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Wire & Cable ASIA 线缆

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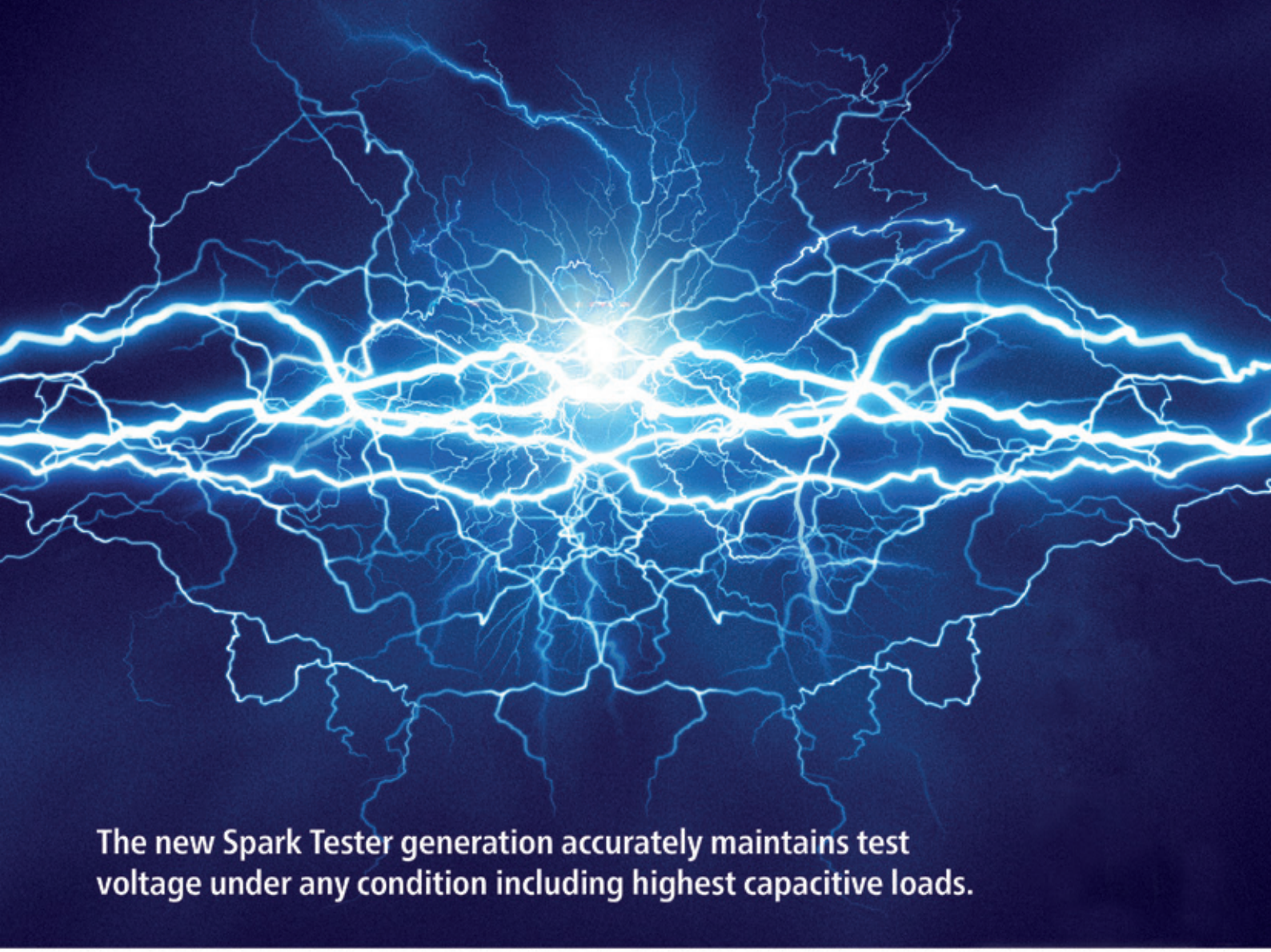

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President SIKORA (Fuzhou) Electronic Technology Co., Ltd.

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wire Southeast ASIA

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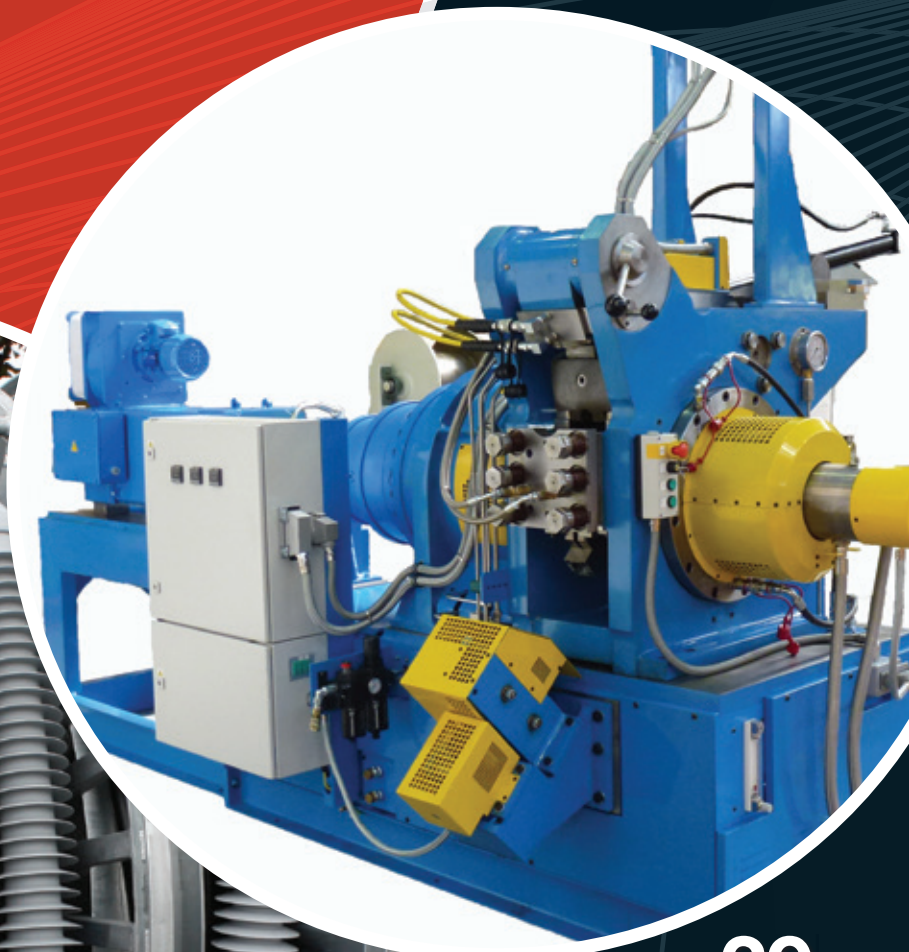
Contents



Regulars

Next Issue

Getting Technical -

Ultra-fast, high resolution, surface quality measurement (SQM), for wires, optical fibres and cables

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www.bigstockphoto.com "Bridge link between Mrt and Bts mass transportation in the heart of Bangkok" by Khunaspix

Expansions, new branches and wire 2016

There is a broad mixture of expansions, new branches and looking ahead to the wire and cable industry's largest exhibition – wire 2016 – in this issue of *Wire & Cable ASIA*.

Gem Gravure has opened a new plant in San Diego, USA, catering for the company's expanding customer base in the west. You can read the full details on page 12.

Italian company Eurolls is also getting closer to its Asian customers with the opening of a branch in China – Eurolls Machinery Shanghai. This will provide immediate technical support to customers in the region. Full story on page 14.

UK manufacturer BWE has launched the smallest machine in its popular Conklad range – the 315 – featuring many of the standard features of its larger machines. Details are on page 29.

And it is now less than nine months away from the wire and cable industry's largest exhibition in its calendar, wire 2016 in Düsseldorf.

The German city will again play host to thousands of visitors from 4th to 8th April. Catch up with the latest news on page 10.

David Bell

Editor

When and where

September 2015

16-18 September:
wire Southeast Asia –
trade exhibition –
Bangkok, Thailand
Organisers:
Messe Düsseldorf Asia
Fax: +65 6337 4633
Email:
wire@mda.com.sg
Website:
www.wire-southeastasia.com

October 2015

5-10 October:
EMO –
trade exhibition –
Milan, Italy
Organisers:
EFIM-ENTE Fiere
Italiane Macchine
Fax: +39 0226 255 882
Email:
info@emo-milan.com
Website: www.emo-milano.com

October 2015

6-8 October:
wire South America –
trade exhibition –
São Paulo, Brazil
Organisers:
Messe Düsseldorf GmbH
Fax: +49 211 4560 668
Email:
info@wire-south-america.com
Website:
www.wire-south-america.com

October 2015

TBA October:
IWCS Technical Symposium –
conference and exhibition –
Atlanta, Georgia, USA
Organisers:
IWCS
Tel: +1 717 993 9500
Email:
phudak@iwcs.org
Website: www.iwcs.org

The temporary cables from Nexans

High voltage benefits

NEXANS temporary site cables are custom-made, quick-connectable cables for use in the high-voltage network, for example, during repair work on overhead lines or in transformer stations when converting networks.

The temporary site cables feature multi-strand copper conductors with cross-sections of 150mm^2 and 300mm^2. They are similar in design to high voltage cables, but the high-purity insulation allows for a reduced insulation thickness, resulting in a compact cable with reduced outer diameter and weight.

Temporary site cables are supplied with flexible pre-fabricated and pre-tested silicone rubber terminations which facilitate use in any position. Temporary site cables are easy to handle on construction sites and quick to connect.

The cables are available in 110, 132, 150 or 230kV and are produced in lengths of 50m to 500m. They can carry a current up to 750A and can be connected in parallel to double the capacity.

They are delivered on highly durable single- or triple-chamber drums that ensure safe unwinding and winding of the cables and the pre-fabricated terminations.

Prior to delivery, each individual cable is rigorously tested in Nexans' high voltage laboratory in Hanover. Temporary site cables are exceptionally robust so they do not have to be checked for freedom from partial discharge until they have been used a number of times.

Temporary site cables are not only suitable for the temporary supply of power during scheduled conversion work in transformer stations or as an alternative to temporary installation overhead lines. They can also be put to instant use in case of emergencies or disruptions such as storm damage. During a power outage, temporary site cables can have power restored within hours once the cables are on site.

Volker Gauler, marketing and product manager land high voltage contracting, said: "Temporary site cables are perfect for reducing the disconnecting times of transmission lines during conversion. We are continuously improving them to maximise the benefit to our customers. Nexans' innovative temporary site cables help to ensure a secure power supply at any time."

Nexans – France
Website: www.nexans.com

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E-mail.: office@supermacindia.com

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Plot No 2 Sector 6, IMT Manesar, Gurgaon Haryana, India
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E-mail.: jasvinder@supermacindia.com

www.supermacindia.com

Wire, wire, everywhere – especially at Düsseldorf!

MANY areas of our modern world depend on a reliable supply of electric power. This requires not only power stations where the electricity is generated but also wires and wire-based products which then take the power to the consumer and make it usable.

All these products are made by businesses operating in the wire and wire-processing industry.

And it is this industry which heads for Düsseldorf next April for wire 2016 – the largest exhibition in the show calendar.

A wind power station, for instance, has 120 miles of copper wire, mainly in the form of coils in ring generators and, of course, also in the power line that connects the power plant to the grid.

The main reason for the use of copper is that it has the highest electrical conductivity of all the possible metals that may be used.

The grid consists of overhead power lines, underground cables and facilities such as switching and transformer stations. In addition to the actual conductor, a line generally also contains further wire products acting as reinforcement, preventing electro-magnetic interference and transmitting signals.

With overhead power lines the net weight is important, so they are usually made from aluminium.

The transfer capacity of an existing line is relatively easy to expand. It is a matter of replacing the traditional round conductor with a conductor with a sector-shaped cross section which then increases the size of the power-conducting cross section.

If, on the other hand, power cables are laid within buildings, then the weight is less important. In fact, in a study entitled “Ecodesign for Power Cables in Indoor Electrical Installations”, the European Copper Institute (ECI) even recommends using copper wire with a bigger cross section. This minimises losses, so that power is transmitted more efficiently.

Another highly promising energy efficiency measure has been worked out by the Ultrawire Project, sponsored by the European Commission. Coordinated by the Department of Materials Science and Metallurgy of the University of Cambridge, a range of companies are working on the industrial manufacturing of ultra-conductive copper.

The largest exhibition in the wire and cable industry is being staged in Düsseldorf next April

The project involves numerous businesses, including copper, copper wire and cable manufacturers, as well as university departments.

The material, which has so far only been created in a laboratory, is almost pure copper with a very small addition of finely distributed nanocarbon.

Used at room temperature, this material is almost twice as conductive as pure copper. When engines, transformers and other components are wired with ultra-conductive copper conductors, they should therefore be much lighter than in the past.

Finally, to use electric power in technical systems, it is vital to have contact elements which are both efficient and reliable.

The relevant functional parts, such as pins, sleeves, springs and bent parts, are made from wire and sheet metal in a variety of alloys, eg copper combined with precious metal.

Depending on usage conditions and the resulting loads, parts must have a certain conductivity, but also several further qualities, such as dimensional stability, impact strength and abrasion resistance.

There is currently a growing trend to make increasingly better use of the physical qualities and tolerances of the materials that are processed. This automatically leads to greater require-ments on production engineering.

Manufacturers of wires and wire products for electrical systems therefore need innovative machinery and equipment.

These and many forward-looking developments will be highlighted at the leading international industry trade fair, wire 2016, which takes place from 4th to 8th April next year, and is organised by Messe Düsseldorf GmbH.

Messe Düsseldorf GmbH – Germany
Website: www.wire.de

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A real Gem for expansion plans

GEM Gravure offices now cover the United States coast to coast after the company opened Gem West in the San Diego area. The new location provides a work shop for printer preparation and repair. Office space is available for customer meetings, training or demonstrations.

The new facility joins Gem World Headquarters in Hanover, Massachusetts, and the Midwest Research Facility in Nixa, Missouri.

"We are excited to have a home in California, near our expanding west coast customer base," said Paul Gemelli, executive vice president of GEM. "The new location allows us to stage equipment within our western region. It represents GEM's commitment to provide the best service to our customers, no matter where they are located."

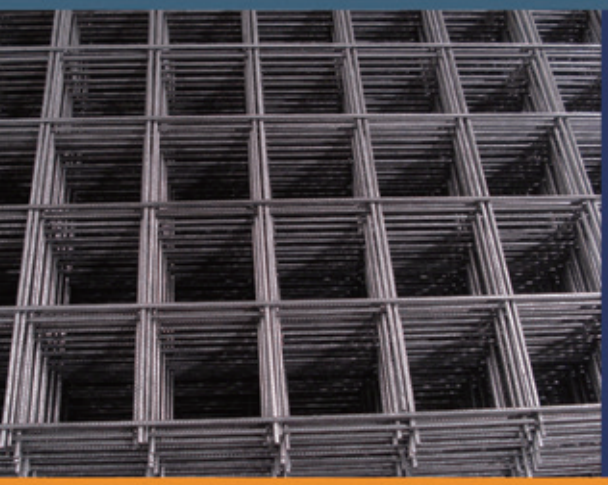
Family owned and operated since 1952 and located in Hanover, Gem designs speciality inks, all of which are RoHS compliant in a variety of applications.

Gem Gravure Inc – USA
Website: www.gemgravure.com

The Gem Gravure plant in San Diego

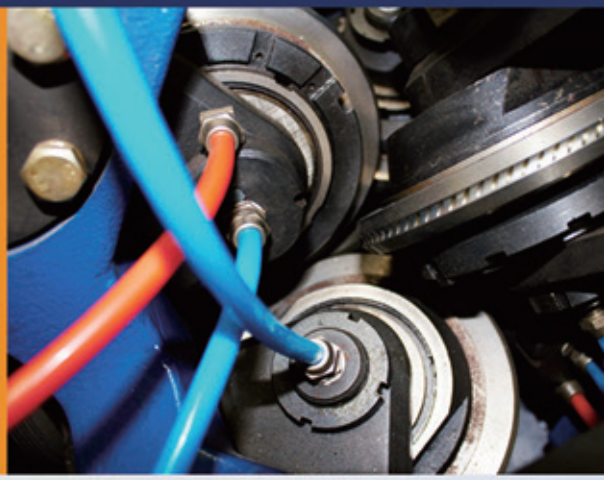
STIRRUP BENDER

WIRE STRAIGHTENING AND CUTTING MACHINE



WIRE MESH WELDING MACHINE

WIRE COLD ROLLING MACHINE



New Factory 270,000 m²

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South Side of Huashi Rd., Beichen Dist.,
Tianjin, China,300409
Tel: +86-22-26993766
Fax: +86-22-86996265
Website: www.tjkmachinery.com
E-mail: tjk@tjkmachinery.com

Eurolls gets closer to Asian customers

EUROLLS is getting closer to its customers by implementing a branch in China – Eurolls Machinery Shanghai.

The mission of Eurolls Shanghai, with its Italian management team and highly specialised local staff, is to promote the sales of microcassettes/cassettes while being able to provide the Asian and South Asian customer base with immediate technical support (which is crucial for this technology to be successful).

In the machinery division, Eurolls is proficient when it comes to high carbon technology and its processes. This is a result of years of experience in the field of PC wire, PC strand, steel rope and steel cord. Eurolls Machinery Shanghai is providing its technical support to the international and Asian markets, and its engineers are assisting with scientific analysis and identification of the most adequate technical/commercial solutions.

The company has also received a significant order for the production of custom-made equipment. The sale of a "highly innovative integrated solution" for the construction wire market was also delivered, which will provide increased productivity, space savings and a significant ROI to the customer.

This machinery was on display in early June during an Open House, which took place in Italy by Eurolls Machinery and the Eurolls Product Division. Agents, managers of Eurolls subsidiaries, and several customers accepted the invitation to attend. This was also the official introduction of the new managing director of Eurolls SpA machinery division, Fabio Firmani, who joined the Eurolls Group last April.

Eurolls Group SpA – Italy **Website**: www.eurolls.com

New web launch

Lloyd & Bouvier of Clinton, USA, has launched its new website featuring new product search. This website is smartphone-ready and features a unique Quote Cart for gathering information on products including self-print specification sheets.

More and more customers are sending Internet requests for new and fully rebuilt wire and cable machinery. The new website lets visitors search and conveniently accumulate information on new, rebuilt and used machines, as well as accessories and parts, with the Quote Cart feature.

Requests for printed data sheets on all equipment are automatically sent to selected co-workers, who can immediately view or print a copy. Lloyd & Bouvier gets an automatic notification if quotes are requested. The responsive website works well on smartphones, tablets, laptops and desktop computers, and is both Windows and Mac compatible.

Lloyd & Bouvier – USA
Website: www.lloydbouvier.com

Laboratory expansion for Metalube

SPECIALIST lubricant manufacturer Metalube is to more than double the size of its laboratory facilities at its Manchester, UK, headquarters.

Already an award-winning innovator, the company plans to considerably increase its laboratory capacity to 126m². The new fully equipped facility will be used for both quality control and research and development.

An artist's impression of Metalube's new laboratory

Chris Nettleship, technical director, said: "We create the best possible lubricants available in the market and our laboratory team plays a huge part in this.

"We have in recent times increased the number of chemists within Metalube by 25 per cent. We can now give them an outstanding 21st century laboratory to work from."

The new space will be purpose built and fitted with the latest specialist laboratory furniture. It will meet all the requirements for a modern day lubricant developer.

Metalube manufactures a range of non-ferrous drawing oils and maintenance lubricants as well as a variety of corrosion protection and forming oils. The experienced exporter employs 34 people and has offices in China, India and Brazil.

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

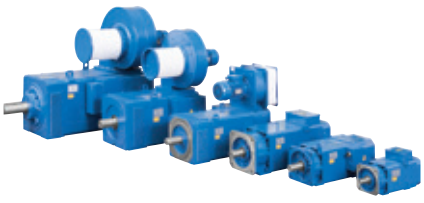
DC and AC in a wide selection

MAGNETIC Srl has been producing electric motors for variable speed applications since 1981.

The present production programme includes DC and AC motors, both for positioning systems (permanent magnet servomotors) and for power applications (DC or asynchronous vectorial motors) with a wide selection of sizes and options.

Magnetic's production has been appreciated by both Italian and worldwide customers for many years for its high quality, product reliability and flexible approach to tailor-made solutions.

The company's investment policy is to develop a flexible and lean production, using the most advanced organisation techniques, and collaborate with specialised suppliers who make it possible to satisfy the most demanding market requests in terms of lead time.



The MA series from Magnetic

Products research and development allow Magnetic to propose advanced technological solutions and to support customers while integrating products with their solutions. Wire drawing and winding machines is one of the most successful areas for Magnetic with machines produced with DC motors up to 200kW, and then through to AC vectorial motors to more than 500kW.

At the moment the higher number of applications use AC vector motors, which provide additional advantages such as:

- Less maintenance due to brushes absence
- Higher protection level (IP54 or more) in the same frame size and with the same dimensions of DC motors, a feature appreciated in such a harsh environment with metallic dust typical of wire production
- High speed regulation, even up to 8,000rpm
- Possibility to have dedicated solutions for axial ventilation to fit the space constraints of drawing machines

Also, compared to standard asynchronous motors, AC vectorial motors can be better appreciated for high power/torque density and reduced dimensions at the same power, and for increased dynamic performances. Last but not least, the asynchronous vectorial motors produced by Magnetic can be equipped with UL/CSA certified insulation systems.

Magnetic Srl – Italy
Website: www.magnetic.it

Answers just a click away

Ametek Electronic Components and Packaging (ECP), end-to-end electrical packaging and cable solutions for harsh environments and a producer of custom-engineered preforms and micro stampings, has launched a new global website at www.ametek-ecp.com

The new site provides a single, easy-to-use web portal for Ametek ECP's three principal businesses:

ECP-Packaging, developer of high-reliability electrical packaging solutions for harsh environments. Its products include glass-to-metal seal (GTMS) and ceramic-to-metal seal (CTMS) hermetic packaging and high-temperature co-fired ceramic (HTCC) connectors for aerospace, defence, medical, telecommunication and industrial applications. Its brands include Aegis™ and Glasseal™ packaging and connector products.

ECP-Components and Wire, a global provider of custom-engineered solder and braze preforms, micro stampings and cover assemblies, as well as precision fine bond wire and integrated sub-assemblies for semiconductor packaging. Its products, marketed under the Coining® brand, serve the automotive, defence, electronics, medical, microwave, photonic and semiconductor markets.

ECP-Defense Navy: innovative custom electrical and optical connectors, cable assemblies, pressure hull penetrators, and fibre-optic feedthroughs for a wide range of extreme environments.

Ametek SCP – USA
Website: www.ametek-ecp.com

Anniversary time!

Miltec UV is celebrating it 25th anniversary this year. Founded in December 1989 by Joe and Marilyn Blandford as a distributor of UV curing products, they were joined shortly thereafter by sons Bob and Charles Blandford.

During those 25 years, Miltec has grown from four employees as a distributor, to over 65 employees and is now a global UV equipment manufacturer.

Miltec is unique in that it offers both microwave-powered and arc lamp systems to its customers, who represent about 30 major industries.

Miltec's research and development division, Miltec UV International, LLC, is a major part of the business, always looking at innovative ways to optimise the use of UV technology.

Currently, the company has a US Department of Energy (DOE) contract to develop processes to utilise UV technology in the production of lithium ion batteries to reduce cost in vehicle technology. Along with being chosen as a top vendor by many of its customers, the company was a winner of the 2012 IWF Challengers Award for its innovative HPI Gloss Control UV Curing System.

Miltec's president, Bob Blandford, was honoured as a finalist for the International Leadership Award by the Maryland Trade Center Institute in 2013.

Miltec has set a new benchmark for UV curing equipment, making its systems a choice for those interested in maximising production and profits.

The company's reputation has been consistent with its mission of building long-term relationships with customers by providing high quality products at reasonable prices and with excellent customer service, while upholding a high code of ethics.

While the company has overcome and continues to thrive in spite of many challenges and changes over the years, it has been appreciative and proud of the loyal customers who have been part of its success.

As new opportunities arise, Miltec looks forward to further growth with new customers and serving past customers in the coming years.

Miltec – USA
Website: www.miltec.com

New issue out now!

THE new issue of the Niehoff magazine, the customer journal of the Niehoff Group, is available now. In his introductory remarks, Arnd Kulaczewski, chief executive, emphasises the group's responsibility with regard to environmental protection, resource and energy efficiency and sustainability, and the respective activities of the group.

Readers are also kept up to date on a number of shows that the company is exhibiting at.

A market report shows that the economic situation for the wire and cable industry in North America and Mexico is promising. David Smith, vice president operations of the Texas-based Encore Wire Corporation, explains in an interview the main reasons of this company's success: Encore Wire was founded over 25 years ago with only a few employees and has become one of the leading manufacturers of building wire in North America with about 1,500 people.

In the company profile, LLC Tatcable is introduced, one of the five largest cable plants in the Russian Federation in terms of production output. The company founded only in 2009 is headed by Victor V Miller and made the headlines in August 2014 with the successful production of a 330kV power cable.

The cover page of the new Niehoff magazine

A further prospering company is the aluminium wire manufacturer Gutmann Aluminium Draht (GAD) GmbH, Germany, which has been operating a completely new factory since July 2014. Paul Habbel, CEO of GAD, explains the philosophy behind the factory's architecture and the cross linking between the architecture, a highly motivated staff and a successful business.

There is also an interview with Dr Klaus Probst, CEO and president of Leoni AG, Germany, who will retire in 2015 after 25 years with the company.

Maschinenfabrik Niehoff GmbH & Co KG – Germany **Website**: www.niehoff-gmbh.info

Top honour for CommScope chief

EDDIE Edwards, president and chief executive officer, CommScope Inc, was one of eight recipients of the Wire and Cable Manufacturers' Alliance's (WCMA) 2015 Distinguished Career Award. The award was presented to Mr Edwards during the 31st annual awards dinner and investiture ceremony earlier this year.

The WCMA's board of directors selects the new annual recipients from those of strong character and creditability who have made significant commercial or technical contributions over a minimum 25-year industry career.

"I am honoured to be receiving this award from the WCMA because of what it represents within the wire and cable industry," Mr Edwards said. "While our portfolio of industry solutions has evolved, everyone understands just how important cabling is to evolving network infrastructure—both wired and wireless. The WCMA is to be commended for providing leadership and a strong voice for wire and cable manufacturing companies and their employees. I'm also proud of all of our accomplishments here at CommScope. We continue to drive innovation in networks and technologies with high-performance and high-quality products while also helping our customers solve their business challenges."

Mr Edwards was named to the company's top position and to the board of directors in January 2011, following the completion of the merger with The Carlyle Group when CommScope became a private company.

Since then, CommScope returned to being a publicly traded company following its initial public offering in October 2013.

"Timing couldn't be better having Eddie Edwards receive this award at the same time CommScope is completing yet another significant industry acquisition in the datacomm cable and connectivity industry," said Ed Fenton, chairman, WCMA. "Apart from that, this recognition continues our history of recognising other CommScope executives receiving this award. We are thrilled Mr Edwards has a chance to talk about leading this team."

The Wire & Cable Manufacturers' Alliance (WCMA) is a non-profit trade association for manufacturers of electrical, electronic and fibre optic wire and cable with an established manufacturing base in North America, including the producers of signal and current-carrying wire and fibre, the producers of bulk cables, and wire and cable processors.

WCMA was established in 2004 as the successor organisation to the Wire & Cable Clubs of America, which began the Distinguished Career Award in 1984.

WCMA currently has 80 corporate members, with nearly 250 company representatives, concentrated mainly in the northeastern United States.

Mr Edwards joins Frank M Drendel, chairman of the board and co-founder; Randall W Crenshaw, executive vice president and chief operating officer; Rob Wessels, vice president, cable research and development; Kevin St Cyr, senior vice president, enterprise; and Christopher Story, senior vice president, global operations, as fellow CommScope employees who also received WCMA Distinguished Career Awards.

CommScope Inc – USA
Website: www.commscope.com

Joining forces

Goodwin Machinery and Danross Engineering are working together to provide the best of both worlds for clients.

Goodwin, specialist in used cable machinery, and Danross – a new machinery manufacturer – will be combining their relevant experience and knowledge to provide new cable lines, whether used or new.

Lines can be assembled to best suit customers' production requirements and budget.

Both companies also offer a range of installation, commissioning and refurbishment by skilled technicians on-site or at their own plants.

Goodwin Machinery – UK
Website:
www.goodwinmachinery.co.uk

Danross Engineering Ltd – UK
Website:
www.danrossengineering.co.uk

Dutch buy out

Lantor, a manufacturer of non-wovens for the cable and composites industry, has been acquired by the Active Capital Company (ACC). The selling party is the British IPT Group. The acquisition fits ACC's strategy to invest in the high-quality manufacturing industry in the Netherlands.

Lantor produces non-wovens made from short fibres that integrate together as a whole under the influence of heat or chemicals. This creates the fleece (felt) textile type. These Lantor non-wovens are used in communications and energy cables, packaging, construction and insulation materials, and fibre-strengthening synthetics (composites) in the form of wind turbines and polyester boots, among other things.

Lantor, with its 180 employees, achieves an annual turnover of €40 million. "This is a textbook example of the high-quality manufacturing industry in the Netherlands," said Dick Zeldenthuis, managing director at ACC. "Lantor is therefore a company that fits our strategy perfectly."

At the same time as the ACC investment, Lantor has appointed a new general manager: Daan Koppen de Neve. He trained as an engineer and has a background in private equity and business. Lantor will be investing the capital made from this acquisition in production resources, product development and the technical applications of the products.

Mr Zeldenthuis added: "This acquisition and the appointment of a new general manager enables Lantor to do even more in the way of improving its products and exploring new markets in the Netherlands and internationally."

Lantor BV – Netherlands **Website**: www.lantor.com

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Single European energy market a step closer

PRYSMIAN Group is leading a consortium of seven companies for the realisation of the new high voltage direct current (HVDC) interconnection between Italy and France.

The total value of this project, awarded by Terna Rete Italia SpA and RTE, the transmission system operators in Italy and France, is worth more than €500m.

The share of Prysmian that, in its capacity as the consortium leader, will coordinate the design, supply, installation – including civil works – and commissioning of the interconnection is about €200m.

"We are proud to make our technologies and our experience available to the realisation of a project with such a high strategic value," said Valerio Battista, Prysmian Group CEO.

"The development of power transmission interconnections is of paramount importance in Europe and Prysmian is a key player. As a matter of fact, we are in the final stages of the HVDC interconnection between France and Spain that will start operations by the first half of 2015," he added.

The underground HVDC cable project, known also as the "Piemonte-Savoia" interconnection, will play a strategic role in increasing the security of power supply and enabling energy exchange between Italy and France up to 1,200MW, as a new and important step towards the creation of a single European energy market.

The project consists of a ±320 kV extruded HVDC underground cable turnkey system that includes the engineering, production and installation of two 600MW bipolar circuits along a 190km land route between the substations of Piossasco, near Turin, Italy, and Grand'Ile in Savoy, France, with a total of approximately 95km in each country.

Prysmian and Silec Cable will provide the HVDC underground cables insulated with extruded material technology; Roda SpA and CEBAT Srl will provide civil works and installation on the Italian side; and Gauthey, Serpollet and Sobeca will provide civil works and installation on the French side.

Commissioning is scheduled for 2019. The overall length of the link is the longest of its type and sets a world record for HVDC underground interconnections using extruded cable technology.

The group has also recently announced the commissioning and hand over of the first and the second HVDC offshore grid connections (BorWin2 and HelWin1).

A further two DC offshore grid connection projects, SylWin1 and HelWin2, and the DC land section of Skagerrak 4 are nearing completion.

Prysmian is currently also implementing also the HVDC cable systems for the DolWin3 and BorWin3 projects.

Prysmian – Italy
Website: www.prysmiangroup.com

University's IT boost thanks to CommScope

In an effort to consolidate an IT infrastructure that was dispersed throughout its campus, the University of Montana, USA, has completed the installation of its legacy servers and storage devices within the Data Center on Demand™ modular data centre solution from CommScope.

The IT portfolio is now online and serving the university within its new high-efficiency, purpose-built data centre solution.

From its initial planning in 2014 to the time it became fully operational, the Data Center on Demand solution was completed in less than nine months – significantly faster than the time required to plan, design and build a traditional bricks-and-mortar facility.

The actual production and deployment of the unit itself took less than 20 weeks. Coupled with recent virtualisation initiatives, the university's modular data centre has a built-in migration path with several available racks for future integration of outlying legacy systems.

"This new data centre further strengthens our network and IT infrastructure with the best technology available," said Tony Jablonski, assistant chief information officer at the University of Montana. "We are now in a position to consolidate about one-third of our 23 modest-sized data centres, which were scattered across our campus, into a single unit. We have already begun that process with great success. CommScope's advanced infrastructure solutions are highly reliable and we had a great experience working with them on this project.

"We have a significant responsibility to provide our faculty and students with a secure, efficient and dependable service when managing their information. Now that most of our data centre technology is operating within the Data Center on Demand modular solution, I can sleep better at night."

The purpose-built Data Center on Demand at the University of Montana includes:

- SmartAir evaporative cooling with self-regulating adiabatic temperature controls
- 16 server racks running 20 kilowatts each
- Backup power through battery and diesel generators
- Redundant universal power supply units

"Many organisations face the same challenges as the University of Montana when trying to consolidate their IT infrastructure with very little budget or real estate," said Kevin St Cyr, senior vice president of enterprise solutions, CommScope. "The Data Center on Demand solution was the perfect fit to quickly bring all of their legacy systems into one efficient modular unit that still has room to grow."

CommScope Inc – USA
Website: www.commscope.com

耐克森临时电缆

Nexans临时用电电缆减少切断时间

Nexans现场临时用电电缆是在高压网络临时使用的定制、可快速连接电缆。例如，可临时用于架空线路的维修工作，或是转换网络时的变电站中。

现场临时用电电缆具备多股铜导体，横截面积150mm²和300mm²。这种电缆设计类似于高压电缆，但是高纯度的绝缘允许降低绝缘厚度。这就造就了一种降低外直径和重量的紧凑型电缆。

现场临时用电电缆供应配备预制的、预先测试的硅橡胶终端，有利于任何位置的便利使用。因此，现场临时用电电缆可在施工现场简易安装并快速连接。

这种电缆的电压可以是110千伏、132千伏、150千伏或230千伏，生产长度从50米到500米不等。传输电流达750安培，能够实现并联，从而使容量加倍。交付时，使用非常坚固的单或三腔鼓，以确保电缆安全开卷与卷绕，预制终端更加方便运输。

在交付前，每条电缆都会在Nexans位于汉诺威的高压实验室进行严格测试。现场临时用电电缆非常牢固，所以不需要因局部放电而经常检查，只需要在多次使用后检查。现场临时用电电缆不仅适用于变电站中预定转换工作的临时供电，或是临时安装架空线路的一种选择，还可以在暴风破坏的紧急情况或中断中立即使用。断电发生时，一旦现场临时用电电缆到位，可以在数小时内恢复供电。

Nexans陆地高压营销兼产品经理Volker Gauler表示：“现场临时用电电缆对于转换过程中减少输电线路的断开时间是一种理想选择。我们正在持续改进产品性能，为客户带来最大化的利益。Nexans的创新现场临时用电电缆有助于确保任何时间的安全供电。”

Nexans – 法国
网址: www.nexans.com

电线，电线，随处可见

现代化社会的诸多领域依靠电力的可靠供应。这不仅需要发电的电力站而且和传输电力到客户端的电线及电线产品息息相关。所有这些产品都由电线和电线加工业的企业制造而成。

一座风力发电站，例如，具有120英里铜线，主要在环发电机上以线圈的形式出现，当然，还包括用于连接发电厂与电网的电线。使用铜的主要原因在于在可用的所有金属中铜具有最高导电率。

电网包含架空电线、地下电缆和转换、变压器站等设施。除了实际导体，线路通常还包含其它电线产品，用来增强、防电磁干扰和发射信号。对于架空电线而言，净重非常重要，所以通常由铝制成。现有电线的传输容量相对容易扩充，通过一种扇形横截面的导体来替代传统圆形导体，从而增加导电横截面的尺寸。

另外，如果电力电缆敷设在建筑物内，那么重量就没那么重要。实际上，在一项命名为“室内电气设备电力电缆生态设计”的研究中，欧洲铜协会(ECI)甚至推荐使用更大横截面的铜线，可最大限度地减少损失，使电力传输更加有效。欧盟委员会发起的Ultrawire项目制定了另一前景更广阔的能源效率措施。一些公司与剑桥大学材料科学和冶金系协作，正在从事超导铜的工业生产。

项目涉及众多行业，包括铜、铜线和铜缆制造商以及大学的各大院系。材料迄今为止还只局限在实验室制造，几乎为纯铜，具有非常少额外均匀分布的纳米

线缆行业最大展会将于明年4月在杜赛多夫举行

炭。室温条件下使用，这种材料导电率是纯铜的两倍。一旦发动机、变压器等元件和超导铜导体连接，它们就比过去重量轻得多。

最后，在技术系统中使用电力，关键要具备既有效又可靠的接触元件。相关功能部件，诸如销、套筒、弹簧和弯曲部件都由各种金属丝和合金金属片如铜结合贵金属制造而成。根据使用条件和产生的负载，部件必须有一定的导电性和其它特质，例如尺寸稳定性、冲击强度和耐磨损性。

目前有个趋势，即加工材料的物理性质和公差越来越好地被利用。这将直接导致对生产工艺的要求更高。

因此，电线和电线产品电气系统制造商需要创新机械与设备。这些和其它许多前瞻性的发展都将成为领先的国际展览会的亮点，该展览会将于2016年4月4日-8日举行，由Messe Düsseldorf GmbH 主办。

Messe Düsseldorf GmbH – 德国
网址: www.wire.de

荷兰Lantor被ACC收购

Lantor为电缆和复合材料工业制造无纺芯材，已被Active Capital Company (ACC)收购。出售方是英国IPT集团。此次收购契合公司对荷兰高品质制造企业的投资战略。Lantor利用短纤制造无纺芯材，在热或化学物的影响下作为整体集成在一起。这就制成了羊毛 （毡） 织物。Lantor无纺芯材适用于通信和能源电缆、包装、建筑和绝缘材料，纤维强化合成材料(复合材料)适合于风力涡轮机和聚酯纤维靴等应用。

Lantor，员工180名，实现了年营业额4000万欧元。“这是高品质的制造业在荷兰的典型例子”，Dick Zeldenthuis说。“Lantor因此是完全符合我们的战略公司。”同时，作为ACC投资，Lantor任命了新的总经理Daan Koppen de Neve。他受训成为一名工程师，具有在私募股权投资的商业背景。Lantor将收购所得资金投资于生产资源、产品开发和技术应用。

Zeldenthuis先生补充说：“此次收购和任命新的总经理使得Lantor能够不断改进产品和开拓荷兰及国际新市场。”

Lantor BV – 荷兰 网址: www.lantor.com

强强联手

Goodwin Machinery 和 Danross Engineering携手合作，旨在为业界客户提供最佳解决方案。Goodwin专业从事二手机床，Danross是新的机械设备制造商，两家公司将融合相关知识经验，提供全新或二手电缆生产线。组装生产线适合所有的生产需求和预算。两家公司的专业技术人员现场或在其工厂提供一系列安装、调试和整修服务。

Goodwin Machinery – 英国
网址: www.goodwinmachinery.co.uk

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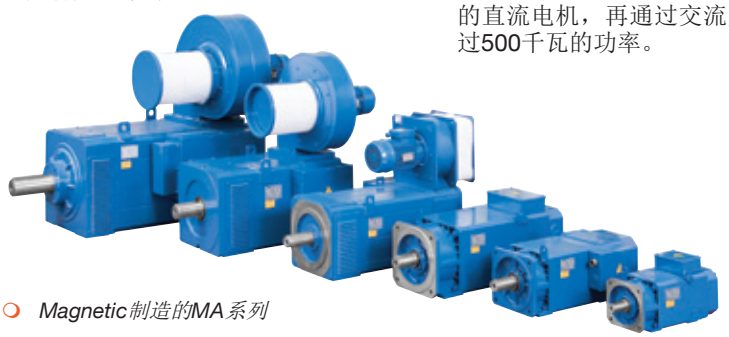
Magnetic Srl成立于1981年，专业生产电动马达，以提供变速驱动器的解决方案。目前产品系列包括直流交流电机，适用于定位系统（永磁伺服电机）和功率应用（直流或异步电机矢量），提供多种尺寸和选项。

Magnetic因其生产品质高、产品可靠并且生产方法灵活，多年来倍受意大利和世界客户的亲睐。



Magnetic制造的MA系列

公司的投资政策是使用最先进的技术发展灵活而精益的生产，与专有供应商合作，在交货时间方面能够满足最苛刻的市场需求。产品的研究与开发使得Magnetic能够提供最先进的技术解决方案，并且将解决方案与客户产品集成，为他们提供支持。

拉丝和卷绕机是Magnetic最成功的领域之一，这是因为公司采用了高达200kW的直流电机，再通过交流矢量马达到超过500千瓦的功率。

目前，更多的应用使用交流矢量马达，附加优势如下：

- 由于没有电刷，维护更少
- 保护水平更高(IP54或以上)，同一大小机架具有相同尺寸的直流电机，在恶劣环境下使用典型的线材生产金属粉尘，功能很赞
- 高速调节，可高达8,000rpm
- 可具备专门的解决方案，轴向通风以适应拉丝机的空间限制

与标准异步电机相比，交流矢量电机更适用于高功率/转矩密度和相同功率下尺寸更小，另外还可用于提高动态性能。

最后值得一提的是，Magnetic制造的异步电机矢量也可以配备UL/CSA认证绝缘系统。

Magnetic Srl – 意大利
网址: www.magnetic.it

陆地建设始于Dudgeon海上风电场

位于英国诺福克的Dudgeon已开始安装海底电缆和建设变电站，从而实现Dudgeon风电场与英国国家电网的连接。

两条海底交流电缆连接北诺福克海岸Weybourne和斯沃弗姆附近的Necton，那里将建设新的变电站，方便与国家电网相连。长度约47千米，这将是英国最长的海底陆上电缆，用于海上风电场。

Carillion plc获得了该风电场的总包合同，负责电缆铺设的市政工程和安装事宜；电缆铺设涉及到在属于44家土地所有者的农田上建设40米长的工作走廊，这些土地所有者都与Dudgeon Offshore Wind Limited签署了相关协议。

电缆铺设与安装将从Weybourne开始，沿走廊一直向南，穿过北诺福克和布列克兰，Carillion使用了最新的海底管道挖沟机，以确保铺设工作于2015年末或2016年初完成。

与此同时，两座变电站毗邻A47高速公路而建，具体位置在诺福克布列克兰区的Necton。Siemens Transmission and Distribution Limited负责供应整体输电系统，两条海底电缆将互连，国家电网将建设和调试位于Dudgeon附近的新设施。

变电站建设的大部分工作将于2016年4月份完成，但测试和试运行将持续到2016年11月份。

负责建设Dudgeon海上风电场的设施经理Olav-Bernt Haga表示：“本月展开诺福克陆上建设活动意味着该项目正按计划推进，预计在2017年第一季度向国家电网输送首台风力发电机的电力。”

Dudgeon海上风电场距离北诺福克海岸克罗默20英里外。2017年底完成后，67个风力涡轮发电机每年为41万户居民提供足够的清洁电力。

Dudgeon Offshore Wind Limited持有许可证，被同意建设Dudgeon海上风电场，由挪威国家石油公司Statoil 和挪威国家电网公司Statkraft, 以及阿布扎比可再生能源公司Masdar共同拥有。Statoil作为责任运营商，负责项目的建设和运营。

Dudgeon Offshore Wind Ltd – 英国
网址: www.dudgeonoffshorewind.co.uk

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Lloyd & Bouvier – 美国
网址: www.lloydbouvier.com

CommScope促进校园IT提升

蒙大拿大学致力于巩固分散在整个校园的IT基础设施，最近在美国CommScope公司提供的(应需数据中心解决方案 (Demand™) 安装了传统服务器和存储设备。IT产品组合已在线，为整个校园提供新型高效、专用数据中心解决方案。

从2014年开始规划到投入全面运营，应需数据中心解决方案不到9个月就完成了 - 比规划、设计时间要短得多，建成了一个传统的实体设施。

设施本身实际生产和部署时间不到20周。加上近期的虚拟化举措，校园的模块化数据中心具有一个内置的迁移路径，几个可用机架用于未来整合外围遗留系统。

“新的数据中心运用当今最先进的技术进一步强化了我们的网络和IT基础设施，”蒙大拿大学助理首席信息官Tony Jablonski表示。

“23个中等规模的数据中心中，我们现在能够巩固其中的三分之一，它们分散在我们的校园，组成一个独立的个体。我们已经取得了巨大成功。CommScope先进的基础设施解决方案非常可靠，在这个项目中，我们合作得非常愉快。”

“我们有责任为我们的教师和学生处理信息提供安全、高效、可靠的服务。目前，我们大部分数据中心技术采用了CommScope公司的应需数据中心解决方案，这让我很放心，晚上可以睡个好觉。”蒙大拿大学为特定目的而建的应需数据中心包括：

- 具有自我调节绝热温度控制的SmartAir蒸发冷却
- 16个服务器机架每个运行20千瓦
- 通过电池和柴油发电机组供电
- 冗余通用电源模块

“许多机构都面临同样的挑战，正如蒙大拿大学一样，学校迫切需要巩固其IT基础设施，但预算和不动产又非常有限，”CommScope企业解决方案高级副总裁Kevin St Cyr表示。“应需数据中心解决方案能够快速有效地将所有传统系统集成到一个有效的模块化单元，并且仍然留有提升空间。”

CommScope Inc – 美国
网址: www.commscope.com

Gem扩张计划

Gem Gravure在圣地亚哥地区开设了新工厂Gem West，到目前为止，公司分支机构覆盖美国东西海岸。

新工厂不但为打印机准备与维修提供工作车间，而且还提供召开客户会议、培训或演示的空间。

新工厂加入总部设在美国汉诺威的Gem World，中西部研究设施在美国Nixa。

“我们很高兴能在加利福尼亚州安家，非常靠近我们日益壮大的西海岸客户群。”GEM执行副总裁Paul Gemelli表示。

“新地点允许我们在西部地区展示设备。这意味着不管客户位于何处，GEM都将致力于为他们提供最好的服务。”

Gem系家族企业，创立于1952年，位于美国汉诺威，专门设计特种油墨，所有产品都符合RoHS标准的各种应用。

Gem Gravure Inc – 美国
网址: www.gemgravure.com

Gem Gravure圣地亚哥工厂

欧洲单一能源市场建设更近一步

以全球最大的电缆制造商Prysmian Group为首的七家企业联合体成功中标意大利-法国互连高压直流输电项目(HVDC)。该项目由意大利能源公司Terna Rete和法国电力公司RTE斥资5亿多欧元筹建。这一由Prysmian为主导的七家企业联合体负责设计、供应、安装(包括土建工程)和调试等工作，互连项目调试约2亿欧元。

“我们非常高兴能够参与这一具有重要战略意义的高压直流输电项目，”Prysmian Group首席执行官Valerio Battista表示。

“电网互连发展是欧洲目前最重要的目标之一。Prysmian则是其中最主要的参与者。与此同时，我们参建的法国-西班牙高压直流输电项目工作已经接近尾声，预计于2015年上半年开始投入使用，”他补充说。这一地下高压直流电缆项目也称之为“Piemonte-Savoia”互连，输电能力达到1200兆瓦，对意大利和法国的能源供应安全和电力贸易起到非常重要的作用，对欧洲单一能源市场的建设也同样举足轻重。

该高压直流输电项目采用±320千伏挤出型高压直流地下电缆技术，包括在设计、制造与安装两个600MW双极电路，该输电项目全长190公里，位于意大利都灵附近Piossasco和法国萨沃Grand'Ile的变电站之间，双方各拥有长约95公里的电路。

Prysmian和Silec Cable负责提供高压直流地下电缆绝缘挤出型材料技术。Roda SpA和CEBAT Srl为意大利提供土建与安装，Gauthey、Serpollet和Sobeca则为法国提供土建与安装。

预计于2019年进入调试运营阶段。这也是目前世界上最长的挤出型地下高压直流输电电缆系统。

集团最近宣布已成功交付与调试第一、第二个高压直流海上并网项目(BorWin2和HelWin1)。另外两个直流海上并网项目SylWin1和HelWin2以及Skagerrak 4直流陆地部分已接近完工。

Prysmian目前还在为DolWin3和BorWin3建设高压直流电缆系统。

Prysmian – 意大利
网址: www.prysmiangroup.com

Metalube扩建实验室

世界领先的专业润滑剂制造商Metalube计划将总部在英国曼切斯特的实验室规模扩大两倍。公司是屡获殊荣的创新者，正着手大幅提高其实验室能力，面积扩充至126m²。新的设备齐全的实验室将用于质量控制和研发。

Metalube新实验室给人以艺术美感

技术总监Chris Nettleship表示：“我们之所以能够开发市场上最好的润滑剂，毫无疑问，我们的实验室团队发挥了巨大的作用。Metalube化学家的数量最近增加了25%。现在我们能够为他们创造一个高级的21世纪的实验室。”

新空间将量身打造，配备有最新的专业实验室家具，满足现代润滑剂开发商的所有要求。

Metalube制造一系列有色拉丝油、各种保养润滑油和防腐蚀与成型油。这一经验丰富的出口商聘请了34人，在中国、印度和巴西设立了办事处。

Metalube Ltd – 英国
网址: www.metalube.co.uk

喜迎周年庆!

Miltec UV今年迎来了25周年庆。公司于1989年12月由Joe和Marilyn Blandford创建，起初是UV固化产品的分销商，不久后两个儿子Bob和Charles Blandford加盟。

在这25年里，Miltec从当初的4位员工成长为员工数超65人的分销商，现已发展成为全球性的UV设备制造商。

Miltec产品独特，能够为客户提供微波动力和弧光灯系统，客户覆盖30个主要行业。Miltec研发部门Miltec UV International, LLC是公司业务的重要组成部分，一如既往寻求创新方法来优化使用UV技术。目前，公司与美国能源部（DOE）签署了合同，为其开发使用UV技术的工艺流程，该流程将用于生产锂离子电池，以降低汽车技术成本。

随着Miltec UV被众多客户选定为顶级供应商，公司因其创新HPI光泽控制UV 固化系统而赢得了2012 IWF挑战者奖。Miltec主席Bob Blandford于2013年入围马里兰贸易中心协会颁发的国际领袖奖。Miltec为UV固化设备树立了新的标杆，使之成为那些有意将生产与利益最大化客户的最明确的选择。

公司坚持以合理的价格为客户提供高品质的产品和服务，恪守商业道德，与客户建立长期的合作关系，在业界树立了良好的口碑。

公司多年来克服了很多困难与挑战并不断发展壮大，也见证了客户因为使用Miltec产品屡获成功而倍感欣慰和自豪。

随着新机会的出现，Miltec期待有新的增长，欢迎更多的新客户加盟并继续为老客户提供优质服务。

Miltec – 美国
网址: www.miltec.com

Eurolls与亚洲客户联系更加紧密

Eurolls通过其中国子公司Eurolls Machinery Shanghai与亚洲客户建立更加紧密的联系。

Eurolls Shanghai依靠意大利管理团队和高度专业化的本地员工，旨在促进微型辊模/辊模的推广销售，同时为亚洲和东南亚地区的客户提供即时技术支持（这是该技术取得成功的关键所在）。

在机械设备领域，Eurolls非常精通高碳技术及其工艺，这主要是因为公司多年来在预应力钢丝、预应力绞线、钢丝绳和钢帘线领域积累了丰富的经验。Eurolls Machinery Shanghai为国际和亚洲市场提供技术支持，工程师们协助科学分析和鉴定最合适的技术/商业解决方案。

该公司获得了生产定制设备的大宗订单。另外，还向建筑线材市场交付了“高度创新的集成解决方案”，用于提高生产力、节省空间和为客户带来显著的投资回报。

该机器于去年六月初的一个开放日在意大利Eurolls机械和Eurolls产品部进行了展示。

代理商、Eurolls分公司经理和几个客户经理应邀参加。同时，正式推出了Eurolls SpA机械部新任总经理Fabio Firmani，他于去年四月正式加入Eurolls Group。

Eurolls Group SpA – 意大利
网址: www.eurolls.com

答案只需一个点击

端对端电气包装和电缆解决方案，最近推出新的全球网站：www.ametek-ecp.com。新网站为Ametek ECP三大主营业务提供单一、使用方便的web门户平台：ECP-包装，为恶劣环境开发高度可靠的电气包装解决方案。产品包括玻璃-金属密封(GTMS)和陶瓷-金属密封(CTMS)包装，以及航空航天、国防、医疗、电信和工业应用的高温共烧陶瓷(HTCC)连接器。包装和连接器产品商标有Aegis™和Glasseal™。ECP-组件和电线。公司是定制焊料、铜焊预制件、微型冲压件、盖组件、精密细焊丝和半导体包装集成组件的全球供应商。该系列产品销售商标为Coining®，广泛应用于汽车、国防、电子、医疗、微波、光子和半导体领域。ECP-海底防御。创新定制光电连接器、电缆组件、压力船体穿入和光纤馈通，适用于各种极端环境。该系列产品商标为Ametek SCP，为海底、油田、核电和航空航天应用提供解决方案。

“推出新网站是Ametek ECP公司的重大举措，这意味着我们能够通过单一、用户友好的网站为客户提供与产品和解决方案线上交流的机会。”Ametek ECP副总裁兼总经理 Greg Nelson 表示。“这大大增强了我们服务于现有客户的能力，同时也为我们提供了一个让新客户了解创新产品和解决方案的平台。”

Ametek SCP – 美国
网址: www.ametek-ecp.com

新杂志发行啦

Niehoff杂志是针对Niehoff Group客户群的刊物，现已发行。

在其介绍性发言中，首席执行官Arnd Kulaczewski强调了集团在环保、资源和能源利用效率、可持续发展和集团各个业务团体的责任。

读者可跟踪不断更新的公司参展信息。

一份市场报告显示，电线电缆行业在北美和墨西哥的经济形势向好。

新的Niehoff杂志封面

德克萨斯州Encore Wire Corporation公司运营副总裁David Smith在接受采访时表示，公司取得成功的主要原因在于：Encore Wire已有超过25年的发展史，成立初期，只有少数员工，现已发展成为拥有1,500人的大公司，成为北美市场建筑用线的一线制造商之一。

在公司推介中，介绍了LLC Tatcable，就产能而言，该公司是俄罗斯联邦五大电缆制造商之一。

公司成立于2009年，在Victor V Miller先生的领导下，2014年8月因成功生产了330千伏电力电缆而成为各大媒体争相报道的头条新闻。

德国Gutmann Aluminium Draht (GAD) GmbH是一家发展势头较好的铝线制造商，2014年7月开始运营一家全新的工厂。

GAD首席执行官Paul Habbel介绍了工厂架构背后的经营理念和跨架构之间的连接，以及朝气蓬勃的员工和企业的成功之道。

另外，还采访了德国Leoni AG公司首席执行官Klaus Probst博士，他在公司供职25年之久，将于2015年退休。

Maschinenfabrik Niehoff GmbH & Co KG – 德国
网址: www.niehoff-gmbh.info

CommScope总裁获最高荣誉

CommScope Inc总裁兼首席执行官Eddie Edwards最近获颁电线电缆制造商联盟 (WCMA) 2015年杰出成就奖，获得此项殊荣的总共有8人，Eddie Edwards是其中之一。

奖项于年初举行的第31届年度颁奖晚宴和就职仪式上颁发给了Edwards先生。WCMA董事会从那些具有坚强品质和良好信誉，并且在不低于25年的职业生涯中做出杰出商业或技术贡献的人员中挑选新的年度获奖人。

“我很荣幸获此殊荣，因为它代表着电线电缆行业的肯定，”Edwards先生说。

“行业解决方案在不断发展，我们每个人都明白，布线对日新月异的网络基础设施是多么地重要—有线和无线。WCMA为电线电缆制造企业及员工提供权威和强有力的声音是值得称道的。”

“我对CommScope今天取得的成绩感到自豪。我们将继续在网络和技术领域推动创新，为客户提供高性能、高品质的产品，帮助我们的客户解决业务挑战。”

Edwards先生于2011年1月被任命为公司总裁兼首席执行官，这是继与Carlyle Group完成合并，CommScope成为一家私营公司之后。

从那时起，CommScope成为一家上市公司，于2013年10月首次公开发行。

“时势造英雄，Eddie Edwards获得奖项的同时，CommScope正在完成数据通信电缆和连接业的重要并购，WCMA主席Ed Fenton表示。”

“另外，我们回顾过去，CommScope公司不少高管都获过此殊荣。我们也感到非常高兴，Edwards先生有机会跟我们分享他是如何领导这支团队的。”

电线电缆制造商联盟 (WCMA) 是非营利性行业协会，服务于电气、电子、光纤电线电缆制造商，这些制造商在北美都有生产基地，包括信号和载流导线和光纤制造商、散装电缆制造商和电线电缆加工商。WCMA成立于2004年，是美国电线电缆俱乐部的继任组织，该俱乐部于1984年开始设立杰出职业奖。WCMA目前拥有80个成员企业，将近250个公司代表，主要集中在美国东北部。

至此，CommScope公司获得WCMA杰出职业奖的有Edwards先生、董事长兼联合创始人Frank M Drendel、执行副总裁兼首席运营官Randall W Crenshaw、电缆研究与开发部副总裁Rob Wessels、公司高级副总裁Kevin St Cyr和全球运营高级副总裁Christopher Story。

CommScope Inc – 美国
网址: www.commscope.com

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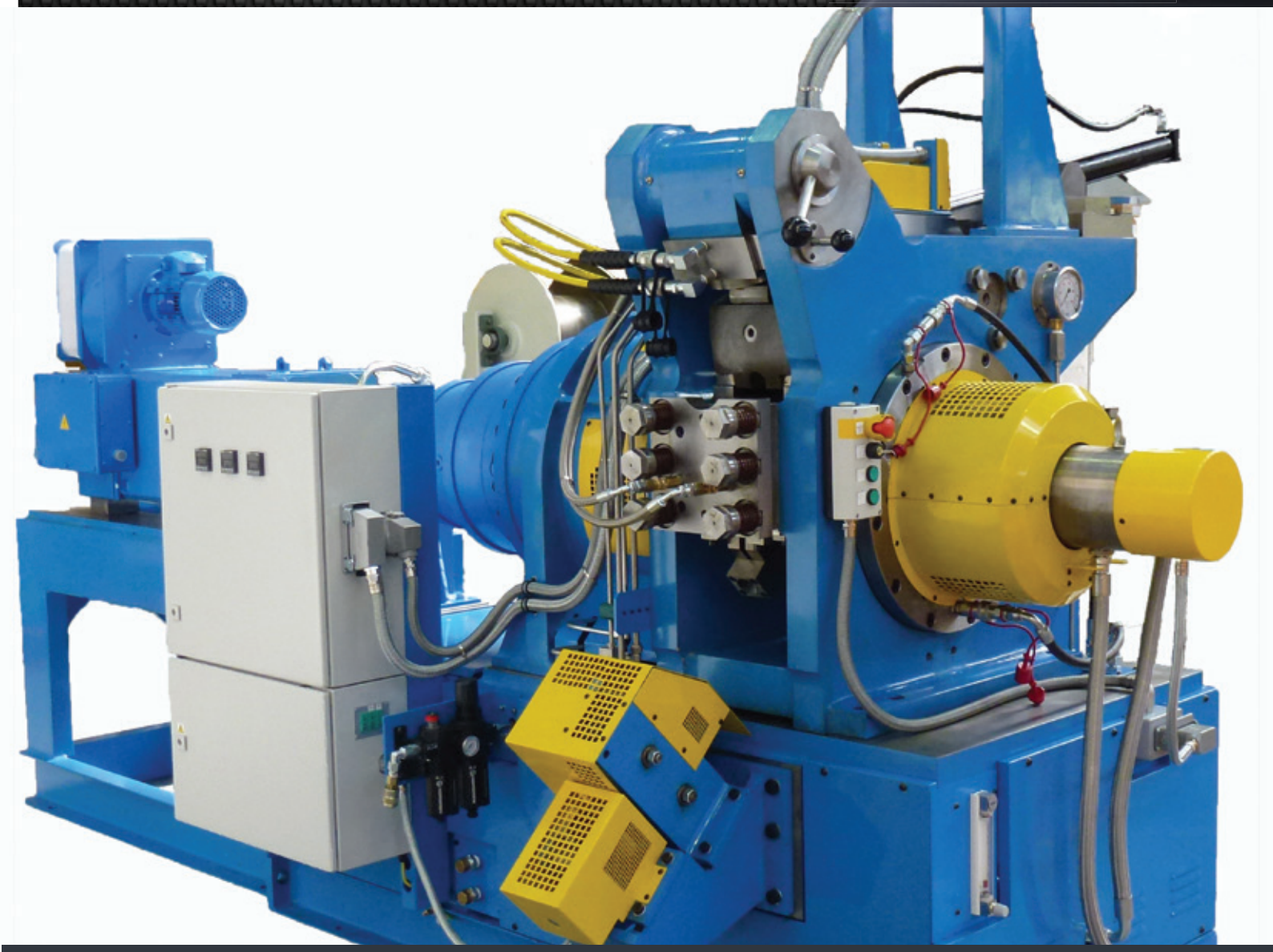


The Conklad 315 from BWE

Smallest in the BWE range

BWE's Conklad 315 machine is based on the highly successful and well-proven Conform 315 model. The Conklad 315 is the smallest machine in the BWE Conklad range but incorporates many of the standard design features found on the larger machines, such as hydraulic shoe opening, feedstock shear, epicyclic gearbox and torque tube.

The Conklad 315 operates in tangential mode, using a single infeed rod, for cladding and sheathing operations. The machine has been optimised for high efficiency production of:

- Aluminium clad steel wire (AS Wire)
- OPGW and CATV cables
- Sheathed composite cores
- Reinforced aluminium wire
- Solid aluminium conductor (SAC)

The basic machine construction is based on the proven BWE design, which has an excellent record of reliable operation over many years of service. Extreme rigidity, the ability to operate at high extrusion pressures and separately controlled wheel and die temperature ensures that tooling clearances remain optimal throughout long periods of continuous operation.

Automatic die heating and wheel cooling systems ensure rapid pre-heat to the correct starting temperature and maintain optimum extrusion conditions during production without operator intervention. Overall economics are further improved by insert tooling that allows the wearing surface of the main tooling component, the die chamber, to be replaced at minimal cost.

BWE offers a wide range of services tailored to customers' needs ranging from machine-only supply with customers providing their own ancillaries to full turn-key systems including plant engineering, training, installation and commissioning.

BWE Ltd – UK
Website: www.bwe.co.uk

Graphics bigstockphoto.com Artist Olechowski

Online diameter control during wire and cable production

IN the past years wire and cable manufacturers have invested heavily in measuring and control techniques as well as line control systems aiming for online quality control, higher productivity and cost reduction. Today, online measuring devices with controlling function have become a standard in extrusion lines.

For the measurement of a product diameter there are two established techniques. The first method was invented 40 years ago and is commonly known as the 'scanning system'. By using a rotating mirror, a laser beam is scanned across the measuring field onto a light sensor. In between the rotating mirror and the light sensor there are two lenses. The first lens directs the laser beam in parallel across the measuring field to the second lens. The second lens directs the laser beam onto the light sensor.

The product is guided in between the two lenses and interrupts the laser beam while the laser beam is scanned across the measuring field. Thus, the diameter of the product is calculated from the time the laser beam needs to pass across the total measuring field, compared to the time the laser beam needs to run across the product. Time is in this case equivalent to diameter. The measuring rate depends on the rotating speed of the mirror.

The technology that was presented 20 year later uses a laser beam, which is directed onto a high resolution CCD line sensor, with no rotating mirror and lenses in between. The product causes a shadow on the CCD line sensor. In this case the number of dark pixels on the line sensor is equivalent to the diameter.

The main differences between the two techniques are that the second technology is completely digital, and requires no moving components and no lenses. As a consequence, accuracy, repeatability and measuring rate are higher, and calibration is not necessary.

The technological base of Sikora diameter gauges described in the following is the second principle, using CCD-line sensor technology combined with laser diodes as light sources and

No rotating mirror and lenses in between

powerful analysis software. There are two types of measuring heads available that meet classic respectively high-end requirements demanded for quality control on cable production lines.

There are diameter gauges with classic functions available such as the gauge heads of the Laser Series 2000 that meet the standard requirements which are imposed on a diameter measuring system. The gauges measure the diameter in two or three planes with a measuring rate of 500 measurements per second. Interesting is the three-axis gauge head for defining the ovality of a product. It is known that an oval is defined by five tangents.

Accordingly, by using three measuring axes (six tangents on the oval) not only the min/max value of the oval, but also the orientation of the oval can be defined. All devices are equipped with standard interfaces such as RS 485, optional Profibus-DP and other industrial field buses for the data transfer to a line PC or a display and control device.

With an additional control module, which is integrated into Sikora's display and control devices, the diameter is continuously controlled to the nominal value. Customers can select from 18 types of devices covering a diameter range from 0.05mm to 500mm. These devices are standard in extrusion lines.

Today, users are aiming for a permanent quality control of their production as well as maximum productivity and cost reduction, for instance, by using advanced innovative measuring devices.

Due to this demand, Sikora has developed three diameter gauge head models of the Laser Series 6000, which meet the current high-end requirements in the wire and cable sector. The gauge heads of the Series 6000 combine a variety of technological innovations to improve the productivity of extrusion lines sustainably.

Up to 5,000 measurements per second, each of them with highest single value precision, allow for an optimum line control and provide reliable statistical data. The high measuring rate also allows the detection of lumps and neckdowns. Therefore, the user receives a two-in-one system with which investment costs are reduced and more space is achieved in the line, as the installation of only one gauge head is required. Transparent and coloured products can also be measured with the Laser Series 6000.

For applications where statistical data will be processed and stored and/or where reports will be printed, external processing systems of the EcoControl Series are available. Directly integrated in the gauge heads is an universal interface module for all connections such as RS 485, RS 232, Profibus-DP, Profinet or alternative industrial field buses.

Additionally, the Laser Series 6000 has an optional Wi-Fi interface, which allows for a direct connection to a smartphone or laptop. The Wi-Fi interface is used for diagnosis and quality control, and transfers measuring values, trend and statistical data, as well as video signals.

An important feature for integration in the production line is the swivelling gauge head design. The gauge heads can easily be moved up and out of the extrusion line. The feeding of the cable connection to the interface module is also safely protected in the gauge head stand. Sikora offers the three diameter measuring devices for a product diameter from 0.2 up to 78mm.

Sikora AG – Germany
Website: www.sikora.net

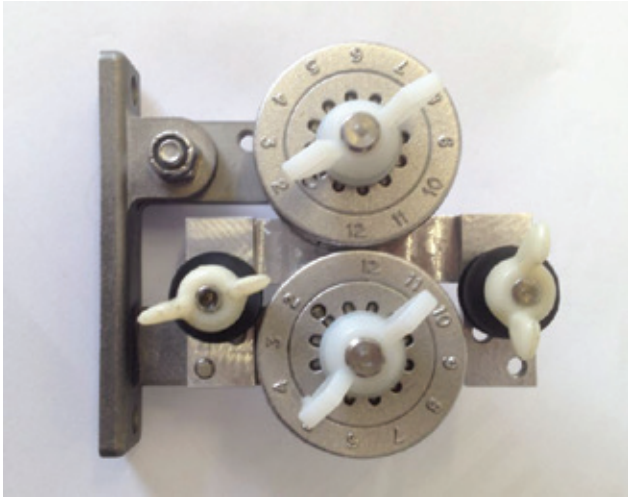
New feature added to Marldon airwipes

The Marldon "variable orifice" airwipe design has always offered users the economy of a single unit to process a range of cable (or tube) diameters effectively, but the guidance of cable into the unit has been the responsibility of the customer.

Correct alignment of cable through the unit is essential to good drying and also to avoid the cable coming into contact with the airwipe, which may damage the cable and, over time, the airwipe.

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

Marldon Group Ltd – UK **Website**: www.marldon.com



Airwipe design with rollers

Videojet's answer to ultra-small printing

MANUFACTURERS in the electronics, components and cable sectors, as well as other industries requiring ultra-small printing capabilities, can now benefit from high quality micro printing with advanced uptime thanks to the new 1650 High Resolution (HR) and 1620 HR Continuous Inkjet (CIJ) printers from Videojet Technologies.

Enhanced micro printing capabilities of the new printers achieve high-resolution, quality printing of characters as small as 0.6mm in height, and speeds of up to 348 metres per minute. The 40 micron nozzle enables the 1650 HR and 1620 HR systems to print 2D bar codes and highly legible alphanumeric multiline codes at high speeds on integrated circuits, small-diameter cables, and other products with limited printing space, optimising traceability for manufacturers without compromising line productivity.

The new HR micro printers build off the successful Videojet 1000 Line platform and the application-tested 'Ultra-High-Speed' nozzle innovations that Videojet released in 2013. With tens of thousands of successful installations, the 1000 Line platform continues to be the standard for CIJ uptime performance.

The new HR printer nozzle leverages the proprietary Precision Ink Drop™ technology which allows the nozzle to operate at over 100,000 drops per second via the advanced high frequency printhead design, which together with sophisticated software algorithms modifies the flight path of individual ink drops for optimal code quality.

Anthony Blencowe, business unit director for CIJ at Videojet Technologies, said: "Manufacturers using micro print place a premium on print quality. The 1650 HR and 1620 HR incorporate these enhancements plus specialised rasters to overcome the print quality challenges inherent in shortened character heights and fast line speeds. Manufacturers can now print more data with better legibility, at faster line speeds, often in the same, limited print area."

The new HR printers feature Videojet patented CleanFlow™ technology, which reduces ink build-up on nozzle ends, enabling the printers to run longer than traditional micro printing systems between nozzle cleaning intervals, significantly cutting maintenance requirements.

The printhead offers automated cleaning, supporting faster system start-ups even after extended line shut downs, increasing production uptime. An internal pump eliminates the need for external air, lowering the risk of contaminants in the ink stream, further boosting print consistency.

Complementing the advanced nozzle technology, the HR printers use a range of specialised halogen-free inks, which offer abrasion, temperature and chemical resistance. All inks can be used on RoHS-compliant products (EC 2011/65/EU Annex II) to meet the specific needs of the electronics industry.

In common with the other 1000 Line Videojet CIJ printers, the 1650 HR and 1620 HR solutions feature the Smart Cartridge™ fluid system that helps to ensure that only the correct ink is selected for each product, supporting electronics and wire and cabling manufacturers who may be using multiple ink types.

The printers use a needle and septum to draw ink from each cartridge, eliminating the risk of spillages and reducing waste.

To meet manufacturers' specific operational needs, both HR systems offer unique features to aid functionality for line personnel. The 1650 HR features the Videojet exclusive CLARiTY™ touchscreen, which offers built-in productivity tools to help boost OEE and enhance line efficiency. The 1620 HR comes with a keypad interface that is robust and easy to use with minimal training, facilitating simple and speedy product changeovers.

Videojet Technologies – UK
Website: www.videojet.co.uk

MultiStrip 9480 – versatile cut and strip platform

SCHLEUNIGER has debuted the new MultiStrip 9480, the company's latest innovation in its cut and strip product family.

"Thanks to innovative technical solutions, the MultiStrip 9480 simplifies and extends the spectrum of possible applications once again," said Schleuniger product manager Rajeevan Kumaran. "There is no machine that allows a wider variety of cables to be processed than the MultiStrip 9480."

A range of technical characteristics form the foundation for this versatility.

First, Schleuniger's unique indexing cutter head allows a wide variety of blade and tool sets to be mounted. Next, the freely programmable rotary incision capability enables high-precision and fast processing of coaxial and micro-coaxial cables, as well as the handling of other multi-layer applications. In addition, an optional universally deployable slitting unit that attaches directly to the SmartBlade blade cartridge is available and considerably increases accuracy during the slitting process.

The MultiStrip 9480 can be set up quickly and easily and features short retooling times.

Mr Kumaran explains: "With this machine, changeover times are minimised in order to maximise productivity."

Mr Kumaran's statement is supported by the machine's SmartBlade system, which enables complete blade sets to be exchanged in a matter of seconds, and the magnetic guide tubes, which can also be exchanged in seconds without the use of tools.

The machine's high degree of productivity is also based on its fast transport speeds, the parallel and simultaneously running axes, as well as the extremely fast cutter head. Finally, Schleuniger's exceedingly reliable technology almost completely eliminates downtime due to technical breakdowns.

The MultiStrip 9480 features intuitive programming via high-definition colour touchscreen. With its user-friendly navigation, both experienced users as well as the occasional machine operator can learn to program the machine with ease.

The time required for programming is reduced even further thanks to predefined standard parameters for common cable types and freely programmable material and processing libraries.

The MultiStrip 9480 is available in six machine versions to meet individual production needs and budgets, allowing customers to invest in a customised solution.

A wide range of options and accessories increase the machine's versatility and provides users with a virtually unlimited range of application possibilities.

For example, users can choose between roller drives and belt drives as well as a large selection of blades, combing and slitting units.

Schleuniger – USA
Website: www.schleuniger-na.com

Measuring the length and speed of products during production to avoid costly product overages and shortages

High accuracy helps to reduce manufacturing costs

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

Manufacturers of wire and cable have applications where they need to tightly control the length and speed of product during production.

Applications include continuous length measurement, differential speed control, cut-to-length control, product positioning, printing/marking control, and other demands. Most manufacturers depend on the accuracy of their drive speeds or mechanical contact encoders.

However, mechanical encoders can lose contact on various product surfaces due to slippage or vibration, and require frequent calibration because of mechanical wear and tear. A contact encoder with inaccuracies as much as two per cent can cost a manufacturer a significant amount of money due to product give-away, waste, maintenance, and system downtime.

To solve this problem, manufacturers have installed the LaserSpeed non-contact gauge on their production line to directly measure the length and speed of product.

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

As the product moves, light is scattered back to the LaserSpeed unit. This information is translated into product speed, and pulses are produced to determine the product length. Length and speed measurements are captured with ±0.05% accuracy and ±0.02% repeatability.

NDC offers a complete line of LaserSpeed systems with measurement speeds up to 12,000m/min (39,400ft/min) and down to the true zero speed, standoff distances up to 1,000mm (39.4"), and measurement depth of field up to 100mm (3"). NDC also offers a European certified length measurement system that meets MID (Measuring Instruments Directive) 2004/22/EG requirements.

NDC Technologies – USA
Website: www.ndc.com

Ultrasonic welding – favoured method of assembly

WITH manufacturers using wire harnesses in increasingly challenging functional and environmental conditions, ultrasonic welding is becoming the favoured method of assembly, since it produces welds with high conductivity and tensile strength. In fact, it is estimated that at least two-thirds of the cabling used in today's cars is ultrasonically welded.

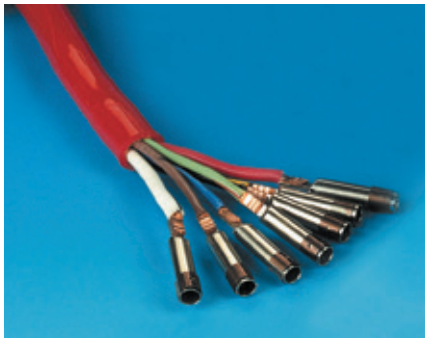
"Wire harnesses are like the central nervous systems for equipment in a wide variety of industries, including consumer electronics and appliances, data and telecommunications, lighting, medical, automobile, marine and aerospace," said Melissa Alleman, Sonobond Ultrasonics' vice president.

"It's absolutely crucial that wire harnesses function as required – despite exposure to heat, humidity, vibration, corrosive substances and adverse environments – so good conductivity and guaranteed reliability are essential."

Ultrasonic welding has become a popular alternative to other methods of welding because it uses vibrational energy to disperse surface oxides and create galling on wire strands. This forms a solid-state metallurgical bond with high conductivity, producing the lowest resistance weld available.

"Unlike resistance welding that generates high heat, in ultrasonic welding the metals do not melt, so there are no significant changes in the material properties, and the lower heat means no external water cooling is needed," added Ms Alleman.

Also, unlike soldering – which cannot be used if the temperature at the weld during use approaches the melting point of the solder – ultrasonic welding



High conductivity and tensile strength

requires no flux or filler materials. Plus, ultrasonic welding uses much less time and energy than its alternatives.

The ultrasonic welding process begins with a power supply that converts input line power into high frequency electrical power and transmits that energy to a transducer. The transducer transforms the electrical energy into vibratory energy, which is delivered to the welding area as sound waves, or ultrasonics.

When the vibrating, shear forces of the ultrasonic waves are directed by the welding tip to the interface between two metals, which are held together under clamping force, internal stresses cause deformation where the materials are in contact.

A localised increase in temperature and interfacial slip breaks up oxides and surface films, permitting metal-to-metal contact at many points. Continued vibration causes further deformation of the points, increasing the contact area and essentially creating a weld without melting, and producing a metallurgical bond with high conductivity and tensile strength.

"One of the things that sets us apart from our competitors is our patented Wedge-Reed Ultrasonic Welding system, the only ultrasonic system that is able to weld tin-coated and oxidised wire and terminals," added Ms Alleman. "This enables our machines to be exclusively capable of producing durable welds when tinned wire is required or preferred."

The Wedge-Reed system uses a vertical vibrating reed, driven by a wedge-shaped coupler and transducer assembly perpendicular to the reed, allowing high clamp force without bending stress or stalling.

Sonobond's Dual Head SpliceRite™ features welding heads on both sides of the weld area, enabling it to provide one-pulse wire splicing of up to 100mm^2 in stranded bare copper wire and tinned wire to about 60mm^2. Also available are a Dual Head Spot Welder, as well as Sonobond's SonoWeld® units, which can be custom-tooled to weld tinned wire to bare or coated terminals.

Every Sonobond welder is equipped with a microprocessor controller that can program welds by height, energy or time, and store and recall up to 250 jobs.

Additionally, all units have heat-treated, taper-lock tips that are capable of achieving up to 100,000 welds and that are easily replaceable without requiring machine readjustment or calibration. Sonobond's equipment also offers automatic frequency control and overload protection, and can detect and prevent wrong-part or no-part activation.

Sonobond Ultrasonics – UK
Website:
www.sonobondultrasonics.com

Enhanced flame retardance and low-shrinking grades

New additions to a low-cost series of Halguard® halogen-free flame retardant (HFFR) compounds for general-purpose jacketing applications include two compounds from Teknor Apex with enhanced flame retardance and one that exhibits lower post-extrusion shrinkage.

The new compounds cost less than premium compounds while entailing little compromise in performance properties. Teknor Apex recommends them for cable used in subway, mass transit, cell tower, data centre and infrastructure applications, as well as internal wiring in electrical and electronic equipment. The grades include:

- Halguard 58610 and 58615. These 53 Shore D compounds have UL-94 vertical burn ratings of V-0 for 1/16". (1.59 mm) thick specimens, and oxygen indices of 52 and 45 per cent, respectively. Both enable passing the UL-1685 FT-4 and UL-1666 riser flame tests for more complex cable constructions.
- Halguard 58620. This 54 Shore D compound provides the low level of post-extrusion shrinkage that is important for fibre optic cable applications, and enables passing the UL-1685 flame test.

Teknor Apex – USA
Website: www.teknorapex.com

Efficient, versatile and future-pointing BMV braiding concept

AS cable products have to meet continuously increasing demands, wire and cable manufacturers need machinery which enables an energy-raw materials, and cost-effective manufacturing process. Furthermore, the machines must be flexibly adaptable to new production requirements.

The machinery developed and built by Maschinenfabrik Niehoff meets all these requirements. One example is the lever arm rotary braiding machines of the BMV series, designed for 12, 16 or 24 spools in vertical operation.

The BMV machines feature an infinitely variable electronic control of braiding speed and pitch as well as an automatic central lubrication system. All process steps – from the pay-off of the cable to be braided to the individual wires and bundles of wires and the final take-up of the braided cable – are monitored by a quality control system.

As an option, an empty bobbin detection system can be installed which ensures that a BMV machine is stopped automatically before a braiding bobbin is completely empty. This system minimises waste and the amount of residual wire left on the bobbin.

For greater operational safety and reliability, the temperature of slideways is monitored by a monitoring system. The operator can use this system for adjusting the lubrication frequency and amount of lubricant to optimise lubricant consumption. As a result of all these measures, BMV braiders can be operated for a long time unattended and without an operator.

The most recent innovation in the field of the BMV braiders is the 24-carrier lever arm rotary braiding machine BMI 124. A striking feature of the 24-spool machine is its inclined braiding rotor. The inclination means a cable deflection of just 45° (instead of 90°) on each deflection pulley – resulting in reduced cable deformation and improved braiding quality.

If combined with a caterpuller haul-off, the machine can be used to manufacture cables with diameters up to 40mm. The BMI 124 enables bundles of braiding wire to be produced with maximum bundle cross-sections of 24 x 1.5mm².

Wire harness – the central nervous system for equipment

The BMV machines can be combined with different types of taping systems so that braiding and taping can be performed in a single operation. This simplifies the manufacturing process, reduces the amount of space required and increases the product quality compared with when individual process steps are used. The experience of many cable manufacturers has shown that one BMV braider can be used to replace two to three older types of braiding machine.

Niehoff's BMV braiding machines are designed for the processing of bare or coated round and flat wire made of copper, aluminium and stainless steel with single-wire diameters of 0.05 to 0.3 mm, as well as yarns and fibres made of plastic.

The machines can be used for the production of data cables, control cables and coaxial cables, braiding for battery cables, strand braids and for mechanical reinforcement for pressure hoses.

Maschinenfabrik Niehoff GmbH & Co KG – Germany
Website: www.niehoff-gmbh.info

Quality assurance for the production of optical fibres

THE production of optical fibres is a single process that some manufacturers have specialised in.

After the drawn fibre has been proof-tested and wound onto reels, the fibre is coloured in a separate step and subsequently processed to an optical cable in a loose tubing or tight buffering line. During the production of optical fibre cables, one important aspect is the protection of the fibre inside the cable.

Typically, optical fibre cables receive an outer insulation layer made from PE as an outer protective coating. For this cable type, the measurement of the wall thickness of the outer insulation layer is usually necessary, especially with regards to the eccentricity of the insulation layer. The measurement of the diameter is naturally also of importance, however, a diameter measurement alone is generally not sufficient enough.

The applied measuring technique for the measuring of the diameter, wall thickness and eccentricity of optical fibre cables also has to be applicable for 'loose tube', 'fibre ribbon', 'loosely bundled' and 'tight buffered' cables. Furthermore, the measuring technique should be independent of the shielding material under the outer coating.

Inductive and optical measuring principles, as applied by the Centerview 8010 and 8025, have proven their effectiveness for the measuring of the eccentricity of cables with an electrical conductor made from copper or aluminium. For larger dimensions, measuring by means of X-ray is a process offering a continuous quality control during production. The applied X-ray technology is convincing as no calibration is required for different insulation materials or ambient conditions.

The devices of the X-Ray 6000 series are suited for the measurement of optical fibre cables. The diameter, minimum wall thickness, eccentricity and ovality are directly defined from the X-ray image. The recording of the measuring values is carried out by an X-ray sensitive image sensor within fractions of a second.

When the eccentricity of the wall thickness of the insulation layer is non-critical and the focus lies on the compliance with the specified average wall thickness, the diameter of the optical fibre cables is measured online before and after the extruder crosshead, and the average wall thickness is defined by the difference of the measured values.

Generally the line speed is controlled for a singular insulation layer and the extruder rpm for multi-layer extrusion. For an optimum use of resources, an automatic allowance of material shrinkage, resulting from the cooling of the insulation layer, is recommended.

The applied measuring and control technology can only be successful when it receives a high acceptance of the operator. This implies that the workload of the operator is lightened and that he can concentrate on other tasks.

Sikora AG – Germany
Website: www.sikora.net

Improve dosing with the Miniblend V

The volumetric Miniblend V dosing and mixing unit offers excellent mixing quality and consistently accurate dosing. Mounted between the machine hopper and the feed throat of the plastics processing machine, the unit requires very little space.

Disc dosing with the Miniblend V gives real volume dosing which guarantees a very high dosing accuracy – even for very small dosing quantities. Three different disc sizes as well as dosing modules made of materials such as stainless steel or glass, and special wear-resistant discs for hard and abrasive materials are available.

Module exchange is quick and easy and thus allows fast colour changes. The Miniblend V is designed to dose free and normal-flowing materials and micro-batches. The unit can be operated by motan's volumetric controls VOLU MC or VOLUnet MC, which is equipped with an Ethernet interface.

motan colotronic GmbH – Germany
Website: www.motan-colortronic.com

Miniblend V volumetric dosing and mixing unit

Truly steam-cleaned!

REA Steam Cleaning has introduced the inline cleaning of wires using saturated steam, giving the following advantages:

- higher degreasing levels
- wire is absolutely dry after cleaning
- directly cleaning in line at any speed
- different diameters and shapes without changing the equipment
- low water consumption (in most cases < 50 litre/hour)
- very little waste water produced (in most cases < 10 litre/hour)
- greater reduction in encumbrances on the production line (in most cases < 2 metres)
- an environmentally friendly alternative to solvents

Higher degreasing levels are an intrinsic feature of steam cleaning due to the high temperature of the steam which hits the wire at temperatures of over 140°C. When the wire is heated by steam it stays perfectly dry and avoids the need for the drying phases which are essential in other cleaning systems.

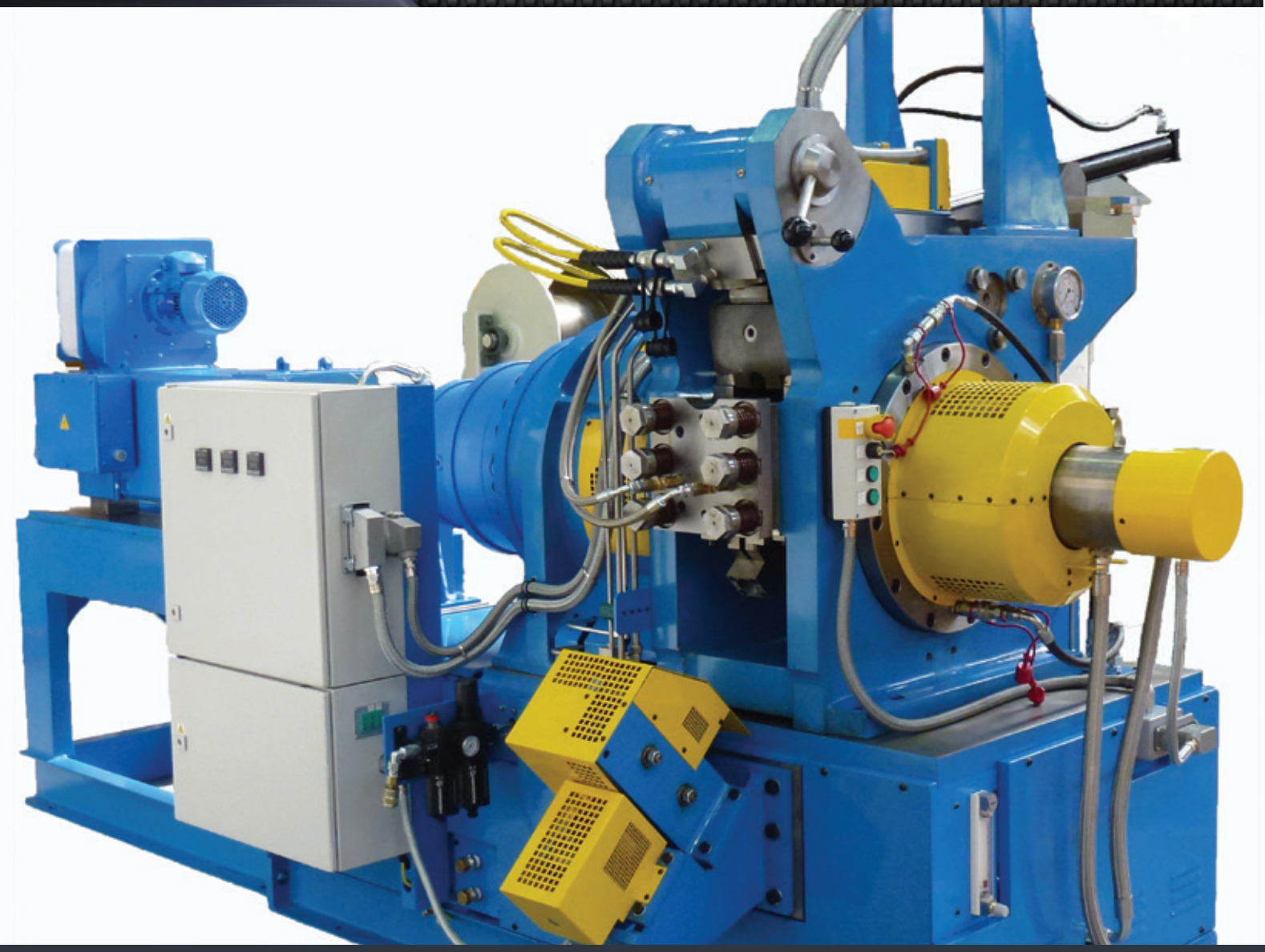
The line speed allows for a passage speed of up to 60m/minute and the amount of water is always contained, especially in cases where the section is very small, such as in wire, and gives water consumption figures of between 15 and 100 litres per hour.

One of the features that makes steam cleaning systems distinctive is the low amount of waste water produced, which consists mainly of the dirt removed and the water from the condensed steam.

All cleaning systems on the production line stand out for their much lower level of encumbrances, and all the other support units are placed outside the line.

The steam cleaning systems have always been a truly environmentally friendly alternative to the use of solvents. Should it be necessary to use detergents, these are continuously recycled so consumption is very low, generally less than one litre per day.

REA Steam Cleaning Srl – Italy
Website: www.reasrl.eu



BWE提供的Conklad 315型机

同系列中的最小型机

BWE公司推出的Conklad 315是基于非常成功、充分验证的Conform 315型机的基础上研究开发的。

Conklad 315是BWE Conklad系列中最小的机器，但包含了大型机器的许多标准设计特征，如液压制动开口、原料剪切、行星齿轮箱和扭矩管等。

Conklad 315在切向模式下运作，使用单一的进料杆，用于包层和护套操作。机器已被优化，用于高效率生产：

- 铝包钢丝（AS Wire）
- OPGW和CATV电缆
- 护套复合芯
- 强化铝线
- 实心铝导线（SAC）

基本的机器机构是基于成熟的BWE设计，具有多年可靠运行的良好记录。极端刚性、在高挤出压力下的操作能力、单独控制轮和模具温度等特性，确保整个连续操作过程模具间隙始终保持最佳状态。

自动模具加热和轮冷却系统保证快速预热到正确的起始温度，并保持生产过程中最佳的挤压条件，无需操作人员干预。通过插入模具，从而允许主模具部件的磨损表面、模具腔室以最低的成本更换，这使得整体经济效益得以进一步提升。

BWE提供广泛系列针对客户要求的服务，从客户自己提供辅助设备的机器到完整的交钥匙工程，包括工厂设计、培训、安装和调试。

BWE Ltd – 英国
网址: www.bwe.co.uk

Graphics bigstockphoto.com Artist Olechowski

电线电缆生产过程中在线直径控制

在过去的几年里，电线电缆制造商大力投资于测量控制技术和生产线控制系统，用于在线控制质量，以期获得更高的生产率和降低成本。今天，具备控制功能的在线测量仪器已成为挤压线的标准配置。

使用的测量装置包括测量头，在挤压过程中测量电缆的外径。Sikora基于激光技术开发了两个产品系列，用于连续在线质量控制。操作人员可在一般或高端技术之间进行选择。

对于测量产品直径，目前有两种方法。第一种方法是40年前发明的，通常称之为“扫描系统”。通过使用旋转镜，激光束经过测量区扫描到光传感器。在旋转镜和光传感器之间，有两个镜头。第一镜头引导平行激光束穿过测量区到达第二镜头。第二镜头将激光束引导至光传感器。

产品被引导至两个镜头之间，当激光束经过测量区扫描即被中断。因此，产品直径从激光束需要通过总测量区时就开始计算，与激光束需要运行于整个产品阶段形成对比。在这种情况下，时间相当于直径。测量率取决于镜头的旋转速度。

20年后的今天，该技术采用激光束，激光束被引导到一个高分辨率CCD线传感器上，之间没有旋转镜和镜头。产品在CCD线传感器上形成阴影。在这种情况下，线传感器上暗像素的数量相当于直径。实际上阴影评估通过衍射信号的信号处理来完成，形成最准确的读数。测量率在这种情况下非常高，仅受限于所选择的CCD线传感器。

这两种技术之间的主要区别在于第二种技术完全数字化，不需要运动部件和没有镜头。因此，精度、可重复性和测量速率都较高，没有必要校准。

以下所述的Sikora直径测量仪的技术基础是第二原则，该原则将CCD-线传感器技术与激光二极管相结合，作为光源和强大

之间无旋转镜和镜头

的分析软件。目前可提供两种类型的测量头，符合电缆生产线中质量控制的一般或高端需求。

公司提供的一般功能直径测量仪，比如Laser Series 2000测量头符合标准化的要求，应用于直径测量系统。该测量仪测量两或三个平面直径，测量率达到每秒500次。有趣的是，三轴测量头用于确定产品的椭圆度。众所周知，五条切线确定一个椭圆。

因此，通过使用三测量轴 （椭圆上6条切线），不仅确定了椭圆的最小/最大值，而且椭圆的取向也可被定义。所有设备都配备了标准接口，如RS 485、可选Profibus-DP和其它工业现场总线，用于数据传输到PC线和显示、控制设备。

另外的控制模块被整合到Sikora显示与控制装置，直径被连续控制至标称值。客户能够从18种类型的装置中进行选择，直径范围从0.05毫米到500毫米。这些装置是挤压生产线的标准配置。

有趣的是，拥有先进技术的测量与控制装置的市场开发具有功能强化、易于操作、测量率更高、精度最高和灵活的数据传输等特点。如今，用户旨在为生产提供永久的质量控制，以达到最高的生产率和降低生产成本，比如，使用创新测量设备来实现此目标。

基于这些需求，Sikora开发了Laser Series 6000三个直径测量头，满足了当前电线电缆行业高端需求。除了传统功能，也包括了Laser Series 2000，Series 6000测量头结合了多种技术创新，以提高挤压生产线持续的生产率。

每秒高达5,000次测量，每次测量都具有最高的单精度值，允许最佳的线路控制和提供可靠的统计数据。高测量速率也允许检测结块和颈缩。用户因此获得了功能二合一的系统，这使得投资成本降低，生产线上空间更大，因为只需要安装一个测量头。透明和彩色物体都可以通过Laser Series 6000来测量。此外，测量头具有一个集成的LCD显示器，这使得操作人员在测量装置上就可以直接看到直径值。

应用中的统计数据应被加工和存储，或者报告应被打印，可使用EcoControl Series外部处理系统来完成。直接集成到测量头的是通用接口模块，用于各种连接，例如RS 485、RS 232、Profibus-DP、Profinet或可替代的工业现场总线。此外，Laser Series 6000拥有一个可选的Wi-Fi接口，允许直接连接到智能手机或笔记本电脑。Wi-Fi接口用于诊断、质量控制、传输测量值、动向和统计数据以及视频信号。

生产线中一个重要的一体化特征是旋转测量头的设计。如果更换产品，测量头很容易被移动，或从挤压线中移除。所有测量头在底部都打开，以防止灰尘和水进入测量区。提供电缆连接到接口模块，在测量头支架上也受到安全保护。Sikora提供三个直径测量装置，适用的产品直径从0.2到78毫米。

Sikora AG – 德国
网址: www.sikora.net

增强阻燃和低收缩性

Teknor Apex公司Halguard®无卤阻燃（HFFR）化合物成本经济，适合于一般护套应用，最近该系列产品又添新成员，新增加的两种化合物具有增强的阻燃性和较低的挤压后收缩率。

新化合物成本低于优质化合物，但性能表现绝不逊色。Teknor Apex推荐用于地铁、公共交通、手机信号塔、数据中心和基础设施等应用电缆中，以及电气和电子设备的内部布线。等级包括：

- Halguard 58610 和 58615。这些53肖氏D化合物在1/16英寸（1.59毫米）厚的样品中具有UL-94垂直燃烧率V-0级，氧指数分别为52和45%。Halguard 58610 和 58615通过了UL-1685 FT-4和UL-1666直立燃烧测试，适用于更复杂的电缆结构。
- Halguard 58620。该54肖氏D化合物具有挤压后低收缩率，这在光缆应用中尤为重要。该化合物通过了UL-1685阻燃测试。

这些新的化合物是继去年推出了首批低成本HFFR系列Halguard 58600和58605产品后发布的。

“Teknor Apex公司去年推出了58600和58605化合物，之后我们不断收集客户咨询和建议，继而开发了Halguard 58610、58615和58620，以满足客户的特定需求”Teknor Apex公司乙烯基部市场营销和业务发展总监Mike Patel表示。

“这五种化合物满足一般护套应用的性能要求，同时，成本低于其它Halguard化合物或与无卤阻燃产品价格相当。”

Teknor Apex – 美国
网址: www.teknorapex.com

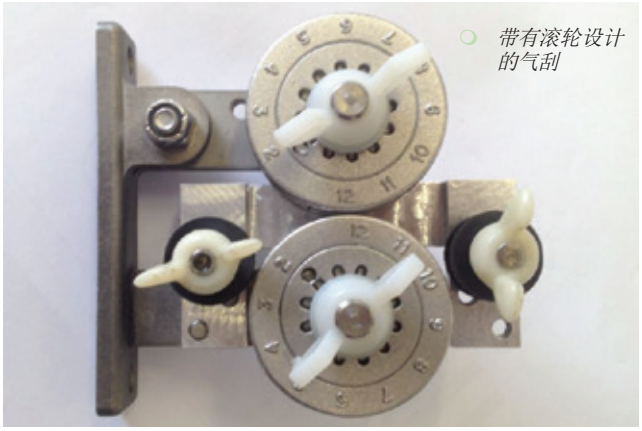
Marldon气刮又添新功能

Marldon“可变孔”气刮设计一直以来为用户提供单个设备处理多种电缆 （或管道） 直径的成本经济解决方案，但是引导电缆进入装置是客户自己的责任。

对于良好的干燥而言，通过装置进行正确的对准是非常必要的，同时，也避免了电缆与气刮接触有可能导致电缆损坏，随着时间的推移，气刮也会受损。

Marldon目前提供一种附件，能够保持设备输入和输出侧上的导轨。该附件为紧凑型，位于气刮组件内，恰到好处。

每个轧辊独立调整高度，以适应被加工(穿过所有的电缆直径时，中心线必须保持恒定） 电缆 （或管道） 的特定直径。



带有滚轮设计的气刮

Marldon Group Ltd – 英国
网址: www.marldon.com

真正的蒸汽清洗!

REA Steam Cleaning使用饱和蒸汽进行线材在线清洗，其优点如下：

- 较高的脱脂水平
- 线材清洗后绝对干燥
- 任何速度下直接在线清洗
- 不同的直径和形状，不需要改变设备
- 水消耗低(大多数情况下 <50升/小时)
- 极少废水产生(大多数情况下<10升/小时)
- 进一步减少生产线的负担(大多数情况下<2米)
- 溶剂的环保替代品

更高的脱脂水平是蒸汽清洗的固有特征，这是由于蒸汽的高温在超过140°C时撞击线材。

当线材由蒸汽加热，会保持完全干燥，省略了干燥阶段，这在其它清洗系统中是必不可少的。

线速度允许通过速度高达60米/分，水的量总是包含的，尤其在截面非常小的情况下，比如线材，并给出了每小时15到100升的耗水量。

产生的废水量很低是该蒸汽清洗系统的一个显著特征，主要包括除去的污垢和冷凝蒸汽的水。生产线上所有的清洗系统减少了更多的障碍，所有其它支持设备总是置于线外。蒸汽清洗系统真正实现了环保，可替代溶剂的使用。如果必须使用洗涤剂，这些洗涤剂能被连续循环利用，因此，消耗非常低，通常每天低于1升。

REA Steam Cleaning Srl – 意大利
网址: www.reasrl.eu

最高精度有助于降低生产成本

NDC Technologies报告指出，公司创新Beta LaserMike LaserSpeed®非接触式激光测量仪能够让电线电缆制造商在生产过程中精确测量产品的长度和速度，以避免昂贵产品过剩和短缺，并减少废品和返工。

生产过程中测量产品的长度和速度以避免代价高昂的产品剩余或短缺

电线电缆制造商需要用来严格控制生产过程中产品的长度和速度。具体应用包括连续长度测量、差速控制、切割长度控制、产品定位、印刷/标记控制等。大多数制造商依赖驱动速度或机械接触编码器的精度。

然而，机械编码器由于打滑或震动会失去与各个产品表面的接触，因为机械磨损而需要频繁的校准。接触式编码器高达2%的误差会导致产品成为废品，加上维护和系统停机，使制造商遭受严重的经济损失。为了解决这个问题，制造商在其生产线上安装了LaserSpeed非接触式测量仪，用来直接测量产品的长度和速度。

LaserSpeed测量仪采用先进的激光技术，在生产过程中精确测量电线电缆的长度和速度，而且不会与产品接触。该高性能测量仪在产品表面展现出独特的模式。

随着产品移动，光散射回LaserSpeed设备。该信息被译成产品速度，产生脉冲以确定产品长度。长度和速度测量被捕获，精确率达±0.05%，重复率±0.02%。

NDC提供完整系列的LaserSpeed系统，测量速度高达12,000米/分(39,400英尺/分)，下降到真正的零速，偏离距离达到1,000毫米(39.4")，测量深度可达100毫米(3")。NDC还提供欧洲认证的长度测量系统，以满足MID(测量仪器指令)2004/22/EG的要求。

NDC Technologies – 美国
网址: www.ndc.com

Videojet契合超小打印需求

电子、元器件和线缆行业的制造商，以及其它需要超小型打印功能的各行各业，都可以采用Videojet Technologies公司推出的新型1650高分辨率 (HR) 和1620 HR连续喷墨 (CIJ) 打印机提供的高质微打印，机器运行时间正常。

新打印机增强的微打印功能实现了高清晰度，打印字符小到高度只有0.6毫米，速度高达348米每分钟。40微米的喷嘴使得1650 HR和1620 HR系统能够在集成电路中高速打印2维条形码和高度清晰的字母数字代码，以及小直径电缆和其它打印空间有限的产品，在不影响生产率的前提下，提升了制造商的可追溯性。

新的HR微型打印机造就了高度成功的Videojet 1000 Line平台和应用测试“超高速”喷嘴的创新，Videojet公司于2013年正式发布1000 Line。继数以万计的成功案例之后，1000 Line平台已成为CIJ正常运行时间的性能标准。

新的HR打印机喷嘴利用专有Precision Ink Drop™技术，允许喷嘴以每秒超过100,000滴的速度通过先进的高频打印头运作，再配以高级软件运算法则，修改个别墨滴的飞行路径，以实现打印的代码质量最佳。

Videojet Technologies公司CIJ业务主管Anthony Blencowe表示：“使用微打印的制造商都特别重视打印质量。1650 HR和1620 HR增强了相关功能，加上专门的光栅克服了缩短的字符高度和快速线速度等方面的质量挑战。目前，制造商能够以更高的线速度，通常在同一个有限的打印区域内，打印更多更加清晰的数据。”

新的HR打印机具有Videojet专利CleanFlow™技术，减少了喷嘴末端的油墨堆积，与传统微打印系统相比，喷嘴清洗间隔时间更长，大大减少了维护需求。

打印头提供自动清洗，即使在延长线停机后，也能够支持更快的系统启动，从而提高了生产的正常运行时间。内部泵省去了对外部空气的需求，并且降低了墨流中污染物的危害，进一步提高了打印的一致性。

HR打印机凭借先进的喷嘴技术，使用一系列专门的无卤油墨，提供耐磨、耐高温和耐化学腐蚀等特性。所有的油墨可用于符合RoHS标准的产品 (EC 2011/65/EU Annex II)，以满足电子行业的特殊需求。这允许打印一系列耐久、耐磨的代码，例如，在散热片、电容器、连接器和高绝缘带上打印。

与其它1000 Line Videojet CIJ打印机相同的是，1650 HR和1620 HR解决方案也具有Smart Cartridge™液体系统，有助于确保每种产品只选择正确的墨水，从而为有可能使用多种墨水的电子和电线电缆制造商提供支持。该打印机使用针和隔从每个墨盒吸取墨水，消除了溢出风险和降低了浪费。这在微印刷应用中提供了一个清洁环境的真正优势。

为了满足制造商的具体业务需求，两个HR系统都提供独特的功能，为操作人员提供援助。1650 HR采用了Videojet公司独特的CLARiTY™触屏，它提供了内置的生产力工具，来帮助提高OEE和生产线效率。1620 HR配备了一个键盘界面，该界面很坚固，使用方便，只需要简单的培训，为简单快速的更换产品提供了方便。

Videojet Technologies – 英国
网址: www.videojet.co.uk

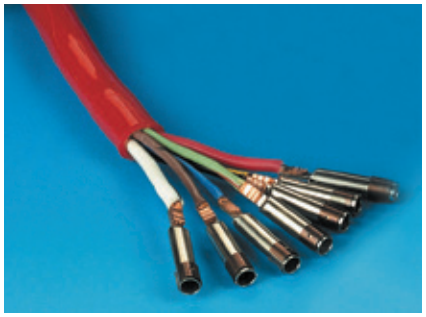
线束焊接的最佳方法

使用线束的制造商面临日益严峻的功能和环境条件挑战，超声波焊接设备产生的焊缝具有高导电性和拉伸强度，因此成为理想的选择。事实上，目前估计有至少三分之二的汽车线束采用超声波焊接。

“线束就像设备的中枢神经系统，广泛应用于各行各业，包括消费电子、家电、数据通信、照明、医疗、汽车、船舶和航空航天，”Sonobond Ultrasonics副总裁Melissa Alleman表示。

线束的功能非常重要 – 尽管暴露在高温、潮湿、震动和腐蚀等条件下。由于超声波焊接使用振动能量来驱散表面的氧化物和在绞线上创建磨损，因此，超声波焊接已成为当下最流行、替代其它作业方式的焊接方法。因此，形成了具有高导电性的固态冶金结合，同时产生最低的电阻焊接。

“与电阻焊接不同的是，电阻焊接会产生很高的热量，超声波焊接过程中金属不熔化，所以材料性能没有显著的变化，热量较低，这意味着不需要外部水冷却，”Alleman女士说。另外，与熔焊不同的是 – 如果焊接温度没有达到焊料的熔点就不能使用熔焊 – 超声波焊接不需要助焊剂或填充材料。此外，与其它作业方式相比，超声波焊接使用的时间和精力要少得多。



高导电性和抗长强度

超声波焊接过程，从电源将输入线电源转换成高频电力开始，然后将能量发送到传感器。传感器将电能转化为振动能，振动能传递到焊接区域作为声波或超声波。”

一旦振动，超声波的剪切力由焊嘴指向两个金属之间的接口，在夹紧力的作用下合在一起，内部应力导致变形，材料相互接触。

温度和界面滑移的局部增加导致氧化物和工件表面的污物分解，允许纯净金属表面呈现多点状接触。随着高频振动的延续，纯净金属接触面积不断扩大，直到扩展为整个焊接区，本质上创建一个不熔化的焊接，并产生一个高导电性和拉伸强度的冶金结合。

“专利Wedge-Reed超声波焊接系统让我们在行业内独树一帜，因为只有这种超声波系统能够焊接镀锡和氧化电线和端子，”Alleman女士补充说。“我们的机器能够产生持久的焊接，这正是镀锡线所需要和亲睐的。”

Wedge-Reed系统使用垂直振动簧片，通过楔形耦合器和垂直于簧片的传感器组件驱动，允许高夹紧应力，但没有弯曲应力和失速。

Sonobond公司推出的SpliceRite™双头焊机在焊接区域的两侧都有焊头，能够为绞合裸铜线提供高达100mm²单脉冲线拼接，镀锡线约为60mm²。

此外，还包括双头点焊机和Sonobond SonoWeld®装置，可定制式焊接镀锡铜线和裸或涂层端子。每台Sonobond焊接机都配备一个微处理控制器，该控制器能够针对高度、能量和时间进行程序化焊接，存储和调用多达250次作业。此外，所有设备都具有热处理和锥形锁尖，可实现高达100,000次焊接，并且无需机械调整或校准。Sonobond设备还提供自动频率控制、过载保护，检测和防止出错和没有被激活的部分。

Sonobond Ultrasonics – 英国
网址: www.sonobondultrasonics.com

India Insight

Modernisation underway for reliable power

T BHASKAR, assistant executive engineer (electrical), of the Karnataka Industrial Areas Development Board (KIADB), has confirmed that a process of power supply modernisation is to begin for industrial areas, commencing with a pilot project in the Mysuru industrial area.

As part of the modernisation, it is proposed to replace all overhead power supply lines with underground cables. Mr Bhaskar added that transformers with modern technology will be installed to ensure an uninterrupted power supply to industry.

KIADB is also planning to supply solar power to selected bore wells and streetlights. Mr Bhaskar said that, depending on the results of the pilot project, KIADB would extend the programme to all industrial areas in Karnataka.

EP Vishwanath, president of the Mysore industries association, said industrialists would not demand subsidies, incentives and concessions if the government provided good infrastructure, including adequate water and power supply.

He assured KIADB of full support for the success of the pilot project.

"With this [upgrade] of power infrastructure, Mysuru industrial area will attract more investments," said Suresh Kumar Jain, secretary of MIA.

Karnataka Industrial Areas Development Board – India
Website: www.kiadb.in

The fountains in Brindavan Garden, Mysore

Steel shed

Tata Steel has sold its entire stake in Lanka Special Steels Ltd (LSSL) to E B Creasy & Company PLC in an all cash deal.

LSSL, incorporated in Sri Lanka, was a wholly-owned subsidiary of Tata Steel. It is engaged in the business of manufacturing and supplying hot dip galvanised wire and nail wire with an installed capacity of 14,400 tonnes per annum.

It is the sole manufacturer of GI wires in Sri Lanka and caters to the commercial galvanised wires market for end uses such as barbed wires, wire meshes and chain links.

Lanka Special Steels Ltd – Sri Lanka
Website: www.lankassl.com

India hydro project

GVK Power & Infrastructure has announced that the first unit of a 330MW hydropower project in India's Uttarakhand state is now online, with units two and three to follow shortly. The project features four 82.5MW units and a 248m long, 90m high dam with a head of 66m.

The plant, located on the Alaknanda river in the city of Srinagar, will sell 88 per cent of its power to the neighbouring state of Uttar Pradesh under a power purchase agreement, but will reserve 12 per cent for Uttarakhand without charge, the developer said.

GVK's founder, chairman and managing director, GVK Reddy, said: "This project is another significant step towards contribution of the country's infrastructural development. We are happy to have lived up to the faith reposed in us."

He added: "This project not only aims to benefit the people of Uttarakhand and Uttar Pradesh, but also aid the nation to be self-reliant."

GVK Power & Infrastructure – India
Website: www.gvk.com

Industry predictions

Bharat Book Bureau's latest report, "Insulated wire and cable", presents historical demand data (from 2004, 2009 and 2014) and forecasts (for 2019 and 2024) by material, product and market.

The report projects that USA insulated wire and cable demand will exceed $27 billion in 2019, as total consumption of insulated wire and cable continues to recover from its depressed 2009 level.

A strong expected recovery in construction expenditures will fuel growth in demand for several types of wire, including building, electronic, and power wire and cable.

Building wire and cable held the largest share of demand in 2014, and is expected to see the most rapid advances through to 2019, to exceed $8 billion. An expected acceleration in growth of building construction expenditures, after a period of slow improvement between 2009 and 2014, is anticipated to drive growth.

The construction market for insulated wire and cable is forecast to benefit from the fastest growth of any wire and cable market. In addition to building wire, rising construction expenditures will increase demand for telephone wire and coaxial cable.

The electrical equipment market held the largest share of insulated wire and cable demand during 2014. Through the forecast period, demand is projected to increase 4.1 per cent per year, driven by higher demand for wire and cable for power transmission and distribution.

Increasing electricity production as well as use of new sources of power generation, such as solar and wind farms, will support the growth.

The full report is available now.

Bharat Book Bureau – India
Website: www.bharatbook.com

Going underground

After heavy rains and high winds caused damage to trees and electricity poles in Bengaluru, civic agencies are to take action to identify decaying trees and to route cables underground in areas of dense vegetation.

Though civic experts had previously recommended underground cabling to avoid outages and electrocution risks due to damage of electric poles and cables, the government had hesitated to act due to the high cost.

Underground cabling would cost Bescom (Bangalore Electricity Supply Company) five times more than overhead cable. However, in recent years the government has carried out underground cabling of 11kV in parts of the city, and low voltage cable will be placed underground in some areas.

Bescom MD Pankajkumar Pandey said it will seek more funds in the coming budget to take up underground cabling, especially in areas with dense tree cover.

"These are the areas which are largely affected during the tree fall. However, the government is now keen on taking cables underground and we are demanding substantial funding for the purpose," he said.

Mr Pandey also stated that softwood trees, planted in Bengaluru a few years ago, were taking a toll on electric poles and wires. "We need trees which can withstand the local weather conditions. We are holding talks with the BBMP (Bruhat Bengaluru Mahanagara Palike) to begin a survey to identify the decaying trees, so that the damage to electric wires is minimised."

Bangalore Electricity Supply Company – India
Website: www.bescom.org

A mobile-centric Africa is seen as providing impetus for many of the most innovative digital businesses of the future

Mobile products created by British-born Nigerian Oke Okaro are used by more than 60 million unique users every month and generate over $1 billion in annual revenues.

Most recently he spent five years at Bloomberg LP as global head and general manager of the Mobile and Connected Devices unit where he built and led a team focused on transforming the company's businesses worldwide.

Recently Mr Okaro was interviewed by Kenya-based *Forbes* contributor Mfonobong Nsehe on how smartphones are changing Africa's digital media consumption habits and the significance of this for the African future.

Here, lightly edited, are the main takeaways from that interview. ("Bloomberg's Former Head Of Mobile on How Smartphones Will Fuel Innovation in Africa," 10th April)

What does mobile expansion mean for Africa? New businesses and industries are going to be built entirely around mobile devices. In the USA and Europe the web was built around desktop users, and 99.9 per cent of the digital properties today are desktop companies which support mobile.

In Africa it will be the reverse, with mobile leading the way; and this is where the breakthrough innovation is going to come from. This is why I'm convinced that a large proportion of the most innovative digital companies of the future will come from Africa.

What does innovation mean to you? It means setting the new standard. It means creatively solving a real problem in the market in an original, thoughtful, elegant and commercially viable way. It means creative destruction – throwing out the old because you can and without inhibition or preconceived notions, rebuilding a new and better mousetrap. It means leadership.

How are tablets, smartphones and connected devices changing Africa's digital media consumption habits? The modern devices are gradually taking centre stage as the preferred platform for consumption. It's still early days, though, since the overwhelming majority of people still don't have access. But this is changing, and within the next ten years 800 million more people are going to have smartphones and thus greater access.

Is there any African mobile-based business you're watching closely which you feel is primed for global domination in the next few years? The most innovative digital businesses of the future are going to come from Africa and I'm not just saying that because I'm African.

Mobile is going to be crucial to every business of the future especially here in Africa. And, yes, I think a number of businesses have the potential to go global.

What are some of the key mobile trends you believe will take centre stage in Africa within the next decade? I think one of the most substantial developments will be the emergence of the localised web, at scale. By localised web I mean home-grown digital properties that uniquely satisfy local needs.

Today, the majority of the most trafficked digital properties are foreign [ie non-African] websites. This balance will shift over time with the proliferation of devices and introduction of new services because the mass-market audience will demand a web that's more relatable.

Of related interest . . .

- Under the terms of a memorandum of understanding announced by the two operators, customers in East Africa who are signed up to Vodafone Group's M-Pesa and those using South Africa-based MTN Group's MTN Mobile Money will be able to transfer money back and forth between them.

  The collaboration is intended to facilitate convenient and affordable international remittances among M-Pesa customers in Kenya, Tanzania, Democratic Republic of Congo (DRC) and Mozambique, and Mobile Money customers in Uganda, Rwanda and Zambia.

  Vodafone, of the UK, and MTN will also share "best practice" techniques and work together to define the rules and standards governing mobile-based remittances in Africa.

The ordinary hand gestures of the smartphone user are enlisted in a new defence against sophisticated malware

Findings published on 26th March by University of Alabama at Birmingham (UAB) researchers hold promise for protecting smartphones from attack by malware.

Simple techniques developed by the university's Department of Computer and Information Sciences enlist the motions performed naturally when people use their phones to block intruder software from infiltrating a smartphone or app to gain access to information about the user.

As reported by Stephanie Kanowitz in *FierceMobileIT* (1st April): "The idea is that when a human tries to access a service, the movement would be recognised and access would be allowed. Malware programs lack gestures, so access would be blocked."

According to the researchers, the hand actions associated with smart-phone use can – by means of motion, position and ambient sensors

available on most smartphones – be identified and turned against would-be attackers.

Researchers collected data from a number of phone models and users in real-life or simulated scenarios in both friendly and adversarial situations. The results, they said, show that typical gestures like snapping and tapping can be detected and distinguished from one another with high accuracy. Further distinction, between benign and malicious activity, then becomes possible.

"The most fundamental weakness in mobile device security is that the security decision process is dependent on the user," Nitesh Saxena, an associate professor of computer and information sciences at UAB, told *FierceMobileIT*. "In this method, something as simple as a human gesture can solve a very complex problem. It turns the phone's weakest security component – the user – into its strongest defender."

The US Federal Communications Commission will offer tech and telecom companies free access to valuable airwaves

In a move hailed by telecommunications industry trade groups, US regulators on 17th April decided to open a section of government-controlled airwaves for commercial use by companies under pressure to meet the growing data demands imposed by new wireless devices.

The Federal Communications Commission (FCC) voted unanimously to work out a process to allow companies access to the frequencies in the 3.5 gigahertz band. The ability of those airwaves to carry heavy data across short distances makes them attractive to wireless Internet service and device companies, including Verizon, Google, Qualcomm and Ericsson.

As with Wi-Fi, the plan would allow wireless providers and others to use the airwaves without charge; or – if the airwaves crowd up – to buy licences for exclusive short-term use in some areas.

By sharing spectrum in places where commercial users would not interfere with incumbent users, companies will be able to take advantage of frequencies now dedicated to military radar and other government operations.

Malathi Nayak of *Reuters* noted that the plan to open up the frequencies could help boost the capacity of existing wireless networks, especially in densely populated areas or indoors.

It could even help with the wireless connection of household appliances to facilitate the Internet of Things.

The FCC has been developing the system, the Citizens Broadband Radio Service, since 2012. Chairman Tom Wheeler said in remarks in Washington that the opening up of 3.5 GHz airwaves "is setting a new paradigm for how spectrum sharing should work."

Elsewhere in telecom . . .

- The Paris-based financial daily *Les Échos* reported on 20th April that the French parliament had approved an amendment to the telecom component of an economic reform law requiring operators to improve mobile coverage throughout France.

- The new legislation directs that existing gaps in 2G network coverage in rural areas be addressed by 2016, and that all unserved municipalities in these "white areas" be covered by 3G/4G networks by 2017. The Loi Macron, named for the French economic minister, empowers telecom regulator Arcep to sanction mobile network operators for any failure of compliance.

- NBN Co, the overseer of Australia's National Broadband Network project, announced the launch in May of a nationwide "speed pilot" designed to significantly boost the broadband speeds available to families and businesses in rural and regional Australia.

  Customers connecting via the fixed-wireless element of the NBN infrastructure reportedly can expect wholesale downlink speeds of between 25Mbps and 50Mbps – double the current top wholesale offering – while wholesale upload speeds will rise to between 5Mbps and 20Mbps.

  As reported by *TeleGeography* (20th April), the speed pilot is slated to conclude 20 business days after the commercial launch of the NBN product, set for fourth-quarter 2015.

  More than 600,000 premises are earmarked for fast broadband via the LTE (long term evolution)-based fixed wireless network by the end of the rollout.

- Also from *TeleGeography* (20th April), China Mobile, the world's largest cellular provider by subscribers, has taken erosion in its traditional revenue streams from the growing popularity of smartphones and data services, as users increasingly adopted OTT (over-the-top) messaging applications.

  For the first three months of 2015, SMS (short message service) usage slipped from 156.1 billion to 146.2 billion and total voice traffic from 1.083 trillion to 1.03 trillion, a fall of 4.9 per cent quarter-on-quarter from 2014.

  But the operator booked operating revenue of $27.76 billion for first-quarter 2015, an increase of 3.9 per cent year-on-year from 2014, driven mainly by growth in the number of the 4G users in its subscriber base.

  China Mobile registered 8.75 million new users in the quarter, lifting its total user base to 815.38 million from 806.63 million at the end of 2014.

- A survey by *BBC World Service* has found that some 6.6 million people – two in five adults – consume BBC content every week in Afghanistan. The London-based public service broadcaster reported that an audience of 3.2 million Afghans watches BBC TV each week.

  Radio – FM and shortwave – remains the BBC's principal platform in Afghanistan, reaching 4.7 million Afghans each week predominantly in Pashto and Dari, and in smaller numbers in Uzbek and English.

以移动业务为中心的非洲为很多非常有创新力的数码企业提供了有力的前景

由英国出生的尼日利亚裔人奥卡罗（Oke Okaro）所制造的移动产品的每月使用者超过6,000万独立用户，年收入超过10亿美元。作为移动通信设备（Mobile and Connected Devices）部门的全球主管和总经理，他最近花了5年在彭博通讯社（Bloomberg LP）创立并领导着一支团队致力于在全球范围内转变公司业务。最近，奥卡罗先生（Okaro）就智能手机如何改变非洲数字媒体消费习惯及这一改变对非洲未来发展的意义接受了肯尼亚福布斯（Forbes）撰稿人Mfonobong Nsehe的采访。以下是这次采访的主要内容简介。（“彭博通讯社移动部门前任主管谈智能手机如何推动非洲创新”，4月10日）

移动设备的扩张对非洲意味着什么？ 新的业务和产业的创意将完全围绕着移动设备来进行。在美国和欧洲，网络是基于台式电脑用户来创立的，当今99.9%的数码产业都是台式电脑公司，它们支撑着移动设备。

在非洲，情形恰好相反，移动设备占据了主导地位；这也恰好成为了突破性创新的来源。这就是我为什么确信未来非洲会发展出很多非常有创新力的数码公司的原因。

创新对你来说意味着什么？ 意味着设立新的标准。意味着以一种原创的、考虑周全的、精妙的且商业可行的方式去创新性地解决市场中存在的现实问题。也意味着创造性破坏——扔掉旧有观念，重新建立一个新的、更好的想法，因为你可以，不再压抑思想或受限于先入为主的观念。这意味着领导力。

平板电脑、智能手机及通信设备是如何改变非洲数字媒体消费习惯的？ 作为首选消费平台，现代化设备正逐渐走向市场中心。由于绝大多数人还无法使用数字消费平台，消费习惯的改变仍处于早期阶段。但是这一现状正在改变，在未来10年内，超过8亿人会拥有智能手机，由此数字消费平台的使用也会增多。

你是否有密切关注哪家非洲移动公司，认为它在未来几年内会成为全球主导？ 未来最有创造力的的数码企业必然出自非洲，我这么说并非仅仅因为我是非洲人。将来移动业务对每一家企业来说都将非常严酷，尤其是在非洲这里。然而，是的，我相信很多企业都有走向全球的潜力。

你认为未来十年会占领非洲移动行业市场中心的趋势主要有哪些？我认为其中最实质性的一个发展趋势将会是本土化网络的大规模兴起。我说的本土化网络指的是专门服务于本土化需要的国产数码企业。

当前，通信量最大的数码企业大多是国外网站[即非非洲本土的网站]。这种状态会随着时间、随着设备的增多和新服务的引进而发生改变的，因为大众市场需要更符合他们习惯的网站。

利益相关者

- 在东非的沃达丰集团移动银行（Vodafone Group's M-Pesa）和南非MTN集团MTN移动支付（MTN Group's MTN Mobile Money）宣布达成谅解备忘录，其中条款规定两家运营商的用户之间将能够进行自由来回转账。这一合作旨在促进M-Pesa移动银行用户和Mobile Money移动支付用户之间进行国际汇款的便利性和可负担性。M-Pesa移动银行用户主要位于肯尼亚、坦桑尼亚、民主刚果共和国和莫桑比克等国，而Mobile Money移动支付用户主要位于乌干达、卢旺达和赞比亚等国。英国沃达丰集团和南非MTN集团也会共享“最佳方案”技术，并合作制定非洲移动汇款管理规定和标准。

针对复杂的恶意软件，一项新的防御功能将智能手机用户的一般手势添加进来

伯明翰阿拉巴马大学(University of Alabama at Birmingham (UAB))的研究人员3月26日公布的调查结果为保护手机不受恶意软件的攻击带来了希望。由该校计算机和信息科学学院所开发的简单技术将人们使用手机时的自然动作用于阻止入侵软件侵入智能手机或应用程序而获得用户信息。

据菲尔斯移动信息技术公司（FierceMobileIT）的史蒂芬妮·卡诺威茨（Stephanie Kanowitz）（4月1日）报道：“我们的想法是，当人试图访问一项服务时，其手势可以被识别，才能允许访问。恶意软件程序没有这些手势，所以其访问会被阻止。”

据研究人员介绍，与使用智能手机关联的手势操作可以通过——动作、位置、和大多数智能手机自带的环境传感器——被识别并阻止潜在的入侵者。研究人员在真实场景和模拟场景中从多个手机和手机用户在友好或敌对的情况下收集到数据。他们说结果表明，像敲击和抓取等一些典型手势可以被精确地识别出来并与其他手势相区别。那么友好活动与恶意活动之间的进一步的区分也将成为可能。

“移动设备安全最根本的缺陷在于安全决策的过程是依赖于用户的，”伯明翰阿拉巴马大学（UAB）计算机和信息科学副教授Nitesh Saxena告诉菲尔斯移动信息技术公司(FierceMobileIT)。“在这种方法中，像人类手势这样简单的东西就可以解决一个非常复杂的问题。这就将手机最不安全的组件——用户——变成了其最强的防护者。”

美国联邦通信委员会(US Federal Communications Commission)将向技术和通信公司免费提供有价值的电波使用权

在4月17日电信行业贸易组织采取的一项行动中，美国监管机构决定开放政府控制的部分用于商业用途的电波业务，以满足新的无线设备所带来的日益增长的数据需求。联邦通信委员会(FCC)一致投票决定制定一个计划，允许公司访问3.5兆赫频带内的各频段。这些电波能够在短距离内传送大量数据，这使得他们对无线互联网服务和设备公司很有吸引力，这些公司包括威瑞森(Verizon)、谷歌(Google)、高通(Qualcomm)、和爱立信(Ericsson)。和无线局域网络一样，该计划会允许无线服务提供商和其他人免费使用电波；或者——如果电波服务过于拥挤——即在某些区域允许他们购买专用于短期用途的许可。

在商业用户不会干扰传统运营商的地方，通过共享频谱公司将可以使用目前专用于军用雷达和其他政府操作的频段。路透社(Reuters) Malathi Nayak的指出，这项开放频率的计划可以帮助提高现有无线网络的承载能力，特别是在人口稠密的地区或在室内。它甚至可以帮助家用电器进行无线连接以促进物联网的发展。自2012年以来，联邦通信委员会(FCC)已经在开发这一系统，即市民宽带无线电服务(Citizens Broadband Radio Service)。主席汤姆·惠勒(Tom Wheeler)在华盛顿发表讲话时表示，3.5 GHz电波的开放意味着“设置一个新范式来说明频谱共享应该如何起作用。”

The world

A close study of the latest International Monetary Fund global economic forecast is more encouraging than the IMF will allow

Even good news, when generated by the International Monetary Fund, is delivered with an implied worried frown. So it was in mid-April, as finance ministers and central bankers from 188 countries converged on Washington for the combined IMF-World Bank spring meetings.

On 13th April the IMF released a forecast of continuing recovery in the Eurozone and growth in the US economy of 3.1 per cent this year, handily outpacing the 2.4 per cent of 2014. The outlook for the broader global economy was even sunnier: expansion by 3.5 per cent this year and 3.8 per cent in 2016.

But the tone of these tidings was typically guarded and cautionary. At a news conference, IMF Economic Counsellor Olivier Blanchard characterised this year's growth as "moderate and uneven."

David Marsh, chairman of the Official Monetary and Financial Institutions Forum (OMFIF), a London-based think tank that promotes dialogue on world finance between private-sector and public institutions, decided to issue a corrective in advance to "the gloom [that] will be on plentiful display in Washington." Here, abridged and lightly edited, are the main points in an article he prepared for *USA Today* ("Five Reasons to Be Upbeat on the World's Economy," 13th April):

- The US is powering its way to recovery, with a generally favourable influence on the rest of the world. Sound fiscal policies and appropriate monetary easing by the Federal Reserve have brought down US unemployment to 5.25 per cent and will sooner rather than later generate a healthy normalisation of American interest rates.

- The fall in oil prices is almost universally good news for the world economy. Yes, it has imposed retrenchment on some prime oil exporters; but most oil producers have the reserves to overcome the setbacks. Oil importing countries, which include a large number of poorer developing nations as well as much of Europe, are huge beneficiaries of the moderate prices.

  This period of price benevolence will be extended at least a year or two by the wish of Saudi Arabia and other leading exporters to keep pumping out oil, as well as the relative buoyancy of USA shale production.

- News from emerging market economies is positive despite their slower growth. The slowdown in China will put that economy on a more sustainable path, driven by domestic consumption rather than exports.

  India is on a more stable growth trajectory under a new prime minister. Brazil and Russia are accustoming themselves to sharp declines in activity.

  Nigeria, the leading economy and most populous state in Africa, has just held a general election – a sign of democratic maturity likely to rekindle economic activity that could reverberate throughout Africa.

- The strong American dollar has been a boon for most countries. It may be holding back USA exporters and depressing foreign earnings, but dollar strength is normally good for the world economy. Many countries can gear up for higher exports and their companies earn more abroad.

  As the world's leading transaction and reserve currency, the greenback spreads confidence internationally. The decision by the Chinese leadership to let the renminbi follow the dollar upward and become, in time, a reserve currency, is a wise move. For one fewer cause of tension in the world, the US Congress no longer terms China a currency manipulator.

- Modest growth is resuming in Europe, home to many of the world's most technologically adept companies and much research and development brainpower. For the time being at least, the European Central Bank's policy of quantitative easing – buying up government bonds to punch up the money supply and ward off deflation – is adding to the momentum of a recovery that was already underway at the turn of the year.

Of related interest . . .

- The managing director of the International Monetary Fund is by tradition a European. But, according to Mr Marsh of OMFIF, the odds are narrowing that Christine Lagarde, of France, whose term is up in 2016, will be replaced by a candidate from Asia or Latin America.

  He wrote: "The more the developing countries can use the tailwinds in the world economy in their own favour, the greater will be likelihood of a landmark decision that takes account of the international economic shift toward the emerging world."

A comparison of the world's passports discloses wide variances in freedom of choice among destinations

"A passport from a country on good diplomatic terms with its peers is a powerful tool, allowing holders to travel across borders with ease."

Sophia Yan of *CNNMoney* also noted that ease of movement is a speciality of the Canadian firm Arton Capital, which helps wealthy individuals obtain multiple citizenships, sometimes through immigrant investor programmes. On the basis of the number of countries that can be visited without a visa, or by getting one upon arrival, the Montreal-based company has ranked the world's passports according to the global mobility they afford the holder. ("These Are the World's Most Powerful Passports," 17th April)

Tied for first place are USA and UK passports, which give holders access to 147 countries, Ms Yan reported.

A Russian passport provides 98 destination options. Passports issued by the world's most populous country, China, offer quick access to 74 countries; followed by India, 59.

As identified by Arton Capital, these are the top-ranked passports and the number of countries they access:
» USA and UK (147)
» France, Germany and South Korea (145)
» Sweden and Italy (144)
» Denmark, Finland, Luxembourg, Netherlands, Japan and Singapore (143)
» Switzerland (142)

The passports offering the most limited access are:
» Democratic Republic of Congo, Yemen, Central African Republic and Kosovo (41)
» Equatorial Guinea, Bhutan, Comoros and Burundi (40)
» Somalia and Eritrea (39)
» Afghanistan, Djibouti, Iraq, Ethiopia and Nepal (38)
» South Sudan, Solomon Islands, Palestinian Territories, São Tomé and Príncipe and Myanmar (28)

Energy

In its fourth year of drought, California takes note that wind energy requires virtually no water to produce electricity

With the recent announcement by Governor Jerry Brown that California residents must immediately cut their water usage by 25 per cent – for a household reduction to 105 gallons per day from the 2013 average of 140gpd – energy sources in the state have come in for a long, hard look. Among the alternatives to hydroelectric power being studied, wind energy is attracting particular interest.

As reported by Jaclyn Brandt of *FierceEnergy* (5th April), according to the American Wind Energy Association (AWEA) wind energy saved 2.5 billion gallons of water in California last year. That saving represents an average of 65 gallons per California resident, or 200 gallons per household.

AWEA also said that if California were to entirely relinquish the use of fossil fuel, it would expect to realise an additional saving of 18 billion gallons of water per year.

While almost all other electricity sources evaporate tremendous amounts of water, a mostly overlooked benefit of wind energy is that it requires virtually no water to produce electricity, said AWEA. Its data for 2008 indicates that thermal power plants in the USA withdrew 22 to 62 trillion gallons of fresh water from rivers, lakes, streams and aquifers, and consumed one to two trillion gallons. AWEA's conclusion: by displacing generation from those conventional power plants, USA wind energy is saving some 35 billion gallons of water per year – the equivalent of 120 gallons per person or 285 billion bottles of water.

The AWEA study was conducted with the use of the AVERT tool from the US Environmental Protection Agency (EPA), which identified the extent to which wind energy displaced power produced by a given fossil-fired plant in California.

Multiplied by power plant-specific water consumption rates from the Union of Concerned Scientists database, the displacement figures disclosed the total water savings at the plant.

Ms Brandt observed that wind is not the only energy source brought to the fore by the water shortage that is curbing output of hydroelectric energy in California. Between 2011 and 2014 hydroelectric appears to have fallen to below 12 per cent of the state's total electricity generation – compared to an average of 18 per cent in a non-drought year. Natural gas accounts for much of the differential.

Automotive

M City: Carmakers worldwide are queueing up to do research on the roads of a mini-metropolis for driverless cars in Michigan

"We've been inundated with requests for visits and demonstrations," the overseer of M City told *BloombergBusiness*. The reference is to the 23-acre testing grounds for autonomous vehicles, built by the University of Michigan in the Detroit suburb of Ann Arbor. A joint project of the university's Transportation Research Institute, the Michigan Department of Transportation, and big automakers including Ford, General Motors and Toyota, the $6.5 million facility is set for a 20th July opening.

Keith Naughton and Jeffrey Green of *BloombergBusiness* reported that M City features 40 building facades, angled intersections, a traffic circle, a bridge, a tunnel, gravel roads, and plenty of obstructed views. There is even a four-lane highway with entrance and exit ramps to test how well cars without drivers would manage the merge. ("Crash-Testing Driverless Cars in a Robot City," 2nd April)

The automotive reporters noted that, until now, tests of autonomous cars have been conducted on public roads or private proving grounds, or on old test tracks designed for evaluation of the speed of new models and how well they handle with humans at the wheel. Now, a controlled environment is available for testing robot cars in everyday driving conditions.

The timing is right. The first totally self-driving vehicles will likely arrive on the public roadways of the USA within five years, Ford CEO Mark Fields said in January. Meanwhile, there can be few enterprises that start out with as many prospective interested clients as M City.

The robot cars are on the way

Tesla Motors plans to offer a self-steering version of its Model S sedan this summer, and GM says it will introduce hands-free highway driving technology on a Cadillac in two years.

Daimler's Mercedes-Benz already sells a system that can pilot a car on the freeway if the driver keeps a hand on the wheel and by 2016 will have a hands-free system, according

to Boston Consulting Group. Honda, Hyundai and Toyota's Lexus line each offer autonomous features that help steer and stop the cars.

While Toyota has a city test course in Japan that replicates driving conditions there, M City will give the automaker a chance to try out technology in the more hectic American environment. And it allows Toyota to experiment alongside other carmakers testing their own autonomous cars. *BloombergBusiness* said this is something that many believe will speed adoption of common standards for such vehicles.

- "The value [of M City] is that it's open to the public and other researchers," Hideki Hada, general manager for electronic systems at the Toyota Technical Center in Ann Arbor, told the two reporters. "That's the interesting opportunity. We would never do any dangerous or risky tests on the open road, so this will be a good place to test some of the next technology."

A 'last mile' problem looms for autonomous cars: some six per cent to 12 per cent of riders will likely experience motion sickness

"From a technological perspective the future of autonomous vehicles is bright. From a pragmatic perspective there are a few basic human hurdles. Like motion sickness."

Business reporter Nathan Bomey of the *Detroit Free Press* also noted that the reaction will be moderate to severe in those riding in driverless cars, and that most of them will experience it every time. His source for this doleful projection is the very same University of Michigan Transportation Research Institute that co-sponsors M City. (See "Carmakers queuing up," earlier)

A report released by UMTRI in early April estimated that six to 12 per cent of American adults will be vulnerable to motion sickness in driverless cars. Authors Michael Sivak and Brandon Schoettle invoked physiology: "By switching from driver to passenger, by definition, one gives up control over the direction of motion, and there are no remedies for this." ("Autonomous Cars Might Have Roller-Coaster Effect," 8th April)

Mr Bomey sees the UMTRI projection as checking the advance of the autonomous car movement, even as industry analysts like Morgan Stanley's Adam Jonas project a future society in which driverless cars are the new normal. On 7th April, Mr Jonas issued a report of his own outlining a future "autopia" with "roving fleets of completely autonomous vehicles in operation 24 hours/day, available on your smartphone."

The *Free Press* business reporter does not dismiss this "futuristic scenario" of autonomous cars dramatically reshaping the automotive industry. While fully driverless cars are still some years away, autonomous driving technology is already creeping into cars. (See "M City," earlier)

"And that's a good thing," wrote Mr Bomey, asserting that the technology "will make the world safer." But he cautioned against proceeding hastily without considering the basic human implications of the transition, not to mention the legal, financial, social, safety and political reverberations.

- The addition of a medical category would introduce the prospect of up to 12 per cent of American adults – some 360,00 people – turning green and writhing on the floors of their driverless vehicles, pleading to be euthanised. It is a bracing thought.

Elsewhere in automotive . . .

- With its lower labour costs, a mature supply base, and access to transportation that makes it easy to export vehicles, Mexico has been attracting billions in new investment from the automotive industry.

  Among the automakers picking Mexico over Canada and the American Midwest and South is Toyota, Japan's number one automaker, which on 15th April announced plans for a new $1 billion plant in Guanajuato in central Mexico where it will build its next-generation Corolla.

  Two days later, Ford said it would invest $2.5 billion in new engine and transmission production in Mexico. The announcement confirmed plans for building the company's turbocharged four-cylinder EcoBoost gasoline engine in North America for the first time. The 1.5-litre engine, currently made in China and the UK, is edging out the 1.6-litre engine in the Ford Fusion.

  "Knocking the displacement down a size means paying lower taxes in many countries including China, which will only increase [the car's] global popularity," noted Alisa Priddle of the *Free Press*.

- Auto dealers in the USA are relying more than ever on their service and parts departments and on used car sales, both of which are more profitable than new vehicle sales, according to the National Automobile Dealers Association. Its annual report, published 10th April, showed that sales from parts and service went up 8.4 per cent to $91.7 billion last year, fuelled by a record wave of recalls, particularly by General Motors. The average dealership did $5.6 million in service and parts work, up from $4.8 million in 2013.

  NADA also found that the average dealership employee earned about $55,000 last year, up 1.9 per cent from 2013 and typical of that income in the automotive heartland of Michigan. Dealership workers in New Jersey earned an average of $64,700, the highest of any state; those in Wisconsin the lowest, at $43,300.

Industries

More receptive to drone testing than a foot-dragging USA, Canada may be gaining the edge in robot e-commerce

"Drone companies, especially those focused on solving the hard problems surrounding machine learning and autonomy,

are already springing up like weeds in Canadian innovation hubs like Waterloo and Toronto, so the FAA's sluggishness may prove vitalising to Canada's emerging flying robot industry."

The sluggard named by Darrell Etherington of *TechCrunch* is the Federal Aviation Administration, a unit of the US Department of Transportation whose "regulator reticence" is seen as responsible for driving the big American e-commerce company Amazon into Canada to test its drone delivery services.

As first reported in the *Guardian*, Amazon is using a field just north of the USA border in the Canadian west to test-trial drones weighing up to 55 pounds and carrying 5lb packages. They are being flown at altitudes between 200 and 500 feet at speeds up to 50 miles per hour.

This is happening in British Columbia, not 2,000 feet to the south on Amazon property in Washington State, because the FAA has been slow to green-light drone tests on American soil. When it did finally approve some experimental testing by Amazon, the company told a US Senate subcommittee – "with no small amount of evident pique," wrote Mr Etherington – that the prototype drone cleared for testing had been obsoleted by technical advances.

In Canada, by contrast, Amazon underwent only a three-week licensing process before receiving what the *Guardian* said is essentially carte blanche to test its entire roster of drones.

Mr Etherington suggested that Canada's openness to working with drone companies on early testing might usher in a small industry boom. ("Canada Proves Fertile Ground for Amazon Drone Delivery Tests," 30th March)

- Citing the *Guardian* article as its source, *TechCrunch* reported that Transport Canada in 2014 approved 1,672 companies for commercial drone use, compared to the FAA total of only 48 for the year. And Canada offers important benefits besides accreditation to these companies – many of them no doubt hoping to eventually sign up customers in the United States.

Alibaba steals a march on Amazon

Alyssa Huntley, an associate editor with the Enterprise IT group, noted these additional points in *FierceMobileIT*. ("Amazon Gets Impatient, Takes Drone Testing to Canada," 30th March)

- The FAA restriction of outdoor drone flight to 400 feet and within sight of the operator hampers experimentation. In Canada, according to the *Guardian*, as well as techniques for maintaining stability in the wind Amazon is testing technology that allows for control of the drone even if the communications connection to its base is lost.

- Amazon is not the only company hoping to take its business to the skies. In February, Amazon's Chinese competitor Alibaba launched rounds of drone testing in Guangzhou, Beijing and Shanghai.

- The FAA may not issue final rules for commercial drone use for another couple of years.

In the meantime, wrote Ms Huntley: "Unless the FAA can turn around applications for testing quicker than it has in the past, businesses like Amazon will be forced to test out their systems elsewhere."

Technology

Wires made easily and in quantity in sizes below 10nm have 'huge ramifications' for chip production

Meniscus-mask lithography, a technique for making tiny wires, holds promise for a semiconductor industry seeking to produce ever-smaller circuits.

Developed at Rice University (Houston, Texas), it is said to reliably create patterns of metallic and semiconducting wires less than ten nanometers (nm) wide.

Current state-of-the-art integrated circuit fabrication allows for signal wires that approach 10nm, visible only with powerful microscopes. Now, as reported in *R&D* (Rockaway, New Jersey), the team at Rice has made nanowires between six and 16nm wide from silicon, silicon dioxide, gold, chromium, tungsten, titanium, titanium dioxide, and aluminium.

Water is the key component in meniscus-mask lithography and contributed to naming it. Chemist James Tour and graduate students Vera Abramova and Alexander Slesarev built upon their discovery that the meniscus – the curvy surface of water at its edge – can be enlisted as an effective aid to nanowire production.

The tendency of water to adhere to surfaces went from an annoyance to an advantage when the Rice researchers found they could use it as a "mask" to make patterns. Water molecules gather wherever a raised pattern joins the target material and forms a curved meniscus created by the surface tension of the water.

The meniscus-mask process involves adding and then removing materials in a sequence that ultimately leaves a meniscus covering the wire and climbing the sidewall of a sacrificial metal mask that, when etched away, leaves the nanowire standing alone. ("Water Makes Wires Even More Nano," 6th April)

"This could have huge ramifications for chip production since the wires are easily made to sub-10nm sizes," Dr Tour said of the Rice process. "There's no other way in the world to do this *en masse* on a surface."

He said as well that the process could be expected to work with modern fabrication technology with no modifications to existing equipment and minimal changes in protocols. No new tools or materials should be needed.

Dorothy Fabian –
Features Editor

美国展望

BigStockPhoto.com Photographer: Alspl

全球市场

国际货币基金组织最新全球经济预测详细报告比其允许的还鼓舞人心

即使是由国际货币基金组织得出的好消息，发布时也是愁容满面。因此在四月中旬，来自188个国家的财政部长和央行行长聚集在华盛顿出席国际货币基金组织——世界银行联合会议。4月13日，国际货币基金组织发布预测：今年欧元地区持续复苏和美国经济增长将达3.1%，轻而易举的超过2014年的2.4%。对于范围更广的全球经济展望则更为乐观：本年度的增长为3.5%，2016年为3.8%。

但是发布这些信息的语气是谨慎和保守的。在新闻发布会上，国际货币基金组织的经济顾问奥利维尔•布兰卡德（Olivier Blanchard）评论称今年增长的特征是“温和而参差不齐的。”

官方货币及金融机构论坛（OMFIF），一家位于伦敦旨在促进全球金融领域民营企业与公共机构对话的智囊机构，其主席戴维德•马什（David Marsh）决心在“阴云密布于华盛顿多彩显示屏”之前作出纠正，以下是其在《今日美国》的文章中主要观点的摘要及稍事修改。（“对世界经济乐观的五大理由，”4月13日）

第一、美国正在加速复苏，对世界其他地区产生有利的影响。美联储健全的财政政策和适度的货币宽松已将美国失业率降至5.25%，同时美国利率将尽早的恢复至一个健康的正常值。第二、石油价格的下跌对全球经济总体而言基本是好消息。是的，它对一些主要石油输出国造成紧缩影响；但是，大部分的石油生产国都有应对挫折的储备。石油进口国，其中包括大量较贫穷的发展中国家及很多欧洲国家，是适中价格的受益者。

因为沙特阿拉伯和其他主要石油输出国有不断生产石油的意向，本阶段的爱心价将持续至少一到两年，也与美国页岩气生产的激增相关。

第三、来自新兴市场经济的新闻除了增长较慢外都是正面的。中国的经济放缓将使其走上一条更可持续发展的道路，由国内消费驱动而不再依靠出口。印度在新总理的领导下发展轨迹更为稳定。巴西和俄罗斯正习惯自身急剧下滑的活动。尼日利亚，非洲经济最发达也是人口最多的国家，刚举行了大选——民主成熟的标志可能使经济活动复苏且在整个非洲蔓延。

第四、强劲的美元对大多数的国家而言是福音。其可能阻碍美国出口商并使外汇收入沮丧，但是美元的强势地位通常对全球经济有利。促进诸多国家出口额增高，使它们的公司能赚更多的钱。

作为全球领先的交易和储备货币，美元在全球范围内提振信心。中国领导人决定让人民币跟随美元上升并适时成为储备货币是一个英明的举动。第五、欧洲增长正在温和复苏，这里是诸多世界上技术最娴熟的公司和许多研究及开发智囊公司的家园。至少暂时，欧洲央行的量化宽松政策——购买政府债券抵充货币供应和抵御通缩——增加了复苏的迹象，该迹象早在岁末年初有所体现。

相关新闻

- 按照传统国际货币基金组织的常务董事通常都是欧洲人。但是，根据官方货币及金融机构论坛（OMFIF）的马什先生的说法，这个奇怪的传统将有所改变，在法国的克莉丝汀•拉加德（Christine Lagarde）2016年的任期结束后，其职位将由来自亚洲或者拉丁美洲的候选人代替。他写道：“发展中国家越是能在世界经济中借用对自己有利的东风，则越有可能作出将国际经济向新兴市场转换考虑在内的里程碑式的决定。”

一份世界护照的比较显示自由选择目的地的能力有巨大差异

“邻国外交关系良好的国家的护照是一个有用工具，允许持有者轻松过境。”

美国有线电视新闻网财经频道（CNNMoney）的索菲亚•严（Sophia Yan） 同样评论称，移动轻松是加拿大公司 Arton Capital的专长，该公司帮助有钱人获得多个国籍，有时通过投资移民计划。根据不用签证或仅用落地签即可访问国家的数量，这家位于蒙特利尔的公司根据世界各国的护照提供给其持有者全球移动能力对护照进行排名。（“这些是世界上最有用的护照，”4月17日）

严女士报道称：美国和英国的护照并列第一，其护照持有人能登陆147个国家。俄罗斯护照提供了98个目的地选项。世界人口最多的国家，中国，签发的护照可快速登录74个国家；之后是印度，59。

经Arton Capital认定，以下是排名榜首的护照及持有者可登录国家的数量：

- 美国，英国(147)
- 法国、德国、韩国(145)
- 瑞典、意大利(144)
- 丹麦、芬兰、卢森堡、荷兰、日本、新加坡(143)
- 瑞士(142)

最少登录国家的护照排名为：

- 刚果民主共和国、也门、中非共和国、科索沃(41)
- 赤道几内亚、不丹、科摩罗、布隆迪(40)
- 索马里、厄立特里亚(39)
- 阿富汗、吉布提、伊拉克、埃塞俄比亚、尼泊尔(38)
- 南苏丹、所罗门群岛、巴勒斯坦领土、圣多美和普林西比、缅甸(28)

能源

在干旱的第四年，加利福尼亚意识到风能发电几乎无需用水

随着州长杰瑞•布朗（Jerry Brown）近期宣布加州居民必须立刻削减25%的用水——对家庭而言将从2013年的每天140加仑用水减少到每天105加仑——该州的能源问题由来已久，积重难返。在被研究水力发电的替代能源中，风能吸引了特别的兴趣。

激情能源（FierceEnergy）（4月5日）贾克琳•勃兰特（Jaclyn Brandt）报道，根据美国风能协会（AWEA），去年风能为加州节约了2500万加仑的水。相当于加州每个居民平均节水65加仑或每个家庭节水200加仑。AWEA还表示，如果加利福尼亚完全放弃使用化石燃料，预计能实现每年额外节水180亿加仑。

AWEA称，几乎其它所有的电力来源都需蒸发大量的水，风能几乎被忽略的好处是其几乎不需要水来产生电能。其2008年的数据显示美国的火力发电从河流、湖泊、溪流、含水土层中吸收了2.2至6.2万亿加仑的水，并消耗了1至2千亿加仑。AWEA结论称：随着常规发电厂的更新换代，美国风能每年将节约大致350亿加仑的水——相当于每人120加仑或2850亿瓶水。

该AWEA的研究来源于美国环境保护局（EPA）的AVERT工具，其认定在何种程度上风能取代由加州现有化石燃料电厂所提供的能源。乘上来源于忧思科学家联盟（Union of Concerned Scientists database）数据库的电厂专用水消费率，排量数据显示了工厂全部节水额。

美国展望

勃兰特女士观察到风并不是因水短缺凸显重要的唯一能源，水短缺还遏制了加州的水电能源的输出。2011年至2014年水力发电已经降至该州全部发电量的12%以下——在非干旱年份平均值为18%。天然气填补了大部分的差额。

汽车行业新闻

M城市：汽车制造商正在密西根排队做小型都市道路无人汽车的研究

“我们已经被淹没在访问和演示的要求中了”M市监察员告诉《彭博商业（BloombergBusiness）》。他所提及的是23英亩专供自动驾驶车辆的测试的场地，由位于底特律郊区安娜堡（Ann Arbor）密西根大学建造。是该大学交通研究学院、密西根交通部及包括福特、通用汽车和丰田汽车等大型汽车制造商在内的联合项目，这个价值650万美元的设备定于7月20日开放。

《彭博商业（BloombergBusiness）》的基斯·诺顿（Keith Naughton）和杰弗里·格林（Jeffrey Green）报导称M市的特色是拥有40栋立体建筑、倾斜的十字路口、一个交通环岛、一座桥、一个隧道、碎石路及大量视角盲区。该市甚至还有一条拥有出入口坡道的四车道高速公路，用来测试没有驾驶员的汽车汇车能做到何种程度。（“机器人之城内的无人驾驶汽车碰撞测试，”4月2日）

汽车行业记者评论称，迄今为止，自动驾驶汽车测试已经在公用道路或民营专用场地，或在用于评估新型车车速及与驾驶车辆人员的配合程度的老式轨道上进行。现在已经实现一个用来测试机器人汽车在日常驾驶条件下的可控环境。时间恰到好处。第一辆全自动驾驶汽车将有可能在5年内驶入美国公共道路，福特汽车CEO马克·菲尔兹（Mark Fields）一月时说。同时，没有几家企业能像M城市那样一开始就有如此多的潜在兴趣客户。

机器人汽车正在路上

特斯拉汽车计划在今年夏天为其S款车提供一个自动转向的车型，通用汽车称其将会在两年内在凯迪拉克上引入免手动高速驾驶技术。根据波士顿咨询集团的观点，戴姆勒的梅赛德斯-奔驰早已销售一个能使车辆驾驶者在高速公路上单手掌控方向的系统，而在2016年之前将拥有免手动系统。本田、现代和丰田的雷克萨斯各显神通的提供自动驾驶特色以帮助转向和汽车制动。

虽然丰田汽车在日本经历了复制该国驾驶环境的城市测试，但M城市将给予该汽车制造商一次在更繁忙的美国环境下测试技术的机会。同时它允许丰田与其他汽车制造商一起测试其自身的自动驾驶汽车。《彭博商业（BloombergBusiness）》称很多人相信通过这些测试将使得上述车辆加速采纳共同标准。

“（M城市）的价值是其向公众及其他研究人员开放，”位于安娜堡的丰田汽车技术中心电子系统部门总经理羽田英吉（Hideki Hada）告诉两位记者。“那是一个有趣的机会。我们永远不会在公路上做任何危险或冒险的测试，因此那将是一个测试部分新一代技术的好地方。”

自动驾驶汽车浮现“最后一公里”的问题：大约6%到12%的乘客可能会晕车。

“从技术角度来看自动驾驶汽车的未来一片光明。从实际角度出发还有些人类的基本障碍。例如晕车。”

《底特律自由新闻（Detroit Free Press）》的商业记者南森·波曼（Nathan Bomey）同样评论称搭乘无人驾驶车辆时反应将是从中度到严重，其中大部分人每次都会有所体验。他的这份令人沮丧的预测的来源与M城市的协办单位密西根大学交通研究学院（UMTRI）的相同。（见“汽车制造商排起长队”，上文）密西根大学交通研究学院于四月早期发布的一份报告估计6%至8%的美国成年人较易在无人驾驶车辆中遭受晕车的折磨。迈克尔·西瓦克（Michael Sivak）和布兰登·舒特勒（Brandon Schoettle）援引生理学：“从驾驶者转变为乘客，从定义上讲，一个人放弃了对运动方向的支配，且没法补救。”（“自动驾驶汽车可能有过山车效应，”4月8日）

波曼先生将密西根大学交通研究学院(UMTRI)的预测视为对自动驾驶汽车发展的校验，即便行业研究员们诸如摩根斯坦利的亚当·乔纳斯（Adam Jonas）预测未来社会无人驾驶将是一种新常态。同样是在4月7日，乔纳斯先生发布了一份报告，其中他自己勾画了了未来的拥有“可通过智能手机实现24小时全天候完全自动驾驶的巡航功能”的“汽车专用道”。

《自由新闻》的商业记者并未摒弃关于自动驾驶汽车将大幅重塑汽车行业“未来场景”的看法。虽然完全无人驾驶汽车仍有几年的路要走，自动驾驶技术早已渗透进汽车。（见“M城市”，上文）“而且，那是件好事，”波曼先生写道，称该技术“将使得世界更安全。”但是他告诫不要贸然前进而忽略改变中最根本的人类因素，更不用说法律、财务、社会、安全及政治反响了。

附加的医疗科目将引入多达12%的美国成年人——大约3.6万人——在他们无人驾驶汽车的地板上脸色苍白不停扭动，恳求被实施安乐死。这是个令人振奋的想法。

工业新闻

相比拖沓的美国，更乐意接受无人机测试的加拿大可能在机器人电子商务中获得优势

“无人机公司，特别是那些专注于解决机器学习和自动驾驶周边疑难杂症的公司，已经在加拿大诸如滑铁卢和多伦多之类的创新中心中蓬勃发展，因此FAA的迟缓可能真正激发加拿大飞行机器人工业的诞生。”

被科技博客（TechCrunch）的达雷尔·艾瑟林顿（Darrell Etherington）称为懒人的机构是美国联邦航空管理局（FAA），美国交通部的一个机构，其“沉默管理”被视为迫使大型美国电子商业公司进入加拿大测试无人机递送服务的罪魁祸首。正如《卫报（Guardian）》最初报道的那样，亚马逊正在使用一片位于加拿大西部的区域就在美国边境的北部，来测试试用重达55磅的无人机携带5磅重的包裹。他们正在200至500英尺的高度以50英里每小时的速度飞行。

这一切正在不列颠哥伦比亚省发生，而不是据华盛顿州以南不到2,000英尺的亚马逊的公司内，因为FAA已经延缓通过在美国境内实施无人机测试方案。当它最终批准由亚马逊进行一些实验性测试，该公司告诉美国参议院小组委员会——“绝无一点明显不满”艾瑟顿先生写道——因为技术不断更新该用于测试的样板无人机已经被淘汰了。与此相反，在加拿大，亚马逊仅经过3周的执照核发程序就收到了如《卫报》所说的基本是全权授权测试其所有在册无人机。艾瑟顿先生暗示加拿开放无人机公司在早期测试工作的可能迎来一个小行业繁荣。（“加拿大为亚马逊无人机递送测试提供沃土，”3月30日）

引用《卫报》的文章作为其来源，“科技博客”报道称加拿大交通部2014年批准了1,672家公司使用商业无人机，相比FAA同年仅批准了48家。同时加拿大还提供了出认可这些公司外的好处——其中很多公司无疑希望最终能与美国境内的客户签约。

专栏编辑：Dorothy Fabian

Measured and simulated DC powering of data cables for power over Ethernet

By Stephen W Simms, Brand-Rex Ltd

Abstract

The increasing demand for higher power levels in Power over Ethernet (PoE) systems is evident, with a variety of non-standard products currently available on the market which provide power levels in excess of those stated in IEEE 802.3at.

Higher power levels will allow PoE to be used in a wider range of applications. However, they will also increase performance risk. With this increase in demand for more power, and the fact that installations using PoE technology differ greatly in terms of their configuration and environment, it is beneficial to mitigate risk by using numerical simulation.

The work presented here provides numerical simulation and experimental verification of the thermal properties of data cables under DC powering which is used in PoE applications.

Introduction

The supply of DC power to end devices along the same electrical path used for AC signal communication has been successfully employed for many years, eg in telephones and audio equipment.

The technique used to provide this functionality is commonly known as 'phantom powering'. In relation to Ethernet, this technique allows power from the Power Sourcing Equipment (PSE) to be delivered to the Powered Device (PD) on the same pair that is used for data.

The DC power is applied to the centre tap of the signal coupling transformer and does not interfere with data transfer. This allows PoE to be deployed over 1000BASE-T systems, in which data is carried on all four pairs. IEEE 802.3at standardisation in 2009 stated the system parameters required for Type 1 (PoE) and Type 2 (PoE+)[1].

The standard classifies nominal highest DC current values of 0.35A and 0.60A per pair, for Type 1 and Type 2, respectively. Some of the most common applications which use PoE technology include wireless LAN access points, VoIP telephones and network cameras.

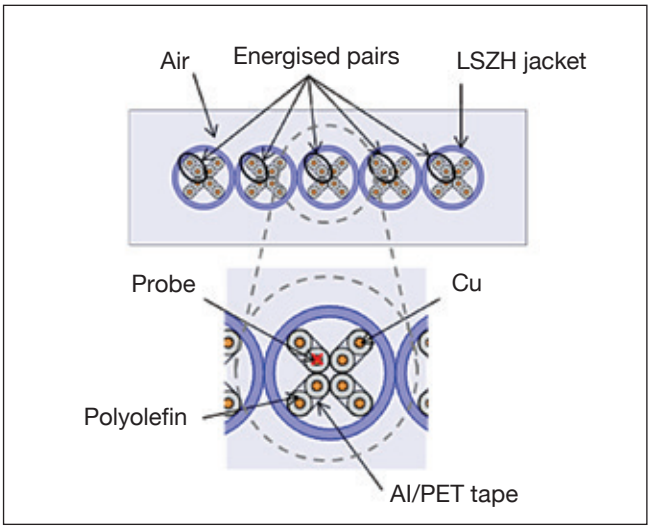


Figure 1*: Simulation setup in COMSOL Multiphysics*

Applying electric current to a conductor releases heat energy, an effect known as Joule heating. In relation to Ethernet cables and components, this heating effect causes concern due to the rise in attenuation, which has a limiting effect on link length. This concern is heightened for cables with a higher resistance than standard cables, eg copper clad aluminium (CCA)[2], and smaller diameter (26 AWG) solid copper conductor cables.

In 2009, IEC subcommittee 46C put forward a test method (46C/906/NP) entitled 'Proposal for measuring of heating of data cables by current'[3].

In this paper, the aim is to achieve a strong correlation between simulation and the proposed measurement method regarding the DC powering of Ethernet cables for PoE applications. The paper also aims to compare temperature rise due to DC powering of CCA cable with cables which have solid copper conductors.

Numerical modelling

A 2D model was set up using COMSOL Multiphysics 4.4, a software package which utilises the Finite Element method[4].

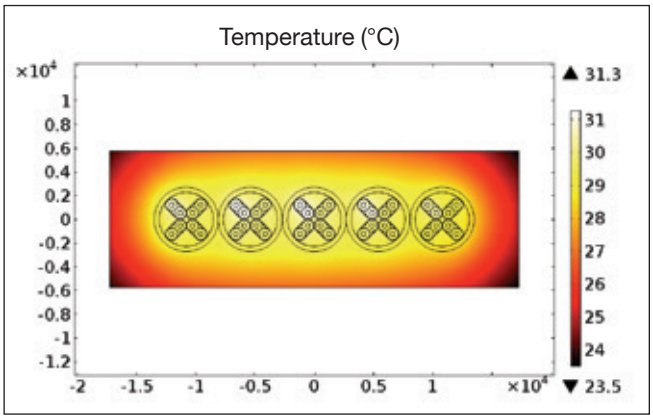


Figure 2: *Cross-sectional temperature plot*

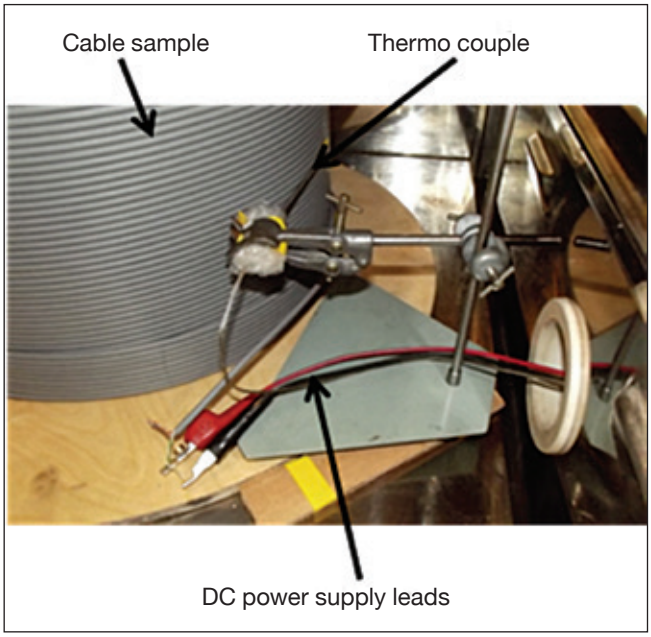


Figure 3: *Measurement setup*

The model was set up to replicate the proposed measurement method[3], which allowed for a comparison between theory and practice.

In order to achieve this, a five-cable linear configuration was set up with the intention of providing a good prediction of the thermal behaviour at the centre cable without the need for including additional cables in a model requiring higher computational resource.

Heat capacity at constant pressure, density and thermal conductivity material properties were applied to represent the constituent parts of the Cat6A 26 AWG U/FTP cable.

These properties were applied to the copper (Cu) conductor, aluminium/PET (Al/PET) tape, Low Smoke Zero Halogen (LSZH) jacket, and polyolefin insulation, see *Figure 1*. Conduction, convection and radiation heat transfer mechanisms[5] were accounted for in the model.

Simulated electric energy was applied to one pair of each cable in the model. A stationary solver was used to determine the thermal behaviour for (a), a point at the centre of one of the energised conductors (see probe position in *Figure 1*), and (b), a 2D temperature plot of the cross-section, *Figure 2*.

From the 2D plot, and as expected, the maximum temperature of the arrangement is evident in the proximity of the energised conductors.

Test method and results

The test method proposed by IEC Subcommittee 46C[3] was followed in order to establish the rise in conductor temperature due to DC powering. This method involved measuring voltage supplied and jacket temperature using a 100-metre sample of cable wound onto a reel and positioned within an environmental chamber fixed at 20°C, see *Figure 3*. This method was followed using a sample of Cat6A U/FTP cable with solid copper 26 AWG conductors, as simulated in section 2.

The cable sample was conditioned at 20°C for at least 16 hours before testing. A thermocouple of J type was positioned along the jacket at the halfway point of the cable. Using a Keithley 2200-60-2 (60V, 2.5A) bench power supply operating in constant current mode, a current (I) of 0.6A was applied to the pair under test with the far end of the sample short circuited. Temperature and voltage data was logged at 15 second intervals using National Instruments LabVIEW software[6].

The temperature of the cable sample increased due to the Joule heating effect, and after a certain time, the temperature stabilised. At this point in time, the heating due to the DC power input became equal to the radiated power of the sample and the temperature was prevented from rising further.

Conductor resistance was calculated based on voltage immediately after the power was switched on (U_0), equation (1), and after the temperature had stabilised (U_T), equation (2). Change in (or delta) conductor temperature (Δt) was then calculated using initial (R_{20}) and stabilised (R_t) resistance, equation (3).

$$R_{20} = \frac{U_0}{I} \quad (1)$$

$$R_t = \frac{U_T}{I} \quad (2)$$

$$\Delta t = \frac{1}{\alpha}\left(\frac{R_T}{R_{20}} - 1\right) \quad (3)$$

$$\text{where } \alpha = 0.004\frac{1}{K}$$

This methodology was repeated using four different current (I) values, ie 1.0A, 1.4A, 1.8A and 2.2A. *Figure 4* shows the change in conductor temperature versus DC current level simulated at the probe (see *Figure 1*) and calculated from the measurement.

Results show a linear relationship with both delta conductor temperature and current plotted on logarithmic scales. Based on this relationship, it was possible to apply an approximation, in the format $\Delta t = x \cdot I^y$, which could be used to predict conductor temperature rise for current values outwith the range measured. For the Cat6A 26 AWG U/FTP cable, this approximation was found to be:

$$\Delta t = 2.3 * I^{2.0}$$

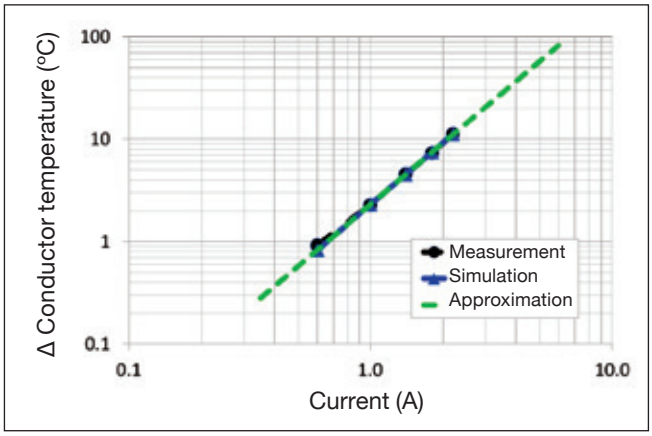


Figure 4: *Simulated, measured and approximated change in conductor temperature*

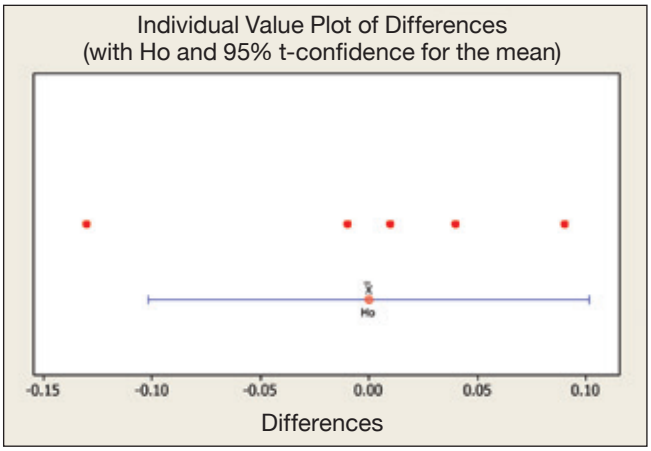


Figure 5*: Individual value plot of temperature differences*

Using the approximation, a current of 3A would provide a temperature rise of 20.7°C for a single cable within an environment fixed at 20°C.

The correlation between simulated and measured results was further investigated from a statistical point-of-view using a Paired t-test via Minitab software[7].

Figure 5 shows an individual value plot of the temperature differences between simulation and measurement, which also shows the 95 per cent confidence interval based on these differences.

The results shows that 95 per cent of additional simulated and measured values are expected to fall within the ±0.1 difference range, confirming excellent correlation. As such, the null hypothesis of no difference in mean values between the two sets of data is not rejected.

Copper clad aluminium

A sample of UTP CCA cable with 24 AWG conductor size was acquired and measured as per the Cat6A 26 AWG U/FTP cable sample in section 3. The DC loop resistance of the pairs under investigation for each cable type are given in *Table 1*. For comparison, a Cat5e UTP cable with 24 AWG solid copper conductors was included in the study.

Due to the high resistance of the CCA cable under investigation, the high voltage required to provide a current of 2.2A was not possible using the bench power supply.

In other words, as the temperature and resistance increased, the voltage required (in order to meet Ohm's Law) was larger than the maximum voltage 60V) of the bench power supply. A current value of 1.95A was chosen in order to generate the fifth data point.

Figure 6 shows the change in conductor temperature, versus DC current level, which was calculated from the measurement. For the CCA cable sample, approximated conductor temperature rise was found to be:

$$\Delta t = 3.1 * I^{2.0}$$

Temperature rise due to the Joule heating effect is known to be proportional to I^2R losses[8] so, as current is fixed for each measurement point, the resistance of the cable pair under investigation will differentiate temperature rise from one cable to another.

Therefore, as expected, the cable with highest DC resistance will have the most temperature rise, and vice versa.

Discussion

Heating cables is known to increase attenuation[9] which has a limiting effect on cable reach. In relation to PoE, the maximum temperature is likely to be in the proximity of the energised conductors which may be used for data transmission.

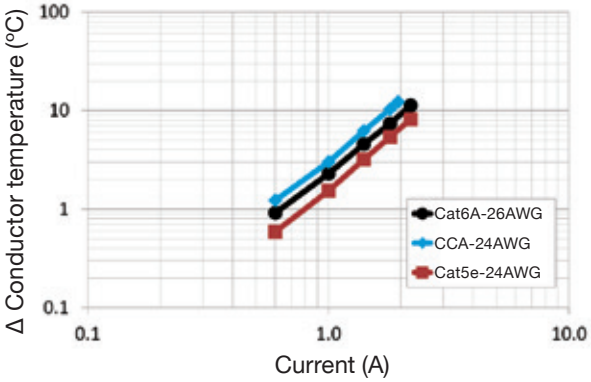
Therefore, the consequences of DC powering on attenuation of the same pair should be taken into consideration.

The results presented in this paper show the temperature rise of one pair energised with DC power using a cable located in a controlled 20°C environment. Realistically, the ambient temperature will vary from site-to-site, and therefore, caution should be taken when installing PoE systems into uncontrolled and/or warmer environments.

Table 1: *DC loop resistance of pair under investigation for each cable type*

	AWG	DC loop resistance (Ω)
Cat6A	26	23.3
CCA	24	28.4
Cat5e	24	18.2

Figure 6: *Measured change in conductor temperature*



Further consideration should be given to the correlation of simulated data and that of the installation environment. On one hand, the simulation may be based on a worst case scenario. However, in reality, the duty cycle may dictate that the power is only supplied for a fraction of the time.

Good installation practices should be implemented wherever possible, such as minimising bundle sizes, accounting for temperature rise for maximum cable lengths, and keeping pathways and spaces free of thermally insulating materials.

It is important to note that, while excellent correlation was seen between simulated and measured results for a single cable setup, this work was not intended to replicate the behaviour of cables in bundles.

However, it is anticipated that good correlation between theory and practice will also apply to bundled configurations in free air and in a variety of cable containment systems, ie tray, trunking, conduit, etc.

A comparison between the CCA 24 AWG UTP and Cat6A 26 AWG U/FTP samples show that it is possible for cables with smaller conductors to radiate less heat than those of larger conductors when supplied with identical DC current values.

It is also known that the conductive foil in screened cables act as a heat sink which helps to reduce the amount of heat radiated from the cable[10].

Therefore, it is important to take into account the construction of cable, and not only the conductor diameter for PoE system deployment.

The increasing demand for more power supplied from the Power PSE to the PD is obvious, with powering over all four pairs expected to be IEEE standardised[11] and a variety of non-standard products currently available on the market which provide power levels in excess of those stated in IEEE 802.3at.

Higher power levels will increase performance risk, but will also allow PoE to be used for a wider range of applications.

Conclusions

A two-dimensional model was set up using COMSOL Multiphysics software in order to replicate measured results.

A test method proposed by IEC subcommittee 46C to assess cables for Power over Ethernet was followed, which outlined the measurement for heating data cables by DC current.

Excellent correlation between simulated and measured results for a single cable has been demonstrated. This correlation encourages use of the software for the thermal prediction of cables in densely populated networks. It is also expected to provide a strong indication of the temperature rise for varying bundle sizes, ambient temperatures, and containment systems, etc.

The thermal performance of a CCA cable subjected to DC powering has also been proven to radiate more heat than cables which use solid copper conductors using equal DC current values. Installations using PoE technology differ greatly in terms of their configuration and environment.

With an increasing demand for more power, which is likely to require powering over all four pairs, further work is required to investigate cable and component performance in areas such as bundled cables, thermal behaviour in different ambient temperature environments, cable reach under PoE, and connector demating under load.

References

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用于以太网供电的数据电缆的直流电供电测量与模拟

作者：奔瑞公司史蒂芬 • W • 西蒙斯

摘要

很明显，人们对更高功率的以太网供电系统的需求日益增长，目前市面上可以获得各种各样的非标准产品，这些产品提供的功率超过了IEEE802.3at所描述的功率级别。

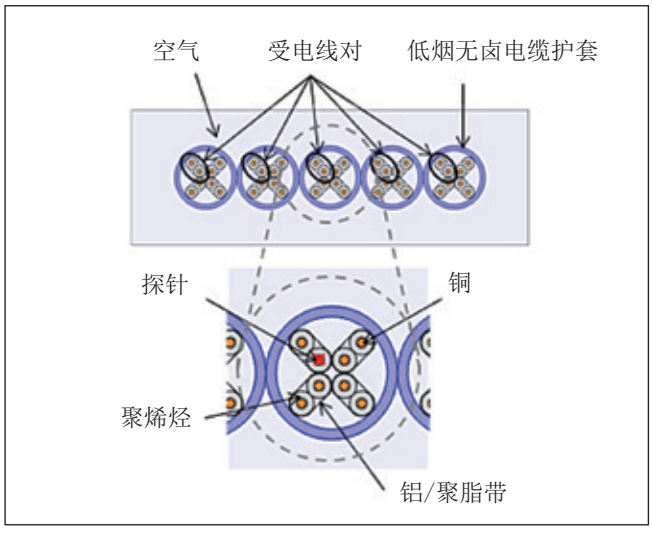
虽然更高的功率水平使以太网供电能够有更广泛的用途，但是它们会同时提高性能风险。随着对更大功率需求的增多，且面对采用以太网供电技术进行安装在配置及环境方面有很大区别的事实，应用数值模拟降低风险大有裨益。 本文在这里展现了直流供电前提下，以太网供电应用中数据电缆的热力特性的数值模拟和实验验证。

引言

多年来，人们已经成功地运用与交流电信号通讯相同的电路向终端设备供应直流电，如电话和音频设备。用于实现这项功能的技术俗称为“幻路供电”。这门技术与以太网相关，能够在数据使用的同一对线上从供电端设备(PSE)向受电端设备(PD)输送电力。向信号耦合变压器的中央分接头施加直流电源，不会干扰数据传输。这使得以太网供电能够被用于1000BASE-T系统，该系统中所有四对线均载有数据。

2009年IEEE 802.3at标准阐明了第一类(以太网供电)和第二类(以太网供电+)[1]要求的系统参数。该标准区分第一类和第二类以太网供电，按照每对线上直流电的名义最高值为0.35安和0.60安进行分类。使用以太网供电技术的一些最常见应用包括无线局域网接入点、互联网协议电话以及网络摄像机。

图1: *多物理场耦合分析中的模拟设置*



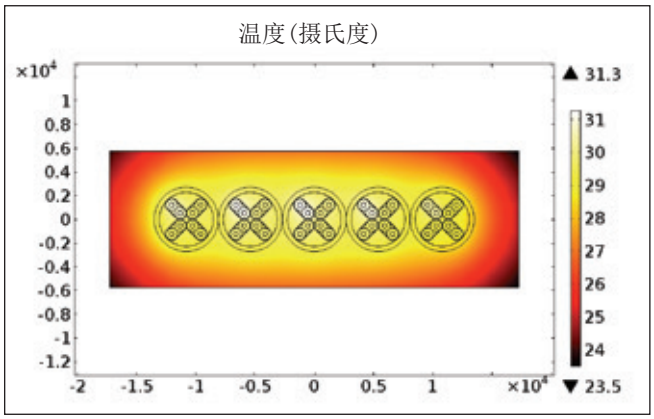


图2: *横截面温度图表*

向导体施加电流会释放热能，这种效应被称为焦耳加热。就以太网电缆和零部件而言，由于衰减增加，对链路长度产生限幅效应，这种热效应使人担忧。与标准电缆相比电阻越高的电缆，如铜包铝线(CCA)[2]以及直径更小的(美国线规26)实心铜线电缆，更令人担忧。

2009年，国际电工委员会46C专门小组推出了一种名为“通过电流测量数据电缆发热的建议”[3]的测试方法(46C/906/NP)。本文旨在在模拟与建议测量方法之间获得一种强对应关系，这种测量方法适用于以太网供电应用中以太网电缆采用直流供电的情形。本文也致力于对比铜包铝线电缆与实心铜线电缆由于直流供电导致的温度升高程度。

数值模拟

本文采用多物理场耦合分析软件4.4创建了一个二维模型，这款软件包充分利用了有限元法[4]。创建该模型可以复现建议的测量方法[3]，这种方法可以将理论与实践进行对比。为了达到这个目的，我们采用了五条电缆线性布局，从而无须加入其他电缆、采用要求更高计算资源的模型，便能较好地预测中央电缆的热性能。本文采用恒定压强、密度时的热容和热传导材料属性作为美国线规26超6类铝箔对对屏蔽电缆的代表性组成部分。我们针对铜(Cu)导线、铝带/聚脂带(Al/PET)、低烟无卤电缆(LSZH)护套以及聚烯烃绝缘(见图1)设定了这些属性。该模型中考虑了传导、对流及热辐射转移机制[5]。

实验对模型中每条电缆的每对线施加模拟电能，用一台静态解算器来确定热性能，得到了(a)其中一条受电导体中心某点(见图1中探针位置)以及(b)一张二维横截面温度图(图2)。从二维图形中所见与预期一致，此布局下的最高温度很明显出现在受电导体附近。

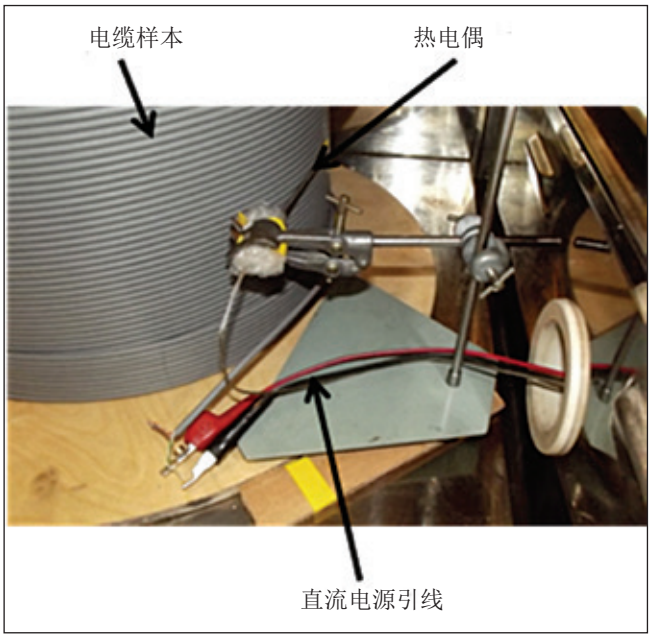


图3: *测量设置*

测试方法及结论

为了确定直流供电导致的导体温度升高程度，研究遵循了国际电工委员会46C专门小组[5]提出的测试方法：使用100米长的电缆样本，电缆缠绕在卷轴上并置于20摄氏度的恒温环境舱内，测量内容包括供电电压和护套温度(见图3)。实验采用一款符合美国线规26的超6类铝箔对对屏蔽实心铜导线实践此方法，正如第2节中模拟的情形。

测试前将该电缆样本置于20摄氏度环境中至少16小时。在电缆中间点的护套外安放J型热电偶。采用吉时利公司的2200-60-2(60伏、2.5安)工作台电源，操作模式设定为恒定电流，为每对被测线施加0.6安的电流(I)，样本远端为短路状态。每隔15秒钟，使用美国国家仪器有限公司的LabVIEW软件[6]记录温度和电压数据。

电缆样本的温度由于焦耳热效应而上升，过了一段时间之后，温度稳定下来。在这一时点，由于直流电接入产生的热能等于样本的辐射功率，抑制了温度的进一步上升。

当电源扭到开(U0)位置时，立即用等式(1)计算基于电压的导体电阻；当温度稳定以后(UT)，用公式(2)计算导体电阻。然后利用初始值(R20)、稳定电阻(Rt)和等式(3)计算导体温度(Δt)变化(或德耳塔)。

$$R_{20} = \frac{U_0}{I} \quad (1)$$

$$R_t = \frac{U_T}{I} \quad (2)$$

$$\Delta t = \frac{1}{\alpha}\left(\frac{R_t}{R_{20}} - 1\right) \quad (3)$$

注 $\alpha = 0.004\frac{1}{K}$

换四种不同的电流(I)值重复这种方法，即：1.0安、1.4安、1.8安和2.2安。图4显示了导体温度相对探针模拟并测量计算的直流电流强度(见图1)变化。

结果表明，德耳塔导体温度与电流的对数存在线性关系。在这层关系的基础上，可以用公式Δt=x*ly计算近似值，该值可用于预测测量范围之外的观测值引致的导体温度升高程度。

我们发现，对于美国线规26的超6类铝箔对对屏蔽实心铜导线，该近似值为：

$$\Delta t = 2.3 * I^{2.0}$$

运用该近似值，在20摄氏度的恒温条件下，3安的电流能够使单个电缆温度上升20.7摄氏度。

我们通过Minitab软件的配对t检验，从统计学角度进一步考查了模拟和测量结果之间的相关关系[7]。图5为模拟与测量之间的温度差异个别值图表，图中也显示了基于这些差异的95%置信区间。上述结果表明，其他模拟与测量值中的95%预计会落在±0.1温差范围内，应证了极好的相关性。同样地，不能拒绝两组数据的均值之间无差异的零假设。

铜包铝线

我们采用导线尺寸为美国线规24的铜包铝无屏蔽双绞线，按照第3节中的美国线规26超6类铝箔对对屏蔽电缆样本方法展开测量。表1列示了每种电缆类型每对被测线的直流环路电阻。研究中纳入了尺寸为美国线规24的5类实心铜质双绞线电缆作为参照。

由于受测铜包铝线电缆阻抗高，使用工作台电源无法提供要求的高电压，从而电流达不到2.2A。换句话说，随着温度和

图4: *导体温度模拟、测量与变化估计*

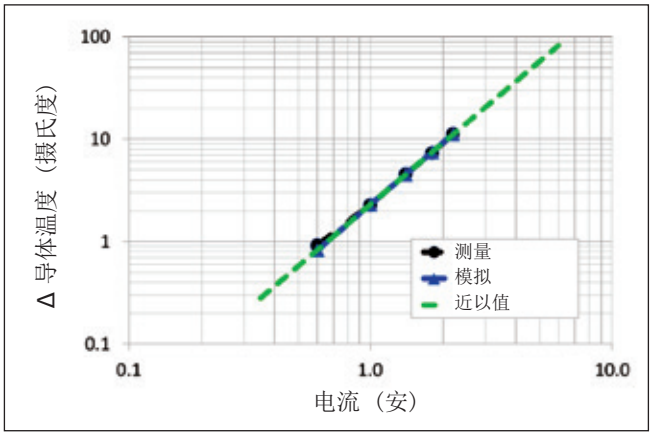
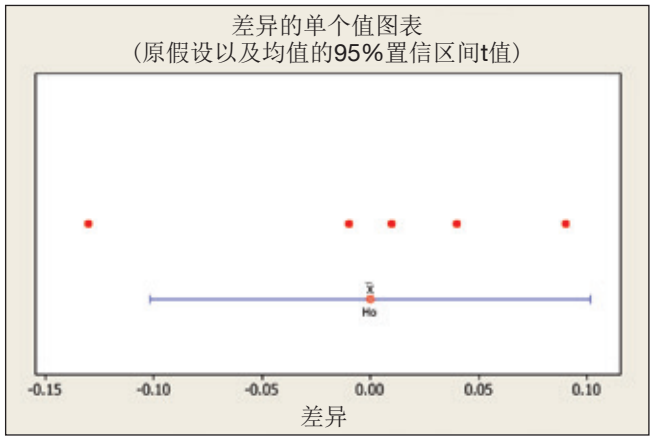


图5: *温度差异的单个值图表*



电阻增加，（为满足欧姆定律的）必要电压超过工作台电源的最高电压60伏。为了得到五个数据点，我们选择了1.95安的电流值。

图6显示导体温度相对直流电流水平的变化，电流水平是测量计算的。对于铜包铝线电缆样本，我们发现，导线温度升近似等于：

$$\Delta t = 3.1 * I^{2.0}$$

我们知道，焦耳热效应引起的温度升高等于I2R损耗[8]，因此，由于每个测量点上电流是固定的，每对被测电缆的电阻会导致温度不同程度的上升。因此，正如预测的，直流电阻最高的电缆温度上升最快，反之亦然。

讨论

我们都知道，电缆受热会加速衰减[9]，从而对电缆延展性产生限制作用。对以太网供电来说，最高温度很可能在用于数据传输的受电导体附近。因此，应当考虑到直流供电对同一对线的延展性所产生的后果。

本文的结果展示了将电缆置于20摄氏度环境温度下，同一对直流电受电线的温度升高情况。现实中，周围环境温度可能因时因地变化，因此，在不可控的和/或更温暖的环境中安装以太网供电系统应当格外谨慎。

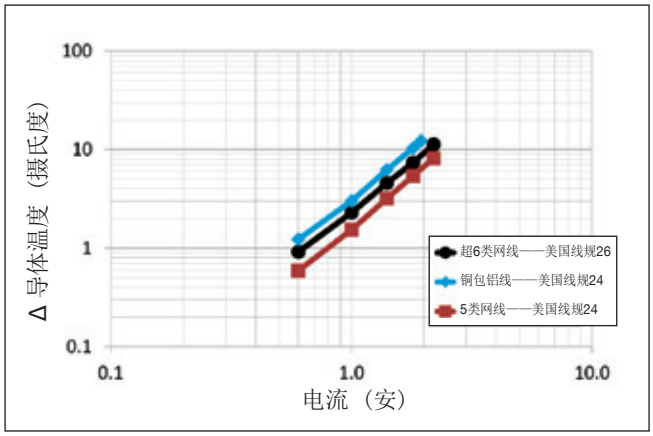
还应当进一步考虑模拟数据和安装环境数据的相关性。一方面，模拟可能基于一种最糟糕的情景案例，然而在现实中，占空比可能要求仅能在一小部分时间供电。实践中要尽可能地采用精良的安装，比如使捆尺寸最小化，计算最大电缆长度的温度上升以及清除道路和空间中的隔热材料。

请注意，虽然单组电缆的模拟和测量结果之间看来有极好的相关关系，但本文并不能复现成捆电缆的表现，这很重要。然而，我们预期，理论和实践之间良好的相关性对外露成捆布局和多种电缆密封系统，如托盘、线槽和管道仍然适用。

表1: *每种电缆类型的被测线对直流环路电阻*

	美国线规	直流环路抗阻 (Ω)
超6类网线	26	23.3
铜包铝线	24	28.4
5类网线	24	18.2

图6: *测量的导体温度变化*



美国线规24铜包铝非屏蔽双绞线和美国线规26超6类铝箔对对屏蔽电缆样本对比表明，施以同样水平的直流电流，导体尺寸更小的电缆有可能比尺寸更大的导体放射更小的热量。我们也知道，屏蔽电缆中的导电箔充当着散热器，有助于减少电缆散发的热能[10]。因此，不仅要考虑以太网供电系统配置的导体直径，也有必要考虑电缆的构造。

很明显，人们需要供电端设备向受电端设备输送更强大的能量，希望所有四对线供电都符合IEEE标准[11]，且目前市面上已经可获得大量非标准产品，这些产品提供的功率超过IEEE 802.3at描述功率。更高的功率水平会提高性能风险，但也使得以太网供电能够被用于更广泛的用途。

结论

为了复现测量结果，本文运用多物理场耦合分析软件创建了一个二维模型。文章中遵循国际电工委员会46C专门小组提出的测试方法对以太网供电电缆进行了评估，这种方法概述了通过直流电流使数据电缆发热的测量。文章展现了单个电缆的模拟和测量结果之间极好的相关性。这种相关性鼓励我们对密集分布网络中的电缆运用软件进行散热预测。预计本文也将为不同捆尺寸、周围环境和密封系统等的温度升高程度提供很好的指导。本文同时证明，在直流供电条件下，铜包铝线电缆的热性能要比施加相同电流值的实心铜导线电缆散发更多的热量。

运用以太网供电技术进行安装在布局和环境方面有很大差异。随着人们对更高功率的追求，很可能要求所有四对线均供电，因此有必要对电缆和零部件性能进行深入研究，包括不同外围温度环境下的成捆电缆和发热属性、以太网供电时电缆延展性以及连接件承重时脱节等领域。

[1] IEEE Standard 802.3at, 2009
[2] M Gilmore, 'The impact of copper clad aluminium (and steel) conductors within balanced pair cables (intended for use within implementations of generic cabling),' FIA-IAN-002, 2011
[3] IEC Subcommittee 46C, 'Proposal for measuring of heating of data cables by current,' 46C/906/NP, 2009
[4] COMSOL Multiphysics: www.comsol.com
[5] G J Anders, Rating of Electric Power Cables in Unfavorable Thermal Environment, Wiley-Blackwell, pp 2-4 (2004)
[6] National Instruments LabVIEW: www.ni.com/labview
[7] Minitab: www.minitab.com
[8] J Wilson and C Hernández-Hall, Physics Laboratory Experiments, Brooks/Cole, p 361 (2009)
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[11] Four-pair PoE study group: www.ieee802.org/3/4PPOE

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