments. Mr Eaton, for one, sees few impediments to its adoption by steel mills.

* What is the inventor of "flash processing" up to now? Ms Frost Gorder of *PhysOrg.com* reported: "[Mr Cola] is working with researchers at Ohio State University to better understand the science behind the new treatment."

Other steel news...

* Writing from Rio De Janeiro in *MarketWatch* (18th June), Diana Kinch reported that, according to the British global investment bank Barclays Capital, by September steel producers in Brazil may have cut their prices on some flat steel grades.

The mills, which had avoided announcing price increases, would be acting in response to the threat of rising imports and the excessively high inventories carried by steel distributors.

Citing information from Brazil's Steel Distributors' Institute (INDA), Barclays noted that preliminary figures for May pointed to stocks levels equivalent to 3.7 months' flat steel usage - higher than the 2.6 months' level "normal" for the industry.

▶ Fibre-to-the-home is now available to one in five households in North America

According to RVA LLC, a market research firm specialising in fibre-to-the-home (FTTH or, variously, FTTP: fibre-to-the-premises), in the year through April 2011 these advanced consumer broadband services were available to 18% of North American residences - almost one in five.

FTTH connectivity allows telecommunications providers to offer high-definition TV and other enhancements as well as very fast Internet speeds.

Tulsa, Oklahoma-based RVA estimates that there are now over a half-million North American households receiving FTTH service



with connection speeds of at least 50 megabits per second (Mbps). Of these, about one-third (170,000 households) receive FTTH service with connection speeds of at least 100 Mbps. RVA says these results are more than double the totals in the previous year's report.

The current survey, of more than 2,000 broadband subscribers, again found that overall satisfaction is higher among FTTH users than among other subscribers.

Some 74% of FTTH respondents professed themselves "very satisfied" with their service (up from 71% percent a year before), compared with 54% for cable and 51% for digital subscriber line (DSL).

Reporting the RVA results on *digitalhome.ca*, a Canadian site that reviews consumer electronics, Hugh Thompson noted (17th June) that the largest FTTH provider in Canada is Bell Aliant, an operator in Atlantic Canada exclusive of Québec.

With its FibreOP brand, Aliant expects to have made FTTH service available to over 600,000 homes and businesses by the end of 2012.

According to its much more comprehensive *North American Market Review and Five-Year Forecast Report (2010-2014)*,

RVA expects annual FTTH growth in the US to decline for the next couple of years before trending upward again.

On the positive side, the FTTH specialists also see improvement in Canadian and Mexican growth rates and many new players entering the US market.

Other telecom news . . .

* Level 3 Communications (Broomfield, Colorado) has added points of presence (PoPs) in the capital cities Ljubljana, Slovenia, and Zagreb, Croatia, enabling direct access to the carrier's global network and portfolio of IP-based communications.

As noted by *TeleGeography* (29th June), the new PoPs form part of a Level 3 strategy of deepening its network in Eastern Europe, which it views as a growth region for Internet traffic.

With the addition of Slovenia and Croatia to the countries connected to its Tier 1 network, Level 3 now spans more than 20 European nations and offers connectivity in 50 markets.

Dorothy Fabian
USA Editor

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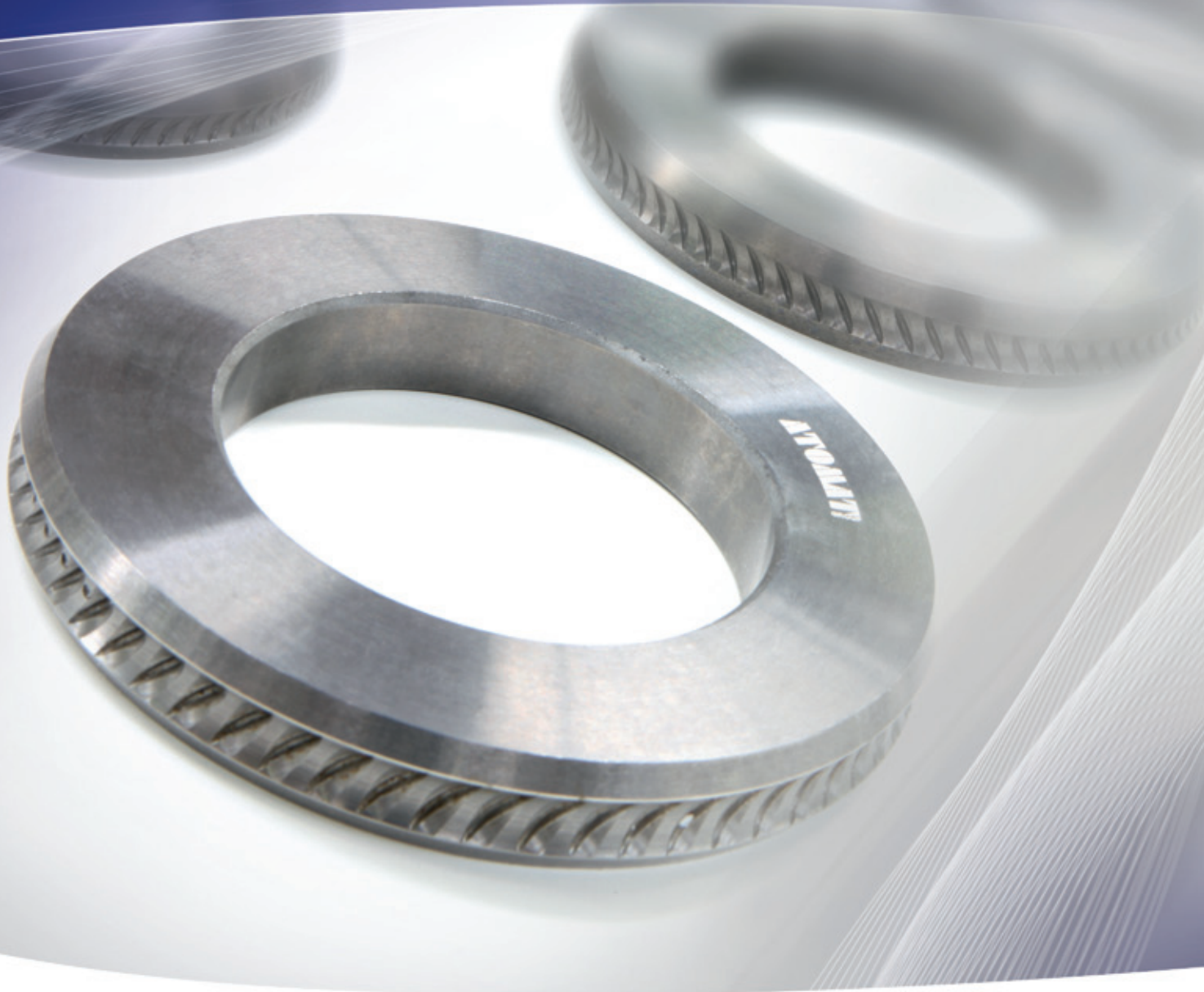
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Keeping it clean and beating breakdowns

WOOD or metal chips, other rough dirt particles, even flying sparks, may considerably affect cable carriers' functionality in machines and installations. In a worst case scenario, this may even result in a total breakdown.

For applications with the corresponding environmental conditions, Kabelschlepp supplies closed cable carrier chains and systems, in the best design possible, and which considerably improve operational safety. In order to meet the customers' requirements, the cable carrier specialist from Wenden, Germany, can rely on a great variety of materials in its portfolio.

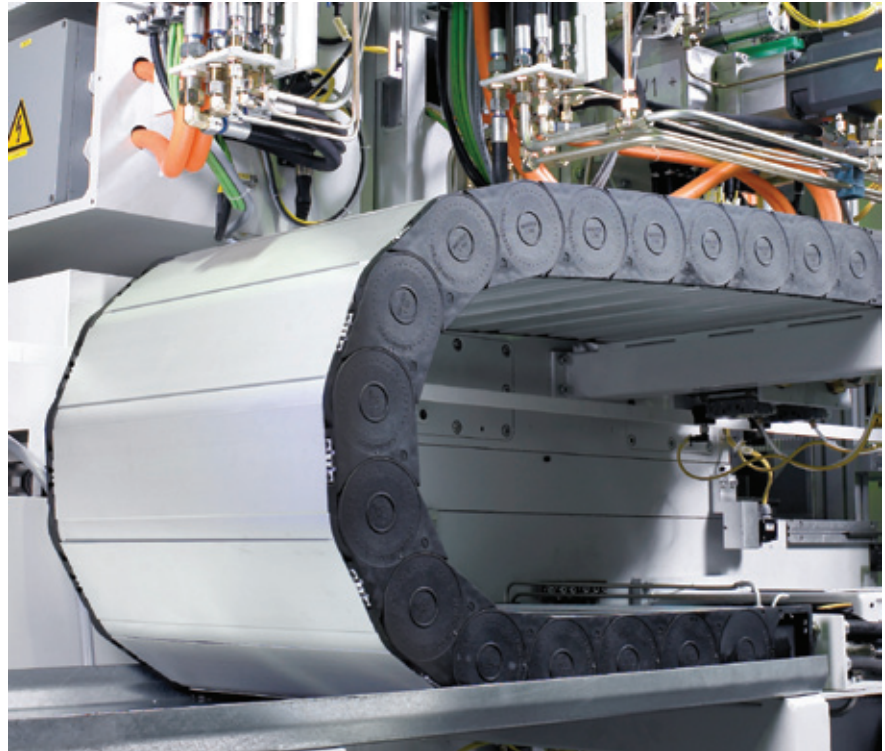
Whether designs made of plastic, steel, or hybrid variants (plastic chain bands with aluminium stays), or economic versatile standard types, robust, weight-optimised, extremely stable fast or quiet cable carriers for large unsupported lengths, with fixed chain widths, or chain widths accurate to the millimetre, with a large internal height or special design requirements – the portfolio offers the suitable solution for any need.

There are also, for example, plastic covers which, depending on the application, are mounted on one or on both sides. aluminium covers are particularly light and strong and therefore have a better long-term heat resistance. Sometimes, hot swarf or sparks remain on the covers for a short while until they die down, so aluminium is definitely the best choice compared to special plastics materials.

Steel chains are recommended for areas with extremely high mechanical loads. With steel chains solutions for long-term loads or application dependent maximum values of up to 600°C may be realised. In a stainless steel design chains may even be exposed to short-term peak temperatures of up to 1,000°C.

In this instance, aluminium covers offer reliable protection without increasing the weight of the chain excessively. Steel band covers offer a lighter and above all more economical option. They are available up to a width of 1,000mm for all chain types. The steel band cover is fastened to the chain bands with corresponding holders.

The enclosed cable carrier CoverTrax is



▲ Covering it up! Part of Kabelschlepp's closed cable carriers range

one of the most recent additions to the Tube series. It offers effective protection against chips, dust and dirt and prevents alien objects from entering in the cable area. This has been achieved by optimised chain geometries and a reinforced cover contour, allowing for very small gap widths, even for large chain widths.

Alien objects cannot be deposited in the narrow gaps, nor can they penetrate into the interior cable compartment while the chain is in motion. Dirt is also deflected to the sides, since the covers provide a sealed enclosure flush with the sides.

Moreover, the design is convincing, thanks to its enclosed stop system and internal damping resulting in quiet operation. With a new linking mechanism, the chain can be opened quickly and easily, both inside (model 60) and outside (model 080), and the cover may be completely removed – essential for a quick cable installation.

The separating stays also contribute to this: they can be moved in the chain's cross section; however, they can also

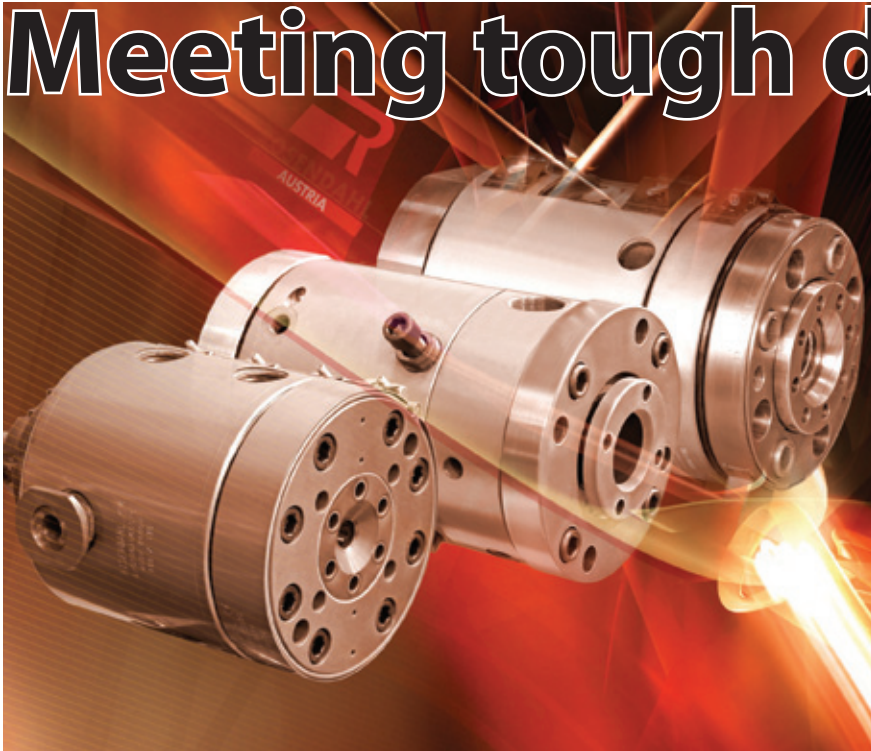
be quickly fixed by simply turning and locking them into place.

Aside from performance and functionality, the optical aspect plays a major role; for this purpose Kabelschlepp has developed designer Tubes. Among them the Conduflex chain with a visually attractive appearance due to stainless steel brackets and frames made of fibre glass reinforced polyamide or the flexible metal spiral tube Mobiflex with a very dense construction, ideal for areas exposed to hot swarf.

Cover variants are designed for easy installation and can be easily and quickly opened, unfastened, unscrewed or unclipped. Different stay systems tailored to the application are available in order to reliably keep the installed cables in position – which is also particularly important for installations where the cable carrier is installed on its side.

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Meeting tough demands



▲ The RX Crosshead Series from Rosendahl

WITHIN the RX Crosshead Series – available in sizes from RX2 to RX110 – the latest product launch of RX5 made by Rosendahl meets the very wide-ranged demands in the field of cable applications between 0.1 and 5mm conductor diameter.

Perfectly balanced polymer distribution, temperature- and pressure-profiles guarantee a smooth and stable melt-flow across the outlet zone. RX-Type Crossheads generally provide high-precision centricity, therefore preventing over-sizing cable wall-thickness.

Enhanced flow-channel geometry ensures short residence time of polymer melt and enables a quick and easy change of colour or material. Easy handling is guaranteed by a compact and modular design, by high precision ball-centring over an adjustable and self-sealing tip-holder – or by the well-proven fine-tuning-centring which is not only requested especially in extrusion-lines for fibre-optic cables.

Advanced RX5-Crosshead design keeps away process-deviations and increases quality and efficiency in extrusion-lines for micro-coaxial-, LAN- and standard power cables for automotive and non-automotive applications.

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Saving time with new fibre flags

Silver Fox, a manufacturer of innovative, durable and time-saving labelling solutions, has launched its new range of Optical Fibre Flag labels suitable for data and telecoms, electrical and energy industries.

A new range of optical fibre flag labels are now available with a choice of four label sizes. These durable, long-lasting labels are supplied as pre-cut A4 sheets designed for printing on any standard office laser printer with label templates available to download from the company's Labacus Innovator labelling software.

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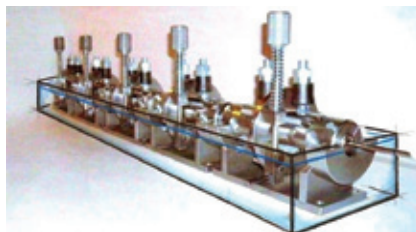
The BHW system incorporates new technology which enables normal plant water to be converted into the most unique 'micro-abrading liquid' agent used for cleaning of drawn wire, in-line, at high speed, at virtually zero energy consumption, providing extra-clean wire. Basically, it is a sensitive multi-layer displace/fine scrub/flush cleaning system, benefiting from water immersed high density ultra-fine brush bristles performing as porous long-life abrading pads that smoothly impact wire surface separating lubricant residue from base material, washing away dispersed contaminants by moving wire, exiting the unit clean of white-metal appearance.

The BHW system provides the ultimate combination of simplicity and effectiveness: acid-free, caustic-free, without ultrasonic, without chemicals. Economical and environmentally friendly, the system provides significant process savings in production of clean H/C and L/C wires.

The BHW wire cleaning system is used in the most demanding applications, allowing the highest cleaning speed, with all carbon steel wires (including 0.90%), mechanically descaled or acid cleaned, bare or pre-coated, drawn with calcium or sodium lubricants. The BHW system is particularly recommended for cleaning applications in which a conventional process is inappropriate, especially with

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wires drawn upon severe conditions resulting in increased heat and burned lubricant tightly bound to the wire surface and embedded in microscopic cracks.



▲ Wire cleaning using the BHW system

The BHW system cleans drawn wire from lubricant residue in applications prior to heat treatment or coating, including galvanizing, annealing, patenting, plating, welding (chain, mesh), painting, plastic coating, Al or Cu cladding, etc. In a typical application, the 2.6mm (0.102 in) drawn wire is cleaned in-line at 12m/s (2,400ft/min) with 5 x BHW units, obtaining a very clean wire with remaining residue of 0.100-0.210g/m², enabling direct galvanizing or other metallic or plastic coatings.

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Optimising welding applications

SIMUFACT Engineering GmbH, a provider of software and services in the area of process simulation, has launched a new simulation environment – Simufact.welding for the process optimisation of welding applications.

Simufact.welding supports welding specialists and engineers in the layout and test of welding processes, and for the first time, the virtual process design and optimisation can be applied closely to production.

The use of Simufact.welding permits an accurately timed control of several robots, an easy modification of welding sequences, speed, heat input, stop times, or fastening devices. Quick evaluation of process variants by change of welding parameters leads to systematic optimisation of fusion zones, heat affected zones, residual stress and distortions.

The software provides extensive tools for reporting, among others, for the display of distortion, temperature distribution, residual stresses, curve progression of physical factors on fixed measuring points as well as several export interfaces.

Most different ways of description such as dynamic cuts through the welding seam, flexible views and detailed x-y-diagrams enable a quick and efficient analysis of the welding process.

The functions of Simufact.welding at a glance:

Pre and post-processing within one GUI; no data conversion; fast presentation of results; result evaluation simultaneous to computation; interactive graphical sequence control of robots and clamping tools; section views of all result values; "Weldmonitor" (trip to all welding seams in a 2D section); measuring point diagrams for comparison with test welds; progress indication of calculations with access to already calculated results during the analysis; context support for

all input areas; interface to RoboCad as well as export interface to robots; Dual Solver Technology: optimised MSC.Marc Solver, IFE WELDSIM Solver; different heat sources (Goldak model, cylindrical volume sources, surface heat sources with Gauss.

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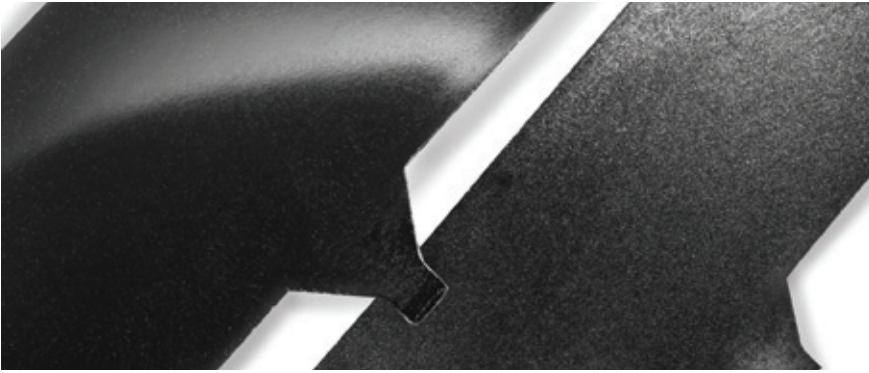


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▲ *Matt or glossy: Vestakeep® Peek moulded parts have a wide range of gloss levels. The part on the left was produced at a mould temperature of 250°C, and that on the right at 180°C*

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HIGH surface quality and resistance to mechanical stress are requirements that polymer mouldings must fulfil – despite increasing functional integration in components and the resulting increase in complexity of component geometry.

An innovative induction heating technology from RocTool improves component quality by ensuring a high mould temperature during the injection phase and high cooling rates during the holding-pressure and cooling phases in the injection moulding process.

In combination with Vestakeep® Peek and Vestamid® HTplus high-performance polymers, this improves particularly the gloss level of moulded parts.

This highly dynamic temperature control selectively influences the formation of the morphology and surface structure.

While the gloss levels achieved for the high-performance thermoplastics investigated lie in the range for high-gloss surfaces, the mechanical properties in the tensile test remain almost unchanged as the mould temperature is varied.

Moreover, the wear rate of Vestakeep® moulded parts, as measured on a pin-disk test rig, is reduced when mould temperatures are sufficiently high. This could, for example, increase the operating life of gears.

Vestakeep® Peek polymers are distinguished by high mechanical strength as well as good electrical insulation and chemical resistance.

The polyphthalamide (PPA) Vestamid® HTplus is known for its high heat resistance and excellent mechanical properties.

Vestamid® HTplus is used as a metal substitute and for fire protection, among other applications.

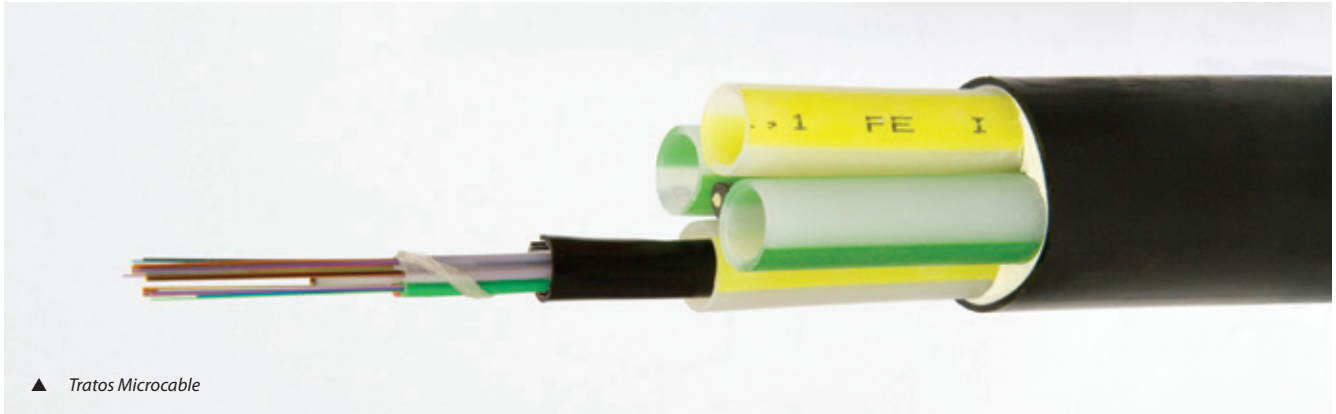
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▲ Tratos Microcable

Flexible solution for broadband OSP applications

ELECTRIC and fibre optic cable manufacturer Tratos has launched the innovative and cost-effective Tratos Microcable solution for Open Settlement Protocol (OSP) applications in the broadband market.

Tratos Microcable contains a high-fibre density but is exceptionally compact and lightweight, thus maximising the fibre count available in a small cable diameter. It is produced in stranded loose tube design and is available in fibre counts from 144 to 192, with outer diameters ranging between 4 and 7.5mm – the 7.5mm Tratos Microcable incorporating 192 fibres is actually the smallest such cable in the world today.

Even with the maximum number of fibres incorporated, Tratos Microcable remains flexible (it has a minimum bending radius of 15 x outer diameter without tension) and is lightweight enough for air-blown installation in very small ducts or sub ducts using Tratos Microduct. Tratos Microcable requires fewer joints in installation, providing reduced resistance when being passed through the ducting.

As a result, Tratos Microcable is ideal for installations where duct space is at a premium and has the added benefit of being easy to handle and install. It also provides a simple, neat and commercially viable solution to upgrade a network at a later date as fibre is simply deployed as and when needed.

Tratos Microcable can be used in operating temperatures of -30°C/+60°C. It has been designed and manufactured to IEC 60794.

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Launch of the Cable Count

H&S Engineering has recently launched the Cable Count, a new cable, wire and conduit measurement machine.

"Cable Count™ has been developed to satisfy a long-standing demand for more efficient mechanical measuring devices," said John Stitchman, managing director of the Norfolk, UK-based company which provides precision engineering and fabrication services in the food, medical devices, printing and energy sectors.

Cable Count utilises an innovative and proprietary roller box design to smoothly deliver the cable to the measuring head to aid accuracy.

It also uses a rack and spur gear arrangement and gas struts to assist in height adjustment.

H&S developed Cable Count after extensive research and development, and will support customers with a robust marketing and after-sales service campaign.

Andrew Howard, chief engineer in charge of research and development for Cable

Count, added: "At the start of the R&D process, we set out a number of targets for Cable Count.

"Apart from high levels of accuracy, we wanted to design a machine with a good range of adjustment in terms of cable diameter and operating height and angle."

Cable Count joins another recently introduced machine at H&S that is for hose and tube pricking.

Again with the industrial market in mind, it makes use of rollers to guide the tube through the pricking head. This innovation allows for efficient set-up on a wide range of tube diameters.

Cable Count sales and after-service in Europe and North America will be fulfilled directly by H&S Engineering, whilst sales in Asia will be through Aerocomp Precision Engineering, an AIV Group company in Bangalore, India.

H&S Engineering Impactbond Ltd – UK

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Email: enquiries@hs-engineering.co.uk

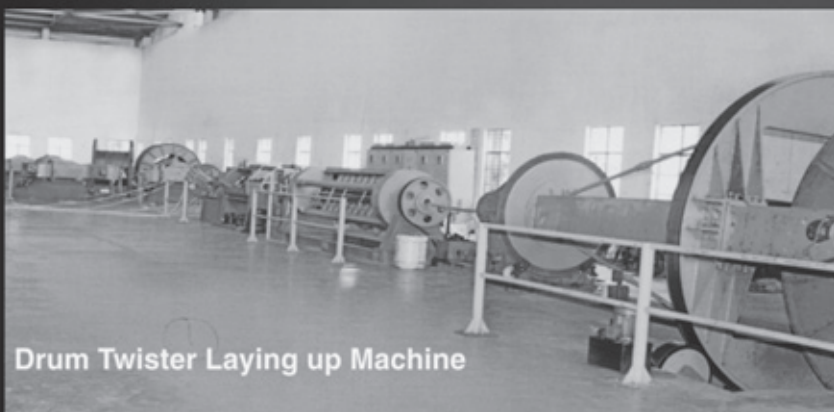
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▲ The new Cable Count from H&S Engineering



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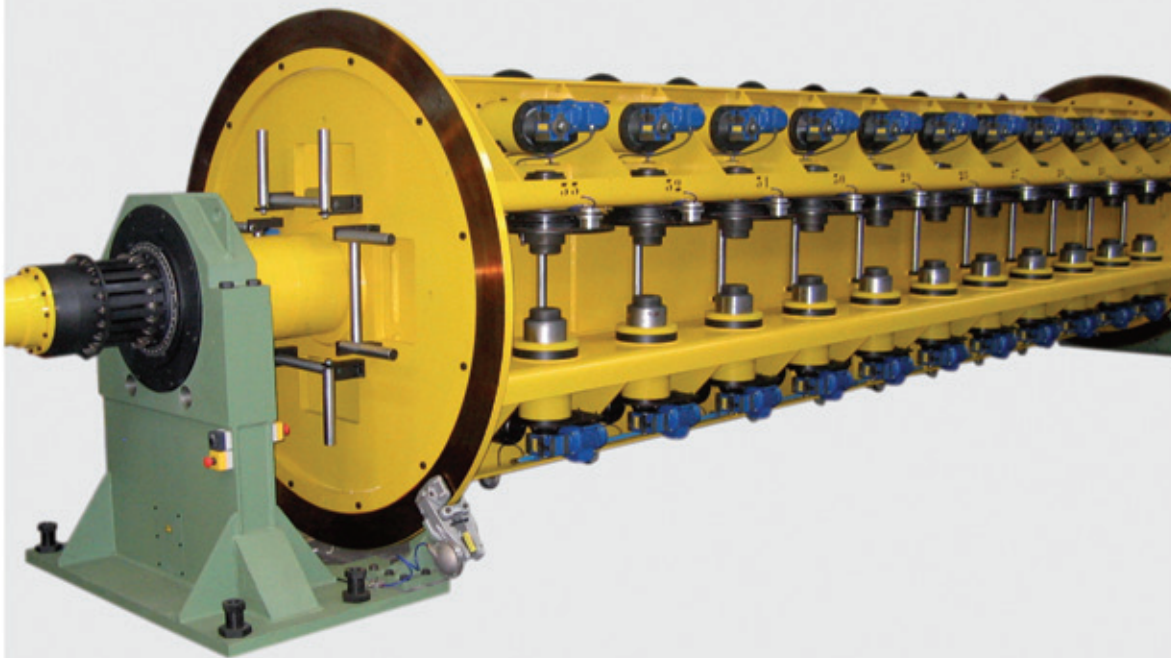
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Measurement that raises the bar: The Laser Series 6000

MEASURING precision combined with outstanding functionality and perfect design – these are the features of the diameter gauge heads of the Laser Series 6000 for continuous quality control in wire and cable production lines.

Regarding electronics of the gauges the Sikora-engineers raised the bar.

The devices have a measuring rate of 2,500 measurements per second with high single value precision independent from the position of the product within the measuring field, and thus ensure optimum line control and reliable statistical data.

The applicable design of the Laser devices, with small dimension and optional swivelling gauge head, includes a measuring value display directly at the gauge head for a further improvement.

Moreover, there are no external plugs. A universal interface module is directly integrated into the gauge head.

As a result the plugs as well as the connection cables are protected from any production influences. In addition, the gauge head opening of the Laser Series 6000 is twice as big as the measuring range. This wide opening as well as the big sight field allows for an easy product feeding.

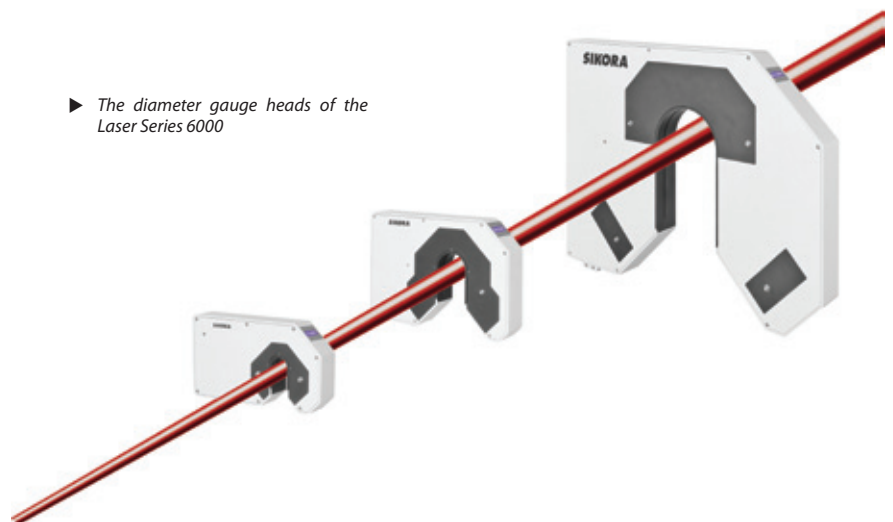
The gauge heads do not include moving parts and maintain their accuracy during the entire operation time.

Calibration procedures or maintenance are not necessary.

The devices cover diameter ranges from 0.25 to 80mm. In addition, Sikora offers further 2-axis diameter gauge heads for products from 0.05 to 500mm as well as 3-axis measuring devices for product diameters from 0.2 to 100mm.

Sikora AG – Germany
Fax: +49 421 4890 090
Email: sales@sikora.net
Website: www.sikora.net

► The diameter gauge heads of the Laser Series 6000





Focus on small butt welders



▲ The type SE1 from Strecker

AUGUST Strecker's focus this year will be on small size electric strand butt welders.

With more than 75 years' experience, Strecker has gained an enviable reputation in manufacturing electric and cold pressure butt welding machines and large welding machines for medium or high voltage submarine cables.

Here the tendency is straight to welds without tubes, using dual upset welders with automatic flash removal system. A recent development is of machines powered by three-phase transformers, reducing the current consumption and facilitating machine installation in the individual cable factories. Progress continues, as it is planned to enlarge the welding ranges for stranded copper up to 1,600 or even 2,000mm².

There has been continuous demand this year for types SE 1, SE 2, and SE 4 butt welders.

These three units cover a total range for stranded copper from 0.08mm² to 35mm² or stranded aluminium from 1.5mm² to 50mm², welds being made using ceramic tubes. A typical application would be in the automotive industry or for electric installations.

August Strecker GmbH & Co KG – Germany

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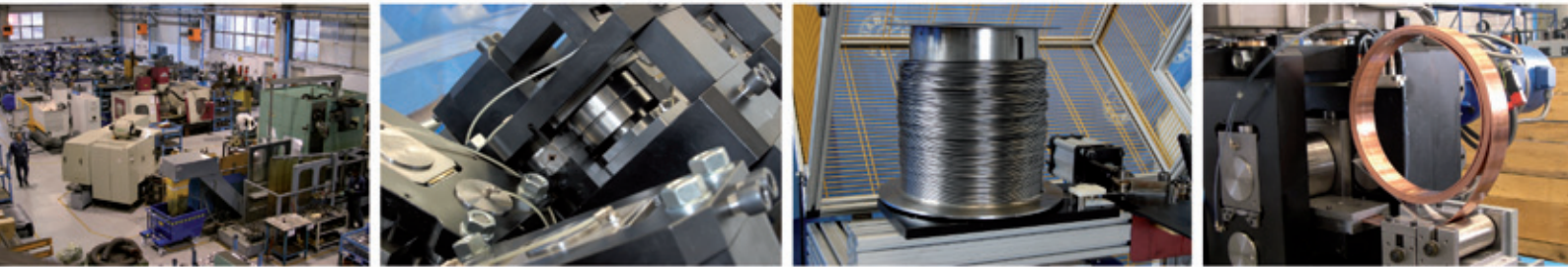
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Capable of 1.5metres of cable measuring per second; the Cable Count's adjustable height makes it incredibly adaptable to any number of cable measuring applications, offering the perfect solution to cutting costs of stock loss across a wide range of cable, wire and conduit materials.

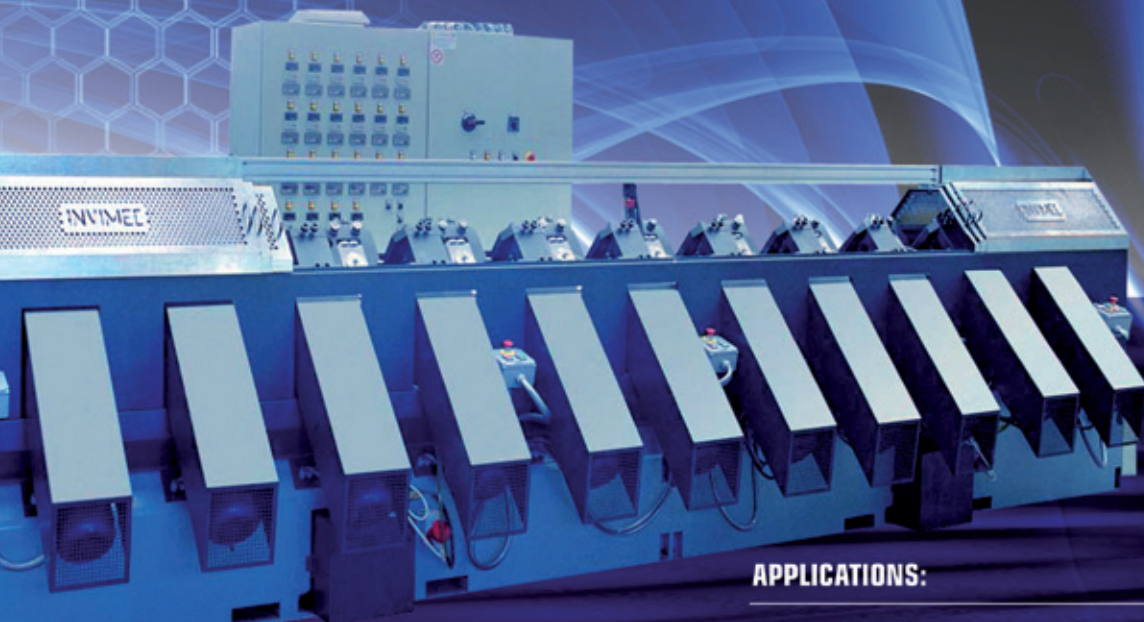
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New wire grips

INSTRON has recently developed two easy-handling grip series, specially designed for testing metals and wires. Instron® S4-5586, -5587, and -5588 is a family of pneumatic wedge action grips for maximum loads of 300, 400 and 600kN.

The new series of Instron® hydraulic side-acting grips for high-capacity testing with load capacities of 600 or 1,500kN uses innovative DuraSync® synchronisation technology for enhanced gripping performance. Both grip families provide a fully open-front design for rapid loading and unloading of specimens, increasing testing efficiency and safety.

The Instron® series S4 wedge action grips are equipped with an integrated pneumatic piston – using 6.2 to 8.5 bar air pressure – that applies force for the initial “bite” on the specimen, while the self-tightening wedge design of the pockets causes the gripping force to increase as tension is applied during a test, thus eliminating slippage.

Specially suited for industrial environments where dust and metal chips may be present, these grips come with protective dust covers that easily fit over the faces to shield the moving surfaces. For 300kN grips, jaw faces are available for round specimens up to 40mm in diameter (57mm for 400 and 600kN grips), and flat specimens up to 50mm thick × 70mm wide (60mm × 100mm for 400 and 600kN grips).

A jaw face mounting system with embedded magnets and circular centering disks simplifies jaw face loading and holds the jaws in position when no load is applied. The grips fit to Instron® SATEC™ Series LX and KN high-capacity universal testing machines, as well as to the Instron® 5988 or 5989 electromechanical floor models. When used with Instron® SATEC models, they can be adapted to use the load frame’s hydraulic power supply in lieu of air pressure.

Instron® hydraulic side-acting grips are an innovative solution for high-capacity testing, delivering enhanced gripping performance, usability, and operator safety over traditional grip designs. They maintain a constant clamping force on the specimen that acts perpendicular to the direction of testing and is independent of tensile loading. Adjustable clamping force alleviates specimen slippage and grip breaks.



▲ The new grips from Instron

The series of dual side-acting grips for specimen diameters up to 85mm (rounds) and widths up to 120mm (flats) incorporate Instron’s patent pending DuraSync® mechanical synchronisation design, that provides many improvements over hydraulic synchronisers or common rack and pinion models, including opposing jaw faces, that repeatedly self-centre during specimen clamping, reducing testing time and eliminating the need to resynchronise the grip actuators between tests.

Built-in compensation for minor bends or irregular specimens (rebar, wire strand) reduces service issues associated with testing un-machined specimens.

Instron’s single side-acting grips include independent, hydraulic actuation for one side of the grip. This robust design accommodates bent and/or irregular specimens such as wire strand, rebar and welded joints.

The jaw faces of both dual and single side-acting grips are easily installed from the front side and require no maintenance beyond simple cleaning. Power is supplied by the machine’s hydraulic pumping unit, saving cost and floor space. The grips are field-serviceable, reducing down time and eliminating shipping costs.

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1km distance for 12.5Gbits

VI Systems GmbH (VIS), a supplier of optical engines and components, has demonstrated an optical link operating a serial transmission at a data rate of 12.5 Gbit/s over 1km distance using Draka's flagship MaxCap-OM4 (50/125 μm) multimode fibre.

The tests were carried out at the Technical University of Berlin in Germany, which provided the high speed test bed and scientific support for the measurements.

A specialist in optoelectronic components for use in short reach optical interconnects, VI Systems

developed the V30-850C1SM high-frequency VCSEL (vertical cavity surface emitting laser) used in the tests for datacom applications.

The device features up to 2mW optical output power at about 7mW power consumption. The operating voltage is less than 3V. Recent tests produced record low energies expended per bit, approaching 100fJ/bit (femto-Joules per bit).

VI Systems GmbH – Germany
Email: office@v-i-systems.de
Website: www.v-i-systems.com

Identifying defects during production

BETA LaserMike offers its Lump and Neckdown (LN) Detector to wire and cable manufacturers wanting to reliably and accurately identify product faults and surface defects during production.

The detector uses infrared light technology and advanced circuitry to instantly detect changes, such as lumps or neckdowns, in the wire or cable diameter.

The signal processing and intelligence is built into the gauge head for a complete, stand-alone detection solution.

Outputs can be taken straight from the LN Detector to trigger alarms or to mark devices when faults are detected.

The detector is easy to install, set up and operate. It can be used in extrusion, drawing, jacketing and other wire and cable production applications for consistent detection of short-term faults in products.

The LN detector is available in a range of models to meet a wide scope of product detection requirements.

Depending on the model, the system can detect faults in products with outer diameters ranging from 0.04 to 40mm (0.0015 to 1.60") up to the fastest line speeds.



▲ The new Lump and Neckdown detector from Beta LaserMike

Long-term advantages to manufacturers include increased productivity, reduced production costs and higher quality products.

Beta LaserMike – USA
Fax: +1 937 233 7284
Email: sales@betalasermike.com
Website: www.betalasermike.com



Measuring and monitoring from Zumbach

▼ The ODAC 63Trio from Zumbach



ZUMBACH offers a wide range of dimensional measurement and quality monitoring systems for the plastics, rubber, wire, cable, steel and metal industries.

The systems described are designed to provide wire and cable manufacturers with the state-of-the-art in process control technology.

Specific parameters covered by these systems include diameter, ovality and wall thickness measurement.

Also new are processors designed to provide on-line measurement and data acquisition, control and display as well as quality monitoring.

Zumbach offers other instruments, such as on-line profile measuring systems of continuously manufactured profiles of any kind, X-ray measuring systems for CV lines, combined diameter and eccentricity measuring systems for communication cables and more.

Diameter and ovality measurement

The new ODAC® 63TRIO system measuring head supplements the programme of three-axis laser measuring systems with a measuring field of 64mm (2.52").

The principle for the ODAC® 63TRIO is the same as for the smaller model ODAC® 33TRIO.

Since commissioning the first system, three-axis measurement has been hugely successful.


The accurate detection of out-of-round condition, regardless of the orientation of the product ovality in combination with reliable and fast diameter measurement are all valuable features.

Advantages include synchronised measurement axes on one single plane, ultra compact design, reliable detection of mean value regardless of the orientation of the product ovality, accurate computation of circumference and cross section, increased measurement accuracy and reliability, integrated fault detector that offers three times higher detection certainty and sensitivity than two-axis models and available interfaces including J standard for USYS, RS-232/-422/-485, Profibus DP and Ethernet.

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- Roschini Maschinen GmbH, Austria
- Planting site ending machine for South America on customer Quatró & Co (Perú), Germany
- Final site preparation and start of building
- DNWIS, France
- IBS Wire's industry has conducted cutting and rolling tests to China 2015-2016, Germany
- Chinese Exhibitors are actively signing up for Wire & Cable Expo, China 2015
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Bangkok – meaning ‘city of angels’ – is home to over nine million people and will be central to the wire and cable industry this September as wire Southeast Asia 2011 opens its doors at BITEC.

More than 220 companies will head to the city’s International Trade and Exhibition Centre between 13th and 15th September to witness first hand the latest in manufacturing equipment and technology advances.



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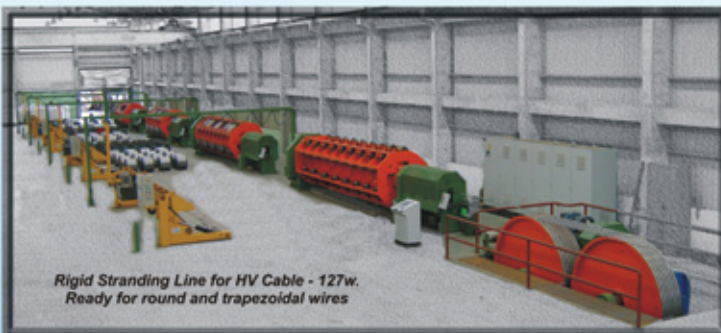
Alphabetical list of Exhibitors

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		Bongard Trading GmbH & Co KG
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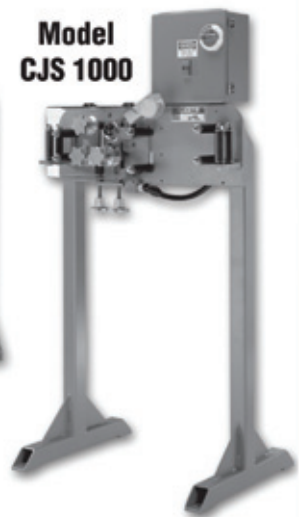
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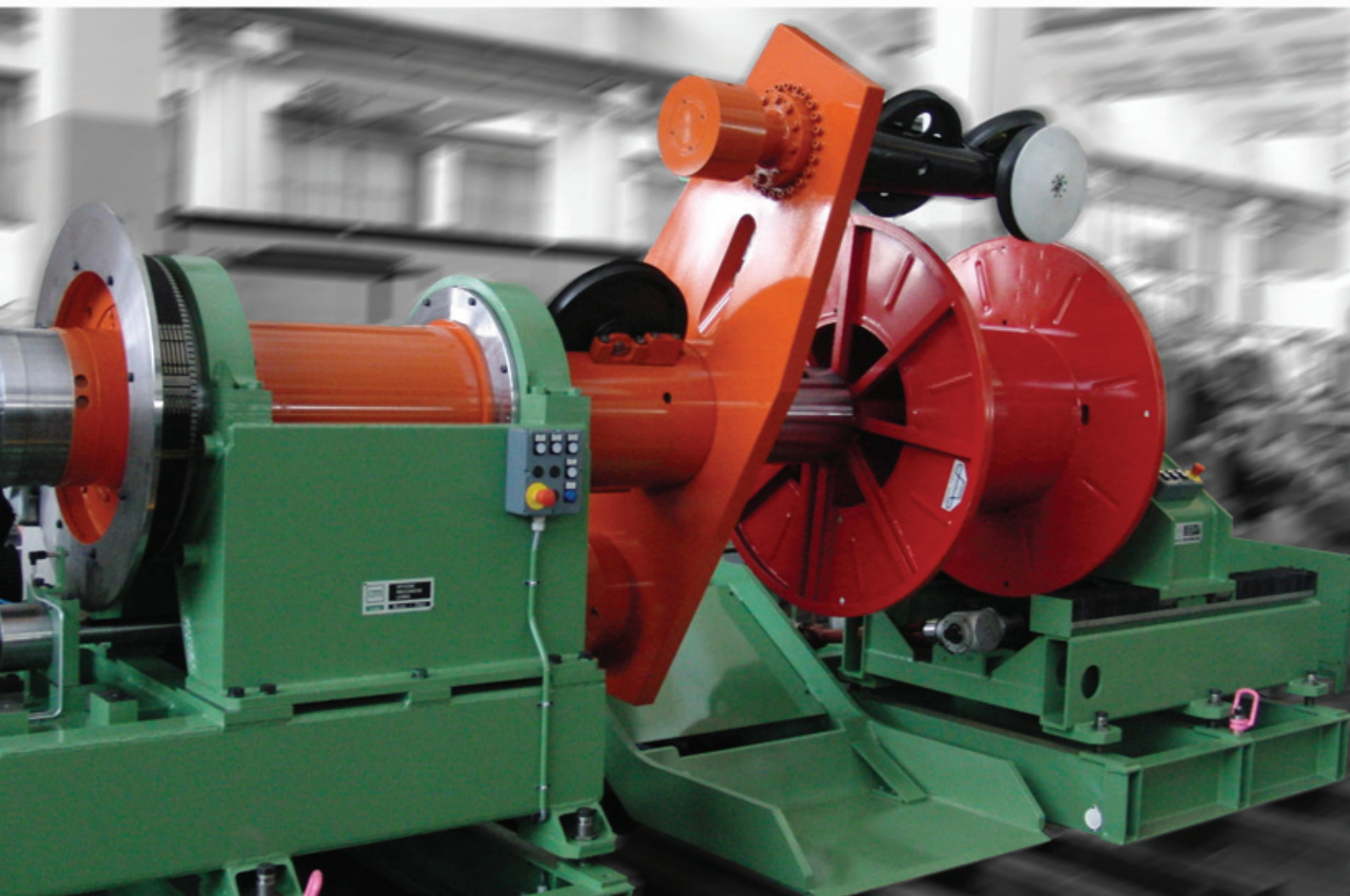
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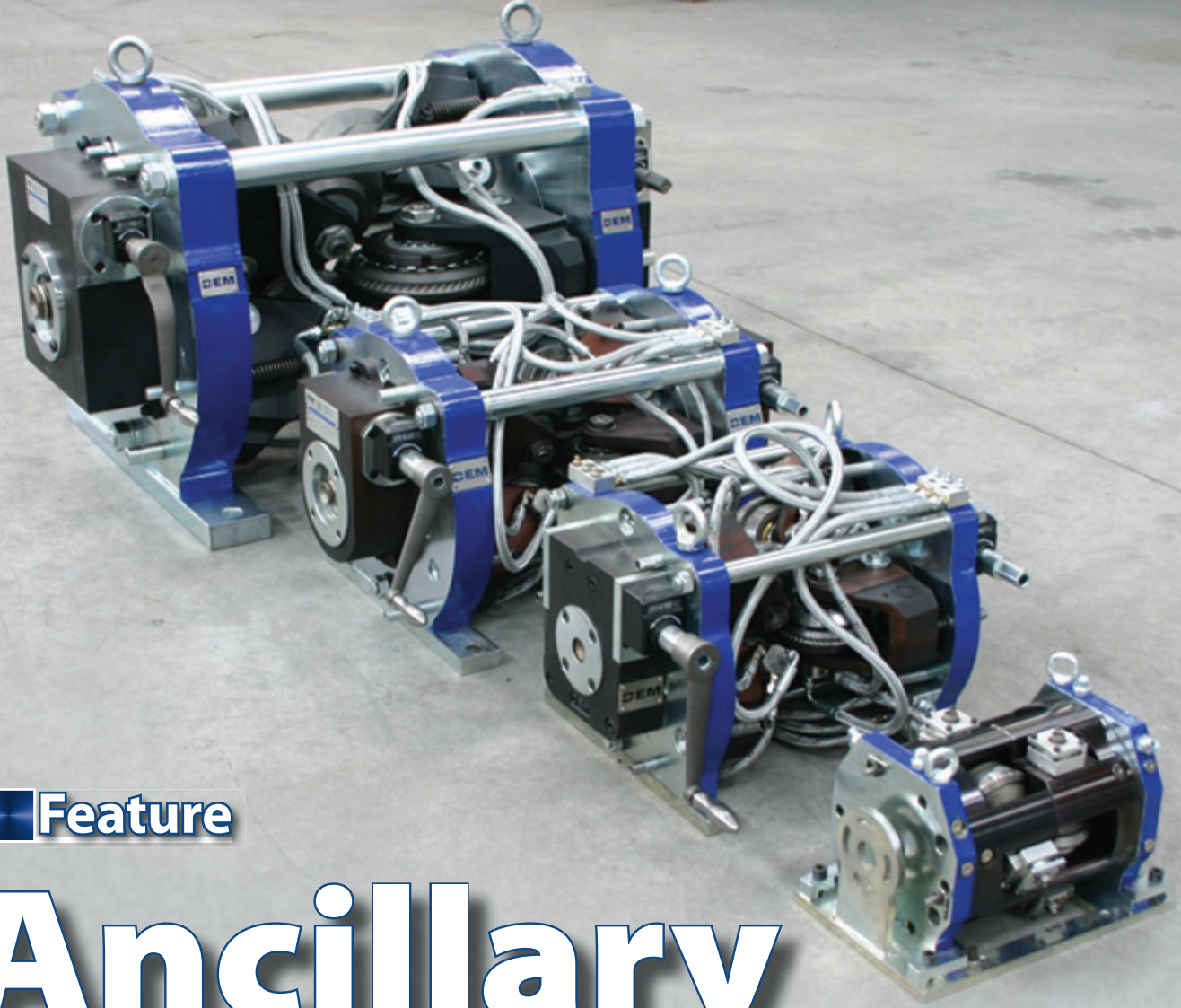
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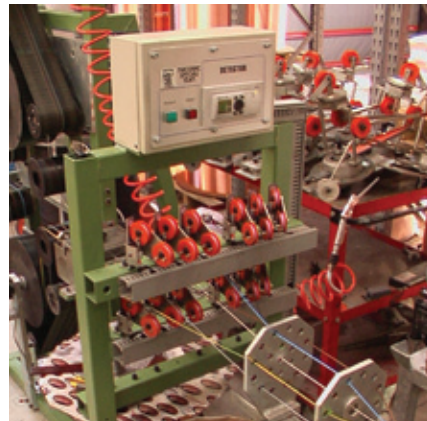
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All about keeping control

Often, some work in the construction of the cables can be tedious and take many hours. Whilst this can sometimes be done without the use of an operator, it is important to keep the process under control.



▲ The detector from Macchine Speciali

Macchine Speciali's detector is the right solution for this.

The system monitors the progress of all the individual wires on the line and, if a wire does not advance in regular way, the line stops.

The system can send an SMS (short message text) to a mobile phone advising about the anomaly and giving the operator the chance to correct the problem.

This detector can be mounted in all kinds of line and can be interfaced with all automation systems.

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Well known in the industry

Italian company OM Lesmo is well known in the wire and cable industry for its rotating machines. The company offers a complete line of pay-offs and take-ups (spoolers) complementing its rotating and wire drawing machines.

The range of pay-off and take-up units by OM Lesmo include:

- Flyer type pay-offs for paying off multi-wires to a bunching machine, available in various sizes. The pay-off tensions can be controlled via mechanical brake, electrical brake or pneumatic brake. Shaftless, pintle-type dynamic pay-offs are also available. These pay-offs are driven pay-offs with a precise tension control system with the use of a dancer unit. They incorporate a unique design for separation of the wire when used for producing 19 strand unilay products on Lesmo double twist or single twist machines
- Dual-shaft with individual tension control system vertical flyer type pay-offs produce various cables using insulated material. Pay-off for shielding tapes can also be accommodated with these pay-offs
- Single twist take-up with back twist pay-offs for unwinding the central core or a number of insulated cables, either in the form of drum twister, single or double twist back twist
- Fixed or self traversing pay-offs and take-ups for rigid, planetary, tubular and skip stranders and cabling

Additionally, Eurodraw Energy, part of the Lesmo Group, manufacturing non-ferrous wire drawing machinery, offers a selection of pay-offs and take-ups (spoolers) for non-ferrous products.

- Double automatic pay-off system for aluminium and alloy rod in coils for up to 2,700kg. It includes hydraulic tilting frames where coils can be inserted by using a fork truck or coil lifting device; it is designed to receive two coils for continuous pay-off
- Automatic dynamic single and double spoolers
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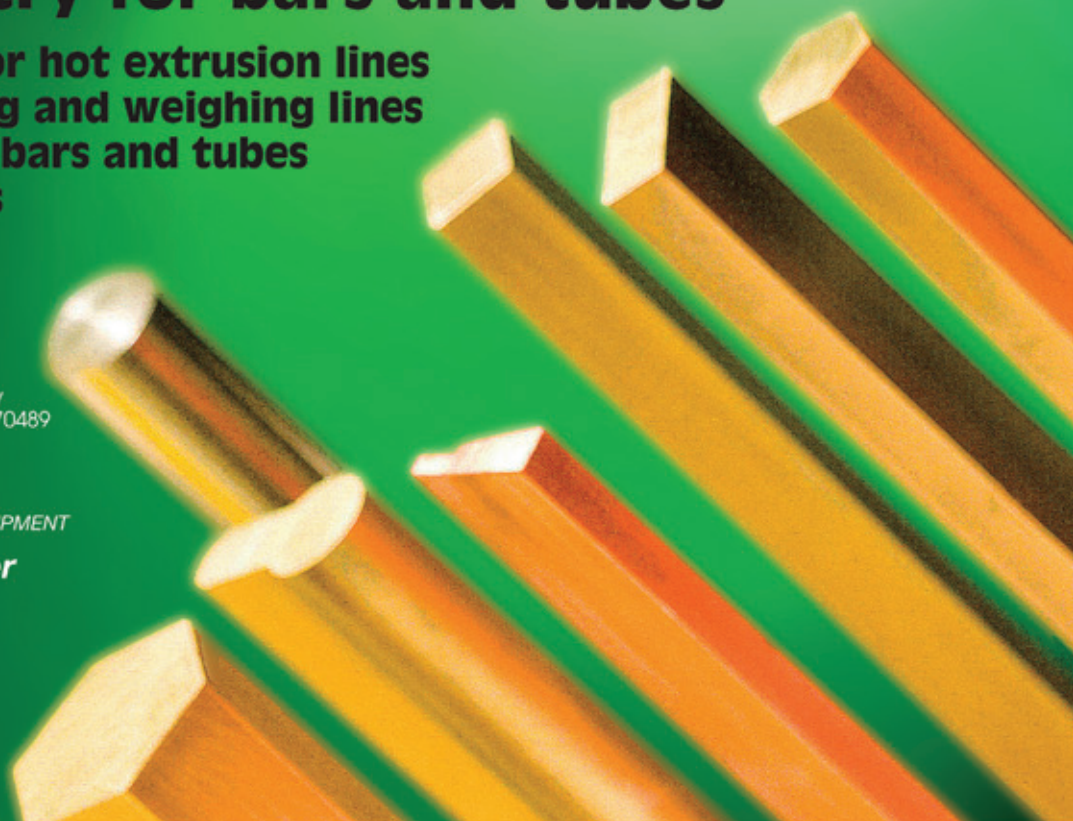
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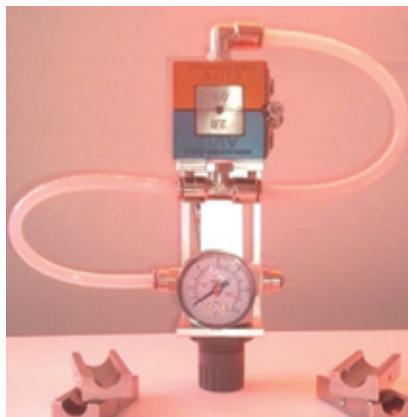
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Wide range of solutions

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▲ An airwipe from Eurotek

The company's range includes useful accessories such as airwipes for extrusion lines (blowers/dryers), and motorised precision cutter to allow clients to obtain samples of extruded cable insulations/tubes or pipes, to a precise measuring of concentricity, thicknesses and diameters, and solutions for the recycling of the wire stripper, used to separate the conductors of cables and/or wires from their plastic coating, as well as a complete series of pneumatic shears for the cut of unipolar or multipolar cables.

The company's ultra modern manufacturing site includes the latest generation machinery, allowing Eurotek to maintain its competitive prices.

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Advanced production method

Wire crimping is an advanced production method for making dependable crimp connections in electronic and electrical assemblies.



The CMT131 splicing machine (above) works with a continuous coil of copperband material which can be fed, cut, formed and securely crimped around the items to be connected in one step.

With high efficiency, reliability and low cost, it is suitable for use in connecting neon lamps, LED, slide switches, reed switches, adaptors and high temperature elements such as glue guns, hair dryer heaters and thermistor sensors at rate up to 2,000 connections per hour.

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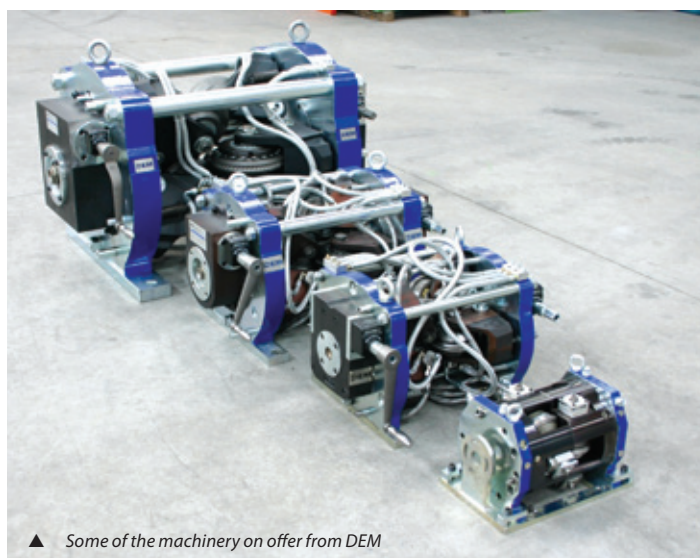
Four different sizes

DEM Cold Rolling Cassettes for wire rope compacting are assembled with 3 + 3 rolls, in four different sizes 125, 150, 180 and 240mm in order to compact strands or ropes with a diameter of up to 24mm.

The latest DEM design has developed a unit with a very rigid frame and an easy maintenance concept. The unit allows roll replacement without opening the housing.

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Flexible bend insensitive riser cable for fast FTTH deployments

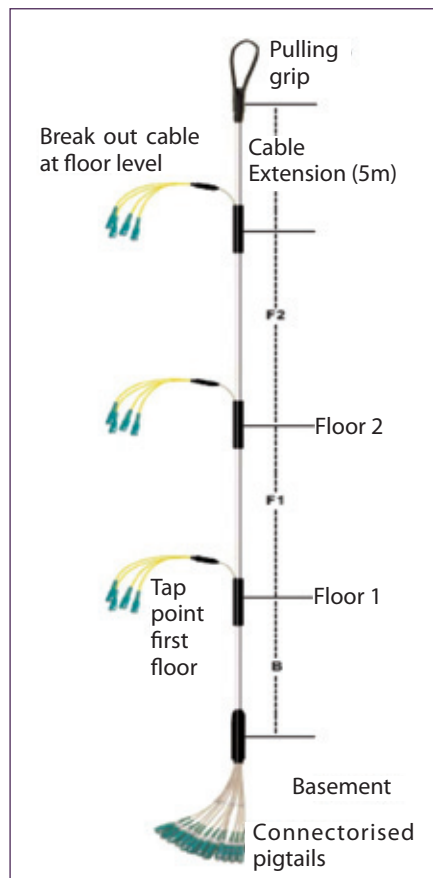
By Grzegorz Tosik, Paweł Kołodziej and Magdalena Mirynowska of Corning Cable Systems

Abstract

Nowadays a Fibre to the Home (FTTH) network plays a crucial role in developing the information society. The increasing popularity of FTTH deployments observed over the last few years has resulted in millions of homes already passed, but in comparison the homes connected market penetration is still relatively small (2.9% of households in US, less than 4% in Europe, and approximately 25% in Asia⁽¹⁾).

The next growth opportunity in FTTH that enables acceleration of market penetration is coming from Multi-Dwelling

▼ Figure 1: Riser cable assembly



Units (MDU) deployments. In typical MDUs the fibre is brought to the floor level and shared by several dwelling units. Network deployments in challenging MDU environments are different than in any single-family house and require an adequate technology. Additionally, as deployments increase, customers will have trouble finding enough skilled splicing technicians to realise large roll outs.

To meet today's market demand Corning designed a FTTH MDU solution (ASCEND™) which uses an advanced riser cable assembly named OptiRise™. Riser Cable Assembly solves major deployment issues and enables MDU installations to be faster, easier and more reliable.

The fibre optic cable consists of network access points which are pre-installed at customer-specific locations distributed along the length of the cable.

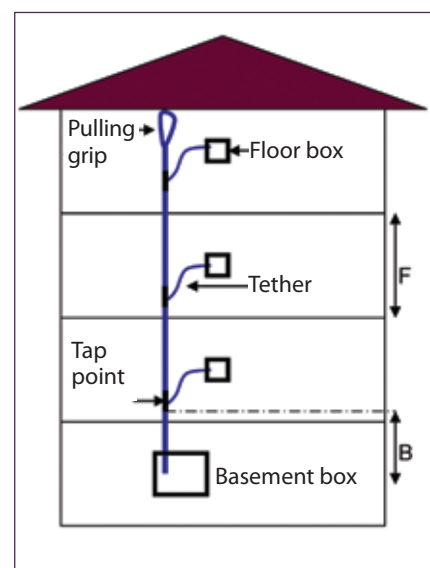
The system is manufactured and tested in the factory, then packaged and shipped to the customer for immediate deployment.

1 Riser cable assembly

The recent emergence of single mode fibres for FTTH applications with improved bending performance has been driven by the increasing amount of optical cable being installed inside buildings with all the associated bend challenges.

As mentioned before, the speed of deployment creates another main challenge in today's installations and the pre-connectorised riser solution has been specifically designed to overcome this issue. As the FTTH scale of deployment increases, customers will have trouble finding enough skilled splicing technicians.

Additionally, labour rates for highly skilled fibre craftsmen are already increasing. The proposed solution enables considerable advantages in the speed of deployment,



▲ Figure 2: Typical MDU Architecture

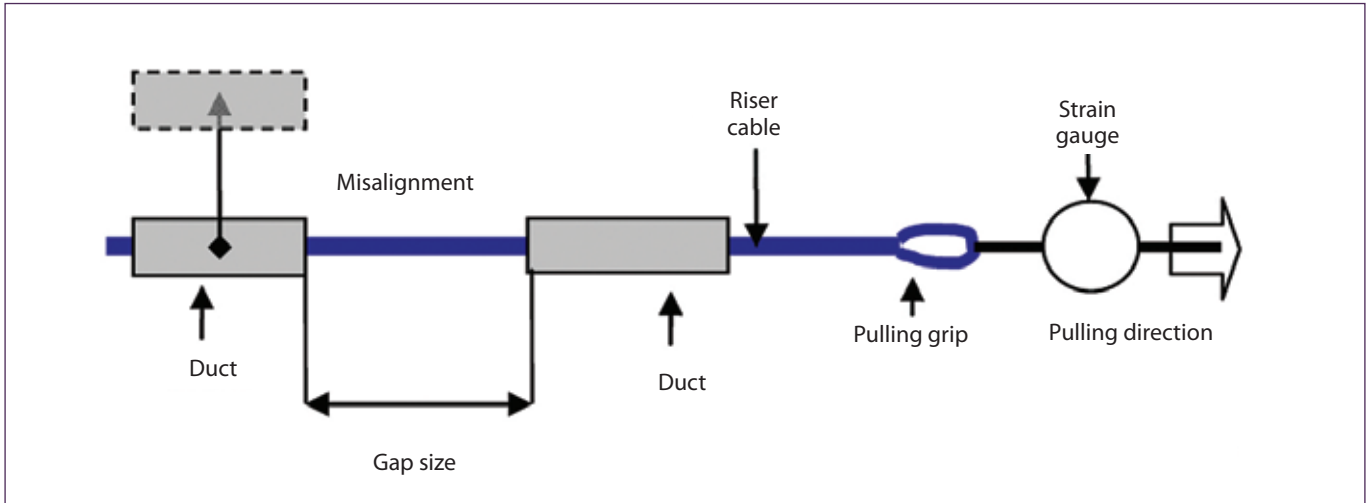
while significantly decreasing the number of skilled installers needed to complete an installation successfully. Faster deployment time will allow customers to generate revenue faster, thus increasing their ROI.

The main element of the proposed solution is a pre-connectorised riser cable shown schematically in Figure 1.

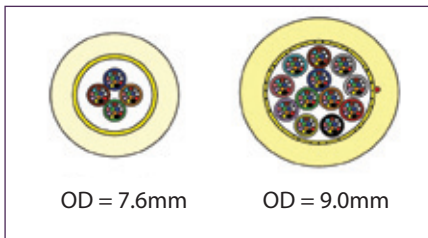
This solution is based on bend insensitive fibre, which makes it ideal for deployments within the challenging MDU environment.

The riser assembly provides single connectors (SC or LC type) on the basement side to be connected to a basement distribution terminal and individual fibre breakouts on each floor level to be connected to the individual customer apartments.

All connectors and the breakouts on the floor level are factory assembled and therefore avoid the critical step of a typical mid span access of the cable. The cable is already 100% factory tested before being



▲ Figure 4: Testing setup



▲ Figure 3: Micromodule cable (up to 144f)

delivered to the deployment site ie MDU. The riser assembly is built according to the exact individual MDU architecture. Only very basic parameters like the distance between floors (F) and the distance from the basement distribution terminal to the first floor breakout point (B) have to be provided in order to enable this (Figure 2).

Based on this information even installers not used to handling fibre can deploy the proposed cable very quickly. The basement tail length is predefined at 120cm for easy connection into the basement distribution terminal.

The length of the individual breakout tethers at the floor level depends on the given floor height (F) and are predefined as F-15cm as the maximum length. In order to minimise the cable diameter during installation the connectors at each floor level are staggered along the main cable during the installation procedure.

The cable assembly comes with a pulling grip for easy installation. The extension distance from the last tap point to the pulling grip is predefined at 5m. Different connector types such as SC or LC can be chosen for the complete assembly.

In order to route vertical cables efficiently and unobtrusively inside buildings, Corning's design efforts for this product focused on smaller diameter and more flexible units leading to FRNC micromodule cables as shown in Figure 3.

An additional advantage of this cable is the extremely small bend enabled by ClearCurve[®](2) fibre that allows discreet storage of fibre in the building, either for tether or for excess pigtailed lengths.

The flexibility and the small outer dimensions of the riser cable assembly ensure the very easy installation of the cable and routing through the wall or on the various levels of the building.

2 Installation conditions

One of the most critical issues related to cable installation is pulling through the vertical duct already installed in MDUs (Figure 2).

The following tests were performed to simulate installation conditions and define installation limits of the cables in terms of

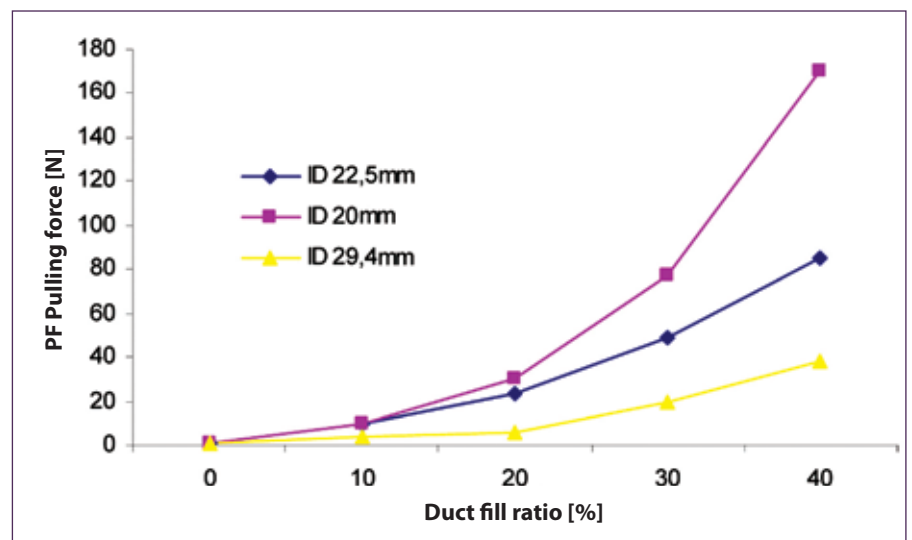
duct congestion. The installation process was simulated for several duct diameters and shapes both with and without copper cables already installed. Additionally, duct misalignment and gap size shown in Figure 4 were considered.

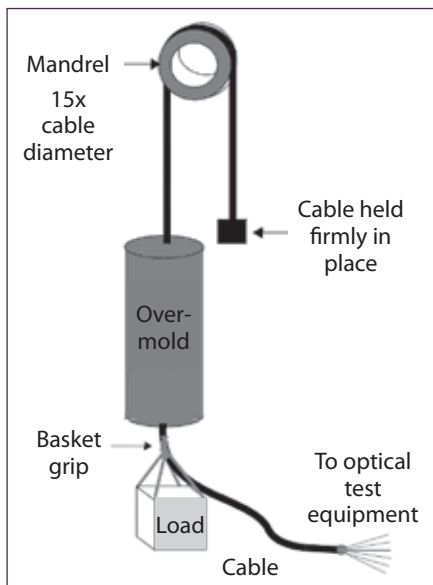
Tests were performed for 3m duct pipes with different dimensions. This simulates typical 3m distances between floors in the MDU building.

Each cable was pulled 3 times for every configuration. Figure 5 shows the pulling force for a 6x4 configuration measured for 3 duct with various inner diameters (ID) and with different filling ratios.

Results showed that the most important factor is the number of riser tap points, which will be pulled simultaneously through the duct. However, the pulling force for different fill ratios depends also on copper twisted pairs arranged inside the duct.

▼ Figure 5: Pulling force vs Duct fill ratio





▲ **Figure 6:** Sheath retention setup

The total pulling force during installation should not exceed 500N. Based on duct size, fill ratio and misalignment data, the maximum number of tap points pulled simultaneously can be calculated as:

$$\text{Max. \# of tap points} = \frac{500N - F_f \cdot MF}{PF}$$

Where, F# is number of floors, MF is misalignment force and PF is pulling force.

3 Reliability

The qualification test plan was a variation of the GR-3122 specification, modified to reflect indoor usage.

Test samples were prepared in the most common configurations; 6 x 4 – 6 tap points, each with 4f, 12 x 4 – 12 tap points, each with 4f and 12 x 8 – 12 tap points, each with 8f.

For such a set of samples the following tests were performed: thermal aging, thermal and humidity cycling, sheath retention, cable flexing, compression, assembly installation, pulling through ducts, cable pulling and straight and 90° tether pull. All tested samples passed both environmental and mechanical tests without any issues.

As an example for the extensive test programme the sheath retention test set-up is presented in Figure 6.

Test condition: The entire test was performed using typical indoor temperature cycles and an applied force of 500N (50kg). Two access jumpers were connected to the sample during the test. Optical monitoring of insertion loss was carried out both before and after the test.

All samples were put inside a walk-in chamber with two access jumpers on both ends. Samples were conditioned for 1h at each temperature and tested for 15 minutes. System measurements were taken before and after test exposure.

4 Deployment cost

Estimations of typical first-installation costs of fibre to the home networks is shown in Figure 7.

Labour typically represents half of the first installed costs of fibre to the home networks while passive components represent only 20% of the total investment.

There are two elements concerning the labour costs, namely the time to deploy,

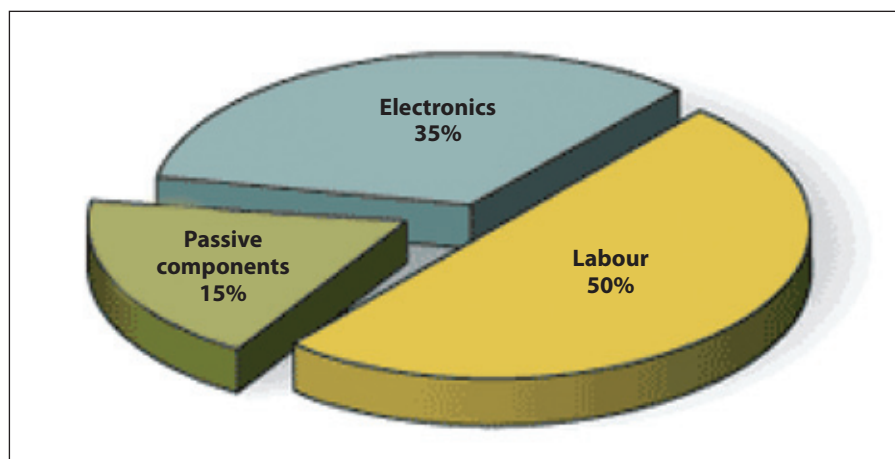
test and troubleshoot, and the hourly rate of the installer required to install the network. That hourly rate depends on the skill set and equipment required to install the components.

Major MDU architectures used for MDU deployments are shown in Figure 8:

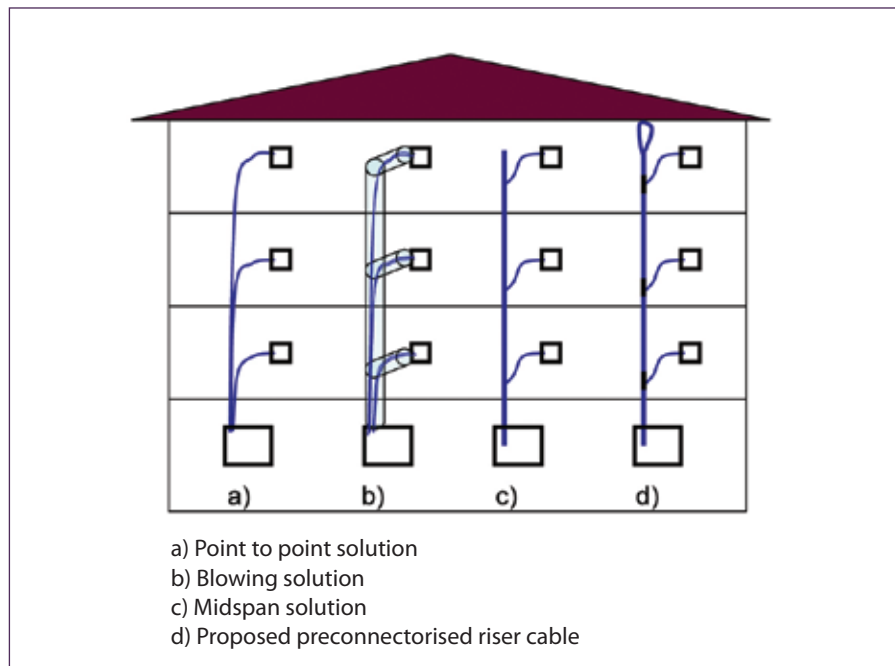
- traditional point to point solution – all fibres are individually terminated at the customer side
- blowing fibres – individual fibres/cables blown from basement to the customer
- mid-span access – cable sheath is cut and fibres are selected and extracted on each floor
- pre-connectorised riser – 100% factory tested ‘plug and play’ solution

The approach of a point-to-point as well as of fibre has been to run individual fibre cables from a single point in the

▼ **Figure 7:** Typical First Installed Cost⁽³⁾



▼ **Figure 8:** Major FTTH architectures used in MDUs





Criteria	Point to point	Blown fibre	Mid-span	Proposed riser
Survey time	medium	long	short	medium
Installation time	long	long	very long	very short
Skilled labour required	yes	yes	yes	no
Material cost	low	high	medium	high
Total-installed cost (labour+material)	medium	high	high	low
Plug N Play (safety – speed, cable damage)	no	no	no	yes

▲ **Table 1:** Comparison of major MDU deployments solutions

basement to each floor of a building, because of the need to centralise splitters or electronics.

Both these approaches result in significant labour time and a high level of craftsmanship of the skilled splice technician who covers the feeder and distribution segments of the network being needed.

Even more for mid-span solutions, where the cable sheath needs to be cut and individual fibres are selected and extracted on each floor, highly skilled installers are required and significant constraints in the deployment time appear.

Additionally, owners of MDUs are sometimes reluctant to grant approval for a service provider to install new cabling and hardware within their buildings, due to the disruptions these activities will cause for their tenants – making the speed of deployment even more important.

Table 1 shows a comparison of major MDU architectures used for MDUs in terms of system characteristics.

The proposed riser cable can be quickly and easily deployed with minimal disruption of the end customer.

Instead of traditional deployment techniques involving a separate cable for each floor or the need to perform a mid-span access at specified locations, the OptiRise™ is simply pulled through the vertical riser conduit.

The network access points then line up with the openings in the riser conduit where the riser tethers can be accessed.

The benefits of this innovative approach enable considerable advantages in the speed of deployment, while significantly decreasing the number of skilled installers needed to complete an installation successfully.

At the same time, the risk of reworks and failures is reduced due to each fibre in the riser cable being 100% factory tested before shipping to the customer and provides valuable test points during deployment and for later trouble shooting.

A pre-connectorised solution reduces health and safety risks associated with fibre cable preparation and splicing. Connecting additional MDU customers later is easier than any conventional splice solution.

In combination with bend insensitive fibre, this system combines the advantages of a 'plug & play' approach with excellent cable bend performance.

5 Conclusions

This paper describes a fully pre-fabricated fibre optic distribution cable intended to be used as a key part of Corning's Ascend™ MDU System inside MDU buildings. The proposed riser solution is generally faster, and regarding total cost

of ownership mostly cheaper vs standard splice architectures for FTTH installation in MDU buildings.

All environmental (thermal aging and thermal & humidity cycling) and mechanical tests have been successfully performed.

The simulation results show that the presented solution meets today's market requirements for both brown field and green field MDU installations and is an ideal candidate for fast and cost effective FTTH deployments. ■

6 References

- ^[1] FTTH Council Press Release 23/7/2008
- ^[2] www.corning.com
- ^[3] C Mazzali, R Whitman, B Deutsch Lightwave, January, 2005

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Weltweit größter Drahtseil-Aufwickler

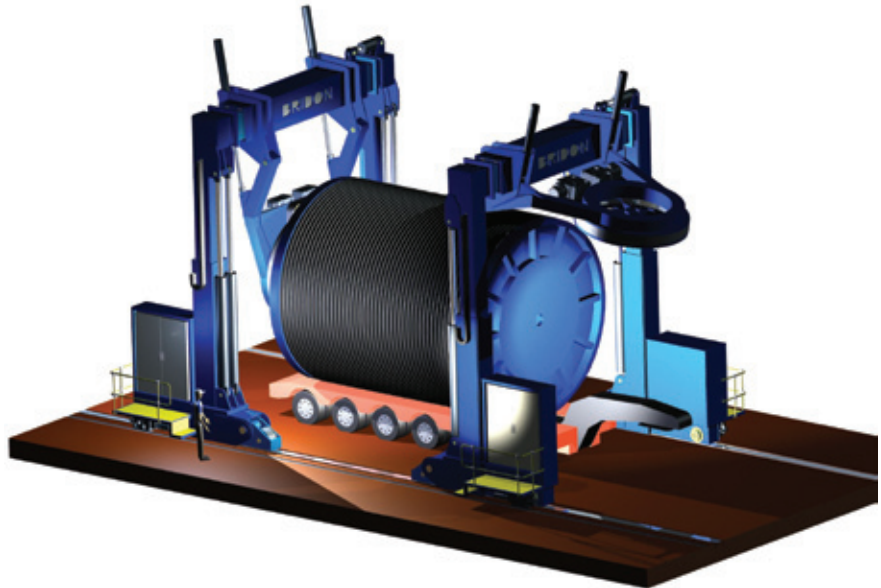
PIPE Coil Technology Ltd hat eine Bestellung von Bridon International für die Lieferung von zwei Drahtseil-Aufwicklern erhalten, von denen einer der weltweit größte seiner Art sein wird und eine Hubkraft von 650 Tonnen aufweist.

Diese Aufwickler sind Teil einer neuen Anlage für die Verseilung des Drahtseils, die nach ihrer Inbetriebnahme im Jahr 2012 einige der weltweit größten Drahtseile herstellen wird. In dem hochmodernen Werk, das Bridon im Tyneside baut, wird die Fertigung einiger der größten und kompliziertesten Drahtseile der Welt übernommen.

Die innovative Aufwicklerkonstruktion ermöglicht das Be- und Entladen voller Trommeln direkt vom Werkstattboden wie auch von einem Transportanhänger ohne den Einsatz eines Brückenkrans zu erfordern. Diese Fähigkeit, in Kombination mit dem geringen Gewicht der Konstruktion, bietet im Vergleich zu den herkömmlichen, im Drahtseilsektor verwendeten großen Abwicklern wesentliche betriebliche Vorteile und war der Hauptgrund für Bridon, PCT als Lieferant für dieses wichtige Projekt auszuwählen.

Colin Pratt von Bridon meinte dazu: "Dieser Auftrag wurde uns nach einem strengen, sechsmonatigen Ausschreibungsverfahren erteilt. Während dieser Zeit räumte PCT jeden Zweifel daran aus, dass diese einzigartige und innovative Maschinenlösung die Betriebsanforderungen von Bridon erfüllen kann."

Die Auftragserteilung bezeugt die



▲ Ein Bild des weltweit größten Drahtseil-Aufwickler mit einer Hubkraft von 650 Tonnen

technische Innovationskraft des Entwicklungsteams von PCT ebenso wie die erwiesene Fähigkeit des Unternehmens, den globalen Marktführern in den Branchen Seildraht, Unterwasser-Versorgungskabel, Stromkabel und Ablauflinien hochwertige, maßgeschneiderte, technische Lösungen zu liefern.

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Zeitersparnis mit neuen Faserföhnchen

Silver Fox, ein Hersteller innovativer, haltbarer und zeitsparender Etikettenlösungen, hat sein neues Sortiment an Etiketten "Optical Fibre Flag" auf den Markt gebracht, die für die Datenübertragung und Telekommunikation wie auch für Elektro- und Energieindustrie geeignet sind.

Eine neue Palette Föhnchen-Etiketten für Lichtwellenleiter ist nun in einer

Auswahl von vier Etikettengrößen erhältlich. Diese strapazierfähigen, langlebigen Etiketten werden als vorgeschneidene A4-Seiten geliefert und sind für den Druck auf jedem beliebigen Standard-Büro-Laserdrucker ausgelegt, wobei die Etiketten-Mustervorlagen von der Etiketten-Software Labacus Innovator des Unternehmens heruntergeladen werden können.

Nick Michaelson, Geschäftsführer,

meinte hierzu: "Wir haben eng mit unseren Kunden bei der Entwicklung dieser neuen Etikettenauswahl zusammengearbeitet und freuen uns nun, sowohl große wie kleine Etiketten in verschiedenen Konfigurationen anbieten zu können"

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Eine Gesamtlösung von Roblon

ROBLON Industry ist ein Lieferant von Gesamtlösungen für die Kabelindustrie mit Schwerpunkt auf Kabelherstellungsmaschinen und Industriegarne für Kabel.

Das Unternehmen entwickelt und produziert hochtechnologische Industriefasern, wie z. B. Glas- und Aramid-Zugentlastungselemente, Bindergarne und Reißleinen (Standard und wasserabweisend) und ist nach ISO 9001 und 14001 zertifiziert.

Es entwirft und fertigt weiterhin Außenschutz- (servers), Binde-, Abwickel- und Aufwickelausrüstungen und ist bekannt für seine hochwertigen Außenschutz- und Bindemaschinen, von denen über 400 weltweit im Einsatz sind.

Das Verbundglas von Roblon ist ein heisserschmelz-beschichtetes Glas-Zugentlastungselement, das sich ideal für die Verstärkung von Erdkabeln und Luftkabeln mit kurzen Spannweiten eignet.

Roblon stellt eine Reihe von Verbundglas-Zugentlastungselementen her und bietet spezielle Heißschmelz-Mischungen an. Ein Beispiel hierfür ist eine extrastark

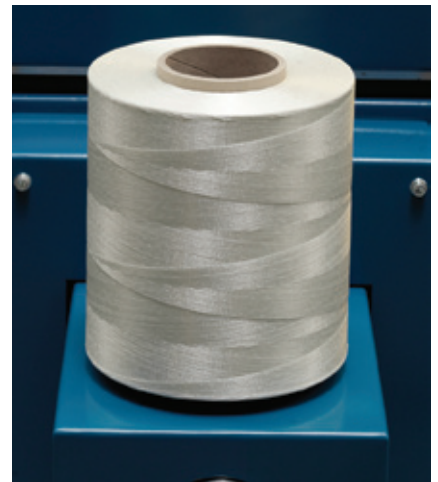
haftende Variante, die die Kraft der Zugentlastungselemente auf das Ummantelungsmaterial überträgt und somit besonders für Luftkabel mit kurzen Spannweiten prädestiniert ist.

Das Unternehmen hat auch eine Mischung entwickelt, die sich besonders für direkt erdverlegte Kabel eignet oder für Kabel, die in extremen Umgebungen verlegt werden, wie z. B. in Kanalisationssystemen.

Das Verbundglas von Roblon ist ein vollimprägniertes und extrem hartes Garn, das somit in allen Produktionsverfahren einsetzbar ist und um den Kabelmittelpunkt verseilt oder längs eingesetzt werden kann.

Die Standard-Außenschutzmaschinen von Roblon (des Typs SE-18 oder SE-24) verfügen über eine nachweisliche Erfolgsbilanz und werden weltweit in der Fertigung von Lichtwellenleiterkabeln eingesetzt. Diese Maschinen legen einem Kabel Garne an, indem das Material abgewickelt wird, wodurch ein ideales System für Garntype entsteht, wie z. B. das Verbundglas von Roblon.

Die Spannungssteuerung während



▲ *Verbundglas von Roblon*

der Produktion erfolgt einzeln über Hysteresebremsen und mit Hilfe einer hochmodernen Software. Die Außenschutzmaschinen von Roblon können leicht sowohl in bestehende wie auch in neue Fertigungsanlagen integriert werden.

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Ethem gewinnt das Preis Silver Certificate



Ethem Erdas, der Produktleiter für Draht- und Kabelanwendungen von Beta LaserMike, hat die Auszeichnung "Silver Certificate Award" von der Wire Association International (WAI) in Empfang genommen.

Die prestigeträchtige Auszeichnung wurden für den technischen Bericht von Erdas mit dem Titel "An in-process SRL predictor system for data cable manufacturing" (Ein prozessimmanentes Predictor-System für die Herstellung von Datenkabeln) verliehen. Die Auszeichnung wurde im Mai während der Handelsmesse Interwire 2011 und der 81. Jahrestagung der WAI in Atlanta vorgestellt.

Der Bericht veranschaulicht die wichtige Rolle, die ein prozessinternes System zur Rückflusdämpfungsvorhersage (SRL) bei der Datenkommunikation wie auch bei Koaxialkabel-Herstellungsverfahren spielt. Er behandelt darüber hinaus derzeit branchenweit eingesetzte, unterschiedliche Vorhersage- und Analysemethoden und stellt unter Verwendung aktueller, durch SRL Pro Predictor erfasster Felddaten, die Zeit- und Kosteneinsparungen dar, die von verschiedenen Herstellern erzielt wurden.

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◀ *Ethem Erdas nimmt seinen Preis während der Interwire 2011 in Atlanta in Empfang*



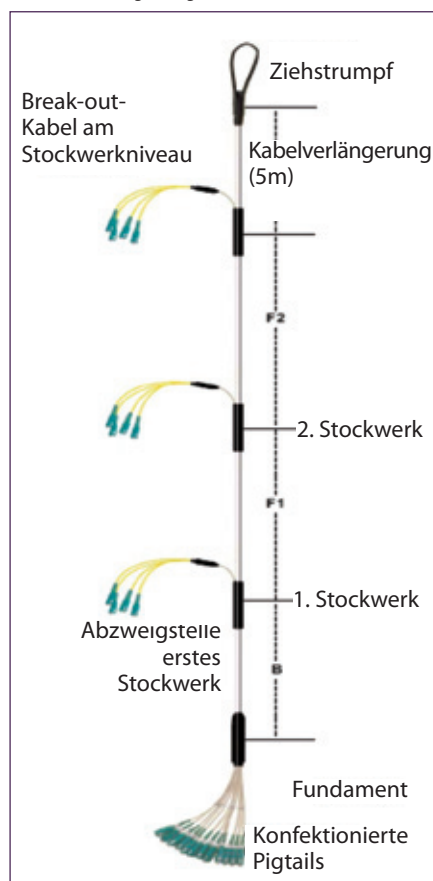
Flexible biegeunempfindliche Steigleitung für schnelle FTTH-Verlegungen

Von Grzegorz Tosik, Paweł Kołodziej und Magdalena Mirynowska, von Corning Cable Systems

Übersicht

Heutzutage spielt ein Faser bis zum Haus (Fiber to the Home - FTTH)-Netzwerk eine entscheidende Rolle bei der Entwicklung der Informationsgesellschaft. Das in den letzten Jahren beobachtete, zunehmende Interesse an FTTH-Verlegungen führte bereits zu mehreren Millionen Hausanschlüssen, aber im Vergleich ist die mit den Hausanschlüssen verbundene

▼ **Abb. 1:** Steigleitungsaufbau



Marktdurchdringung immer noch relativ gering (2,9% Wohnungen in den USA, weniger als 4% in Europa und rund 25% in Asien⁽¹⁾).

Die nächste Wachstumschance für FTTH, die eine Beschleunigung der Marktdurchdringung ermöglicht, wird durch die Verlegungen der Mehrwohneinheiten (Multi-Dwelling Units - MDU) kommen.

In typischen MDUs wird die Faser auf das Stockniveau gebracht und von mehreren Wohneinheiten geteilt. Netzwerkverlegungen in anspruchsvollen MDU-Umgebungen sind anders als in Einfamilienhäusern und erfordern eine adäquate Technologie.

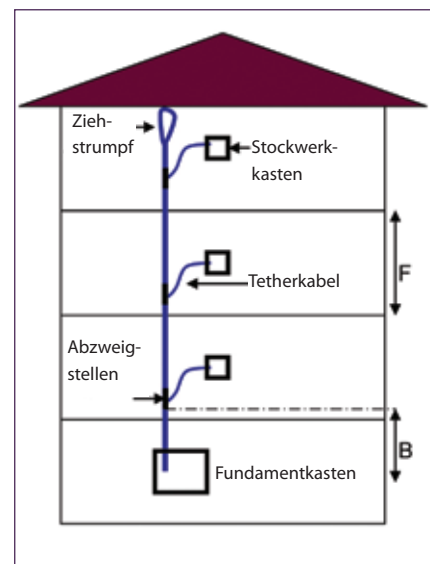
Während sich die Verlegungen immer weiter erhöhen, werden die Kunden Probleme haben, ausreichend qualifizierte Spleißtechniker zu finden, um Großinstallationen zu realisieren.

Um die heutigen Marktanforderungen zu erfüllen, entwarf Corning eine FTTH-Lösung für MDU (ASCEND™), die einen hoch entwickelten Steigleitungsaufbau namens OptiRise™ einsetzt.

Der Steigleitungsaufbau löst die wichtigsten Verlegungsprobleme und ermöglicht schnellere, einfachere und zuverlässigere MDU-Installationen.

Der LWL-Kabel besteht aus Netzwerk-Zugangspunkten, die in kundenspezifischen Positionen vorinstalliert sind und entlang der Kabellänge verteilt werden.

Das System wird im Werk hergestellt und geprüft, dann verpackt und dem Kunden für die sofortige Verlegung versandt.



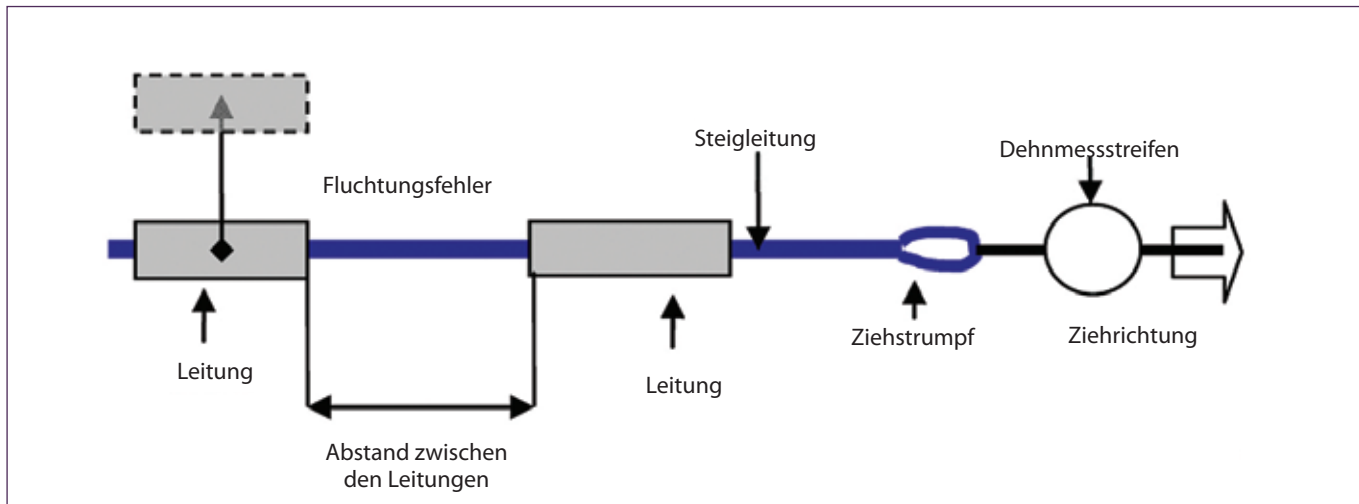
▲ **Abb. 2:** Typische MDU-Bauweise

1 Steigleitungsaufbau

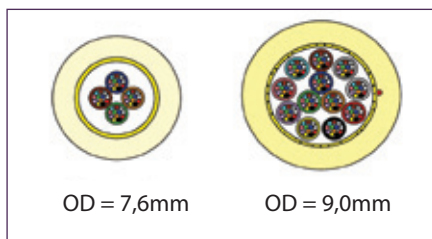
Die neueste Verbreitung von Singlemode-Fasern für FTTH-Anwendungen mit verbesserten Biegeleistungen wurde durch die zunehmende Menge an optischen Kabeln beschleunigt, die in Gebäuden mit allen damit verbundenen Biegeherausforderungen installiert wurden.

Wie bereits erwähnt, schafft die Verlegungsgeschwindigkeit eine weitere wesentliche Herausforderung in den heutigen Installationen und die Lösung vorkonfektionierter Steigleitungen wurde speziell entwickelt, um dieses Problem zu überwinden.

Während sich die Anzahl an FTTH-Verlegungen immer weiter erhöht, haben Kunden Probleme dabei ausreichend qualifizierte Spleißtechniker aufzufinden.



▲ **Abb. 4:** Prüfeinstellung



▲ **Abb. 3:** Mikromodulkabel (bis zu 144f)

Außerdem steigen die Lohnkosten für hochqualifizierte Faserhandwerker bereits. Die vorgeschlagene Lösung ermöglicht erhebliche Vorteile in der Verlegungsgeschwindigkeit und gleichzeitig eine erhebliche Reduzierung der Anzahl qualifizierter Installateure, die benötigt werden, um eine Installation erfolgreich durchzuführen. Dank einer schnelleren Verlegungszeit können die Kunden schneller Umsätze erzielen, wodurch sich ihre Kapitalrendite erhöht.

Das wichtigste Element der vorgeschlagenen Lösung ist eine vorkonfektionierte Steigleitung, die schematisch in *Abb. 1* dargestellt wird.

Diese Lösung basiert auf biegeunempfindlichen Fasern, die sich ideal für Verlegungen in anspruchsvollen MDU-Umgebungen eignen.

Der Steigleitungsaufbau bietet Einzelstecker (SC- oder LC-Typ) an der Fundamentseite, die an einer Fundament-Verteilerklemme angeschlossen werden und einzelne Breakout-Kabel aus Glasfasern je Stockniveau, die an den einzelnen Kundenwohnungen angeschlossen werden.

Alle Stecker und Breakout-Kabel auf dem Stockniveau sind werkseitig montiert und vermeiden damit den kritischen Schritt eines typischen Mid-Span-Zugangs des Kabels. Das Kabel ist bereits zu 100% im Werk geprüft, bevor es an den Verlegungsort geliefert wird, d. h. MDU.

Der Steigleitungsaufbau ist nach der genauen einzelnen MDU-Bauweise gebaut.

Nur sehr grundlegende Parameter, wie z. B. der Abstand zwischen den Stockwerken (F) und die Entfernung von der Verteilerklemme des Fundaments zum Breakout-Punkt (B) des ersten Stocks müssen vorgesehen werden, um dies zu ermöglichen (*Abb. 2*).

Basierend auf diesen Informationen können auch Installateure, die nicht mit dem Umgang von Fasern vertraut sind, das vorgeschlagene Kabel sehr schnell verlegen. Die Länge des Fundamentendteils ist vorab auf 120cm für den einfachen Anschluss in der Fundament-Verteilerklemme bestimmt.

Die Länge der einzelnen Breakout-Tetherkabel am Stockniveau hängt von der bestimmten Stockhöhe (F) ab und kann bis F-15cm für die Höchstlänge erreichen.

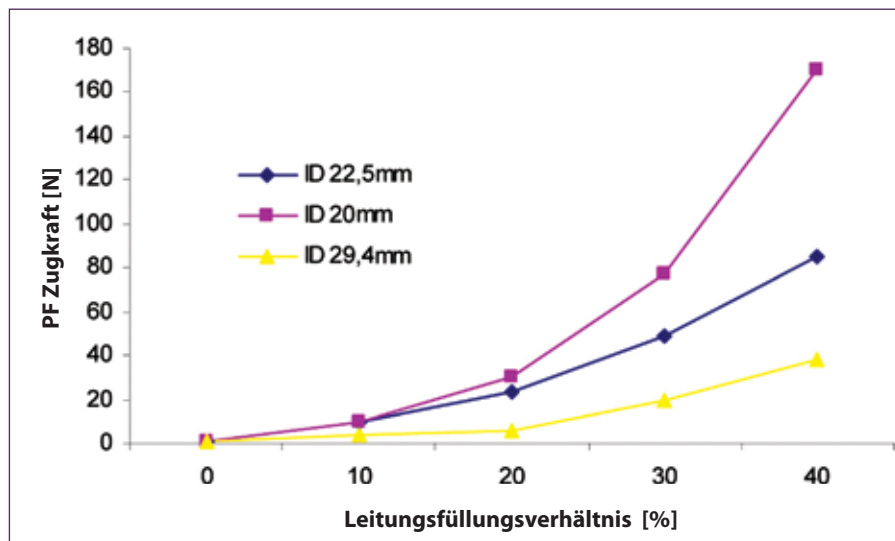
Um den Kabeldurchmesser während der Installation zu minimieren, sind die Stecker je Stockniveau entlang dem Hauptkabel während des Installationsverfahrens versetzt angeordnet. Der Kabelaufbau ist mit einem Ziehstrumpf für eine leichte Installation ausgestattet.

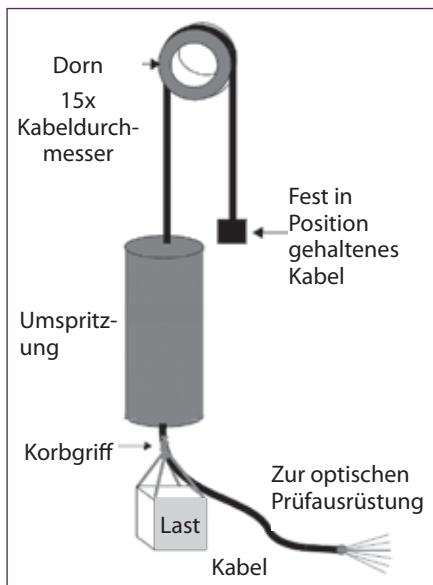
Der Verlängerungsabstand von der letzten Abzweigstelle zum Ziehstrumpf ist auf 5m vordefiniert. Verschiedene Steckertypen wie z. B. SC- oder LC-Stecker können für die komplette Montage ausgewählt werden.

Um vertikale Kabel effizient und unauffällig im Gebäudeinnere zu leiten, zielen die Entwurfsbemühungen von Corning für dieses Produkt auf einen geringeren Durchmesser und flexiblere Einheiten, die zu FRNC-Mikromodulkabeln führen, wie in *Abb. 3* dargestellt.

Ein weiterer Vorteil dieses Kabels ist die extrem kleine Biegung, die dank der Faser

▼ **Abb. 5:** Verhältnis zwischen Zugkraft und Leitungsfüllung





▲ **Abb. 6:** Einstellung der Beibehaltung der Ummantelung

namens ClearCurve^{®[2]} ermöglicht wird, was wiederum eine unauffällige Lagerung der Faser im Gebäude ermöglicht, sowohl für das Tetherkabel wie für überschüssige Pigtail-Längen.

Die Flexibilität und die geringen Außenabmessungen des Steigleitungsaufbaus sichern eine sehr leichte Installation des Kabels sowie das Ablegen durch die Wand oder auf den verschiedenen Gebäudeebenen.

2 Installationsbedingungen

Eines der besonders kritischen Themen im Zusammenhang mit der Kabelinstallation ist das Ziehen durch die bereits in MDUs (Abb. 2) installierte vertikale Leitung.

Die nachfolgenden beschriebenen Tests wurden durchgeführt, um Installationsbedingungen zu simulieren und die Installationsgrenzen der Kabel in Bezug auf Leitungseingänge zu definieren. Das Installationsverfahren wurde für mehrere Leitungsdurchmesser und Formen simuliert, sowohl mit wie auch ohne bereits installierte Kupferkabel.

Zusätzlich wurden der in Abb. 4 dargestellte Fluchtungsfehler und Spaltmaß zwischen den Leitungen berücksichtigt.

Die Tests wurden für 3m Rohrleitungen mit unterschiedlichen Abmessungen durchgeführt. Dies simuliert typische 3m-Abstände zwischen den Stockwerken im MDU-Gebäude. Jedes Kabel wurde 3 Mal je Konfiguration gezogen. Abb. 5 zeigt die Zugkraft für eine 6x4-Konfiguration, für 3 Leitungen mit

verschiedenen Innendurchmessern (ID) und mit unterschiedlichen Füllungsgraden gemessen.

Aus den Ergebnissen ergibt sich, dass der wichtigste Faktor die Anzahl der Steigleitung-Abzweigstellen ist, die gleichzeitig durch die Leitung gezogen werden.

Allerdings hängt die Zugkraft für verschiedene Füllungsgrade auch von Twisted-Pair-Kabeln aus Kupfer ab, die in der Leitung angeordnet sind. Die gesamte Zugkraft während der Installation sollte 500N nicht überschreiten. Basierend auf die Daten vom Leitungsgröße, Füllungsgrad und Fluchtungsfehler, kann die maximale Anzahl an gleichzeitig gezogenen Abzweigstellen wie nachfolgend berechnet werden:

$$\text{Max \# der Abzweigstellen} = \frac{500N - F_s \cdot MF}{PF} \quad (1)$$

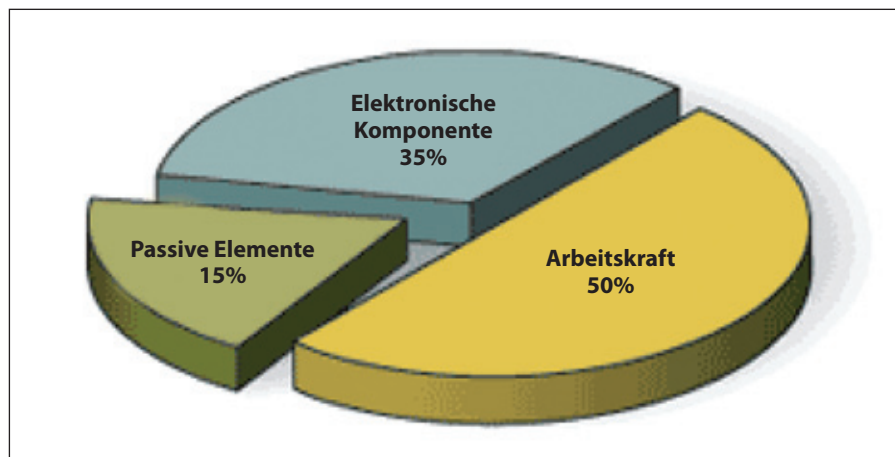
die Kraft des Fluchtungsfehlers ist und PF die Zugkraft ist.

3 Zuverlässigkeit

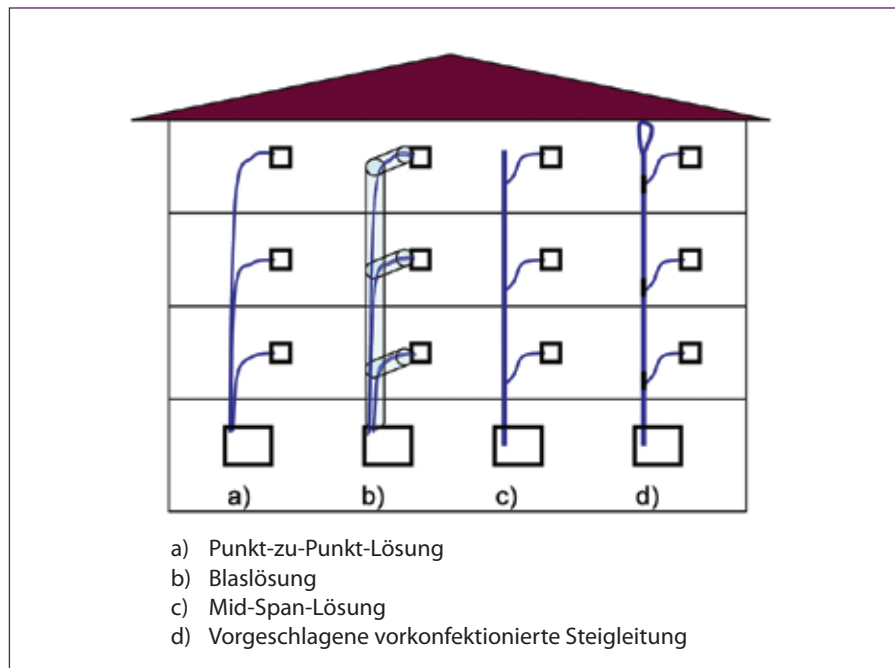
Der Qualifikationsprüfplan war eine Variante der GR-3122-Spezifikation, geändert um den Innengebrauch widerzuspiegeln. Prüfproben wurden in den gängigsten Konfigurationen vorbereitet, 6 x 4 - 6 Abzweigstellen je mit 4f, 12 x 4 - 12 Abzweigstellen, je mit 4f und 12 x 8 - Abzweigstellen, je mit 8f.

Für einen solchen Probensatz wurden nachfolgende Tests durchgeführt: thermische Alterung, zyklische Veränderung der Temperatur und der Feuchtigkeit, Beibehaltung der Ummantelung, Kabelbiegen, Stauchung, Installation, durch die Leitung Ziehen, Tetherkabelziehen sowie gerade und

▼ **Abb. 7:** Typische Kosten der Erstinstallation^[3]



▼ **Abb. 8:** Wichtigsten bei MDUs verwendete FTTH-Bauweisen



Kriterium	Punkt-zu-Punkt	Blasfaser	Mid-span	Vorgeschlagene Steigleitung
Überprüfungszeit	durchschnittlich	lang	kurz	durchschnittlich
Installationszeit	lang	lang	sehr lang	sehr kurz
Qualifizierte erforderliche Arbeitskräfte	ja	ja	ja	nein
Materialkosten	niedrig	hoch	durchschnittlich	hoch
Gesamte Installationskosten (Arbeitskraft + Material)	durchschnittlich	hoch	hoch	niedrig
Plug and Play (Sicherheit – Geschwindigkeit, Kabelschaden)	nein	nein	nein	ja

▲ **Tabelle 1:** Vergleich zwischen den wichtigsten MDU-Verlegungslösungen

90°-Kabel Ziehen. Alle geprüften Proben haben sowohl umweltbedingte als auch mechanische Tests problemlos bestanden.

Als Beispiel für das umfangreiche Testprogramm wird der Prüfaufbau bezogen auf die Beibehaltung der Ummantelung in *Abb. 6* dargestellt.

Prüfbedingung: Der gesamte Test wurde unter Verwendung typischer Innentemperatur-Zyklen und einer angelegten Kraft von 500N (50kg) durchgeführt.

Zwei Zugangs-Überbrückungskabel wurden während der Prüfung an die Probe angeschlossen.

Die optische Überwachung der Einfügedämpfung wurde sowohl vor als auch nach dem Test durchgeführt. Alle Proben wurden in eine begehbare Kammer mit zwei Zugangs-Überbrückungskabeln an beiden Enden gelegt. Die Proben wurden 1 Stunde lang je Temperatur konditioniert und 15 Minuten lang getestet. Systemmessungen wurden vor und nach der Testdurchführung vorgenommen.

4 Verlegungskosten

Die Einschätzungen der typischen Kosten für die Erstinstantionen für Fiber-to-the-Home Netzwerke ist in *Abb. 7* dargestellt. Die Arbeitskraft stellt in der Regel die Hälfte der Kosten für die Erstinstantion für Fiber-to-the-Home

Netzwerke dar, während passive Komponente nur 20% der gesamten Investitionskosten darstellen. Es gibt zwei Elemente, die sich auf die Lohnkosten beziehen, nämlich die Zeit für die Verlegung, jene fürs Prüfen und für die Störungssuche sowie der Stundensatz des Installateurs, der bei der Installation des Netzwerks erforderlich ist.

Der Stundensatz hängt vom Fachwissen und den Ausrüstungen ab, die bei der Installation der Komponenten erforderlich sind.

Die wichtigsten für die MDU-Verlegung verwendeten MDU-Bauweisen sind in *Abb. 8* dargestellt:

- a) traditionelle Punkt-zu-Punkt-Lösung - alle Fasern werden individuell zum Kunden gebracht und dort vervollständigt
- b) Blasfaser - einzelne Fasern/Kabel die vom Fundament bis zum Kunden geblasen werden
- c) Mid-Span-Zugang - der Kabelmantel wird geschnitten und die Fasern werden ausgewählt und je Stock herausgezogen
- d) vorkonfektionierte Steigleitung - 100%ige im Werk geprüfte „Plug and Play“-Lösung

Die Einstellung der Punkt-zu-Punkt-Lösungen sowie der Blasfaser besteht darin, die einzelnen Kabel von einem einzigen Punkt ins Fundament zu jedem Stock eines Gebäudes laufen zu lassen, wegen der Anforderung, die Verteiler oder die elektronischen Komponente zu zentralisieren.

Beide diese Einstellungen sind sehr zeitaufwändig und fordern ein hohes Maß an handwerklichem Können der qualifizierten Spleißtechniker, die die erforderlichen Versorger- und Verteilungssegmente des Netzwerks abdecken.

Das gilt um so mehr für die Mid-Span-Lösungen, bei denen der Kabelmantel geschnitten werden muss und einzelne Fasern ausgewählt und je Stock herausgezogen werden müssen, und daher hochqualifizierte Installateure benötigt werden und sich erhebliche Einschränkungen in der Verlegungszeit zeigen.

Darüber hinaus haben MDUs-Besitzer manchmal eine skeptische Einstellung gegenüber den Zulassungen für Dienstprovider, denn sie befürchten, daß durch die Installation neuer Verkabelungen und Hardware bei den Mietern Unterbrechungen verursacht werden - wodurch die Verlegungsgeschwindigkeit noch wichtiger wird.

Tabelle 1 zeigt einen Vergleich der wichtigsten MDU-Bauweisen, die für MDUs in Bezug auf Systemeigenschaften verwendet werden.

Das vorgeschlagene Steigleitungskabel kann schnell und leicht mit geringen Unterbrechungen beim Endkunden verlegt werden. Anstelle der traditionellen Verlegungstechnik, bei der ein separates Kabel je Stock vorgesehen wird oder die Notwendigkeit, ein Mid-Span-Zugang



an bestimmten Orten durchführen, wird OptiRise™ einfach durch die vertikale Steigleitung gezogen.

Die Netzwerk-Zugangspunkte sind dann auf die Öffnungen in der Steigleitung ausgerichtet, wo der Zugang zu den Steigleitungs-Tetherkabeln ermöglicht wird.

Die Vorteile dieser innovativen Einstellung ermöglicht erhebliche Vorteile in der Verlegungsgeschwindigkeit, während sich die Anzahl qualifizierter Installateure erheblich reduziert, die benötigt werden, um eine Installation erfolgreich zu vervollständigen.

Gleichzeitig wird das Risiko von Nacharbeiten und Störungen verringert, da jede Faser im Steigleitungskabel zu 100 Prozent im Werk vor der Auslieferung an den Kunden getestet wird und wertvolle Testpunkte während der Verlegung und für die spätere Störungssuche bietet. Eine vorkonfektionierte Lösung reduziert die mit der Glasfaserkabelvorbereitung und -spleißung verbundenen Gesundheits- und Sicherheitsrisiken.

Das spätere Anschließen zusätzlicher MDU-Kunden ist einfacher als bei anderen herkömmlichen Spleiß-Lösungen. In Kombination mit biegeunempfindlichen Fasern, vereinigt dieses System die Vorteile eines „Plug and Play“-Konzepts mit hervorragender Leistung bei der Kabelbiegung.

5 Schlußfolgerungen

Dieser Beitrag beschreibt ein vollständig vorgefertigtes Glasfaser-Verteilerkabel, von dem man als Schlüsselement des Ascend™ MDU-Systems von Corning in MDU-Gebäuden Gebrauch machen soll.

Die vorgeschlagene Steigleitungslösung ist im allgemeinen schneller, und in Bezug auf die Gesamtbetriebskosten meistens billiger gegenüber Standard Spleiß-Bauweisen für FTTH-Installation in MDU-Gebäuden.

Alle Umwelttests (thermische Alterung sowie zyklische Veränderung der Temperatur und der Feuchtigkeit) und mechanische Prüfungen wurden erfolgreich durchgeführt.

Die Simulationsergebnisse zeigen, dass die vorgestellte Lösung den heutigen Marktanforderungen - sowohl für Brownfield- als auch für Greenfield-MDU-Installationen (d. h. bereits vorhandene Installationen oder komplett neue Installationen) - entspricht und ein idealer Kandidat für schnelle und kostengünstige FTTH-Verlegungen ist. ■

6 Literatur

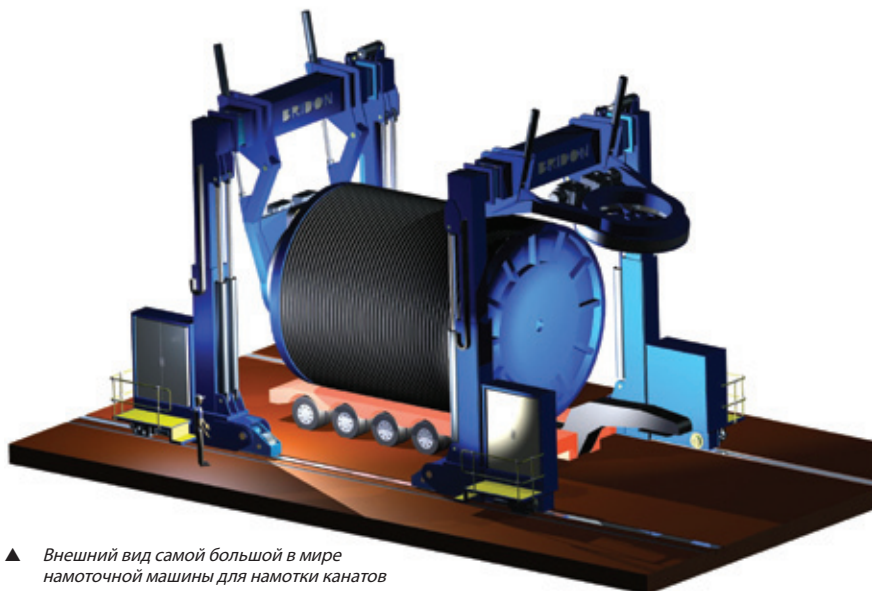
^[1] FTTH Council Press Release 23/7/2008

^[2] www.corning.com

^[3] C Mazzali R Whitman B Deutsch Lightwave Januar, 2005

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Самая большая в мире машина для намотки стальных канатов



▲ Внешний вид самой большой в мире намоточной машины для намотки канатов грузоподъемностью 650 тонн

Компания «Пайп койл технолоджи лтд» (Pipe Coil Technology Ltd) получила от «Брайдон интернэшнл» (Bridon International) контракт на поставку двух намоточных машин для намотки стальных канатов, одна из которых будет иметь грузоподъемность 650 тонн и станет самой мощной из машин подобного типа в мире.

Машины будут смонтированы на линии окончательной обработки стальных канатов, на которой после ее пуска в эксплуатацию в 2012 году будут производиться одни из самых больших стальных канатов в мире. Современное предприятие, которое компания «Брайдон» строит в Тайнсаиде, будет выпускать одни из самых больших в

мире канатов, конструкция которых будет также одной из самых сложных. Инновационная конструкция машин позволяет производить полную загрузку и разгрузку барабанов либо непосредственно в производственном цеху, либо с использованием транспортного трейлера, обходясь без мостового крана. В сочетании с облегченной конструкцией такая возможность дает существенные эксплуатационные преимущества по сравнению с крупногабаритными намоточными машинами традиционного типа, которые используются в канатном производстве, и послужила основной причиной, обусловившей выбор «Пайп койл технолоджи» компанией

«Брайдон» в качестве поставщика для этого крупнейшего проекта.

Выдача этого заказа является свидетельством инновационного технического потенциала коллектива конструкторов «Пайп койл технолоджи» и признания возможностей компании по поставке высококачественных специализированных инженерных решений для ведущих мировых производителей, выпускающих такую продукцию, как канаты, подводные шлангокабели, силовые кабели и коллекторы. «Пайпкойлтехнолоджи лтд» – это частная компания, расположенная в Ньюкасле (Великобритания) и имеющая дочерние предприятия в США и Китае. Компания разрабатывает и поставляет оборудование для намотки и упаковки гибких изделий, таких как пластмассовые трубы, подводные шлангокабели и силовые кабели, коллекторы и стальные канаты.

Компания «Брайдон интернэшнл», головной офис которой находится в Донкастере (Великобритания), владеет девятью производственными предприятиями в разных странах мира, чьи технические и коммерческие отделы ориентируются на рыночные потребности и опираются в своей деятельности на глобальную сеть торговых агентов и дистрибьюторов.

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Экономьте время с новыми этикетками-флажками для оптического кабеля!

Компания «Силвер фокс» (Silver Fox), поставляющая инновационные решения для надежной и времясберегающей маркировки продукции, начала выпуск новой серии этикеток Optical Fibre Flag, пригодных для использования в отраслях, связанных с передачей данных и телекоммуникациями, а также в электротехнической

промышленности и энергетике. Этикетки-флажки для волоконно-оптических кабелей новой серии теперь предлагаются четырех размеров на выбор. Эти прочные и долговечные этикетки поставляются на предварительно раскроенных листах формата А4, предназначенных для печати на любом стандартном офисном лазерном принтере

по шаблонам этикеток, которые доступны для скачивания вместе с нашим программным обеспечением для маркировки Labacus Innovator.

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Комплексное решение от компании «Роблон»

«Роблон Индастри» (Roblon Industry) является поставщиком комплексных решений для кабельной промышленности, специализирующимся на выпуске оборудования для кабельной промышленности и производстве технических комплексных нитей для кабельной продукции.

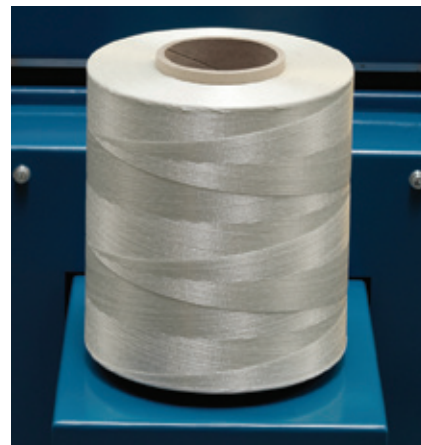
Компания разрабатывает и производит высокотехнологичное волокно промышленного назначения, например, силовые элементы из стеклянных и арамидных нитей, обвязочные нити и вытяжные шнуры (со стандартными и водоблокирующими свойствами), и имеет сертификаты соответствия требованиям стандартов ИСО 9001 и ИСО 14001.

Компания также занимается разработкой и производством обвязочного, обмоточного, приемного и смоточного оборудования и известна своими высококачественными обвязочными и обмоточными станками – двух типов оборудования, более 400 единиц каждого из которых находятся в эксплуатации в различных странах мира. Композитное стекловолокно компании «Роблон» представляет собой силовой элемент из стеклянной нити с покрытием, нанесенным из расплава, и является наиболее подходящим материалом для армирования подземных кабелей и подвесных кабелей на линиях с небольшими пролетами.

«Роблон» производит широкий ассортимент силовых элементов из композитного стекловолокна и предлагает специальные рецептуры расплавов. Одним из примеров является состав со сверхвысокой адгезивной способностью, который передает усилие силовых элементов на материал кабельной оболочки, что делает эту рецептуру идеальным решением для подвесных кабелей на линиях с небольшими пролетами.

Компания также разработала рецептуру, которая особенно подходит для кабелей, укладываемых непосредственно в грунт, или кабелей для прокладки в экстремальных условиях, например, в канализационных сетях. Композитное стекловолокно компании «Роблон» представляет собой полностью пропитанную пряжу, обладающую исключительно высокой прочностью, что позволяет использовать его в любом производственном процессе, с возможностью навивки вокруг сердечника кабеля или наложения в продольном направлении.

Выпускаемые компанией «Роблон» стандартные машины для наложения упрочняющих нитей SE-18 и SE-24 хорошо зарекомендовали себя и используются производителями волоконно-оптических кабелей по всему миру. Эти станки накладывают нить на кабель, сматывая ее с бобин, за счет чего они прекрасно подходят



▲ Композитное стекловолокно компании «Роблон»

для работы с такими типами нитей, как композитное стекловолокно «Роблон».

В процессе производства натяжение каждой нити регулируется с помощью гистерезисных тормозных устройств и новейшего программного обеспечения. Машины для наложения упрочняющих нитей производства компании «Роблон» легко агрегируются как с существующими, так и с новыми производственными линиями.

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Этхем Эрдаш получает серебро



▲ Этхем Эрдаш на церемонии вручения ему награды на выставке Interwire 2011 в Атланте

Этхем Эрдаш (Ethem Erdas), менеджер по проволочно-кабельной продукции компании «Бета лазермайк» (Beta LaserMike), получил премию «Серебряный сертификат» от Международной ассоциации производителей проволоки и кабельной продукции (WAI). Престижная награда была присуждена Эрдашу за техническую статью «Система активного прогнозирования СВП для производства кабелей передачи данных» (An in-process SRL predictor system for data cable manufacturing). Вручение награды состоялось в мае месяце на выставке-ярмарке Interwire 2011 в рамках работы 81-го ежегодного съезда WAI в Атланте.

В статье продемонстрирована та важная роль, которую система активного прогнозирования структурных возвратных потерь (СВП) играет в процессе производства кабелей для передачи данных и коаксиальных кабелей. Статья рассматривает различные методы прогнозирования и анализа, которые в настоящее время используются в промышленности, и с помощью реальных эксплуатационных данных, зафиксированных программой прогнозирования SRL Pro, демонстрирует показатели экономии времени и средств, которых добились различные производители.

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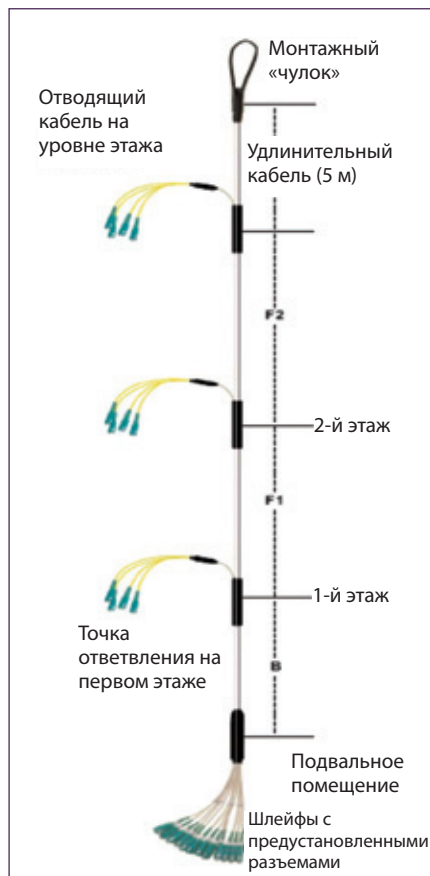
Гибкий, нечувствительный к изгибам кабель вертикальной прокладки для быстрого развертывания сетей FTTH

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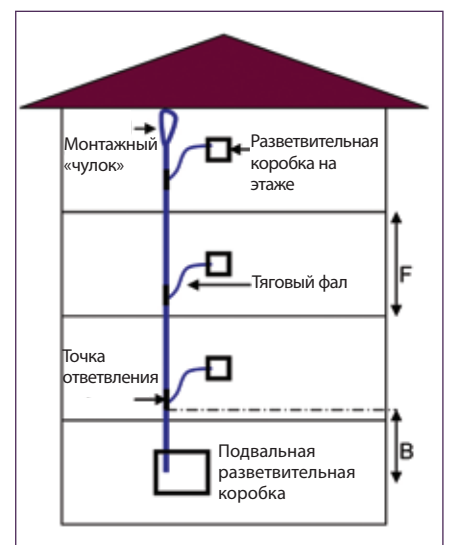
Аннотация

В настоящее время сети, построенные по технологии «оптоволокно до дома» (FTTH), играют ключевую роль в развитии

▼ **Рис. 1.** Кабельная сборка для вертикальной прокладки



информационного сообщества. Благодаря растущей популярности сетей FTTH, которая отмечается в последние годы, ими уже охвачены миллионы домов. Тем не менее, по сравнению с общим количеством подключенных домов доля проникновения этих сетей на рынок услуг связи по-прежнему относительно мала (2,9 % жилых домов в США, менее 4 % в Европе и приблизительно 25 % в Азии ⁽¹⁾). Другую возможность роста использования технологии FTTH, которая позволяет ускорить темпы ее внедрения на рынок, дает организация сетей в многоквартирных домах (МКД). В типовых МКД оптоволокно подводится до уровня этажа и совместно используется несколькими жилыми секциями. Развертывание сетей в сложных условиях многоквартирного дома производится не так, как в доме на одну семью, и требует использования соответствующей технологии. Кроме того, с увеличением количества развертываемых сетей заказчиком все сложнее будет найти достаточное число квалифицированных техников-монтажников для подключения в массовом порядке. В целях удовлетворения потребностей сегодняшнего рынка компания «Корнинг» разработала технологию развертывания сетей FTTH в МКД (ASCEND™), в которой используется усовершенствованная кабельная сборка для вертикальной прокладки OptiRise™. Кабельная сборка для вертикальной прокладки позволяет решить основные проблемы развертывания и обеспечивает более высокую оперативность, простоту и надежность монтажных работ в МКД. Волоконно-оптический кабель состоит из

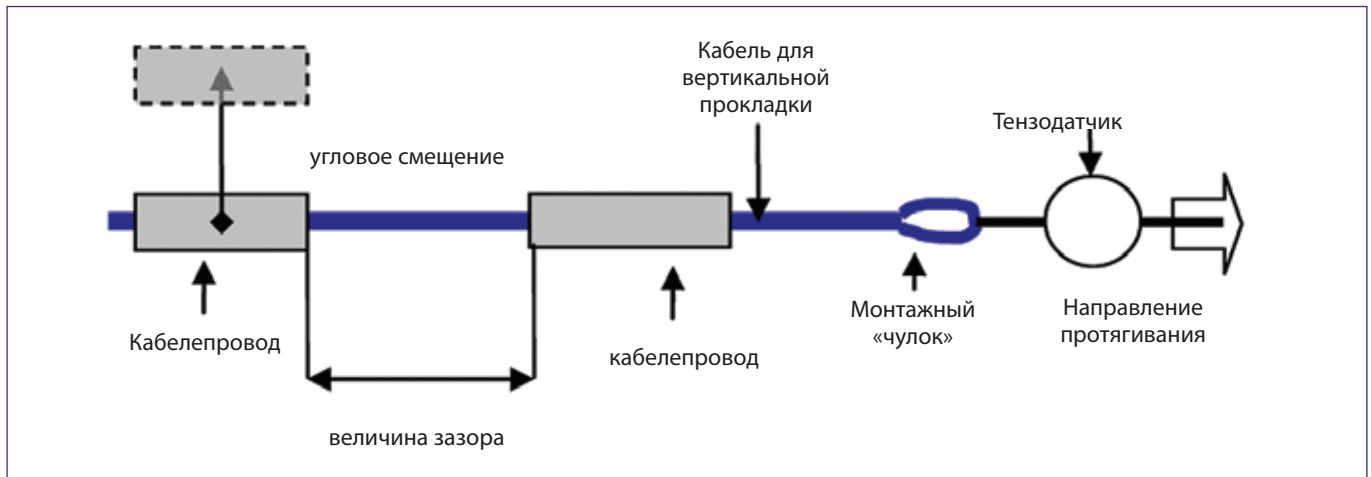


▲ **Рис. 2.** Типовой МКД

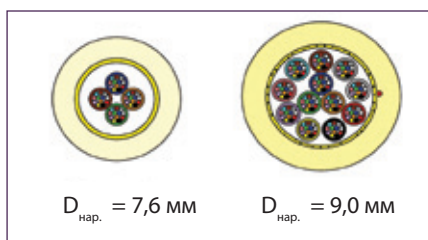
нескольких точек доступа к сети, которые предварительно устанавливаются на указанных заказчиком участках, распределенных вдоль кабельной трассы. Система изготавливается и испытывается в заводских условиях, а затем упаковывается и отгружается в адрес заказчика для немедленного развертывания.

1. Кабельная сборка для вертикальной прокладки

Недавнее появление одномодового волокна для сетей FTTH с повышенной



▲ Рис. 4. Испытательный стенд



▲ Рис. 3. Кабель с микромодульной структурой (до 144 волокон)

прочностью на изгиб стало результатом увеличения количества волоконно-оптических кабелей, прокладываемых внутри зданий в сложных условиях, обусловленных наличием монтажных изгибов. Как упоминалось ранее, скорость развертывания сегодня представляет собой еще одну серьезную проблему при прокладывании сети, и технология использования кабельной сборки с предустановленными разъемами специально предназначена для ее решения.

С увеличением масштабов развертывания сетей FTTH заказчик будет сложно найти достаточное число квалифицированных техников-монтажников. Кроме того, в настоящее время уже наблюдается рост ставок заработной платы высококвалифицированных специалистов по оптоволокну. Предлагаемое решение дает значительные преимущества в скорости развертывания, при этом существенно снижая число квалифицированных специалистов, необходимых для успешного выполнения монтажных работ. Сокращение времени развертывания сетей позволит заказчикам получить доход в более короткие сроки, ускорив тем самым окупаемость их инвестиций.

Основным элементом предлагаемого решения является кабель для вертикальной прокладки с предустановленными разъемами, который схематически представлен

на рис. 1. В основе этого решения – нечувствительное к изгибам волокно, благодаря чему кабель идеально подходит для прокладки в сложных условиях МКД.

Кабельная сборка для вертикальной прокладки обеспечивает подключение одинарных разъемов (типа SC или LC) со стороны цокольного этажа к разветвительной клеммной коробке в подвальном помещении, а также подвод отдельных отводящих концов оптоволоконного кабеля до уровня каждого этажа с последующим подключением к квартирам индивидуальных пользователей.

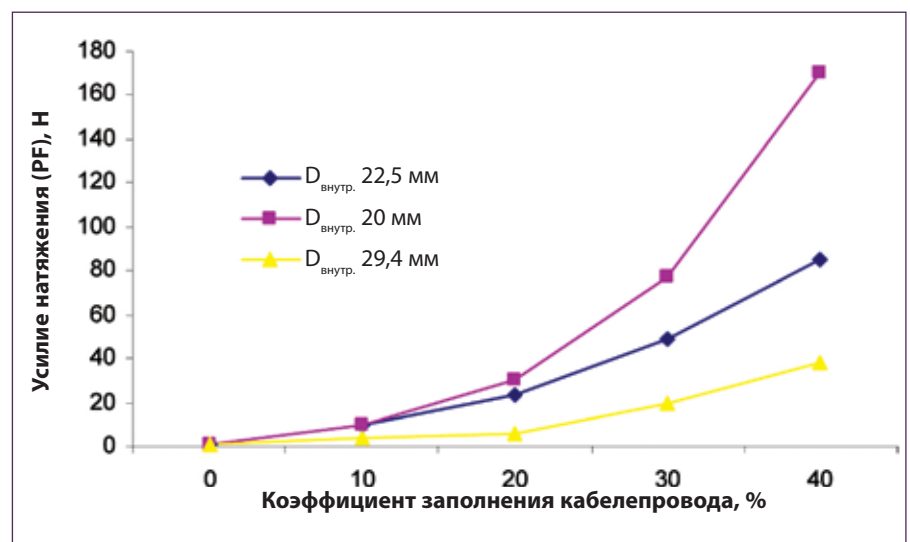
Все разъемы и отводы, подключаемые на этажах, выполнены на заводе-изготовителе, и таким образом устраняется необходимость в стандартном проведении такой ответственной операции, как обеспечение доступа в середине

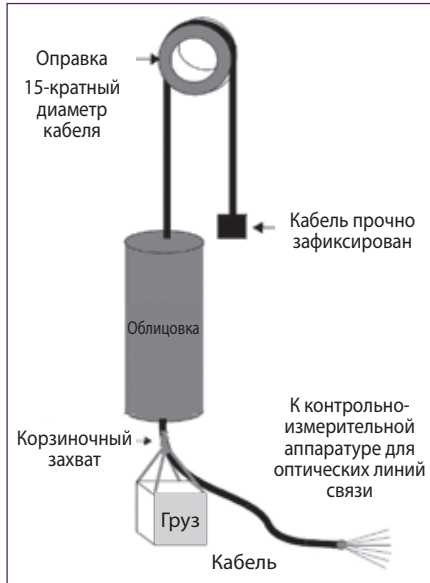
кабельного пролета. Перед поставкой на место прокладки, т. е. в МКД, кабель проходит 100-% контроль качества на предприятии-изготовителе. Монтаж кабельной сборки для вертикальной прокладки осуществляется в строгом соответствии с архитектурным планом каждого МКД.

Для этой цели необходимы лишь самые основные параметры, такие как расстояние между этажами (F) и расстояние от подвальной разветвительной клеммной коробки до точки отвода на первом этаже (B) (рис. 2.).

На основании этой информации даже монтажники, не имеющие опыта работы с оптоволоком, могут проложить кабель в очень короткие сроки. Для свободного конца кабеля в подвальном помещении устанавливается длина в 120 см, чтобы обеспечить простое подключение к подвальной разветвительной клеммной

▼ Рис. 5. График зависимости усилия натяжения от коэффициента заполнения кабелепровода





▲ **Рис. 6.** Испытательный стенд для определения механической прочности оболочки

коробке. Длина отдельных тяговых фалов для отводящих кабелей на этажах зависит от высоты конкретного этажа (F), при этом максимальная длина заранее определена как (F-15) см. Для того чтобы при прокладке использовать кабели меньшего диаметра, разъемы на уровне каждого этажа в процессе установки размещаются в шахматном порядке вдоль магистрального кабеля. Для упрощения монтажа кабельная сборка поставляется в комплекте с монтажным «чулком». Длина вылета от крайней точки ответвления до монтажного «чулка» определяется заранее и составляет 5 м. Для полностью смонтированного узла выбираются разъемы различных типов, например, SC или LC.

Для обеспечения эффективной и беспрепятственной вертикальной прокладки кабельных линий внутри зданий разработчики предлагаемого решения из компании «Корнинг» сосредоточили усилия на уменьшении диаметра и увеличении гибкости кабельных узлов. Результатом работы стало появление не поддерживающих горения, коррозионно-стойких (FRNC) кабелей с микромодульной структурой, которые представлены на рис. 3.

Дополнительным преимуществом этих кабелей является исключительно малый радиус изгиба, обеспечиваемый за счет использования оптоволоконка типа ClearCurve® [2], что позволяет иметь небольшой запас кабеля в здании под использование для тяговых фалов или для выбора под шлейфы. Гибкость и малые наружные размеры кабельной сборки для вертикальной прокладки обеспечивают максимальную простоту монтажных работ и проводки через стены или на разных уровнях здания.

2. Условия монтажа

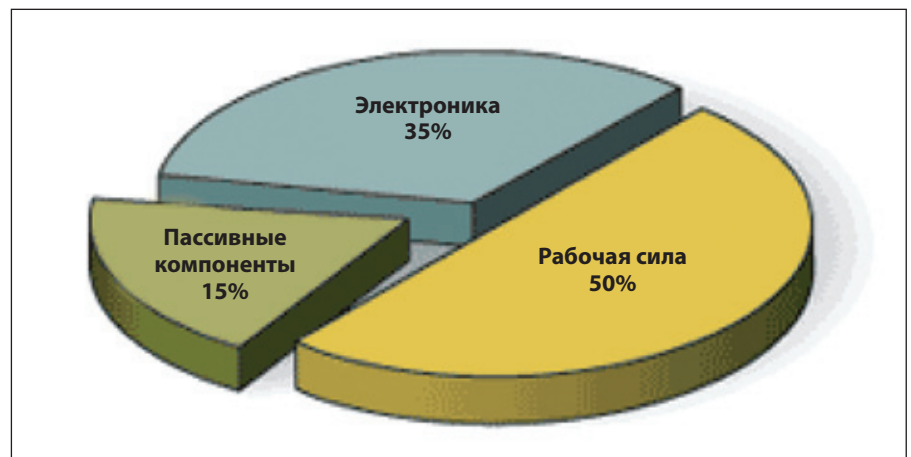
Одной из наиболее острых проблем, связанных с прокладкой кабеля, является его протягивание через вертикальный кабелепровод, уже установленный в МКД (рис. 2). Для моделирования условий монтажа и определения ограничений при монтаже кабеля по заполнению кабелепроводов был проведен ряд испытаний. Моделирование процедуры монтажа проводилось для кабелепроводов нескольких диаметров и конфигураций, как с уже проложенными медными кабелями, так и без них. Кроме того, были изучены значения углового смещения кабелепроводов и величина зазора между ними (см. рис. 4).

Испытания проводились на кабелепроводах длиной 3 м и различного

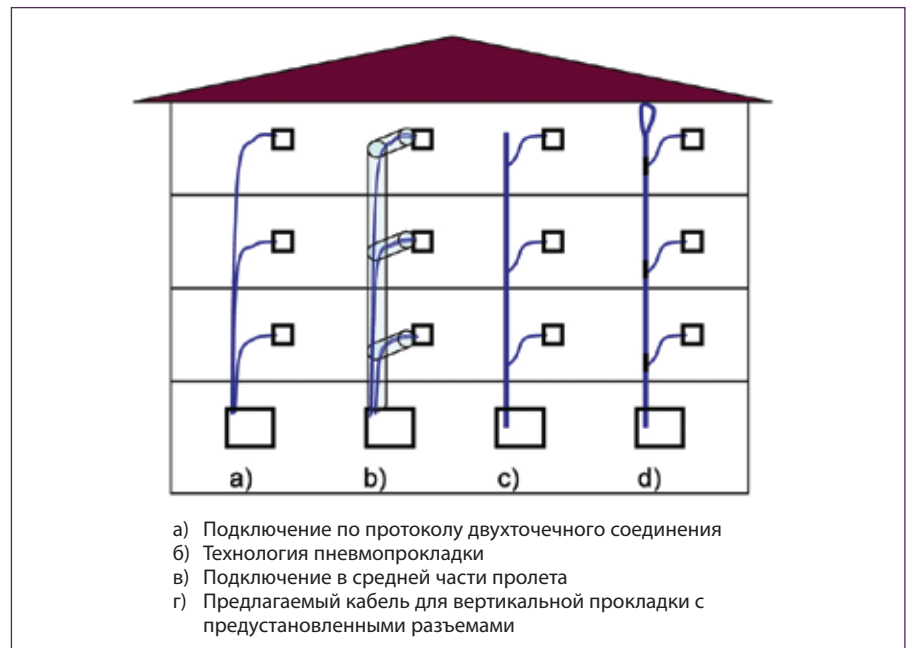
сечения. Такая схема моделирует стандартное расстояние в 3 м между перекрытиями в многоквартирном доме. Для каждой конфигурации каждый кабель протягивался трижды. На рис. 5 представлены значения усилия натяжения для конфигурации 6x4, которые были измерены для 3-метрового кабелепровода с различным внутренним диаметром ($D_{\text{внутр.}}$) и разными коэффициентами заполнения.

Результаты показали, что наиболее важным фактором является количество точек ответвления в кабеле для вертикальной прокладки, которые будут одновременно пропускаться через кабелепровод. Однако величина усилия натяжения для разных значений коэффициента заполнения также зависит от количества медных витых пар, уложенных в кабелепроводе. Общее усилие натяжения при монтаже

▼ **Рис. 7.** Типовые первоначальные затраты на развертывание сетей^[3]



▼ **Рис. 8.** Основные типы архитектуры сетей FTTH, применяемые в МКД





не должно превышать 500 Н. Исходя из данных о размерах кабелепровода, коэффициенте заполнения и угловом смещении, максимальное количество одновременно пропускаемых точек ответвления можно рассчитать по формуле:

$$\text{Макс. кол-во точек ответвления} = \frac{500N - F_s \cdot MF}{PF}, \quad (1)$$

где: F_s – количество этажей;
 MF – усилие смещения; и
 PF – усилие натяжения.

3. Надежность

Квалификационные испытания проводились по программе, предусмотренной типовыми требованиями GR-3122, с изменениями, внесенными под использование продукции внутри помещений.

Образцы для испытаний были подготовлены в наиболее распространенных конфигурациях: 6 x 4 (6 точек ответвления, каждая с 4 волокнами), 12 x 4 (12 точек ответвления, каждая с 4 волокнами) и 12 x 8 (12 точек ответвления, каждая с 8 волокнами). На указанной серии образцов были проведены следующие испытания: испытания на термическое старение, циклические испытания на тепловую нагрузку и влагостойкость, испытания механической прочности оболочки, испытания кабеля на многократный изгиб и прочность на сжатие, испытания кабельного узла в сборе по месту установки, испытания на растяжение при протягивании через кабелепроводы, испытания на определение усилия натяжения кабеля при протягивании и при затягивании тяговым фалом вдоль оси прокладки и под углом 90°. Все контрольные образцы без каких-либо проблем прошли как испытания на воздействие внешних условий, так и испытания на устойчивость к механическим нагрузкам.

Для иллюстрации комплексного характера программы испытаний на рис. 6 представлена схема испытательного стенда для определения механической прочности оболочки.

Режим испытаний: все испытания проводились с использованием стандартного цикла изменения температуры внутри помещений и с приложением усилия, составляющего 500 Н (50 кг). Во время испытаний к образцу подключались две технологические перемычки. Инструментальный контроль вносимого затухания в оптическом кабеле проводился как перед началом, так и после проведения испытаний. Все образцы помещались в

Критерии	Двухточечная топология	Пневмопрокладка оптоволоконна	Подключение в средней части пролета	Предлагаемый кабель для вертикальной прокладки
Время на проведение обследования	умеренное	длительное	короткое	умеренное
Время на монтаж	длительное	длительное	очень длительное	очень короткое
Необходимость в использовании квалифицированного труда	есть	есть	есть	нет
Материальные затраты	низкие	высокие	умеренные	высокие
Общая стоимость установки (рабочая сила + материалы)	умеренные	высокие	высокие	низкие
Готовность к использованию (безопасность – быстрота, повреждения кабеля)	нет	нет	нет	есть

▲ Таблица 1. Сравнительный анализ основных типов сетевой архитектуры, используемых в МКД

малую камеру, и к ним с обоих концов подключались две технологические перемычки. Образцы выдерживались при каждой температуре в течение 1 часа, а затем испытывались на протяжении 15 минут. Измерение параметров системы проводилось до начала и по окончании испытаний.

4. Стоимость развертывания сети

Оценка стоимости типовых первоначальных затрат на развертывание сетей «оптоволоконно до дома» представлена на рис. 7. Половина первоначальных затрат на развертывания сетей FTTH, как правило, приходится на затраты на рабочую силу, тогда как стоимость пассивных компонентов составляет лишь 20 % от общего объема инвестиций. В затратах на рабочую силу есть две составляющие, а именно: время на развертывание, проведение испытаний и устранение неполадок и почасовые ставки оплаты услуг монтажников, требуемых для установки сети. Почасовые ставки зависят от установленного уровня

квалификации монтажников и требуемого оборудования для монтажа сетевых компонентов.

Основные типы сетевой архитектуры, применяемые для развертывания сетей в МКД, представлены на рис. 8: а) подключение по протоколу двухточечного соединения, когда все оптические волокна по отдельности подключаются на стороне пользователя, б) пневмопрокладка оптоволоконна, когда отдельные световоды или кабели задуваются в кабельные трубы, идущие из подвального помещения до точки подключения пользователя, в) подключение в средней части пролета волоконно-оптического кабеля, когда на каждом этаже производится вскрытие кабельной оболочки с извлечением необходимого количества оптических волокон, г) кабельная сборка с предустановленными разъемами – решение, полностью опробованное на предприятии-изготовителе и готовое к немедленному применению.

Принцип двухточечной топологии сети, а также методика пневмопрокладки оптоволоконна сводятся к прокладке отдельных волоконно-оптических кабелей от одной точки в подвальном помещении на каждый этаж здания в силу необходимости централизованного



использования разветвителей или электронных устройств. Оба этих подхода требуют существенных затрат рабочего времени и высокого уровня мастерства со стороны квалифицированных техников-монтажников, обслуживающих подводящие и распределительные сегменты задействованных сетей.

Это тем более справедливо для варианта подключения в средней части пролета, когда на каждом этаже необходимо произвести вскрытие кабельной оболочки с извлечением необходимого количества отдельных волокон, – здесь требуются высококвалифицированные монтажники, и существуют серьезные ограничения по времени развертывания. Кроме того, собственники МКД подчас неохотно дают разрешение поставщикам услуг на прокладку новых кабелей и установку нового оборудования в принадлежащих им зданиях ввиду тех неудобств, которые такие работы могут причинить квартиросъемщикам, что, в свою очередь, придает дополнительную важность фактору оперативности развертывания.

В таблице 1 представлены данные сравнительного анализа основных типов сетевой архитектуры, используемых в МКД, с точки зрения системных характеристик.

Предлагаемый кабель для вертикальной прокладки может быть быстро и легко проложен при минимальных неудобствах для конечного пользователя. Вместо традиционных способов развертывания с использованием отдельного кабеля для каждого этажа или с обязательным выполнением работ по подключению в средней части пролета волоконно-оптического кабеля на определенных участках кабельная сборка OptiRise™ просто протягивается через вертикальный канал в стояке.

Затем точки доступа к сети совмещаются с отверстиями в кабелепроводе, через которые можно использовать тяговые фалы для протяжки кабеля. Достоинства этого инновационного подхода сулят значительные преимущества с точки зрения скорости развертывания, при этом существенным образом сокращая количество высококвалифицированных монтажников, необходимых для успешного выполнения монтажных работ.

Одновременно снижается вероятность возникновения необходимости в переделке, а также опасность появления неисправностей, так как перед отгрузкой заказчику каждый световод в кабеле для вертикальной прокладки проходит 100-% контроль качества на предприятии-изготовителе, а также

предоставляются ценные данные по контрольным точкам в процессе развертывания и для последующего устранения неисправностей. Благодаря предустановленным разъемам снижаются риски для здоровья и безопасности работников, связанные с разделкой и сращиванием волоконно-оптических кабелей.

Подключение дополнительных пользователей в МКД осуществляется проще, чем при использовании любой стандартной технологии сращивания. В сочетании с нечувствительным к изгибам оптоволоконном данная система объединяет в себе преимущества концепции «подсоединяй и работай» и великолепные показатели устойчивости кабеля к изгибам.

5. Выводы

В настоящей работе представлено описание полностью готового к работе волоконно-оптического распределительного кабеля, предназначенного для использования в качестве основного компонента системы Ascend™ компании «Корнинг» внутри МКД. Предлагаемое решение с использованием кабеля вертикальной прокладки в целом обеспечивает более высокую скорость развертывания сети, а с точки зрения общей стоимости владения оно в большинстве случаев дешевле, чем стандартные технологии соединения при организации сетей FTTH в МКД.

Все испытания на воздействие внешних условий (испытания на термическое старение, а также циклические испытания на тепловую нагрузку и влагостойкость) и испытания механической прочности были успешно пройдены. Результаты моделирования свидетельствуют о том, что представленное решение соответствует требованиям сегодняшнего рынка как для МКД, в которых имеется соответствующая инфраструктура, так и для МКД, в которых такая инфраструктура отсутствует, и является идеальным вариантом для быстрого и экономичного развертывания сетей FTTH.

6. Справочная литература

- ^[1] FTTH Council Press Release 23/7/2008
- ^[2] www.corning.com
- ^[3] C Mazzali, R Whitman, B Deutsch Lightwave, January, 2005

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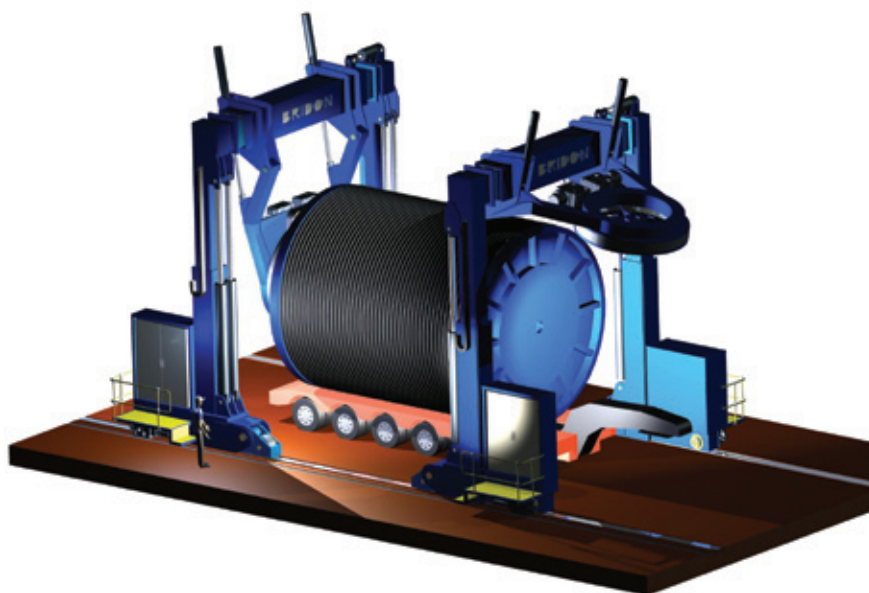
L'enrouleur de câble métallique le plus grand au monde

LA société Pipe Coil Technology Ltd s'est adjudgée un contrat avec Bridon International pour la fourniture de deux enrouleurs de câble métallique, dont un sera le plus grand de ce genre au monde, avec une capacité de soulèvement de 650 tonnes.

Les enrouleurs feront partie d'une nouvelle ligne de toronnage pour câbles métalliques qui, lors de l'entrée en production en 2012, réalisera quelques-uns des câbles métalliques les plus grands au monde. L'établissement de pointe que Bridon est en train de réaliser dans le Tyneside est conçu pour la production de quelques-uns des câbles métalliques les plus grands et les plus complexes au monde.

La conception innovante de l'enrouleur permet de charger et de décharger des tourets pleins aussi bien directement de l'atelier de production que d'une remorque de transport sans qu'il ne soit nécessaire d'utiliser un pont roulant. Cette capacité, associée à une structure légère, offre des avantages opérationnels significatifs par rapport aux enrouleurs traditionnels de grandes dimensions utilisés dans le secteur du câble métallique, et représente le facteur principal à la base de la décision de Bridon de faire recours à la société PCT comme fournisseur de ce projet important.

"Le contrat a été adjudgé après un rigoureux processus de soumission duré six mois, durant lequel PCT a démontré que sa solution unique et innovante peut répondre aux exigences opérationnelles de Bridon", a déclaré Colin Pratt de Bridon.



▲ Une image de l'enrouleur du câble métallique le plus grand du monde avec une capacité de soulèvement de 650 tonnes

L'adjudication du contrat témoigne de la capacité d'innovation de l'équipe technique de PCT et la capacité affirmée de la société d'offrir des solutions techniques personnalisées de haute qualité aux leaders de l'industrie globale dans les secteurs de production des câbles métalliques, des câbles sous-marins ombilicaux, des câbles de puissance et des tuyaux d'évacuation.

PCT Ltd est une société à capital privé, basée à Newcastle, Royaume-Uni, avec des filiales aux Etats-Unis et en Chine. La société est spécialisée dans la conception et dans la fourniture de solutions d'enroulement et d'emballage pour produits flexibles tels que

les tuyaux en plastique, les câbles sous-marins ombilicaux et de puissance, les tuyaux d'évacuation et les câbles en acier.

Bridon International, installée à Doncaster au Royaume-Uni, gère neuf unités de production de par le monde avec des bureaux techniques et de vente axés sur le marché et soutenus par un réseau global d'agents et de distributeurs.

Pipe Coil Technology Ltd – Royaume-Uni

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Website: www.pipecoil.co.uk

Économie de temps grâce aux nouvelles étiquettes pour fibres optiques

Silver Fox, un fabricant de solutions d'étiquetage innovantes et durables, permettant d'économiser du temps, a présenté sa nouvelle gamme d'étiquettes "Optical Fibre Flag" spécialement conçue pour

des applications industrielles de la transmission de données, des télécommunications, électrique et de fourniture d'énergie. Une nouvelle gamme d'étiquettes pour fibres optiques est actuellement disponible

avec la possibilité de choisir quatre dimensions individuelles.

Silver Fox – Royaume-Uni

Email: sales@silfox.com

Website: www.silfox.com

Une solution complète de Roblon

ROBLON Industry est un fournisseur de solutions complètes pour l'industrie du câble, spécialisé notamment en équipements pour la fabrication de câbles et fils industriels pour les câbles.

La société développe et produit des fibres industrielles de haute technologie telles qu'armatures en verre et en aramide, des fils de liage et des fils de déchirement (standard et imperméables) et elle est certifiée ISO 9001 et 14001.

Également spécialisée dans le développement et dans la production d'équipements de revêtement, de liage, d'enroulement et déroulement, la société est connue grâce à ses machines de revêtement et de liage haute qualité avec plus de 400 exemplaires en fonction de par le monde.

Le verre composite de Roblon est un élément de renfort en verre revêtu de matériau thermofusible, idéal pour renforcer les câbles enterrés et les câbles aériens de longueurs réduites.

Roblon produit une gamme d'éléments de renfort de verre composite et offre des formulations spécifiques de matériau thermofusible. Un exemple de ses produits est représenté par une version extra adhésive transmettant la force

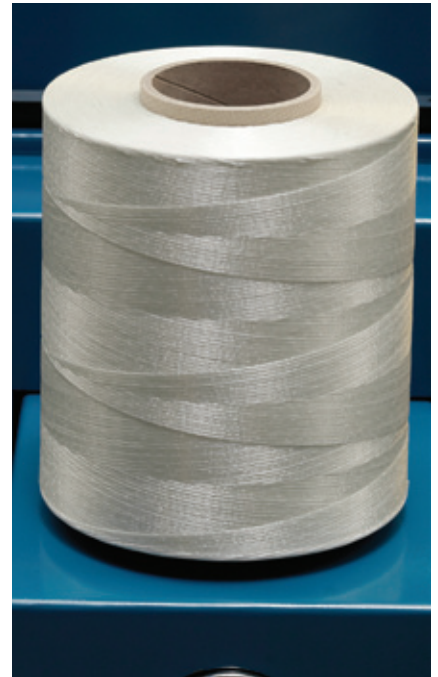
des éléments de renfort au matériau de revêtement, ce qui en fait un matériau idéal pour les câbles aériens de longueur réduite.

La société a également développé une formulation spécifiquement indiquée pour les câbles directement enterrés, ou pour les câbles installés dans des environnements extrêmes tels que les systèmes d'égout.

Le verre composite de Roblon est un fil complètement imprégné et extrêmement résistant, pouvant être utilisé dans tout processus de production et pouvant être toronné autour du centre du câble ou appliqué longitudinalement.

Les machines de revêtement standard de Roblon – SE-18 et SE-24 – présentent un curriculum de résultats positifs et sont utilisées par les producteurs de câbles à fibres optiques dans le monde entier. Ces machines appliquent le fil à un câble en déroulant le matériau, elles constituent donc un système idéal pour les fils tels que le verre composite de Roblon.

La tension est contrôlée individuellement durant la production au moyen de freins à hystérésis et par un logiciel de pointe. Les machines de Roblon peuvent être aisément intégrées dans des lignes de



▲ Verre composite de Roblon

production existant déjà ainsi que dans de nouvelles lignes.

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Ethem reçoit le prix "Silver Certificate"



▲ Ethem Erdas reçoit son prix au cours de Interwire 2011 à Atlanta

Ethem Erdas, responsable de produit pour les applications de fil et câble de Beta LaserMike, a reçu le prix "Silver Certificate" de Wire Association International (WAI).

Le prix prestigieux a été décerné pour l'article technique de Erdas intitulé "An in-process SRL Predictor system for data cable manufacturing." Le prix a été décerné au cours de l'exposition commerciale Interwire 2011 et du 81ème congrès annuel de WAI à Atlanta en mai dernier.

L'article illustre le rôle important revêtu par un système de prévision de l'affaiblissement d'adaptation

structurelle intégré dans le processus de la communication de données et dans le processus de fabrication de câbles coaxiaux.

L'article décrit également les différentes méthodes de prévision et d'analyse actuellement utilisées dans l'industrie et, en utilisant les données effectives enregistrées au moyen de l'analyseur SRL Pro Predictor, il illustre les économies de temps et de coûts obtenus par différents fabricants.

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Câble d'ascension flexible insensible à la courbure pour installations FTTH rapides

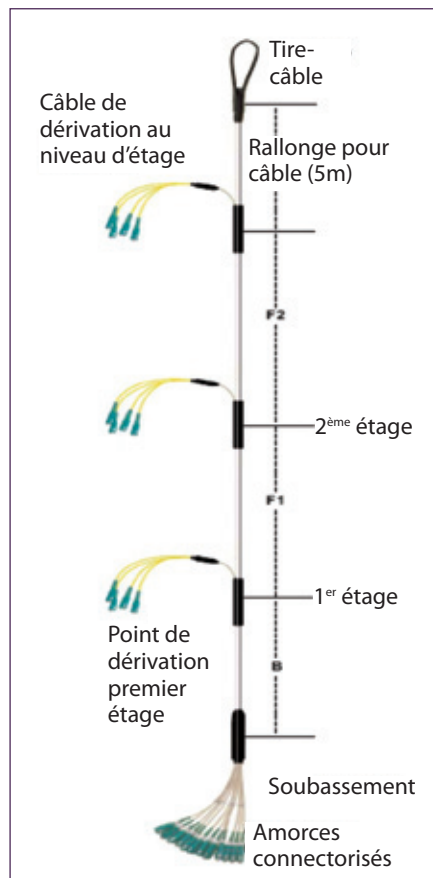
Par Grzegorz Tosik, Paweł Kołodziej et Magdalena Mirynowska, de Corning Cable Systems

Résumé

Actuellement un réseau FTTH (fibre jusqu'à domicile) joue un rôle décisif dans le développement de la société de l'information.

La croissante popularité des installations FTTH observée au cours de ces dernières années s'est révélée en millions de connexions à des habitations déjà

▲ Figure 1: Assemblage câble riser



réalisées, mais malgré cela la pénétration du marché est encore relativement modeste (2,9% des habitations aux États-Unis, moins de 4% en Europe et environ 25% en Asie⁽¹⁾).

La prochaine opportunité de croissance en ce qui concerne les installations FTTH permettant une accélération de la pénétration du marché est offerte par l'installation d'unités à logements multiples (MDU).

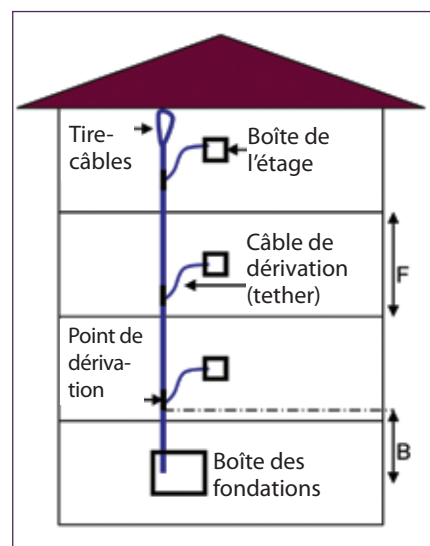
Dans les unités MDU typiques, la fibre est amenée au niveau du plancher et partagée entre plusieurs logements.

Les installations de réseaux dans des environnements MDU difficiles sont différentes de celles employées dans les logements individuels et exigent une technologie appropriée. En outre, au fur et à mesure que les installations augmentent, les clients ont des difficultés à trouver des techniciens spécialisés en épissurages pour réaliser des développements de réseaux étendus.

Pour répondre à la demande de marché actuelle, la société Corning a conçu une solution FTTH pour MDU (ASCEND™) utilisant un câble d'ascension (riser) avancé dénommé OptiRise™.

L'assemblage des câbles riser peut résoudre les principaux problèmes d'installation et permet une installation plus rapide, plus facile et plus fiable des MDU.

Le câble à fibres optiques est constitué de points d'accès au réseau préinstallés dans des positions spécifiées par le client et distribués le long du câble. Le système est réalisé et testé en usine, ensuite emballé et envoyé au client pour être immédiatement installé.



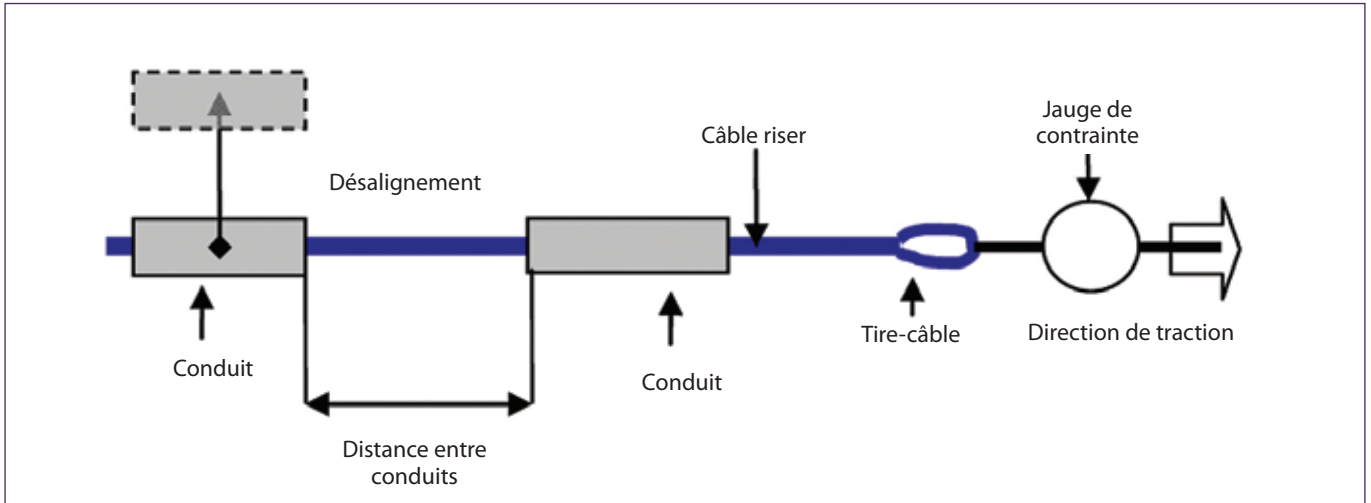
▲ Figure 2: Architecture MDU typique

1 Câble d'ascension (riser)

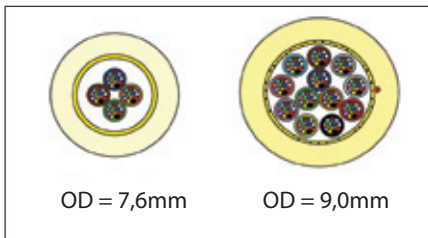
La diffusion récente des fibres monomodales ayant des performances de courbure améliorées pour les applications FTTH a été stimulée par la croissante quantité de câbles optiques installés à l'intérieur des bâtiments y compris les défis associés à la courbure.

Comme mentionné précédemment, la vitesse de pose représente aujourd'hui un autre défi important dans les installations actuelles et la solution du câble riser préconnectorisé a été spécifiquement conçue pour résoudre ce problème.

Avec le nombre croissant d'installations FTTH, les clients auront des problèmes pour trouver des techniciens suffisamment qualifiés pour réaliser les épissurages.



▲ Figure 4: Configuration de l'essai



▲ Figure 3: Câble à micromodules (jusqu'à 144f)

En outre, les coûts de la main d'œuvre pour les techniciens hautement qualifiés sont en train d'augmenter.

La solution proposée présente plusieurs avantages en ce qui concerne la vitesse d'installation, tout en permettant de réduire considérablement le nombre d'installateurs qualifiés nécessaires pour effectuer une installation couronnée de succès.

La réduction des temps d'installation permet aux clients de générer du revenu plus rapidement, en augmentant ainsi le rendement du capital investi (ROI).

L'élément essentiel de la solution proposée est un câble riser préconnectorisé représenté schématiquement à la Figure 1.

Cette solution est basée sur une fibre insensible à la courbure, idéale pour des installations dans des environnements MDU difficiles.

L'assemblage de ce câble riser est équipé de connecteurs individuels (du type SC ou LC) dans le soubassement à connecter à un terminal de distribution et des câbles de dérivation multiconnecteurs à fibres optiques (breakout) sur chaque niveau d'étage à connecter à chaque logement des clients.

Les connecteurs et les câbles breakout de chaque niveau d'étage sont assemblés en usine et permettent donc d'éviter le pas typique d'un accès en plein câble.

Le câble est entièrement testé en usine avant l'expédition au site d'installation (MDU) et est fabriqué exactement conformément à l'architecture spécifique de chaque unité de logements multiples MDU. Par conséquent, seuls quelques paramètres de base tels que la distance entre étages (F) et la distance du terminal de distribution du soubassement au point de dérivation du câble breakout (B) du premier étage (Figure 2) suffisent.

Avec ces données, le câble proposé peut être également installé très rapidement par des installateurs non habitués à manipuler les fibres optiques.

L'extrémité finale du soubassement a une longueur prédéfinie de 120cm pour faciliter la connexion au terminal de distribution du soubassement.

La longueur de chaque câble de distribution multiconnecteurs (breakout tethers) au niveau d'étage dépend de la hauteur spécifique de l'étage (F) et

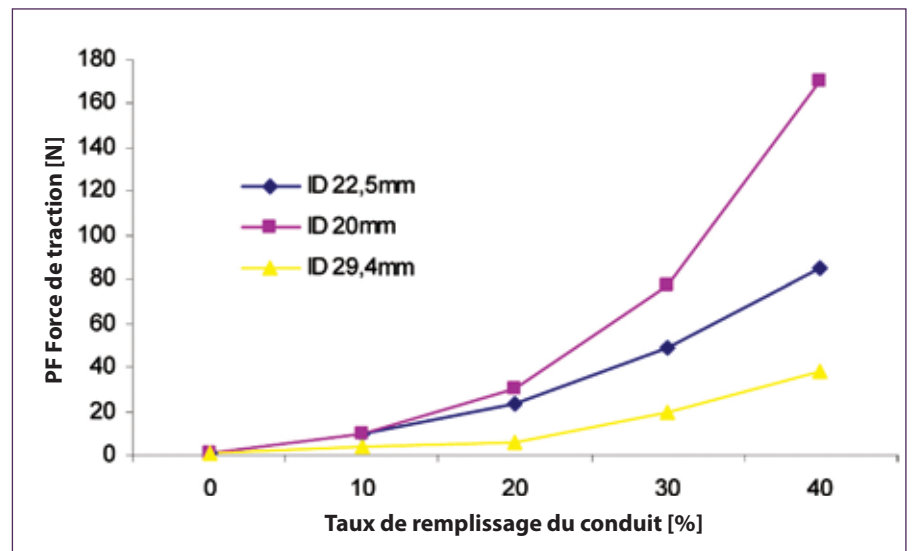
peut arriver à la longueur maximale F-15cm. Afin de réduire au minimum le diamètre du câble durant l'installation, les connecteurs au niveau de chaque étage sont disposés de manière décalée le long du câble principal durant l'opération d'installation.

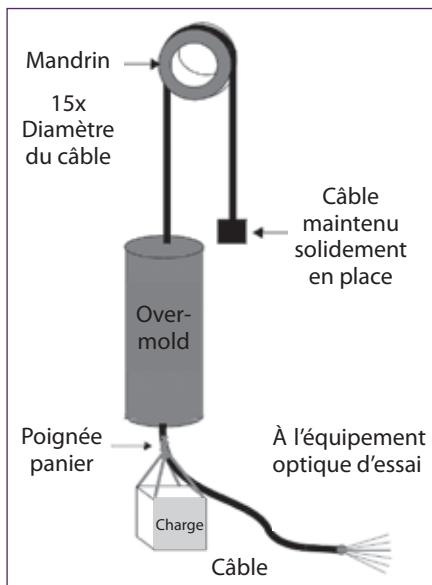
Le câble est équipé d'un tire-câbles pour faciliter l'installation. La distance d'extension du dernier point de dérivation au tire-câbles est prédéfinie à 5m.

Pour la totalité de l'assemblage l'on peut choisir différents types de connecteurs comme le SC ou le LC.

Pour acheminer les câbles verticaux de façon efficace et déterminer un impact minimum pour les bâtiments, les concepteurs de Corning se sont penchés sur le développement d'une solution plus flexible et de diamètre réduit pour ce produit prévoyant les câbles à micromodules FRNC illustrés à la Figure 3.

▼ Figure 5: Force de traction par rapport au taux de remplissage





▲ **Figure 6:** Configuration de l'essai de rétention de la gaine

Un autre avantage de ce type de câbles est représenté par la possibilité de réaliser des courbes extrêmement limitées de la fibre ClearCurve[®][2], permettant un stockage discret de la fibre dans le bâtiment soit pour le câble tether soit pour les longueurs en excès des connecteurs spiralés.

La flexibilité et les dimensions extérieures réduites du câble riser assurent une installation plus simple du câble et l'acheminement à travers la paroi ou sur les différents étages du bâtiment.

2 Conditions d'installation

L'un des éléments les plus critiques liés à l'installation des câbles est représenté par le tirage à travers le conduit vertical déjà installé dans les unités MDU (Figure 2).

Pour simuler les conditions d'installation et déterminer les limites d'installation des câbles en termes de congestion du conduit, les essais décrits ci-après seront effectués.

Le processus d'installation a été simulé pour divers diamètres et différentes formes de conduit, aussi bien avec que sans les câbles en cuivre déjà installés.

En outre, le désalignement et la distance entre les conduits ont été également pris en considération comme l'illustre la Figure 4.

Des essais avec des conduits de 3 mètres de dimensions différentes ont été effectués pour simuler les distances typiques de 3 mètres entre les étages

d'un bâtiment MDU. Chaque câble a été tiré 3 fois pour chaque configuration.

La Figure 5 montre la force de traction pour une configuration de 6x4 mesurée pour 3 conducteurs avec différents diamètres intérieurs (ID) et plusieurs taux de remplissage.

Les résultats indiquaient que le facteur le plus important est représenté par le nombre de points de dérivation du câble riser qui seront tirés simultanément à travers le conduit.

Toutefois, la force de tirage pour différents taux de remplissage dépend également des paires torsadées de cuivre installées à l'intérieur du conduit.

La force de traction totale durant l'installation ne devrait pas dépasser 500N. En fonction des dimensions du conduit, le taux de remplissage et les données de

désalignement, le nombre maximum de points de dérivation tirés simultanément peut être calculé comme suit:

$$\text{Max \# de points de dérivation} = \frac{500N - F_d \cdot MF}{PF} \quad (1)$$

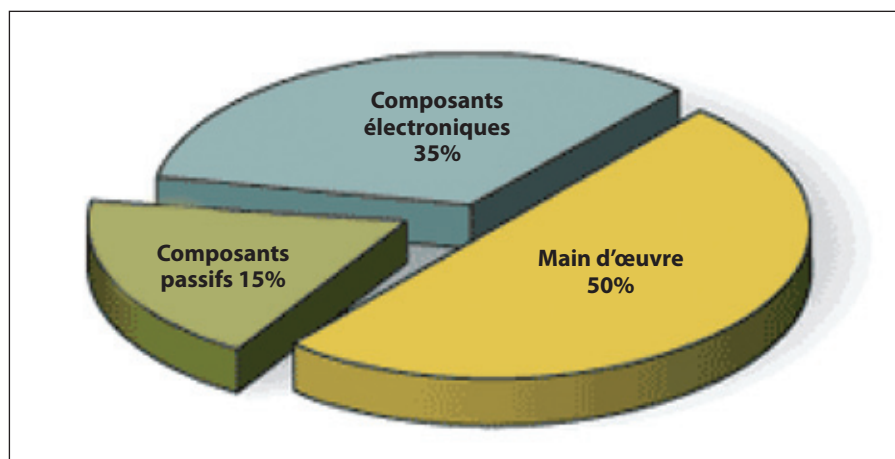
Où, F# est le nombre d'étages, MF est la force de désalignement et PF est la force de traction.

3 Fiabilité

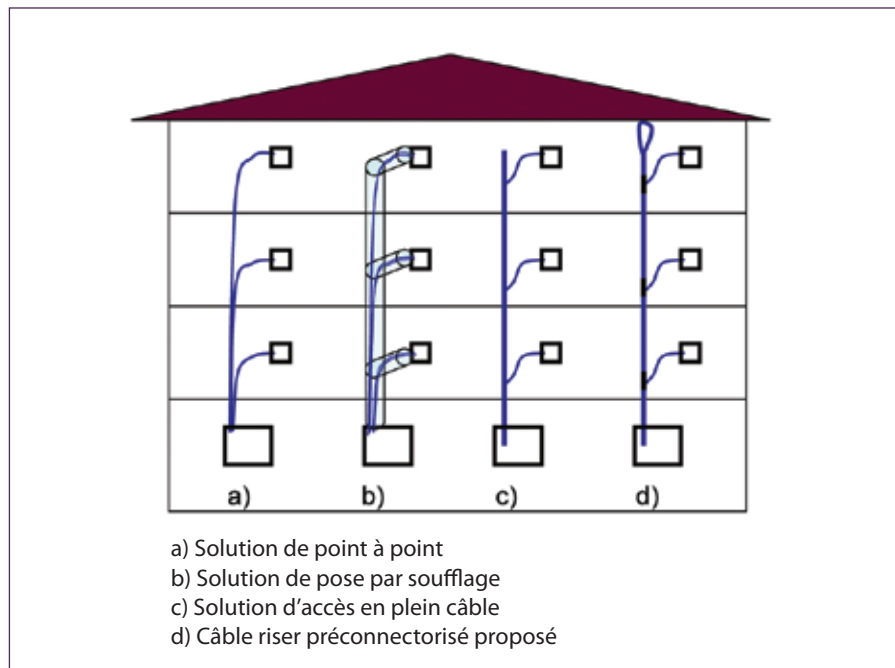
Le plan d'essai de classification consistait en une variation de la spécification GR-3122, modifiée pour simuler l'utilisation à l'intérieur.

Des échantillons d'essai des configurations plus communs ont été préparés: 6 x 4 – 6 points de dérivation, chacun avec 4f, 12 x 4 – 12 points de dérivation,

▼ **Figure 7:** Coûts typiques de première installation^[3]



▼ **Figure 8:** Principales architectures FTTH utilisées dans des unités MDU



Critères	De point à point	Fibre soufflée	Accès en plein câble	Câble riser proposé
Temps d'inspection	moyen	long	court	moyen
Temps d'installation	long	long	très long	très court
Main d'œuvre qualifiée requise	oui	oui	oui	non
Coûts des matériaux	bas	haut	moyen	haut
Coûts d'installation totaux (main d'œuvre + matériau)	moyen	haut	haut	bas
Plug & Play (sécurité – vitesse, dommage au câble)	non	non	non	oui

▲ **Tableau 1:** Comparaison entre solutions d'installation MDU principales

chacun avec 4f et 12 x 8 – 12 points de dérivation, chacun avec 8f. Pour ce groupe d'échantillons les essais suivants ont été réalisés: vieillissement thermique, variation cyclique de la température et humidité, rétention de la gaine, flexion du câble, déformation par compression, installation, tirage à travers les conduits, tirage du câble rectiligne et à 90° du câble tether. Les échantillons ont passé les essais environnementaux et mécaniques sans aucun problème.

Comme exemple de programme extensif, la *Figure 6* présente la configuration de l'essai de rétention de la gaine.

Condition d'essai: l'essai a été réalisé en utilisant des cycles de températures typiques intérieures en appliquant une force de 500N (50kg).

Durant l'essai deux câbles de raccordement d'accès ont été connectés à l'échantillon. La surveillance optique de l'affaiblissement d'insertion a été effectuée avant et après l'essai.

Les échantillons ont été introduits dans une chambre accessible avec deux câbles de raccordement d'accès aux deux extrémités.

Les échantillons ont été conditionnés pendant 1 heure à chaque température et essayés pendant 15 minutes.

Les mesures du système ont été effectuées avant et après la réalisation de l'essai.

4 Coûts d'installation

La *Figure 7* illustre les calculs des coûts typiques pour la première installation de réseaux de fibres jusqu'à domicile.

En général, les coûts de la main d'œuvre représentent la moitié des coûts de la première installation des réseaux de fibres jusqu'à domicile, alors que les composants passifs ne représentent que 20% de l'investissement total.

Les coûts de la main d'œuvre comprennent deux éléments: le temps d'installation, d'essai et de diagnostic des pannes ainsi que le taux horaire de l'installateur de réseau. Le taux horaire dépend de la spécialisation de l'installateur et de l'équipement requis pour l'installation des composants.

Les principales architectures MDU utilisées pour les installations MDU sont illustrées à la *Figure 8*:

- Solution de point à point traditionnelle – les fibres sont amenées jusqu'au client et terminées séparément
- Fibre posée par soufflage – les fibres/câbles individuelles/ls sont posées/és par soufflage du soubassement au client
- Accès intermédiaire – la gaine du câble est coupée et les fibres sont sélectionnées et extraites sur chaque étage
- riser préconnectorisé – solution «plug and play», complètement testé en usine

Pour réaliser les solutions et les installations de point à point et le soufflage de la fibre, les câbles individuels ont été tendus à un seul point dans les fondations vers chaque étage d'un bâtiment, compte tenu de la nécessité de centraliser les séparateurs ou les composants électroniques.

Ces deux solutions exigent beaucoup de temps et un technicien hautement spécialisé avec une expérience considérable pour réaliser les épissures de l'alimentateur et les segments de distribution du réseau.

Les solutions d'accès intermédiaire également exigent beaucoup de temps pour l'installation et des techniciens hautement spécialisés pour couper la gaine du câble, sélectionner les fibres et les extraire sur chaque étage.

En outre, les propriétaires des unités de logements multiples (MDU) sont parfois réticents à donner l'approbation à un fournisseur de services pour l'installation d'un câblage et d'équipements nouveaux à l'intérieur de leurs bâtiments à cause des interférences que ces activités causeraient aux occupants, ce qui rend la vitesse d'installation un facteur encore plus important.

Le *Tableau 1* illustre une comparaison entre les principales architectures MDU utilisées pour les unités de logements multiples en termes de caractéristiques du système.

Le câble riser proposé peut être installé avec rapidité et facilité et dérangement minimum pour le client final.

À la place des techniques d'installation traditionnelles exigeant un câble séparé pour chaque étage ou la réalisation d'un accès en plein câble dans des points spécifiques, le câble OptiRise™ peut être simplement tiré à travers le conduit du riser vertical.

Ensuite, les points d'accès au réseau sont alignés avec les ouvertures du conduit du riser pour accéder aux câbles de dérivation (tether).

Cette solution innovante offre des avantages considérables en ce qui concerne la vitesse d'installation, tout en permettant également une réduction significative du nombre d'installateurs qualifiés nécessaires pour effectuer une installation couronnée de succès.

En même temps, le risque de réparations et de pannes est réduit, puisque chaque fibre du câble riser est complètement testée en usine avant l'expédition au client en fournissant des points d'essai précieux durant l'installation et le



diagnostic de panne suivant. La solution préconnectorisée réduit les risques pour la santé et la sécurité associés à la préparation des câbles à fibres et à l'épissurage.

La connexion d'autres clients MDU dans un deuxième moment est plus facile par rapport à toute solution d'épissurage traditionnelle.

En association avec la fibre insensible à la courbure, ce système présente les avantages d'une solution «plug and play» avec d'excellentes performances de pliage du câble.

5 Conclusions

Le présent article décrit un câble de distribution à fibres optiques complètement préfabriqué, conçu comme élément clé du système Ascend™ MDU de Corning pour l'installation à l'intérieur de bâtiments à logements multiples (MDU).

La solution proposée avec câble riser est généralement plus rapide et le coût total de propriété est souvent inférieur par rapport aux architectures traditionnelles avec épissures standard pour installations FTTH dans des bâtiments MDU.

Les essais environnementaux (vieillesse thermique et variation cyclique de la température et humidité) et les essais mécaniques ont été effectués avec succès.

Les résultats de la simulation confirment que la solution présentée répond aux exigences du marché actuel en ce qui concerne les installations MDU du type brown field (installations déjà présentes) et du type green field (nouvelles installations), ce qui en fait un candidat idéal pour les installations de réseau FTTH rapides et rentables. ■

6 Références bibliographiques

^[1] FTTH Council Press Release 23/7/2008

^[2] www.corning.com

^[3] C Mazzali, R Whitman, B Deutsch Lightwave January, 2005.

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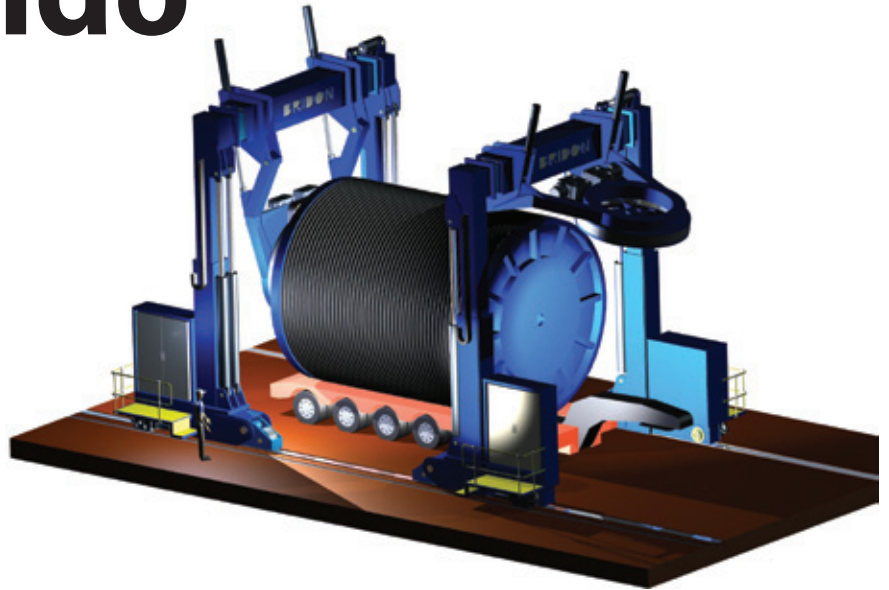
L'avvolgitore di cavo metallico più grande del mondo

PIPE Coil Technology Ltd si è aggiudicata un contratto con la società Bridon International per la fornitura di due avvolgitori di cavo metallico, uno dei quali sarà il più grande del mondo del genere, con una capacità di sollevamento di 650 tonnellate.

Gli avvolgitori faranno parte di una nuova linea di trefolatura per cavi metallici che al momento di entrare in produzione nel 2012, realizzerà alcuni dei cavi metallici più grandi del mondo. Lo stabilimento all'avanguardia che Bridon sta costruendo nel Tyneside produrrà alcuni dei cavi più grandi e complessi del mondo.

La concezione innovativa dell'avvolgitore consente di caricare e scaricare tamburi pieni sia direttamente dall'officina di produzione, sia da un rimorchio senza richiedere un carroponte. Questa capacità associata ad una struttura leggera, offre significativi vantaggi operativi rispetto agli avvolgitori tradizionali di grandi dimensioni utilizzati nel settore del cavo metallico, ed ha rappresentato il fattore principale nella decisione di Bridon di ricorrere alla società PCT come fornitore di questo importante progetto.

"Il contratto è stato aggiudicato dopo un rigoroso processo di offerte d'appalto della durata di sei mesi, durante il quale PCT ha dimostrato chiaramente che la sua soluzione unica e innovativa può soddisfare i requisiti operativi di Bridon", ha dichiarato Colin Pratt di Bridon.



▲ Un'immagine dell'avvolgitore del cavo metallico più grande del mondo con capacità di sollevamento di 650 tonnellate

L'aggiudicazione del contratto testimonia la capacità d'innovazione della squadra tecnica di PCT e la collaudata capacità della società di offrire soluzioni tecniche personalizzate di alta qualità ai leader dell'industria globale nei settori di produzione dei cavi metallici, dei cavi sottomarini ombelicali, dei cavi di potenza e delle tubazioni di scarico.

PCT Ltd è una società a capitale privato, con sede a Newcastle, Regno Unito, con filiali negli Stati Uniti e in Cina. La società è specializzata nella progettazione e nella fornitura di soluzioni di avvolgimento

e imballaggio per prodotti flessibili come tubi in plastica, cavi sottomarini ombelicali e di potenza, tubazioni di scarico e cavi di acciaio.

Bridon International, con sede a Doncaster, Regno Unito, gestisce nove unità produttive in tutto il mondo con uffici tecnici e di vendita, supportate da una rete globale di agenti e distributori.

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Risparmiare tempo con le nuove etichette a bandiera per fibre ottiche

Silver Fox, un fabbricante di soluzioni di etichettatura innovative e durevoli, che consentono di risparmiare tempo, ha presentato la sua nuova gamma di etichette "Optical Fibre Flag" indicata per applicazioni nei settori industriali della trasmissione dei dati, delle telecomunicazioni, elettrico e di fornitura di energia.

È ora disponibile una nuova gamma

di etichette per fibre ottiche con la possibilità di scegliere quattro dimensioni distinte. Queste etichette resistenti e di lunga durata vengono fornite in fogli A4 già tagliati che possono essere stampati su qualunque tipo di stampante laser da ufficio. I modelli di etichette possono essere scaricati dal software di etichette Labacus Innovator della società.

"Siamo lieti di offrire etichette grandi

e piccole in varie configurazioni che permettano agli ingegneri di scegliere le dimensioni che meglio si adattano alle loro necessità di identificazione rispettando qualsiasi limitazione di spazio", ha dichiarato il direttore generale Nick Michaelson.

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Ethem riceve il premio "Silver Certificate"



Ethem Erdas, responsabile di prodotto per le applicazioni di filo e cavo di Beta LaserMike, ha ricevuto il premio "Silver Certificate" di Wire Association International (WAI).

Il prestigioso premio è stato conferito per l'articolo tecnico di Erdas intitolato "An in-process SRL predictor system for data cable manufacturing." Il premio è stato conferito durante l'esposizione commerciale Interwire 2011 e l'81° congresso annuale di WAI tenutosi ad Atlanta nel maggio scorso.

L'articolo illustra l'importante ruolo che riveste un sistema di previsione dell'attenuazione di riflessione strutturale integrato nel processo della comunicazione di dati e nel processo di fabbricazione di cavi coassiali. L'articolo descrive inoltre vari metodi di previsione e analisi correntemente in uso nell'industria e, utilizzando dati effettivi registrati sul campo mediante l'analizzatore SRL Pro Predictor, illustra i risparmi di tempo e di costi ottenuti da vari fabbricanti.

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◀ Ethem Erdas mentre riceve il suo premio durante Interwire 2011 in Atlanta

Una soluzione completa di Roblon

ROBLON Industry è un fornitore di soluzioni complete per l'industria del cavo, specializzato in equipaggiamenti per la fabbricazione di cavo e fili industriali per cavi.

La società sviluppa e produce fibre industriali di alta tecnologia come elementi di rinforzo di vetro e aramide, fili di legatura e corde di strappo (standard e impermeabili) ed è certificata ISO 9001 e 14001.

La società sviluppa e produce inoltre equipaggiamenti di rivestimento, legatura, avvolgimento e svolgimento ed è conosciuta per la sue macchinari di rivestimento e di legatura di alta qualità con più di 400 esemplari in funzione in tutto il mondo.

Il vetro composito di Roblon è un elemento di rinforzo di vetro rivestito con materiali termofusibili, ed è ideale per rinforzare cavi interrati e cavi aerei di lunghezze ridotte.

Roblon produce una serie di elementi di rinforzo di vetro composito e offre formulazioni speciali di materiale termofusibile. Un esempio dei suoi prodotti è rappresentato da una versione

extra adesiva che trasmette la forza degli elementi di rinforzo al materiale di rivestimento, ideale per cavi aerei di lunghezza ridotta.

La società ha inoltre sviluppato una formulazione ideale per cavi direttamente interrati o per cavi installati in ambienti estremi come i sistemi fognari.

Il vetro composito di Roblon è un filo completamente impregnato ed estremamente resistente che può essere utilizzato in qualsiasi processo produttivo e che può essere trefolato attorno al centro del cavo o applicato longitudinalmente.

Le macchine per il rivestimento standard di Roblon – SE-18 e SE-24 – sono collaudate da qualche tempo e sono utilizzate da produttori di cavi di fibre ottiche in tutto il mondo. Queste macchine applicano il filo ad un cavo svolgendo il materiale, facendone un sistema ideale per fili come il vetro composito di Roblon.

La tensione è controllata individualmente durante la produzione mediante freni di isteresi e software d'avanguardia. Le macchine di rivestimento di Roblon possono essere facilmente integrate in linee di produzione esistenti e nuove.



▲ Vetro composito di Roblon

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Cavo riser flessibile non sensibile alla piegatura per installazioni FTTH rapide

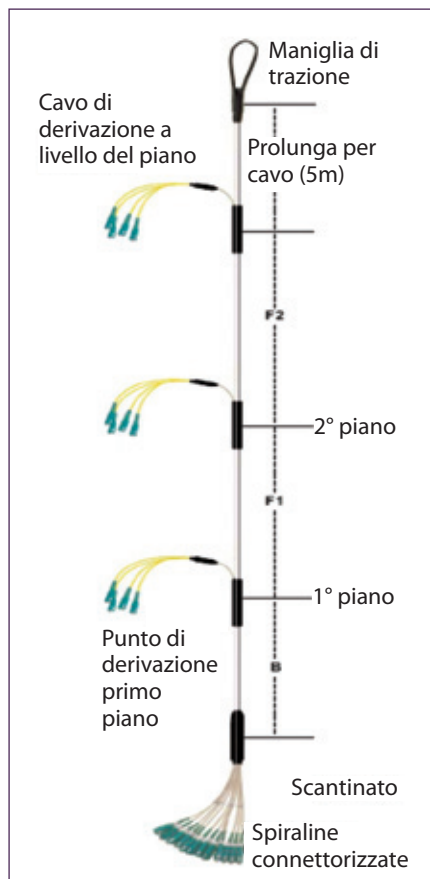
A cura di Grzegorz Tosik, Paweł Kołodziej e Magdalena Mirynowska, di Corning Cable Systems

Riassunto

Oggi giorno una rete FTTH (fibre fino a domicilio) gioca un ruolo cruciale nello sviluppo della società dell'informazione.

La crescente popolarità delle installazioni FTTH osservata nel corso degli ultimi anni, si è rivelata in milioni di collegamenti ad abitazioni già realizzate, ma nonostante ciò la penetrazione di mercato è ancora relativamente modesta (2,9% di abitazioni negli Stati Uniti, meno del 4% in Europa e circa il 25% in Asia⁽¹⁾). La prossima opportunità di crescita per quanto riguarda le installazioni FTTH che consente

▼ **Figura 1:** Assemblaggio cavo riser



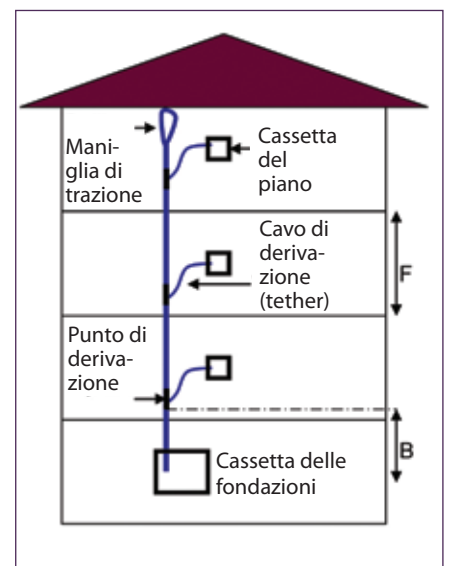
un'accelerazione della penetrazione di mercato proviene da installazioni di unità multiabitative (MDU). Nelle MDU tipiche la fibra è portata a livello del pavimento ed è condivisa da più unità abitative.

Le installazioni di reti in ambienti MDU difficili sono diverse da quelle impiegate in abitazioni singole e richiedono una tecnologia adeguata. Inoltre, con il progressivo aumento delle installazioni, i clienti avranno difficoltà a reperire tecnici specializzati in giunzioni per realizzare installazioni di grandi dimensioni. Per soddisfare la domanda di mercato odierna, la società Corning ha progettato una soluzione FTTH per MDU (ASCEND™) che utilizza un cavo di distribuzione verticale (riser) avanzato denominato OptiRise™.

L'assemblaggio di cavi riser risolve i maggiori problemi di installazione e consente una più rapida, facile e affidabile installazione di MDU. Il cavo a fibre ottiche è costituito da punti di accesso alla rete preinstallati in posizioni specificate dal cliente e distribuite lungo il cavo. Il sistema è realizzato e collaudato in officina, quindi imballato e spedito al cliente per essere immediatamente installato.

1 Cavo di distribuzione verticale (riser)

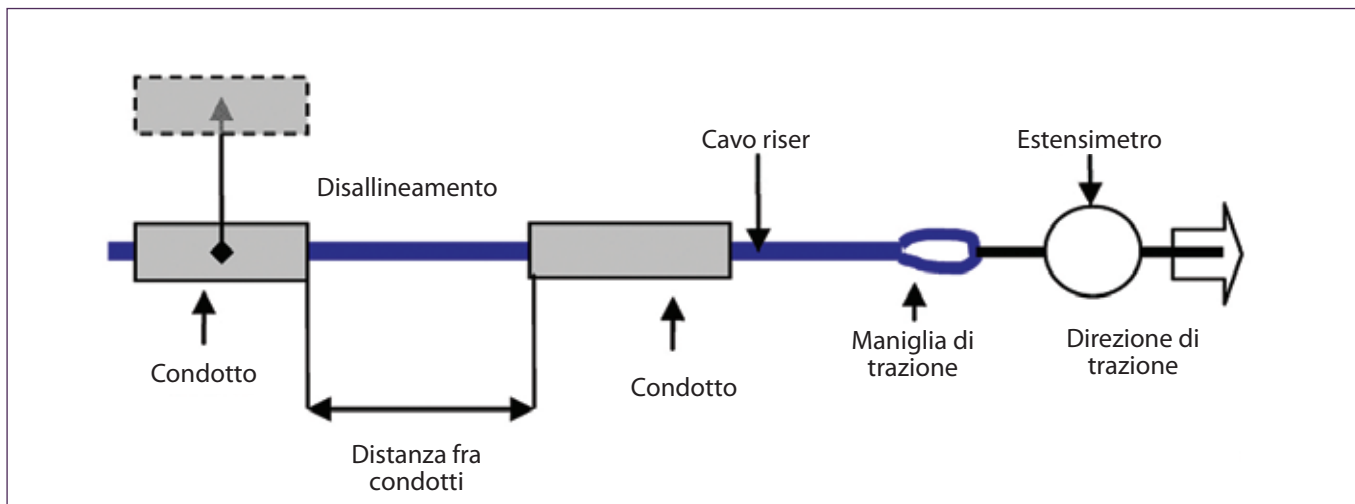
La recente diffusione di fibre monomodali con prestazioni di piegatura migliorate per applicazioni FTTH è stata sollecitata dalla crescente quantità di cavi ottici installati all'interno degli edifici con le conseguenti sfide associate alla piegatura. Come affermato precedentemente, la velocità di posa rappresenta oggi un'altra importante sfida nelle attuali installazioni e la soluzione del cavo riser preconnettorizzato è stata concepita specificamente per risolvere questo problema. Con il crescente numero di installazioni FTTH, i clienti avranno problemi per reperire tecnici sufficientemente qualificati per



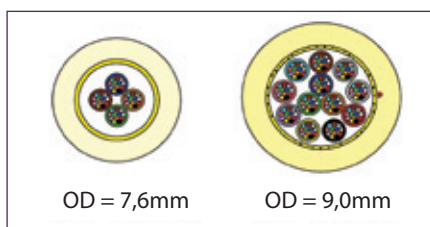
▲ **Figura 2:** Architettura MDU tipica

realizzare le giunzioni. Inoltre, i costi della manodopera per tecnici altamente specializzati sono in aumento. La soluzione proposta presenta notevoli vantaggi per quanto riguarda la velocità d'installazione, consentendo allo stesso tempo di ridurre significativamente il numero di installatori specializzati necessari ad effettuare un'installazione con successo. La riduzione dei tempi d'installazione permette ai clienti di generare reddito più velocemente, aumentando così il tasso medio di redditività (ROI).

L'elemento fondamentale della soluzione proposta è un cavo riser preconnettorizzato rappresentato schematicamente nella Figura 1. Questa soluzione si basa su una fibra insensibile alla piegatura, ideale per installazioni in ambienti MDU difficili. L'assemblaggio di questo cavo riser è munito di connettori individuali (del tipo SC o LC) nello scantinato da collegare a un terminale di distribuzione dello scantinato e cavi di derivazione multiconnettori di fibra ottica (breakout) su ciascun livello del piano da collegare alle singole abitazioni dei clienti.



▲ **Figura 4:** Configurazione della prova



▲ **Figura 3:** Cavo a micromoduli (fino a 144f)

Tutti i connettori ed i cavi breakout di ciascun piano terra sono assemblati in officina e consentono pertanto di evitare il tipico passo di un accesso intermedio del cavo. Il cavo è completamente collaudato nello stabilimento prima della spedizione al sito d'installazione (MDU) ed è fabbricato esattamente secondo l'architettura specifica dell'unità abitativa MDU. Pertanto sono sufficienti pochi parametri fondamentali come la distanza fra piani (F) e la distanza dal terminale di distribuzione dello scantinato al punto di derivazione del cavo breakout (B) del primo piano (Figura 2).

Con questi dati, il cavo proposto può essere installato molto velocemente anche da installatori non abituati a maneggiare fibre ottiche. L'estremità finale dello scantinato ha una lunghezza predefinita a 120cm per facilitare il collegamento al terminale di distribuzione dello scantinato. La lunghezza di ogni cavi di derivazione multiconnettore (breakout tethers) al livello del piano dipende dall'altezza specifica del piano (F) e può arrivare fino a F-15cm come lunghezza massima.

Per ridurre al minimo il diametro del cavo durante l'installazione, i connettori a livello di ciascun piano sono disposti in maniera sfalsata lungo il cavo principale durante la procedura d'installazione. Il cavo è equipaggiato con una maniglia di trazione per facilitare l'installazione. La distanza di estensione dall'ultimo punto di derivazione alla maniglia di trazione è predefinito a 5m.

Per tutto l'assemblaggio, si possono scegliere vari tipi di connettori come SC o LC.

Per indirizzare in modo efficace i cavi verticali con minimo impatto all'interno degli edifici, i progettisti di Corning hanno concentrato i propri sforzi sullo sviluppo di una soluzione più flessibile e di diametro ridotto per questo prodotto che prevede cavi a micromoduli FRNC illustrati nella Figura 3.

Un altro vantaggio di questo tipo di cavi è rappresentato dalla possibilità di realizzare curve estremamente limitate della fibra ClearCurve^{®[2]}, che permette un discreto immagazzinamento della fibra nell'edificio sia per il cavo tether sia per le lunghezze in eccesso dei connettori a spirale.

La flessibilità e le ridotte dimensioni esterne del cavo riser assicurano una più semplice installazione e l'istradamento attraverso la parete o su vari piani dell'edificio.

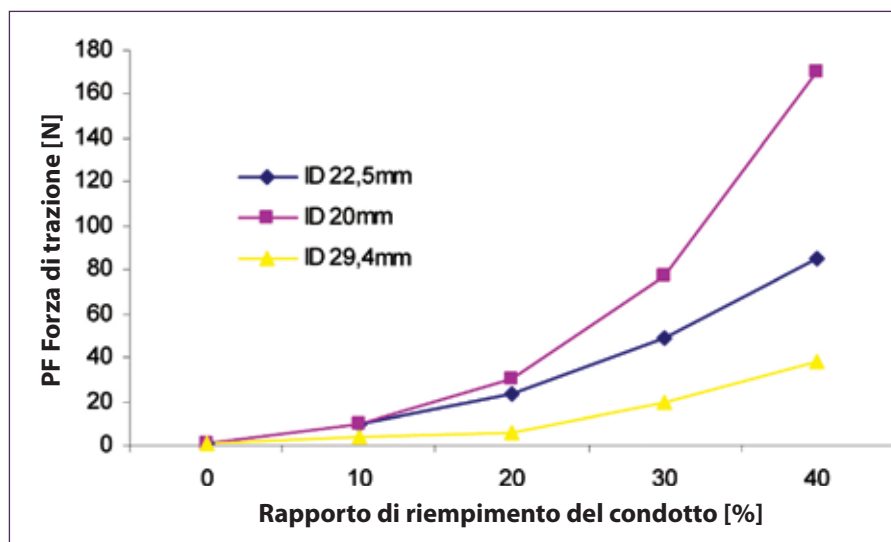
2 Condizioni di installazione

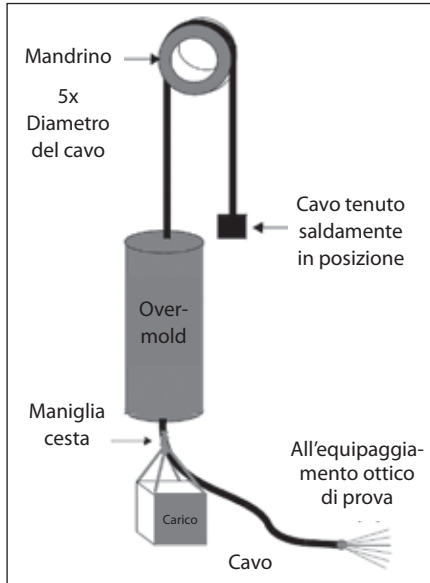
Uno dei problemi più critici che si presenta durante l'installazione dei cavi consiste nel tirarli attraverso il condotto verticale già installato nelle unità MDU (Figura 2).

Per simulare le condizioni di installazione e determinare i limiti di installazione dei cavi in termini di congestione del condotto, si realizzeranno le prove descritte qui di seguito. Il processo di installazione è stato simulato per diversi diametri e forme di condotto, sia con sia senza i cavi di rame già installati. Inoltre, sono stati considerati il disallineamento e la distanza fra condotti, come illustrato nella Figura 4.

Sono state effettuate delle prove con condotti di 3 metri di varie dimensioni per simulare le distanze tipiche di 3 metri fra i piani di un edificio costituito da unità multiabitative MDU. Ciascun cavo è stato tirato 3 volte per ciascuna configurazione.

▼ **Figura 5:** Forza di trazione rispetto al rapporto di riempimento





▲ **Figura 6:** Configurazione della prova di ritenzione della guaina

La **Figura 5** mostra la forza di trazione per una configurazione di 6x4 misurata per 3 condotti con vari diametri interni (ID) e vari rapporti di riempimento.

I risultati indicavano che il fattore più importante è costituito dal numero di punti di derivazione del cavo riser che si tirano simultaneamente attraverso il condotto. Tuttavia, la forza di trazione per rapporti di riempimento distinti dipende anche dai doppietti intrecciati di rame installati all'interno del condotto. La forza di trazione totale durante l'installazione non dovrebbe superare 500N. Secondo le dimensioni del condotto, il rapporto di riempimento e i dati di disallineamento, il numero massimo di punti di derivazione tirati simultaneamente si può calcolare nel seguente modo:

$$PF \text{ Max di punti di derivazione} = \frac{500N - F_d \cdot MF}{PF} \quad (1)$$

F# è il numero di piani, MF è la forza di disallineamento e PF è la forza di trazione.

3 Affidabilità

Il piano di prova di classificazione consisteva in una variazione della specifica GR-3122, modificata per simulare l'utilizzo all'interno. Sono stati preparati dei campioni di prova delle configurazioni più comuni: 6 x 4 - 6 punti di derivazione, ciascuno con 4f, 12 x 4 - 12 punti di derivazione, ciascuno con 4f e 12 x 8 - 12 punti di derivazione, ciascuno con 8f. Per questo gruppo di campioni sono state realizzate le seguenti prove: invecchiamento termico, variazione ciclica della temperatura e umidità, ritenzione della guaina, flessione del cavo, deformazione da compressione, installazione, tiraggio attraverso i condotti,

tiraggio del cavo e tiraggio diritto e a 90° del cavo tether. Tutti i campioni hanno superato le prove ambientali e meccaniche senza alcun problema. Come esempio del programma di prova estensivo, la **Figura 6** presenta la configurazione della prova di ritenzione della guaina.

Condizioni di prova: Tutta la prova è stata realizzata utilizzando cicli di temperature tipiche interne applicando una forza di 500N (50kg). Durante la prova sono stati collegati due cavi ponte di accesso al campione.

La perdita d'inserzione è stata monitorata otticamente sia prima che dopo la prova. Tutti i campioni sono stati introdotti in una camera accessibile con due cavi di ponte di accesso ad entrambe le estremità.

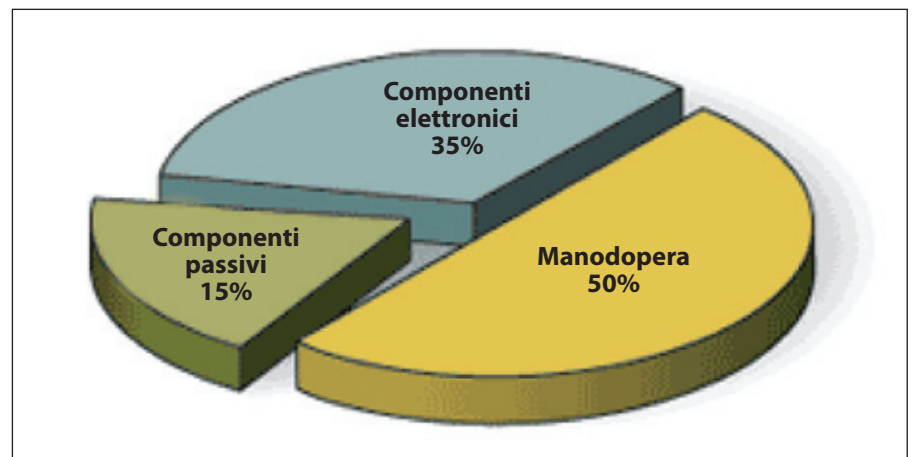
I campioni sono stati condizionati per 1 ora a ciascuna temperatura e provati per 15 minuti.

Le misurazioni del sistema sono state eseguite prima e dopo la realizzazione della prova.

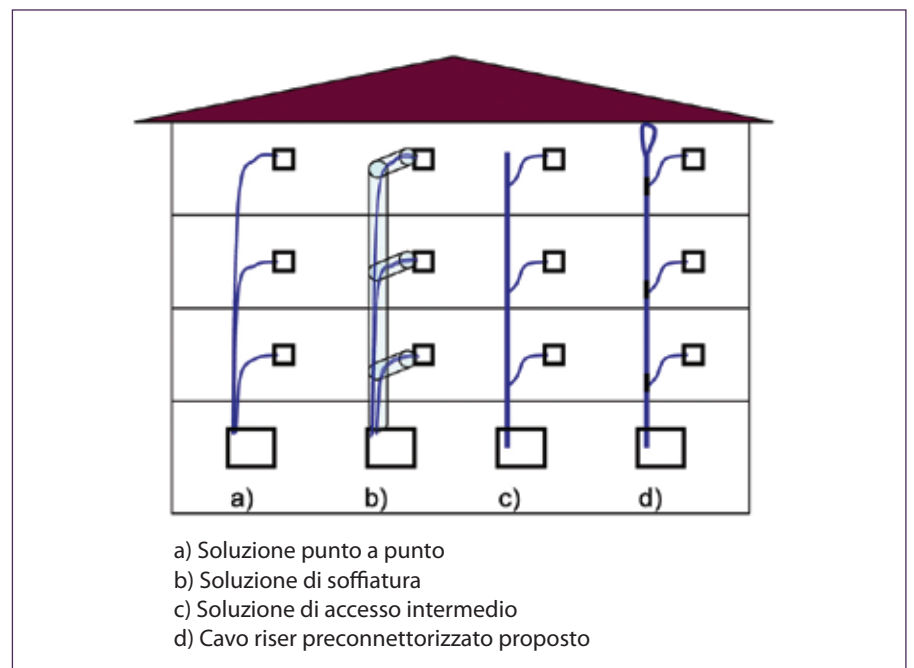
4 Costi di installazione

La **Figura 7** mostra i calcoli dei costi tipici per la prima installazione di reti di fibra fino a domicilio. I costi di manodopera rappresentano di norma la metà dei costi della prima installazione delle reti di fibra fino a domicilio, mentre i componenti passivi rappresentano solo il 20% dell'investimento totale. I costi di manodopera comprendono due elementi: il tempo di installazione, di prova e di localizzazione guasti, nonché la tariffa oraria dell'installatore di rete. La tariffa oraria dipende dalla perizia dell'installatore e dall'equipaggiamento richiesto per l'installazione dei componenti.

▼ **Figura 7:** Costi tipici della prima installazione⁽³⁾



▼ **Figura 8:** Principali architetture FTTH utilizzate in unità MDU





Criteria	Da punto a punto	Fibra soffiata	Accesso intermedio	Cavo riser proposto
Tempo di ispezione	medio	lungo	corto	medio
Tempo di installazione	lungo	lungo	molto lungo	molto lungo
Manodopera specializzata richiesta	sì	sì	sì	no
Costi del materiale	basso	alto	medio	alto
Costi d'installazione totali (manodopera + materiale)	medio	alto	alto	basso
Plug & Play (sicurezza – velocità, danno del cavo)	no	no	no	sì

▲ **Tabella 1:** Comparazione fra soluzioni di installazione MDU principali

Le principali architetture MDU utilizzate per le installazioni MDU sono illustrate nella *Figura 8*:

- Soluzione da punto a punto tradizionale – tutte le fibre sono portate fino al cliente e terminate separatamente
- Fibre soffiate – fibre/cavi singoli vengono soffiati dallo scantinato al cliente
- Accesso intermedio – la guaina del cavo viene tagliata e le fibre sono selezionate ed estratte su ciascun piano
- Riser preconnettorizzato – soluzione “plug and play”, completamente testata in fabbrica

Per realizzare le soluzioni e le installazioni da punto a punto e soffiatura della fibra i singoli cavi sono stati tesi in un solo punto nello scantinato a ciascun piano di un edificio, data la necessità di centralizzare gli splitter o i componenti elettronici. Entrambi questi approcci richiedono molto tempo ed un tecnico specializzato con notevole esperienza per realizzare le giunzioni dell'alimentatore e i segmenti di distribuzione della rete.

Anche le soluzioni di accesso intermedio richiedono molto tempo per l'installazione e tecnici altamente qualificati per tagliare la guaina del cavo, selezionare le fibre ed estrarle su ciascun piano. Inoltre, i proprietari delle unità multiabitative (MDU) sono a volte riluttanti a concedere l'approvazione ad un fornitore di servizi per l'installazione di un nuovo cablaggio

e di attrezzature all'interno dei propri edifici, a causa delle interferenze che queste attività causerebbero agli inquilini, cosicché il fattore velocità diventa ancora più importante.

La *Tabella 1* illustra una comparazione fra le principali architetture MDU utilizzate per le unità multiabitative in termini di caratteristiche del sistema.

Il cavo riser proposto può essere installato con rapidità e facilità e minimo disturbo per il cliente finale. In sostituzione delle tecniche di installazione tradizionali che richiedono un cavo separato per ciascun piano o la realizzazione di un accesso intermedio in punti specifici, il cavo OptiRise™ può essere semplicemente tirato attraverso il condotto del riser verticale. Quindi si allineano i punti di accesso della rete con le aperture del condotto del riser per accedere ai cavi di derivazione.

Questa soluzione innovativa offre notevoli vantaggi per quanto riguarda la velocità di installazione, consentendo inoltre di ridurre significativamente il numero di installatori qualificati necessari per effettuare un'installazione con successo.

Allo stesso tempo, si riduce il rischio di rifacimento dei lavori e di guasti poiché ciascuna fibra del cavo riser è completamente testata in officina prima della spedizione al cliente e fornisce preziosi punti di prova durante l'installazione e la successiva ricerca guasti.

La soluzione preconnettorizzata riduce i rischi per la salute e la sicurezza associati alla preparazione di cavi di fibra e giunzioni. La connessione di altri clienti MDU in un secondo momento è più facile rispetto a qualsiasi soluzione di giunzione tradizionale. In combinazione con la fibra insensibile alle curvature, questo sistema presenta i vantaggi di una soluzione “plug and play” con eccellenti prestazioni di piegatura del cavo.

5 Conclusioni

Il presente articolo descrive un cavo di distribuzione a fibre ottiche completamente prefabbricato progettato come elemento chiave del sistema Ascend™ MDU di Corning di installazione all'interno di edifici di unità multiabitative (MDU).

La soluzione con cavo riser proposta è generalmente più rapida e il costo totale di proprietà è spesso inferiore rispetto alle architetture tradizionali con giunzioni per installazioni FTTH in edifici MDU.

Tutte le prove ambientali (invecchiamento termico e variazione ciclica della temperatura e umidità) e tutte le prove meccaniche sono state eseguite con successo.

I risultati della simulazione confermano che la soluzione presentata soddisfa i requisiti di mercato odierni, sia per quanto riguarda le installazioni MDU di tipo brown field (installazioni già presenti) che green field (installazioni nuove), rendendola ideale per installazioni di rete FTTH rapide e convenienti. ■

6 Riferimenti bibliografici

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- ⁽²⁾ www.corning.com
- ⁽³⁾ C Mazzali, R Whitman, B Deutsch Lightwave January, 2005

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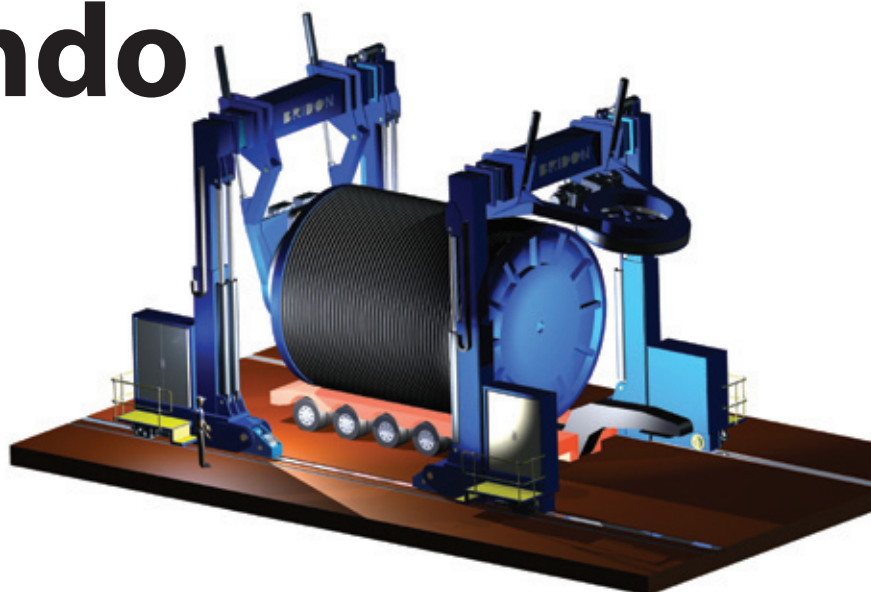
El cabrestante enrollador de cable metálico más grande del mundo

PIPE Coil Technology Ltd se ha adjudicado un contrato de Bridon International para el suministro de dos cabrestantes enrolladores de cable metálico, uno de los cuales será el más grande del mundo por tipo, con una capacidad de levantamiento de 650 toneladas.

Los cabrestantes enrolladores formarán parte de una nueva línea de trenzado de cable metálico que producirá algunos de los cables metálicos más grandes del mundo, cuando entre en producción en 2012. La planta que Bridon está construyendo en Tyneside producirá algunos de los cables más grandes y complejos del mundo.

El diseño innovador del cabrestante enrollador permite cargar y descargar tambores llenos ya sea directamente del piso de producción, ya sea de un tráiler sin necesidad de puente grúa. Esta capacidad, junto con un diseño ligero, ofrece ventajas operativas significativas respecto a los grandes cabrestantes enrolladores tradicionales utilizados en el sector del cable metálico, y ha sido el principal factor decisivo para Bridon a la hora de seleccionar a PCT como proveedor de este importante proyecto.

Colin Pratt de Bridon dijo: "El contrato ha sido adjudicado después de un proceso de licitación de seis meses riguroso, durante el cual PCT ha demostrado claramente que su solución única e



▲ Imagen del cabrestante enrollador de cable metálico más grande del mundo con capacidad de levantamiento de 650 toneladas

innovadora puede cumplir los requisitos operativos de Bridon."

La adjudicación del contrato atestigua la innovación técnica del equipo de diseño de PCT y la probada capacidad de la compañía para proveer soluciones técnicas personalizadas de alta calidad a los líderes de la industria global en los sectores manufactureros del cable metálico, cable submarino umbilical y de suministro eléctrico y tubería de descarga.

PCT Ltd es una empresa de propiedad privada con base en Newcastle, Reino Unido, con subsidiarias en Estados Unidos y China. La compañía diseña y suministra

soluciones de enrollado y empaquetado para productos flexibles como tubos de plástica, cables submarinos umbilicales y de suministro eléctrico, tubería de descarga y cables de acero.

Bridon International, cuya oficina central se encuentra en Doncaster, Reino Unido, dirige nueve plantas manufactureras en todo el mundo con oficinas técnicas y de ventas, respaldadas por una red global de agentes y distribuidores.

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Ahorre tiempo con las nuevas banderitas identificadoras para fibra óptica

Silver Fox, fabricante de soluciones de etiquetado innovadoras, duraderas y que permiten ahorrar tiempo, ha presentado su nueva gama de etiquetas "Optical Fibre Flag" ideales para aplicaciones en los sectores industriales de comunicación de datos, telecomunicaciones, eléctrico y

de suministro de energía. Estas etiquetas resistentes y de larga duración son suministradas en hojas A4 precortadas que pueden ser imprimidas con cualquier tipo de impresora láser de oficina. Las plantillas de las etiquetas pueden ser descargadas del software

de etiquetado Labacus Innovador de la compañía.

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Solución completa de Roblon

ROBLON Industry es un proveedor de soluciones completas para la industria del cable, especializado en máquinas para la fabricación de cable e hilos industriales para cables.

La compañía desarrolla y produce fibras industriales de alta tecnología como elementos de refuerzo de vidrio y aramida, hilos de atado y cordones de rasgado (estándares y bloqueadores de agua) y está certificada ISO 9001 y 14001.

Desarrolla y produce también equipos de revestimiento (servers), atado, enrollado y desenrollado y es conocida por su maquinaria de revestimiento y atado de alta calidad con más de 400 unidades en función en todo el mundo.

El vidrio compuesto de Roblon es un elemento de refuerzo de vidrio revestido con material termofusible ideal para reforzar cables enterrados y cables aéreos de tramo corto.

Roblon produce una serie de elementos de refuerzo de vidrio compuesto y ofrece formulaciones especiales de material termofusible. Un ejemplo de sus

productos es una versión extra adhesiva que transmite la fuerza de los elementos de refuerzo al material de revestimiento, ideal para cables aéreos de tramo corto.

La compañía ha desarrollado también una formulación ideal para cables para enterrado directo o instalados en ambientes extremos como los sistemas de alcantarillado.

El vidrio compuesto de Roblon es un hilo completamente impregnado y extremadamente resistente que puede ser usado en cualquier proceso de producción y trenzado alrededor del centro del cable o aplicado longitudinalmente.

Los equipos de revestimiento estándar de Roblon – SE-18 y SE-24 – disponen de resultados probados y son usadas por productores de cable de fibra óptica de todo el mundo. Estas máquinas aplican hilos a un cable desenrollando el material, un sistema ideal para hilos como el vidrio compuesto de Roblon.

La tensión es controlada individualmente durante la producción por medio de frenos de histéresis y software



▲ Vidrio compuesto de Roblon

de vanguardia. Las máquinas de revestimiento de Roblon pueden ser integradas fácilmente en líneas de producción existentes y nuevas.

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Ethem recibe el premio "Silver Certificate"



▲ Ethem Erdas acepta su premio durante Interwire 2011 en Atlanta

Ethem Erdas, director de productos para aplicaciones de alambre y cable de Beta LaserMike, ha recibido el premio "Silver Certificate" de Wire Association International (WAI).

El prestigioso premio le fue otorgado por el artículo técnico titulado "An in-process SRL predictor system for data cable manufacturing." El premio fue entregado durante la exposición comercial Interwire 2011 y el 81º congreso anual de WAI en Atlanta en mayo.

El artículo ilustra el importante papel que juega un sistema de previsión de la pérdida de retorno estructural integrado en el proceso en la comunicación de datos y en el proceso de fabricación de cable coaxial. Se describen varios métodos de previsión y análisis corrientemente en uso en la industria y, usando datos reales medidos en campo mediante el analizador SRL Pro Predictor, el artículo ilustra los ahorros de tiempo y costes obtenidos por varios fabricantes.

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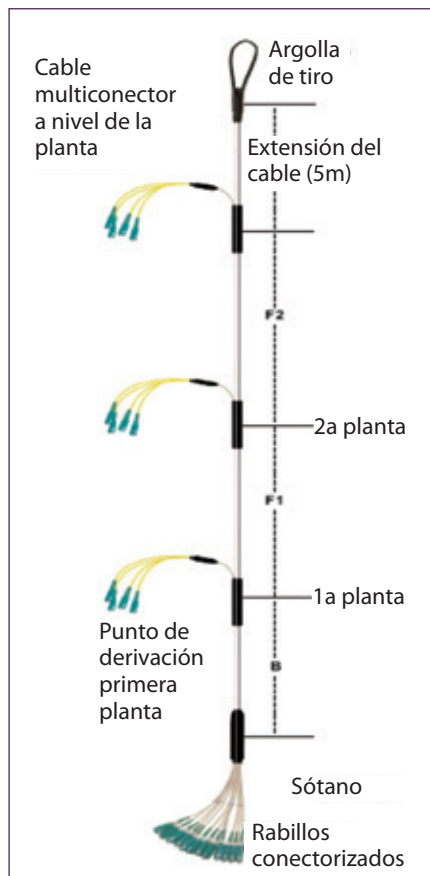
Cable riser insensible a las curvaturas para instalaciones FTTH

Por Grzegorz Tosik, Paweł Kołodziej y Magdalena Mirynowska, de Corning Cable Systems

Resumen

Actualmente las redes de fibra hasta el hogar, conocidas también con la sigla inglesa FTTH (*Fiber To The Home*), juegan un papel crucial en el desarrollo de la sociedad de la información. La creciente popularidad que han adquirido las instalaciones FTTH en los últimos años ha llevado la fibra a millones de hogares cercanos a un cable ya instalado, pero, a pesar de esto, la penetración del mercado sigue siendo todavía relativamente modesta (un 2,9% de hogares en EEUU, menos de un 4% en Europa y aproximadamente un 25% en Asia⁽¹⁾).

▼ **Figura 1:** Cable riser



Las viviendas multi-familiares (MDU, *Multi-Dwelling Units*) representan una oportunidad para el desarrollo de las redes FTTH que permitirá una aceleración de la penetración del mercado. En las viviendas multi-familiares (MDU) típicas, la fibra es llevada a nivel del piso y compartida por varios hogares. El despliegue de redes en viviendas multi-familiares, en condiciones desafiantes, es diferente que en los tradicionales hogares unifamiliares y requiere una tecnología adecuada.

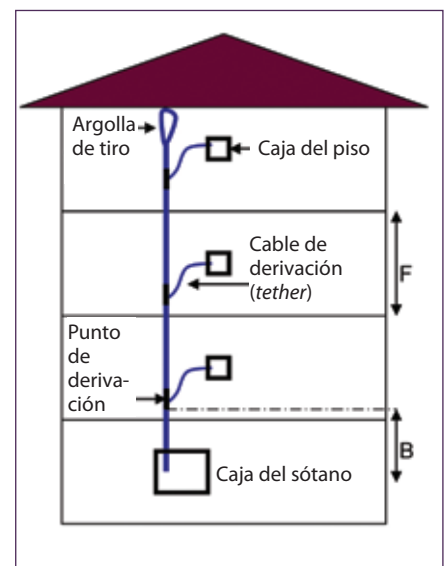
Además, a medida que se despliegan las redes, los clientes tendrán dificultades para encontrar técnicos suficientemente preparados para efectuar los empalmes y hacer frente a grandes despliegues.

Para responder a la demanda del mercado, Corning ha diseñado una solución FTTH para MDUs (ASCEND™) que utiliza un cable de distribución vertical (*riser*) llamado OptiRise™. El cable riser permite resolver los problemas de instalación principales y realizar instalaciones MDU más fiables y de manera más fácil y rápida.

El cable de fibra óptica está provisto de puntos de acceso a la red preinstalados en puntos especificados por el cliente, distribuidos a lo largo del cable. El sistema es realizado y probado en la fábrica, empaquetado y enviado al cliente listo para su instalación.

1 Cable de distribución vertical (*riser*)

La reciente difusión de fibras monomodo de insensibilidad a la curvatura mejorada para aplicaciones FTTH ha sido impulsada por la cantidad creciente de fibra óptica instalada dentro de los edificios y los consiguientes desafíos en lo que se refiere a curvatura. Como se ha dicho antes, otro desafío de las instalaciones de hoy es la necesidad de reducir los tiempos de instalación.



▲ **Figura 2:** Arquitectura MDU típica

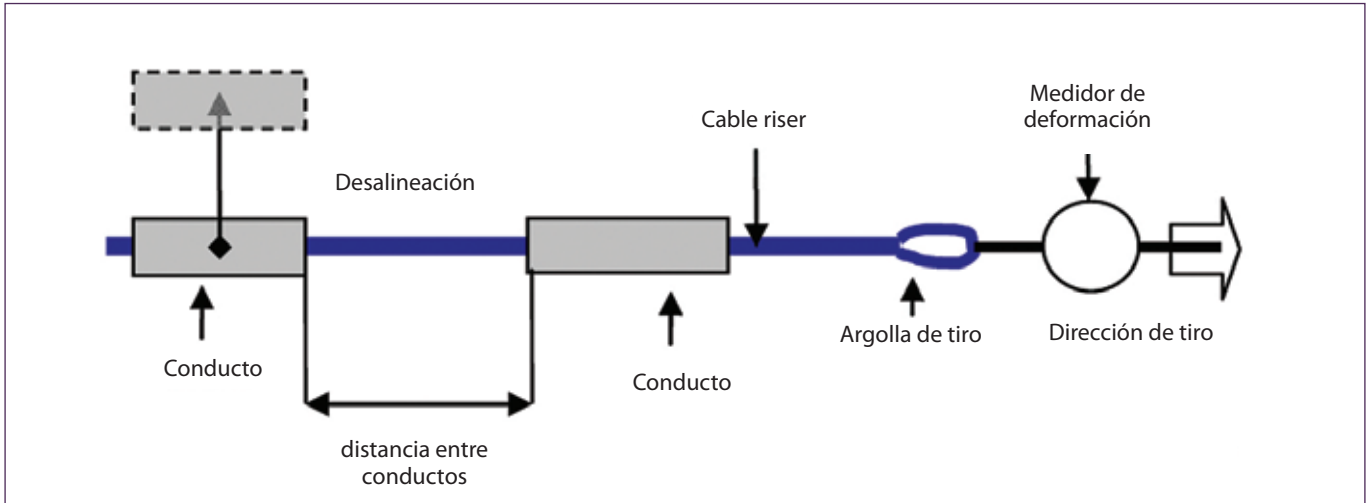
Para resolver este problema específico se ha diseñado el cable riser preconectorizado. Con el número creciente de instalaciones FTTH, los clientes tienen problemas para encontrar técnicos suficientemente capacitados para realizar los empalmes.

Además, los precios de los técnicos altamente especializados están subiendo.

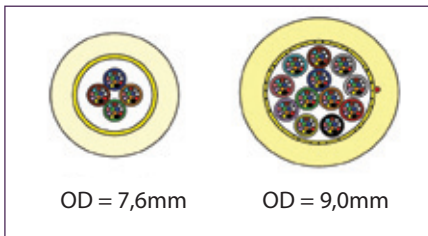
La solución propuesta presenta considerables ventajas de velocidad de despliegue y permite además reducir significativamente el número de instaladores especializados necesarios para efectuar una instalación satisfactoriamente.

La reducción de los tiempos de instalación permite a los clientes generar ingresos más rápido, aumentando así el rendimiento de la inversión (ROI).

El elemento fundamental de la solución propuesta es un cable riser preconectorizado que se ilustra esquemáticamente en la *Figura 1*.



▲ **Figura 4:** Configuración de prueba



▲ **Figura 3:** Cable micromódulo (hasta 144f)

Esta solución se basa en una fibra insensible a las curvaturas ideal para instalaciones en viviendas multi-familiares, en condiciones desafiantes.

Este cable riser lleva conectores (de tipo SC o LC) en el tramo instalado en el sótano, que serán conectados a un terminal de distribución del sótano, y cables de derivación multiconector de fibra (*breakout*) que llegan a cada planta y van conectados a los apartamentos de los clientes.

Todos los conectores y los cables multiconector de cada planta llegan ensamblados de fábrica y, por lo tanto, evitan el típico acceso intermedio del cable. El cable llega completamente probado de fábrica antes de la entrega al sitio de instalación (MDU) y es fabricado siguiendo exactamente la arquitectura de la unidad de vivienda MDU.

Para esto se necesitan sólo pocos parámetros de base, como la distancia entre plantas (F) y la distancia del terminal de distribución del sótano al punto de derivación (*breakout*) de la primera planta (B) (Figura 2).

Con estos datos, el cable propuesto puede ser instalado muy rápidamente incluso por instaladores no familiarizados con fibras ópticas. El tramo final del sótano tiene una longitud predeterminada de 120cm para facilitar la conexión con el terminal de distribución del sótano.

La longitud de cada cable de derivación multiconector (*breakout tether*) a nivel de la planta depende de la altura de cada planta (F) y puede llegar a medir hasta F-15cm. Para reducir al mínimo el diámetro del cable durante la instalación, los conectores de cada planta son colocados de manera alterna a lo largo del cable principal durante la instalación. El cable está equipado con una argolla de tiro para facilitar la instalación. La distancia desde el último punto de derivación (*TAP*) hasta la argolla de tiro está predeterminada en 5m. Para completar el montaje, se pueden escoger varios tipos de conectores, como los SC o LC.

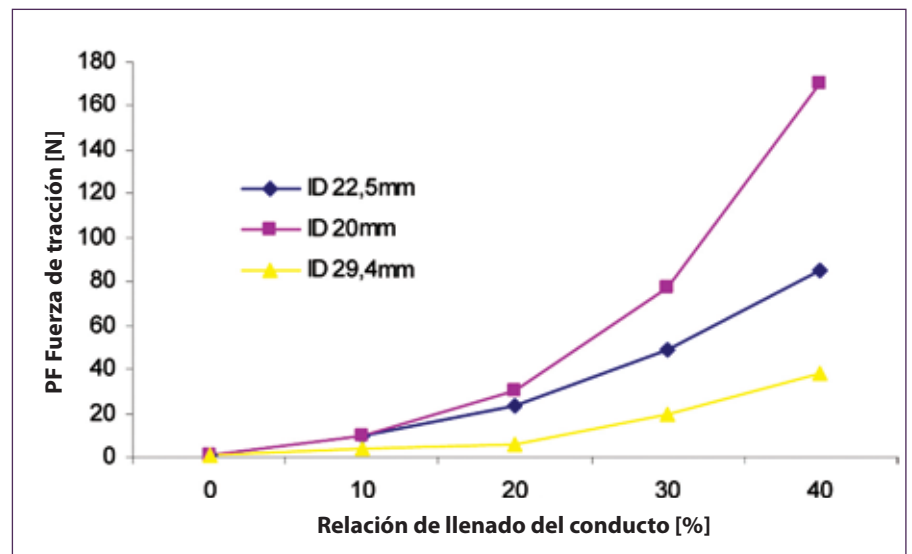
Para encaminar los cables verticales dentro de los edificios de manera eficaz y sin molestias, los investigadores de Corning han centrado sus esfuerzos en el desarrollo de una solución más flexible y de diámetro reducido para este producto que ha llevado a los cables micromódulo FRNC (libres de halógenos y resistentes al fuego) ilustrados en la Figura 3.

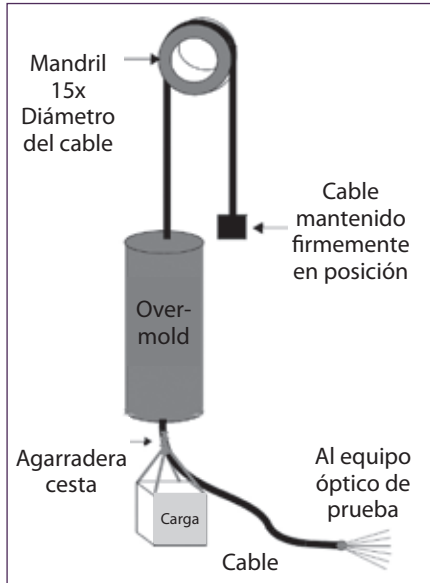
Otra ventaja de este tipo de cables es que pueden doblarse con un radio de curvatura muy pequeño gracias a la fibra ClearCurve^{®12}, que permite almacenar la fibra para las derivaciones (*tether*) o los tramos en exceso de los rabillos de manera prudente. Gracias a su flexibilidad y dimensiones reducidas, el cable riser facilita las operaciones de instalación y su encaminamiento a través de la pared o en las distintas plantas del edificio.

2 Condiciones de instalación

Uno de los problemas más críticos durante la instalación de los cables es tirar de ellos a través del conducto vertical ya instalado en las viviendas multi-familiares MDU (Figura 2). Para simular las condiciones de instalación y determinar los límites de aglomeración de cables en el conducto se realizaron las pruebas que se describen a continuación.

▼ **Figura 5:** Fuerza de tracción frente a relación de llenado





▲ **Figura 6:** Configuración de la prueba de retención de la cubierta

El proceso de instalación fue simulado en varios diámetros y con varias formas de conducto, ya sea con y sin cables de cobre ya instalados. Además, se tomaron en consideración la desalineación y la distancia entre los conductos, como se ilustra en la *Figura 4*. Se realizaron pruebas con conductos de 3 metros de varios tamaños para simular las típicas distancias de 3 metros entre las plantas de un edificio de viviendas multi-familiares MDU. Cada cable fue tirado 3 veces en cada variante de prueba. La *Figura 5* muestra la fuerza de tracción en la variante de 6x4 medida en 3 conductos de distintos diámetros internos (ID) y con distintas relaciones de llenado.

Los resultados mostraron que el factor más importante es el número de puntos de derivación del cable riser que se tiran simultáneamente a través del conducto. Sin embargo, la fuerza de tracción para distintas relaciones de llenado también depende del par trenzado de cobre instalado en el conducto. La fuerza de tracción total durante la instalación no debería exceder los 500N.

Según el tamaño del conducto, la relación de llenado y los datos de desalineación, el número máximo de puntos de derivación tirados simultáneamente se puede calcular de la manera siguiente:

$$PF \text{ Máx. \# de puntos de derivación} = \frac{500N - F_s \cdot MF}{PF} \quad (1)$$

Donde, F# es el número de plantas, MF es la fuerza de desalineación y PF es la fuerza de tracción.

3 Fiabilidad

El plano de prueba de clasificación utilizado es una variación de la

especificación GR-3122, modificada para simular el uso en interiores. Se prepararon muestras de las variantes más comunes: 6 x 4 – 6 puntos de derivación, cada uno con 4f, 12 x 4 – 12 puntos de derivación, cada uno con 4f y 12 x 8 – 12 puntos de derivación, cada uno con 8f.

Se realizaron las pruebas siguientes para cada grupo de muestras: envejecimiento térmico, variación cíclica de temperatura y humedad, retención de la cubierta, flexión del cable, compresión, instalación, tirado a través de conductos, tirado del cable y tirado recto y en 90° del cable de derivación.

Todas las muestras superaron las pruebas ambientales y mecánicas sin ningún problema.

Como ejemplo del programa de prueba de gran alcance, en la *Figura 6* se presenta la

configuración de la prueba de retención de la cubierta.

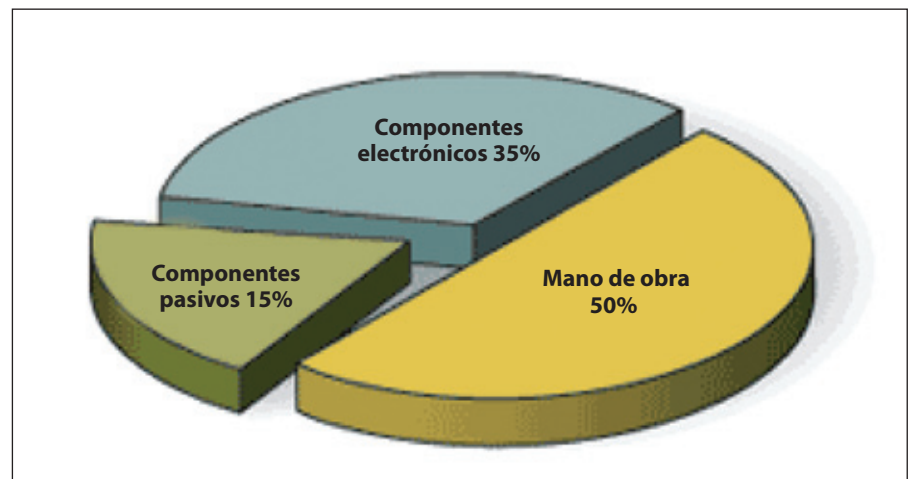
Condiciones de prueba: toda la prueba fue realizada usando ciclos de temperaturas típicas en interiores, aplicando una fuerza de 500N (50kg).

Durante la prueba se conectaron dos puentes de acceso a la muestra. La pérdida por inserción fue monitorizada ópticamente antes y después de la prueba. Todas las muestras fueron introducidas en una cámara accesible con dos puentes de acceso en ambos extremos.

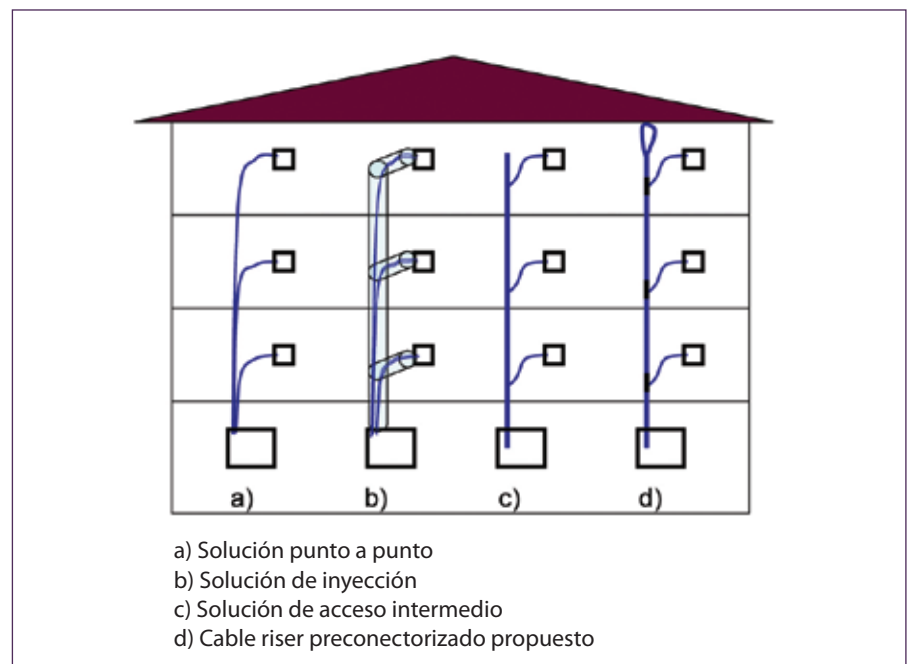
Las muestras fueron acondicionadas para 1 hora a cada temperatura y probadas para 15 minutos.

Las mediciones del sistema fueron tomadas antes y después de realizarse la prueba.

▼ **Figura 7:** Coste típico de la primera instalación^[3]



▼ **Figura 8:** Arquitecturas FTTH principales usadas en MDUs





Criterios	Punto a punto	Fibra inyectada	Acceso intermedio	Cable riser propuesto
Tiempo de inspección	medio	largo	corto	medio
Tiempo de instalación	largo	largo	muy largo	muy corto
Mano de obra especializada requerida	si	si	si	no
Coste del material	bajo	alto	medio	alto
Coste instalación total (mano de obra + material)	medio	alto	alto	bajo
Plug and Play (seguridad – velocidad, daño del cable)	no	no	no	si

▲ **Tabla 1:** Comparación entre las soluciones de despliegue MDU principales

4 Costes de despliegue

La *Figura 7* muestra los cálculos de los costes típicos para la primera instalación de redes de fibra hasta el hogar. Los costes de mano de obra representan normalmente la mitad de los costes de la primera instalación de las redes de fibra hasta el hogar, mientras que los componentes pasivos representan solamente un 20% de la inversión total.

Los costes de mano de obra incluyen el tiempo de despliegue, prueba y búsqueda de averías, además de la tarifa horaria del instalador de la red. La tarifa depende de la capacitación del instalador y de los equipos necesarios para instalar los componentes.

Las arquitecturas MDU principales utilizadas para instalaciones MDU se ilustran en la *Figura 8*. a) Solución de punto a punto tradicional - todas las fibras son llevadas hasta el cliente y terminadas separadamente; b) Fibras inyectadas - los cables/fibras son inyectados desde el sótano hasta el cliente; c) Acceso intermedio - la cubierta del cable es cortada y las fibras son seleccionadas y sacadas a cada planta; d) Cable riser preconectorizado - solución "plug and play", completamente probada de fábrica.

Para realizar las instalaciones de punto a punto y de inyección de fibra se ha metido los cables de fibra por un solo punto del sótano hasta cada planta de un edificio, debido a la necesidad de centralizar los divisores (*splitters*) o los componentes electrónicos.

Las dos soluciones citadas requieren mucho tiempo y un técnico especializado con gran experiencia para realizar los empalmes del alimentador y los segmentos de distribución de la red. Las soluciones de acceso intermedio también requieren mucho tiempo de despliegue y técnicos altamente especializados para cortar la cubierta del cable, seleccionar las fibras y sacarlas a cada planta.

Además, los propietarios de las viviendas multi-familiares (MDU) son reacios a veces a aceptar que un proveedor de servicios instale un nuevo cableado y sus correspondientes accesorios dentro de sus edificios, debido a las interrupciones que estas actividades causan en las actividades cotidianas de los inquilinos, con lo que la velocidad de despliegue se revela aún más importante. La *Tabla 1* muestra una comparación entre las arquitecturas MDU principales utilizadas para las viviendas multi-familiares en términos de características del sistema.

El cable riser propuesto puede ser instalado con rapidez y facilidad perturbando mínimamente al cliente final. En lugar de las técnicas de despliegue tradicionales usadas para la instalación de un cable separado para cada planta o la realización de accesos intermedios en posiciones específicas, el cable OptiRise™ lo hace todo más simple, no hay más que tirarlo por el tubo ascendente vertical. Luego, se alinean los puntos de acceso de red con las aperturas del tubo del riser para acceder a los cables de derivación (*tether*). Esta solución innovadora permite considerables ventajas de

velocidad de despliegue y permite además reducir significativamente el número de instaladores especializados necesarios para efectuar una instalación satisfactoriamente. Al mismo tiempo, el riesgo de repetición de obras y fallos se reduce porque cada fibra del cable riser llega completamente probada de fábrica antes de la entrega al cliente y ofrece valiosos puntos de prueba durante el despliegue y para la sucesiva búsqueda de averías. La solución preconectorizada reduce los riesgos para la salud y la seguridad debidos a la preparación de cable de fibra y los empalmes. La conexión de otros clientes MDU en un segundo momento es más fácil respecto a cualquier solución de empalme convencional. Combinado con la fibra insensible a las curvaturas, este sistema presenta las ventajas de una solución "plug and play" con excelentes prestaciones en caso de doblado del cable.

5 Conclusiones

Este artículo describe un cable de distribución de fibra óptica completamente prefabricado que constituye el elemento clave del sistema Ascend™ MDU de instalación en edificios de viviendas multi-familiares (MDU). La solución de cable riser propuesta es generalmente más rápida y el coste total de propiedad es más bajo respecto a las arquitecturas de empalme tradicionales para instalaciones FTTH en edificios multi-familiares. Todas las pruebas ambientales (envejecimiento térmico y variación cíclica de temperatura y humedad) y todas las pruebas mecánicas han sido realizadas con éxito.

Los resultados de la simulación muestran que la solución presentada cumple los requisitos de mercado de hoy ya sea para instalaciones MDU de tipo "brown field" ya sea "green field" (instalaciones ya presentes o instalaciones nuevas), que la convierten en solución ideal para despliegues de redes FTTH rápidos y rentables. ■

6 Referencias

- ^[1] FTTH Council Press Release 23/7/2008
- ^[2] www.corning.com
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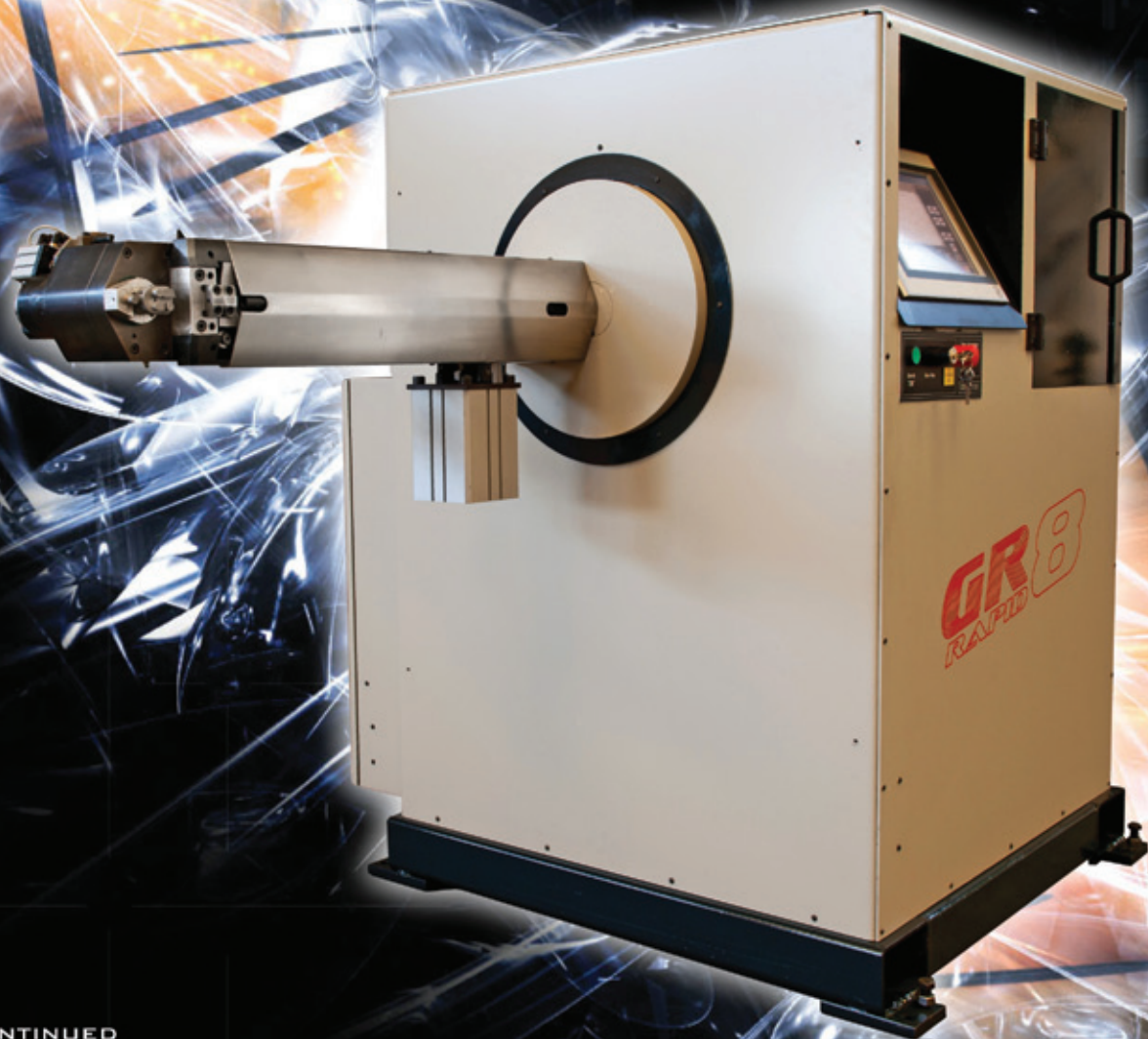
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