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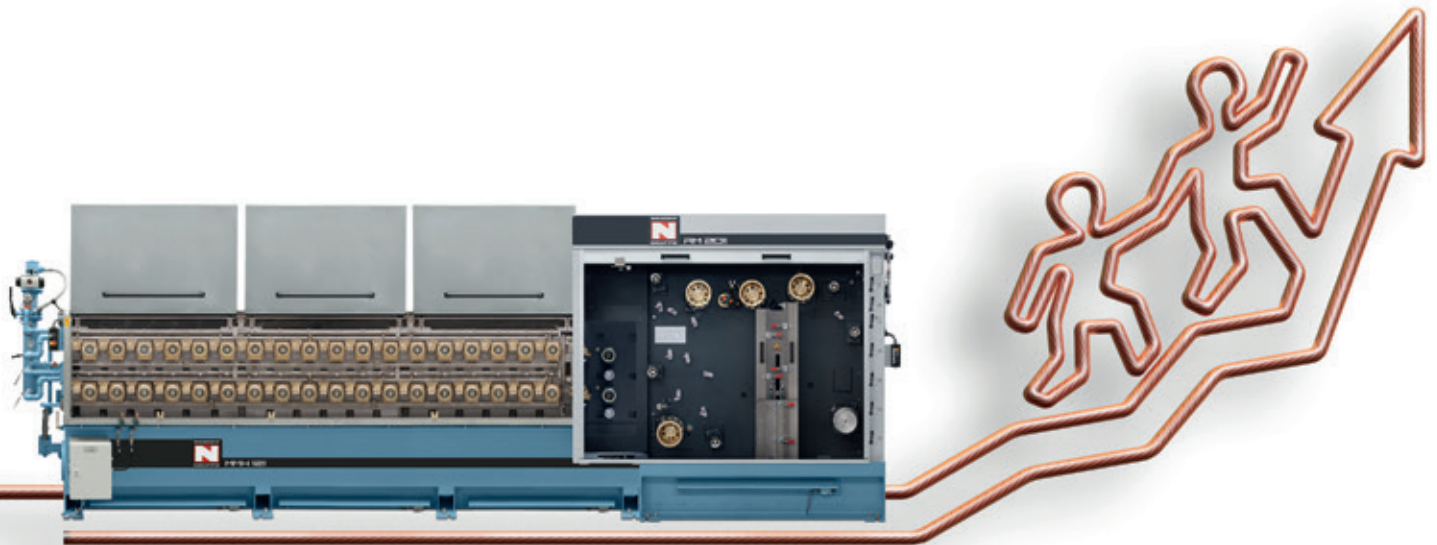


Wire & Cable

January 2016
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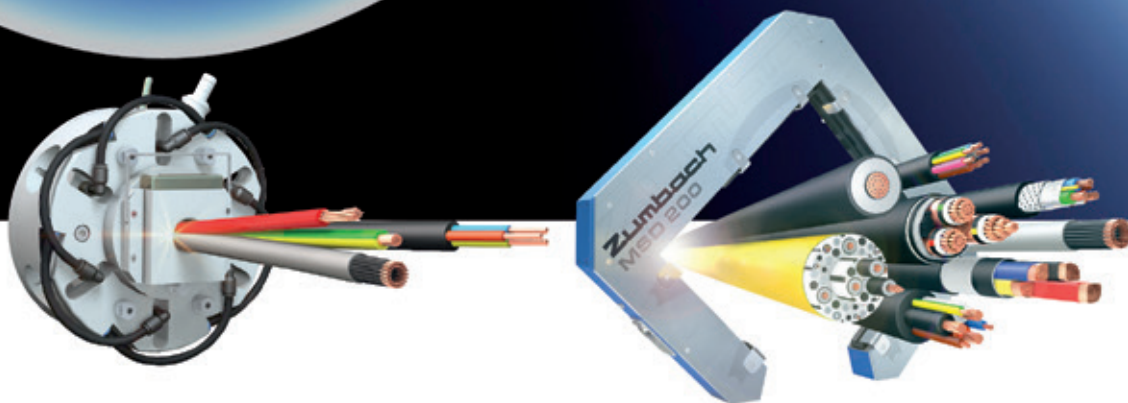
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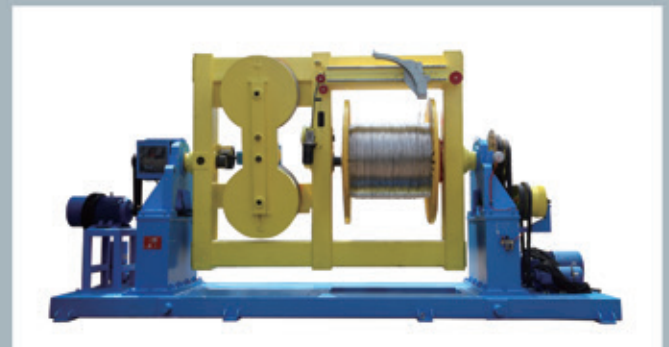
XBΦ500-Φ2500 Cantilever type single twisting machine



SJΦ1000-Φ2500 Double twist stranding machine



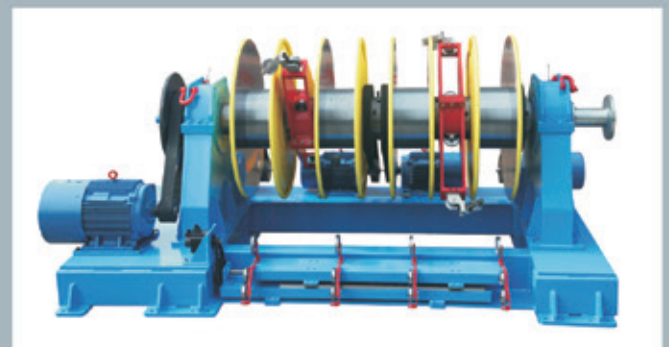
DJΦ630-Φ2500 A type Single twisting machine



DJΦ1000-Φ2000 Single twisting machine



Auto coiling and stacking line



TXJΦ1200 Concentric stranding machine

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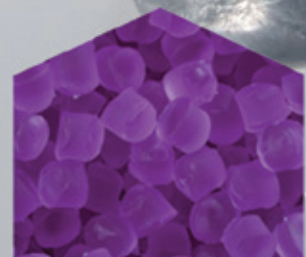
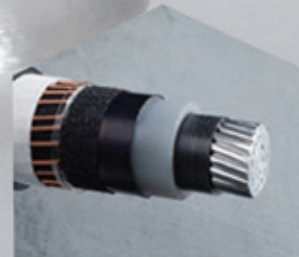
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April 2016

Looking to the future in Düsseldorf and Shanghai

It is now just a matter of weeks before the wire and cable industry gathers en-masse in Düsseldorf, Germany. Thousands of visitors are expected at this year's wire 2016, from 4th to 8th April at the city's Fairgrounds.

This issue of *Wire & Cable ASIA* turns its attention to the exhibitors heading for the week-long exhibition on the banks of the Rhine.

You can find companies and stand numbers starting on page 51. Our March issue will have more in-depth coverage with stand descriptions from many of the exhibiting businesses.

2016 also heralds the year of wire China from 26th to 29th September. Two years ago the Shanghai exhibition, which runs alongside Tube China, closed to record results.

More than 1,400 exhibitors presented the latest technology, machinery and products from the wire, cable, tube and pipe processing industries to over 38,000 visitors.

For the latest details of the exhibition turn to page 8.

Investment in China's infrastructure continues with 30 million rural households and 50,000 villages benefitting from a \$22 billion plan to provide high-speed broadband by 2020. See page 21 for the full story.

David Bell
Editor



When and where

2016
4–8 April:
wire/Tube Düsseldorf
– trade exhibition –
Düsseldorf, Germany
Organisers:
Messe Düsseldorf GmbH
Fax: +49 211 45 60668
Email: wire@
messe-duesseldorf.de
Website:
www.wire.de

2016
11–14 May:
Lamiera –
trade exhibition –
Bologna, Italy
Organisers:
Ucimu-Systems
Fax: +39 0226 255 894
Email:
lamiera.esp@ucimu.it
Website:
www.lamiera.net

2016
8–9 June:
Wire Expo –
trade exhibition –
Uncasville,
Connecticut, USA
Organisers:
Wire Association
International
Fax: +1 203 453 8384
Email: sales@wirenet.org
Website: www.wirenet.org

2016
26–29 September:
wire China –
trade exhibition – Shanghai,
China
Organisers:
SECRI and Messe Düsseldorf
(Shanghai) Co Ltd
Fax: +86 216 169 8301
Email:
shanghai@mdc.com.cn
Website: www.wirechina.net



○ wire China 2014 welcomed 1,461 exhibitors and 38,000 visitors

wire China 2016 – the leading platform for the Chinese market

SHANGHAI, China, becomes centre of attention for the wire industry next September with the 7th wire China being staged at the city's new International Expo Center.

The show, from 26th to 29th September, runs alongside Tube China. Both events are organised by Messe Düsseldorf China Ltd and Messe Düsseldorf GmbH, Germany.

Both exhibitions have developed into Asia's largest and the world's second largest trade fairs for their respective industries.

Exhibitors at wire China 2016 will present machinery and

equipment for wire manufacturing and processing, tools and auxiliary materials for process engineering as well as materials and special wires.

The last staging of wire and Tube China in 2014 closed to record results.

A total of 1,461 exhibitors presented the latest technology, machinery and products from the wire, cable, tube and pipe processing industries to more than 38,000 visitors.

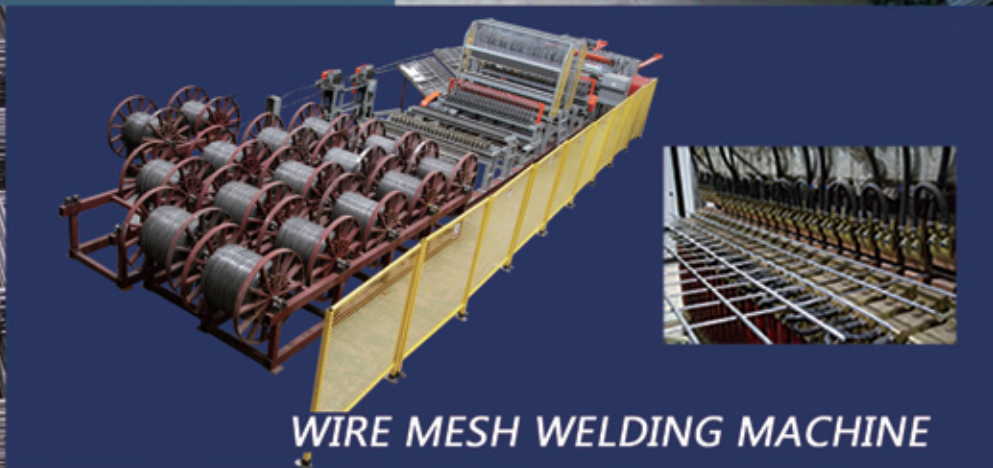
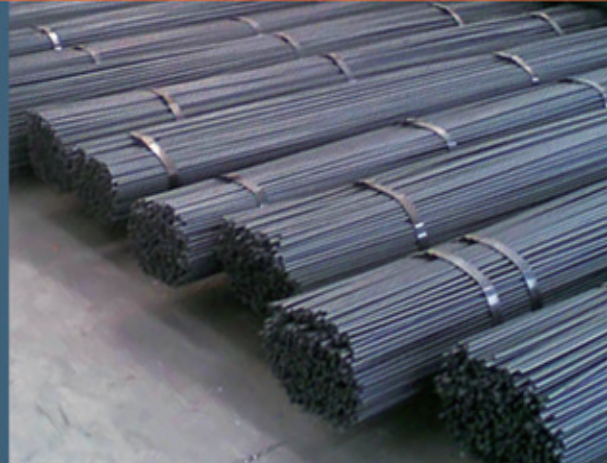
Messe Düsseldorf China Ltd – China
Website: www.wirechina.net



STIRRUP BENDER

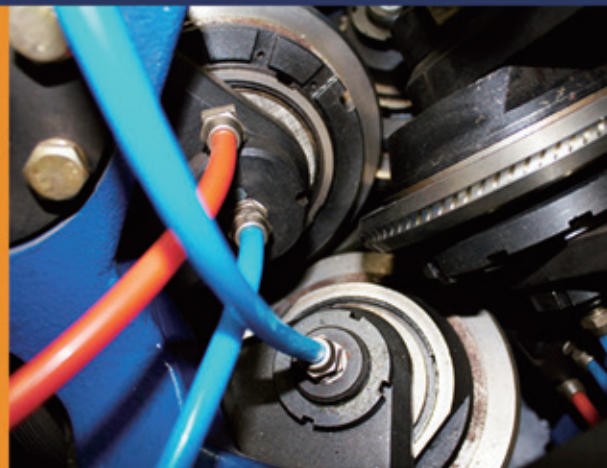


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Website: www.tjkmachinery.com

E-mail: tjk@tjkmachinery.com

Eaydin to represent Haefely Hipotronics in Turkey

HAEFELY Hipotronics has appointed Eaydin Engineering Consulting & Trading Inc as its authorised representative for the industry sector in Turkey.

Eaydin comes from a specialised background in high voltage equipment manufacturing. The senior management of Eaydin have been CEOs and board members of large manufacturing units in Turkey, and bring to the table many years' worth of experience.

The family-run company was founded in 2001 and is backed by more than 40 years' experience in energy markets to provide business development, engineering and management services to power and T&D markets around the world.

Eaydin consults to and helps setup transformer factories in Turkey and other countries, with major clients being Agaoglu Energy Group, Tasyapi Energy Group, Habas, Best Transformers, Fina Energy, Alstom, Areva and Actera Group.

Haefely Hipotronics – Switzerland
Website: www.haefely-hipotronics.com

Eaydin Engineering Consulting & Trading Inc – Turkey
Website: www.eaydin.com



○ Representatives from both companies celebrate the deal

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£2m investment in plant in Haryana, India

CMI Limited, a BSE-listed speciality cable manufacturing company, has acquired the fully developed manufacturing facility of Danish company FL Smidth at Bawal, Haryana, India.

Spread over 11,235 square yards with built up area of 67,000ft², the facility is located in the industrial area of IMT, Bawal, and has all the necessary clearances and facilities for industrial production.

CMI Ltd is investing INR 200 million on the acquisition and setting up of the facility at Bawal.

This investment is expected to significantly augment the production capacity of the company, which intends to start production in the new facility within this financial year.

Commenting on the developments,

Furthering its reach

Clifford Welding Systems (CWS) has appointed new representative offices for the Middle East, Southeast Asia and American markets.

Michael Webber, sales manager at Clifford Welding Systems, said: "We are excited to announce these appointments as they afford us the ability to offer local contact and support to our existing and new customers in the regions. We look forward to introducing many new customers to the CWS family."

Industrial Trade Solutions (ITS) will represent CWS in the rapidly expanding Middle East and North African countries.

Scott Liebenberg, owner of AWT Machinery Inc, of Rockford, Illinois, will represent CWS in the North America and South American regions, where AWT Machinery will provide machinery sales, technical support, and spare parts to ensure local support to Clifford Welding Systems customers.

Jeremy Tan, head of Excelco Equipment Pte Ltd in Singapore, will represent CWS in the Southeast Asia region.

Clifford Welding Systems – South Africa
Website: www.cliffeng.com

Mr Amit Jain, managing director, CMI, said: "This is a new phase in the history of CMI. We are very bullish on the sector and are targeting a CAGR of 40 per cent going forward for the next three to five years.

"The acquisition is a step in that direction and will help CMI enhance its

production capacity in order to achieve the desired growth."

CMI manufactures a wide variety of speciality cables for infrastructure, railways, and oil and refinery industries.

CMI Ltd – India
Website: www.cmilimited.in

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Cable design software successfully implemented

INNOVITES has announced that cable manufacturer Polycab has successfully implemented CableBuilder into its operations.

Used by Polycab to streamline its engineering and product designing processes, the CableBuilder cable design software allows the company to create designs faster, with less effort, while eliminating human errors.

Bharat Jaisinghani, director at Polycab, said: "It's important for Polycab to have efficient and consistent procedures in our engineering processes. InnoVites helped us to get the most out of CableBuilder and streamline our operations. The creation of new designs now takes minutes rather than hours. Mass updates of product data are now simple routine rather than a time consuming headache."

CableBuilder is a software solution to create, calculate and maintain cable designs for all kinds of cables, including power cables, instrumentation cables, telecom cables, optical fibre cables and hybrid cables.

The solution helps cable manufacturing companies to



○ Polycab is now using CableBuilder

reduce design and maintenance time and quotation lead times, to produce professional-looking datasheets and catalogues, to improve manufacturing instructions, and to reduce rework and scrap.

CableBuilder features an integration module to integrate with ERP systems and synchronise the bill-of-material, the routings and the cable dimensions between systems.

Benefits of the solutions include fast, accurate and failsafe creation of designs for all types of cables; version control and alternative designs (including duplicate design detection and design comparison to optimise designs); automatic creation of 2D, 3D and profile drawings; online costing of designs; and workflow and approval control.

InnoVites also sells and develops CableERP, a solution for the cable industry, certified on Microsoft Dynamics AX.

InnoVites BV – Netherlands
Website: www.innovites.com

Polycab – India
Website: www.polycab.com



**THE REVOLUTION IN
TC DIE MANUFACTURING**

Success at wire showcase in Bangkok

ONE of the largest events of the year in the industry calendar, wire Southeast ASIA 2015, was held in Bangkok, Thailand, in September, and Rosendahl and Nextrom attended to showcase their technology solutions. This commitment was an expression of their belief that the exhibition is the ideal platform to meet major wire and cable producers and long-term partners.

Many customers and partners paid a visit to the companies' stand to share views about market developments and to hear news of Rosendahl's extrusion technology for silicone and high temperature materials.

Rosendahl and Nextrom held special presentations in the seminar room at the stand, with a focus on the production of automotive cables, optical fibre, fibre optic cables and underground cables. Visitors learned about Rosendahl's extrusion and crosshead technology as well as about the new Technology Center at the company's premises in Austria, where customers are able to see a new high-performance secondary coating line in action.



○ Rosendahl and Nextrom at wire Southeast ASIA 2015

Rosendahl Nextrom GmbH – Austria
Website: www.rosendahlnextrom.com

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www.messe-duesseldorf.de



Prysmian named as broadband network's supplier of the year

PRYSMIAN Group has been awarded "Supplier of the Year" for 2015 by nbn (national broadband network) of Australia.

Prysmian makes and supplies the optical ribbon integral to nbn's national network, and was awarded exclusive supply of all of nbn's copper cable requirements.

"We are particularly proud of this award as the cables we make for nbn are made here in Australia, in the Sydney suburb of Dee Why," said Danny Doyle, Prysmian commercial manager telecom – Australia and New Zealand. "It's a truly outstanding achievement recognising the superlative contribution of many, many people in Prysmian."

Prysmian's first cable contract with nbn was awarded in 2011. "It has been our responsiveness to the ramp-up in 2014, our continuous support in research and development and the close working connection our production and commercial teams that have allowed us to react quickly to the increasing nbn rollout demands," said Frederick Persson, Prysmian Australia CEO.

The award reiterates Prysmian's position as a supplier of optical and copper cables to the telecom industry in Australia and New Zealand, and worldwide.

The group is constantly developing new cabling and connectivity technologies to bring information wherever it is required, and is fully committed to helping the development of the new generation networks (NGNs). The demand for high-quality optical fibre is expected to grow in the next few years with the spread of NGNs.

Prysmian Group – Italy
Website: www.prysmiangroup.com

70th anniversary turning point

Last year – the 70th anniversary of Tkt Group – was considered a great turning point for the company, with the expansion of its current production capacity with the building of Tecnovo's new lubricants plant in Cremona.

According to the company, the new Cremona industrial hub will be the first and only area in the world manufacturing all the range of products for the steel wire industry (lubricants, dies and auxiliary products).

The company is also looking ahead to promote its new products and initiatives, achieved through research and development activities, at a number of exhibitions worldwide.

In April the company will be at wire 2016 in Düsseldorf, followed by an appearance at wire China in China from 26th to 29th September, and at Wire & Cable India in Mumbai from 5th to 7th October.

Tkt Group – Italy **Website:** www.tktgroup.it

WIRE EQUIPMENT READY FOR THE FUTURE

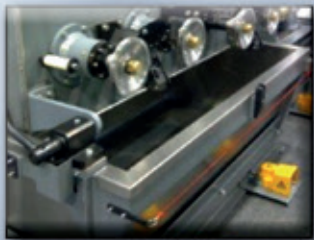


WIRE WET DRAWING MACHINES

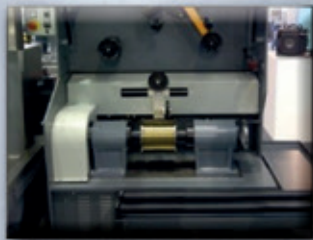
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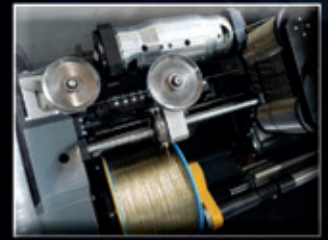
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Tel. +39 030 9517655 / 57 - Fax +39 030 9517571
tecnofil.net - info@tecnofil.net



China moves to more power

CHINA is urging its main wind and solar power production provinces to prioritise transmission of renewable energy over conventional energy sources in a move to get more clean power onto the grid.

China has installed more wind farms than any other country, but not all of the power generated by the projects is used due to curtailment, which is a shortage of transmission capacity to connect projects in remote regions to end users.

Official data reveals that over 15 per cent of energy generated by wind power in the first half of 2015 suffered from curtailment.

Grid companies generally favour conventional energy sources, such as coal and hydro power, over less stable renewable energy sources that also require more investment on grid connections and government subsidised feed-in tariffs.

National development and reform commission has urged Gansu and Inner Mongolia to launch pilot projects to tackle the issue, including increasing consumption of renewable energy locally.

“Renewable energy should be given priority, complemented by

Nuclear plan

China plans to invest over \$78 billion to build 110 nuclear power plants by 2030. The investment exceeds that of the USA, but Beijing is under criticism for failing to implement sufficient safety measures in existing plants.

Beijing-based *China Times* revealed that China will build six to eight nuclear power plants annually for the next five years and operate 110 plants by 2030 to meet the urgent need for clean energy. According to the same report, the country plans to increase its electricity generation capacity to 58GW by 2020, three times the 2014 level.

China currently has 23 nuclear power generating units in operation, with 27 under construction, about one-third of the world's unfinished nuclear units.

conventional energy in a local network with peak shaving, in order to reduce the need for constructing grid capacity to export electricity,” it advised.

Though the regions should build more transmission lines to increase outbound capacity, the authority also urged them to attract more

energy-intensive industries from China's east, helping to better absorb the supply of renewable energy locally.

According to the national energy administration, average curtailment of solar power in the country is nine per cent, but in September in Gansu the level reached 28 per cent.

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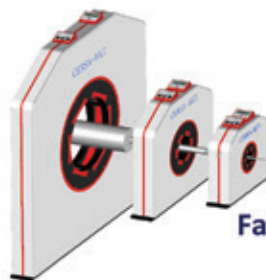
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MEASUREMENT AND CONTROL INSTRUMENTS

“A successful product is the biggest reward”

AN interview with Michael Schaffrath, head of software at Sikora AG, who talks about indispensable technology trends and gives an outlook on further requirements.

What are the tasks of the software development department at Sikora AG?

Michael Schaffrath: The software division works closely together with the hardware, construction, research, service, sales and production departments in order to identify technical challenges, customer requirements as well as new developments and to find suitable solutions.

According to the principle “our aim is to offer an innovative and efficient measuring and control technology that serves all customer and market demands”, Sikora’s developers are working on the continuous improvement and development of the systems. Furthermore, we regularly present special solutions and adaptations of the system in order to meet the individual requirements of our customers.

What are the most important requirement characteristics regarding industrial processor systems?

MS: Today, the requirements for industrial processor systems vary due to technological capabilities. Ten years ago, applications were strongly user-orientated towards the machine operator, and relatively inflexible. For example, metallic front panels with hardware displays were used.

Besides the machine operators, process technicians and quality management (QM) expect to obtain information from the system, which is used for continuous production optimisation.

Our colleagues from Sikora service, QM and R&D also need information in order to provide qualified service, offer continuous process optimisation and, naturally, develop the systems further.

In order to equip our customers’ production lines with sustainable and future-orientated devices, Sikora’s software division is always working on developing expandable systems. Thus, with regular updates, our devices and



○ Michael Schaffrath, head of software at Sikora

applications always meet the highest quality requirements, even after many years.

What are the customer benefits of the Ecocontrol series from a developer’s point of view?

MS: With the Ecocontrol series the customer receives compatible software solutions for his Sikora measuring, controlling and sorting systems from a single source. An Ecocontrol can be used with all measuring devices at the production line and supports the machine operator with comprehensive visualisations. It also offers the possibility of remote maintenance of the Sikora systems.

Where is the trend heading regarding software development for industrial computers in general and Ecocontrol in particular?

MS: In general, the trend is clearly heading towards HMIs (human machine interfaces), which are more intuitive to use. Multi-touch and gesture control open up completely new operating options. Moreover, location-independent access to HMIs from mobile devices is becoming increasingly important. Today, this is being discussed as IoT (Internet of Things). Therefore, we equip our measuring devices more frequently with central access points via LAN or Wi-Fi (WLAN).

With the Ecocontrol we focus on reliability. Our customers operate the devices 24 hours, seven days a week. In addition, support for the machine operator, the process technology of QM and Sikora (service, QM and R&D) as well as easy servicing and the possibility of remote maintenance are

essential aspects we consider when developing processor systems.

How important is data security for software development?

MS: Data security is a very important topic as it has a direct connection with the permanent availability of our devices. Our measuring and control devices are used for process and continuous quality control during production. Therefore, issues like ‘outside attacks’, virus protection, protection of customer data and protection of the complete system are essential in the software development. Special encryption algorithms ensure that no data is lost or passed on, and prevent viruses from entering the systems.

What fascinates you most about your work in the software division? What makes your job exciting? What are the challenges?

MS: I enjoy working with my committed colleagues – including the other departments: hardware, construction, research, service, sales and production – searching for new solutions and realising them.

Furthermore, I am fascinated by the technological developments in the areas of operating systems, development tools, computer platforms and interfaces. In addition to the Ecocontrol systems, at Sikora we are working in the varied field of embedded systems with DSPs (digital signal processors) and MVCs (model view controllers).

Sikora AG – Germany
Website: www.sikora.net

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Official order deadline media entries:
January 29th, 2016



Tangshan orders two continuous galvanising lines



○ The existing galvanising line supplied by Primetals Technologies in the cold rolling mill of Tangshan Iron and Steel Group Co Ltd. The company has now ordered two further lines

TANGSHAN Iron and Steel Group Co Ltd, a Chinese steel producer, has awarded UK-based Primetals Technologies an order to supply two continuous galvanising lines to expand cold rolling mill no.2 at its Tangshan plant in Hebei Province.

This will increase the production capacity for high-strength, coated metal sheets by 650,000 metric tons per annum. The sheets will mainly be used by the automotive industry.

Continuous galvanising lines nos. 5 and 6 will be constructed in a new hall alongside the existing cold rolling mill. This was also supplied by Primetals Technologies, and has been in production since the beginning of 2015.

The two new continuous galvanising lines are scheduled to come into operation in 2017. A special aluminium-silicon coating technology package will be implemented on one line.

Tangshan Iron and Steel is part of the Hebei Iron and Steel Group. With an annual production of around 47 million metric tons in 2014, it claims to be the largest steel producer in China. Cold rolling mill no. 2 comprises a coupled tandem pickling line, a continuous annealing line and a galvanising line.

The mill has an annual capacity of 1.8 million metric tons of high-strength cold strip, and also produces high-quality steels for the Chinese automotive industry.

The two galvanising lines now ordered from Primetals Technologies are part of the second expansion stage intended to create production capacities for these high-quality steel grades. The lines will process not only grades for vehicle body parts but also aluminium-coated hot-forming steel.

Primetals Technologies is responsible for the engineering, manufacturing and supply of the mechanical, electrical and process technology equipment for the lines. Galvanising line no. 5 will have a capacity of some 250,000 metric tons per annum. It will process cold strip in widths ranging from 850 to 1,300mm, and thicknesses from 0.18 to 1.5mm.

Galvanising line no. 6 will be able to galvanise 400,000 metric tons of cold strip per annum in widths ranging from 850 to 1,600mm, and thicknesses from 0.5 to 3mm.

There will also be the possibility of coating the cold strip with an aluminium-silicon alloy. The new lines will be integrated into the existing quality control system of the cold rolling mill plant. Primetals Technologies will also supervise the assembly and commissioning of the lines.

Tangshan Iron and Steel Group Co Ltd – China
Website: www.hebgjtj.com

Primetals Technology Ltd – UK
Website: www.primetals.com



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China's \$22bn broadband plan will connect 30m households

China plans to invest nearly \$22 billion to provide 50,000 villages and 30 million rural households with high-speed broadband by 2020.

A statement, released after a state council executive meeting presided over by premier Li Keqiang, said stronger telecom services will help attract investment and fuel coordinated development, narrowing the gap between urban and rural areas.

The meeting urged more input from the central budget, more support from local policies and capital, more telecom construction and maintenance from private capital, more public-private partnerships, and a stricter supervision of subsidies.

The meeting also stressed the importance of e-commerce, saying faster expansion of e-commerce in rural areas will stimulate consumption, benefit farmers and support the real economy.

Xinhua reports that China's state council recently released a plan promoting a nationwide project to deliver telecom, radio, television and Internet services over a single broadband connection.

The three-network convergence project is aimed at integrating data transmission infrastructure and facilitating information sharing.

The government will support the research and development of key equipment needed to converge the networks.

Optical fibre will replace copper wires to improve Internet speed and transmission capacity, and Internet bandwidth will be increased, especially in rural areas.

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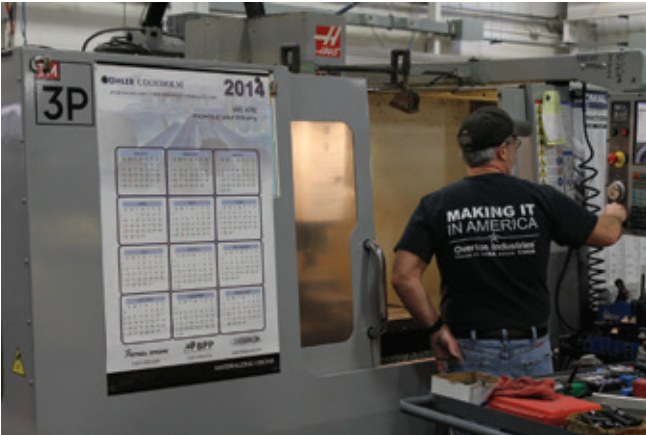
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AIM and Overton Industries announce partnership



○ Strategic partnership between AIM and Overton Industries

AIM Inc, a supplier of CNC wire bending machinery, and Overton Industries, which produces press systems and tube forming, have announced a strategic partnership, specifically geared towards cell automation by allowing customers total turn-key integration.

“AIM will continue to remain focused on its core competency and Overton will do the same,” said Gus Goudis, sales manager at AIM Inc.

“This partnership combines the knowledge-base of two market leaders for the sole purpose of cell automation without change to their regular business activities.”

These systems include presses that can be integrated in-line or externally with AIM machines, along with high-speed upset units.

Overton specialises in press systems and tube forming; their technical staff improves, supports and manufactures tooling and equipment with quick turnaround.

www.candorsweden.com

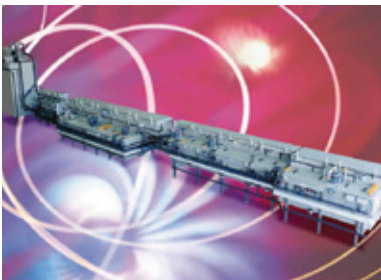
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For close to a decade, AIM has worked with Overton personnel, resulting in Overton’s design and development of systems dedicated to work with AIM machinery.

AIM Inc – USA
Website: www.aimmachines.com

Overton Industries – USA
Website: www.overtonind.com

Leoni strengthens China position with joint venture in China

Leoni AG has agreed a joint venture with China’s Beijing Hainachuan Automotive Parts Co Ltd (BHAP), a subsidiary of state-owned Beijing Automotive Industry Corporation (BAIC).

The Chinese State-owned Assets Supervision and Administration Commission approved the joint venture, which provides that Leoni will sell 50 per cent of the shares in its wiring systems plant in Langfang to BHAP.

This plant has to-date exclusively been making cable harnesses for the car ranges of Beijing Benz Automotive Co Ltd (BBAC), a joint venture between Daimler AG and its Chinese partner BAIC.

Its equal joint venture in China will give Leoni the opportunity to gain new orders from BBAC and other carmakers.

The joint venture will be a key element for Leoni with respect to expanding its business in Asia disproportionately strongly in line with its strategy of profitable growth.

All of Leoni’s other activities in China are unaffected; they will continue to exist outside the new joint venture and will be developed further.

Leoni AG – Germany
Website: www.leoni.com

Bilbao-bound

ASK Chemicals is to consolidate its existing Spanish plants into a single industrial complex covering 10,000m² in the Port of Bilbao, which will become a flagship facility for the ASK Chemicals Group.

ASK Chemicals GmbH – Germany
Website: www.ask-chemicals.com

980km ground wire contract

Suzhou Furukawa Power Optic Cable Co Ltd (SFPOC) has been awarded a new contract by Proyecto Infraestructura Del Peru (PDI) for the supply of 980km of optical ground wire (OPGW) and fittings for one of the largest 500kV power transmission projects in Peru.

The OPGW cable was custom designed to withstand the harsh topographical and environmental conditions along the route of the transmission line, including extremely long span, high wind and a corrosive atmosphere.

SFPOC completed 1,100km of OPGW for Nalcor Energy in 2014, with another project of 1,000km for Interchile to be fulfilled later this year.

Suzhou Furukawa Power Optic Cable Co Ltd – China
Website: www.sfpsc.com

Bangkok conference for lubricant manufacturer



○ Metalube representatives at the conference in Bangkok, Thailand

UK lubricant manufacturer Metalube hosted a distributor conference in Bangkok, Thailand, for its Southeast Asian distributors from Malaysia, Indonesia and Thailand. The conference was staged before the start of the wire Southeast Asia exhibition.

Metalube representatives from Manchester, Dubai, India, Malaysia and China hosted the event where new products were unveiled alongside technical training.

Douglas Hunt, commercial director, said: "We hosted the event prior to our attendance at the SE Asia wire show.

I think all the distributors who attended found the conference highly beneficial and educational. Southeast Asia is a very important market for Metalube and we look forward to enjoying consistent growth here over the coming years."

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

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

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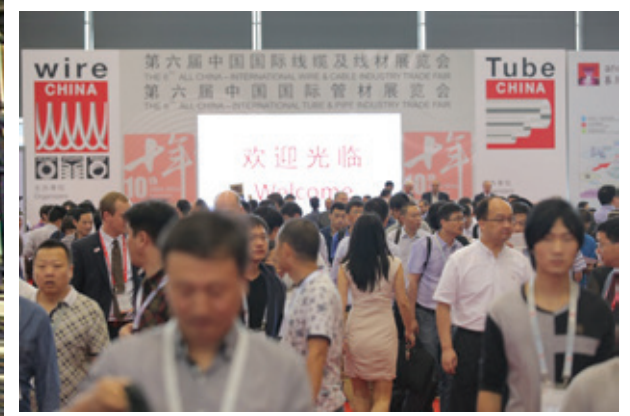
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○ 2014 中国国际线缆及线材展迎来了1,461 名参展商和38,000 名参观者

中国国际线缆及线材展 – 中国市场的领先平台

2016年9月第七届中国国际线缆及线材展览会将在中国上海新国际博览中心举行，届时，中国上海将成为全球焦点，备受瞩目。

此次展览会历时四天，从9月26到29日，中国国际管材展也将同期举行。两大盛会都由杜塞尔多夫展览（中国）有限公司和杜塞尔多夫展览（德国）有限公司联合主办。

这两个展会已成为亚洲最大、世界第二大规模的贸易盛会。

2016年中国国际线缆及线材展的参展商将向来宾呈现线材生产与加工机械、加工设备、辅助加工材料、测控技术、检测工程和特种电线电缆等。

上届线材与管材展创历史记录。参展商达1,461人次，他们向来自电线电缆、管与管道加工行业的38,000名参观者展示了最新的技术、机械和产品。

Messe Düsseldorf China Ltd – 中国
网址: www.wirechina.net

70周年里程碑

去年 – Tkt集团喜迎70周年纪念日 – 这被认为是公司发展的重要里程碑，公司在克雷莫纳新建了Tecnovo润滑油厂，以进一步扩大目前的生产能力。

新的克雷莫纳工业中心将成为世界首个也是唯一的生产基地，能够为钢丝行业（润滑油、模具及辅助产品）制造完整系列的产品。

公司期望通过全球各大展览会来推介新产品，并不断开展研发活动开发新产品。明年四月，公司将参展2016杜塞尔多夫线缆及线材展，紧随其后，公司将参加9月26 – 29日在中国上海举行的中国国际线缆及线材展，并出席10月5 – 7日印度孟买电线电缆展。

Tkt Group – 意大利
网址: www.tktgroup.it



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- WGSB series horizontal heavy braider
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- LRBJ series vertical taping machine
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- WRBJ series horizontal taping machine line
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- Extruding line
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- Pay-off and take-up
各类收放线架



Eaydin代理Haefely Hipotronics土耳其业务



○ 两家公司代表举行庆祝仪式

Haefely Hipotronics公司已委任Eaydin Engineering Consulting & Trading Inc成为其在土耳其工业领域的授权代表。

Eaydin拥有非常专业的高压设备制造背景。Eaydin高级管理层担任土耳其大型制造企业的首席执行官和董事会成员，将为Haefely Hipotronics带来积累多年的丰富经验。

该家族企业成立于2001年，凭借超过40年的能源市场经验为后盾，为全球电力和输配电市场提供业务开发、工程和管理服务。

Eaydin为土耳其以及其它国家提供关于电压器工厂的咨询和建设服务。公司主要客户包括、Agaoglu Energy Group、Tasyapi Energy Group、Habas、Best Transformers、FINA Energy、Alstom、Areva和Actera Group。

Haefely Hipotronics – 瑞士
网址: www.haefely-hipotronics.com

Eaydin Engineering Consulting & Trading Inc – 土耳其
网址: www.eaydin.com

投资200万英镑用于工厂建设

CMI Limited是一家BSE上市公司，专业制造特种电缆，目前收购了发展成熟的制造企业丹麦公司FL Smidth，该公司位于印度哈里亚纳邦巴瓦尔。

该工厂占地11,235平方码，建筑面积67,000平方英尺，位于巴瓦尔的IMT工业园区，拥有所有工业生产必需的资质和设施。

CMI Ltd正投资2亿卢比，用于收购和建立巴瓦尔工厂。这项投资可望显著提升公司的生产能力。公司打算在本财年启动新工厂的生产。

关于公司的发展，CMI总经理Amit Jain先生表示：“CMI迎来了历史发展的新阶段。我们非常看好该行业，目标未来三到五年，实现年复合增长率40%的目标。此次收购向目标迈出了重要的一步，将助推CMI强化其生产能力和达到预期的增长。”

CMI生产广泛系列的特种电缆，应用于基础设施、铁路、石油和炼油行业、工程公司和EPCC承包商等领域。

CMI Ltd – 印度
网址: www.cmilimited.in

着力拓展业务覆盖范围

Clifford Welding Systems (CWS) 已任命新的代表处，负责中东、东南亚和美国市场。

Clifford Welding Systems销售经理Michael Webber说：“我们非常高兴宣布这些任命，新的代表处将为我们当地的新老客户提供本地化的联系和支持。我们期待着越来越多的客户加入到CWS的大家庭。”

Industrial Trade Solutions (ITS) 在迅猛发展的中东和北非市场代表CWS。

ITS负责为钢结构材料包括强化网格、螺纹钢、LRPC线材和冷轧线等制造商提供销售与服务。

位于美国伊利洛州罗克福德的AWT Machinery Inc 公司所有者Scott Liebenberg将在北美和南美代表CWS，在这些地区AWT Machinery将提供机械销售、技术支持和备件，确保为Clifford Welding Systems客户提供本地支持。

新加坡Excelco Equipment Pte Ltd 公司负责人将在东南亚地区代理CWS公司业务。

Clifford Welding Systems – 南非
网址: www.cliffeng.com

中国宽带发展计划

中国计划投资近220亿美元，目标到2020年为5万村庄和3000万农户提供高速宽带。总理李克强主持召开国务院常务会议后发布的声明称，强大的电信服务有助于吸引投资和燃料协调发展，从而缩小城乡差距。

会议要求中央财政更多投入，地方政策和资金更多扶持，利用私人资本进行更多的电线建设和维护，建立更多的公私伙伴合作关系，以及补贴的严格监管等。

会议还强调了电子商务的重要性，表明农村地区快速扩大电子商务将刺激消费，惠及农民和支持实体经济。

新华网报道，中国国务院近日发布的一项推动全国性项目的计划，以通过单一宽带连接提供电信、广播、电视和互联网服务。

这三个网络融合项目旨在将数据传输基础设施和促进信息共享相融合。政府将支持汇聚网络所需的研究开发关键设备。光纤将取代铜线，以提高网络速度和传输能力，网络带宽将增加，尤其在农村地区。

中国唐山订购两条连续镀锌线

唐山钢铁集团有限责任公司是一家中国钢铁制造商，最近授予英国Primetals Technologies大宗订单，为其供应两条连续镀锌线，用于扩展河北省唐山第二冷压薄板厂的生产能力。此举将高强度、涂层金属片材的年产能提升至65万吨。这些片材主要应用于汽车工业。

连续镀锌线图5和6连同现有的冷压机将在新址建造，该镀锌线也由Primetals Technologies提供，据悉2015年初已开始制造。这两条连续镀锌线预计于2017年投产。特殊的铝硅涂层技术包也将在生产线中付诸实施。

唐山钢铁是河北钢铁集团的骨干企业。2014年产能约4700万吨，成为中国最大的钢铁制造商。第二冷压薄板厂拥有耦合串联酸洗线、连续退火线和镀锌生产线。该厂年生产180万吨高强度冷轧带钢，并且为中国汽车工业生产高强度钢材。



○ Primetals Technologies 已为唐山钢铁集团有限责任公司冷轧厂供应的镀锌生产线。公司目前又订购了另外两条生产线

目前向Primetals Technologies订购的两条镀锌线是第二扩展阶段的举措之一，旨在为这些优质钢种打造产能。这些生

产线不仅为车体部分而且为铝涂层热成型钢加工不同等级的钢材。Primetals Technologies负责为生产线设计、制造和供应机械、电气和工艺技术设备。镀锌生产线5的年生产能力达到25万吨，生产的冷轧带钢宽度范围从850到1,300mm，厚度从0.18到1.5mm。

生产线6每年能够镀锌40万吨冷轧带钢，这些钢带的宽度范围在850-1,600mm之间，厚度从0.5到3mm。生产线也可涂覆铝硅合金冷轧带材。新的生产线将与冷轧厂现有的质量控制系统集成。Primetals Technologies将负责监督生产线的组装和调试。

Tangshan Iron and Steel Group Co Ltd – 中国
网址: www.hebgjtj.com

Primetals Technology Ltd – 英国
网址: www.primetals.com

980千米地线合同

Suzhou Furukawa Power Optic Cable Co Ltd (SFPOC) 获得Proyecto Infraestructura Del Peru (PDI) 授予的一项订单合同，为其供应980千米光纤复合架空地线 (OPGW) 和配件，用于秘鲁最大的500kV电力传输项目。OPGW电缆量身定制，以承受输电电路沿线恶劣的地形和环境条件，包括极长跨度、高风和腐蚀性气候。2014年，SFPOC为Nalcor Energy 提供了1,100千米光纤复合架空地线，另外，今年晚些时候还将为Interchile项目供应1,000千米光纤复合架空地线。

Suzhou Furukawa Power Optic Cable Co Ltd – 中国
网址: www.sf poc.com

中国致力于发展移动电源

中国正鼓励风能和太阳能主要生产省份优先发展可再生能源，为国家电网带来更多的清洁能源。中国是目前风电并网装机最多的国家，但所产生的电力并未充分利用，在偏远地区到终端用户到连接项目的传输容量不足。官方数据显示，今年上半年，风力能源中超过15%遭遇削减。

电网企业普遍看好传统能源，例如煤炭和水电，这是因为不太稳定的可再生能源在电网连接和政府补贴上网电价方面也需要更多的投资。国家发改委已要求甘肃和内蒙古开展试点项目，以解决这一问题，包括增加可再生能源本地消耗。

“可再生能源应优先考虑，本地电网调峰能力辅以常规能源，以减少电网容量对出口电力的需求，”国家提出了这样的建议。

虽然地区要建设更多的输电线路来提高输出能力，当局也督促吸引更多来自中国东部的能源密集型企业，有助于更好地本地化吸收可再生能源的供给。

据国家能源局总称，全国太阳能发电的平均削减是9%，但9月份甘肃削减水平达到了28%。

曼谷举行线缆行业展会

今年最大的行业展会之一2015东南亚国际线缆展于9月在泰国曼谷举行，展会期间，Rosendahl 和 Nextrom展示了其技术解决方案。公司相信展会是与重要的电线电缆制造商和长期合作伙伴见面洽谈的最佳平台。许多客户与合作伙伴参观了两家公司的展台，针对市场发展交换了意见，并获悉Rosendahl用于硅和高温材料挤压技术方面的信息。Rosendahl和Nextrom在展位旁的会议室举行了特别宣讲，重点推介汽车电缆、光纤、光纤电缆和地下电缆的制造。来宾对Rosendahl挤压和十字头技术以及公司在奥地利新的技术中心都有了初步了解，在技术中心客户能够看到运行中的新型高性能二次涂装线。生产线的速度可达1,000米/分。

Rosendahl Nextrom GmbH – 奥地利
网址: www.rosendahlnextrom.com



○ Rosendahl 和 Nextrom 参展2015东南亚国际线缆展

电缆设计软件已成功运行

InnoVites日前宣布，电缆制造商Polycab已成功实施了新的电缆软件，应用CableBuilder到其业务领域。

Polycab用来精简工艺和产品设计过程，CableBuilder电缆设计软件允许企业产品设计更快、更省力，并且消除了人为误差。

Polycab总监Bharat Jaisinghani评论说：“在工艺流程中拥有有效、一致的程序对Polycab来说非常关键。InnoVites给予我们最理想的电缆设计软件CableBuilder，从而简化了我们的运营。目前创建新设计只需几分钟，而不是数小时。产品数据的海量更新现已变得简单常规，不再费时费力。”

CableBuilder是一款软件解决方案，为所有品种的电缆，包括电力电缆、仪表



Polycab 现在使用CableBuilder

电缆、电信电缆、光纤电缆和混合电缆创建、计算和维护电缆设计。该解决方案帮助电缆制造企业减少设计、维护和报价交货时间，以生产具有专业水准的数据表和目录，来改善制造指令和减少返工和报废。

CableBuilder具有一个集成模块，能够与ERP系统集成，并与材料清单、工艺路线和系统之间的电缆尺寸保持同步。

该解决方案的优点包括为所有类型的电缆快速、精确和防故障创建设计、版本控制和替代设计（包括重复设计检测和优化设计的设计比较）；自动化创建2D、3D和剖面图；在线成本核算；工作流程和审批控制。

除了转售和实施CableBuilder，InnoVites还销售和开发CableERP，该解决方案专门应用于电缆行业，通过了Microsoft Dynamics AX认证。

InnoVites BV – 荷兰
网址: www.innovites.com

Polycab – 印度
网址: www.polycab.com

中国核计划

中国计划投资超过780亿美元，到2030年兴建110座核电站。总投资额超过美国，但是目前北京由于对现有核电站安全措施执行不力，备受争议。北京出版的《华夏时报》透露，中国在未来五年将建造6-8个核电厂，到2030年将有110座核电站投入运行，以满足清洁能源的迫切需求。根据同一份报告，该国到2020年将发电能力提高至58GW，是2014年发电水平的三倍。中国现有23个核电机组在运行，另外27个在建设中，占世界在建核电机组的三分之一。何祚麻，中国社科院理论物理学家告诉《环球时报》，中国还没有为核电站实施足够的措施发展安全控制技术和设施。他说，四个拥有超过50座核电站的国家包括美国、日本、法国和前苏联都遭遇过核事故。他强调，中国政府应该更加重视其它清洁能源，如风力和水力发电，这些资源在中国非常丰富。周大地，中国能源研究会副理事长表示，中国核电站只产生大约2%的电力，而世界平均水平是14%。

Prysmian被评为“年度宽带最佳供应商”

澳大利亚nbn（国家宽带网络）授予Prysmian集团2015“年度最佳供应商”的光荣称号。

Prysmian为nbn国家网络制造和供应光纤带，并独家供应nbn需要的所有铜缆。

“能获此殊荣我们倍感荣幸，我们为nbn提供的所有电缆都在澳大利亚生产，就在悉尼的郊区Dee Why。”Prysmian负责澳大利亚和新西兰电信市场的商务经理Danny Doyle表示：“这是对我们取得成绩的真正认可，也是对许许多多Prysmian人做出贡献的肯定。”

Prysmian和nbn于2011年签订第一个电缆合同。“2014年我们的客户响应能力不断得到提升，我们对研发领域持续给予支持，与我们的生产和商业团队密切合作，这使得我们能够快速应对日益增加的nbn部署需求，”Prysmian澳大利

亚首席执行官Frederick Persson表示。该奖项再次彰显了Prysmian作为澳大利亚、新西兰及全球电信行业光学和铜缆供应商的地位。

集团不断开发新的布线和连接技术，为各个领域提供相关技术信息，集团也致力于帮助开发新一代网络（NGNs）。随着新一代网络（NGNs）的普及，未来几年高品质光纤的需求预计将增长。

Prysmian集团业务范围包括地下电缆、海底电缆、输配电系统、应用广泛的特种电缆以及用于建筑和基础设施领域的中低压电缆。

对于电信行业来说，集团为语音、视频和数据传输制造电缆和附件，提供品种齐全的光纤、光学与铜缆以及连接系统。

Prysmian Group – 德国
网址: www.prysmiangroup.com

Leoni中国建合资企业以巩固市场地位

Leoni AG已同意与中国北京公司Beijing Hainachuan Automotive Parts Co Ltd (BHAP) 联手建立合资企业，给北京公司是国有企业Beijing Automotive Industry Corporation (BAIC) 的子公司。中国国有资产监督管理委员会批准建立合资企业，Leoni将出让廊坊布线系统工厂50%的股份给BHAP。该廊坊工厂为北京奔驰汽车有限公司 (BBAC) 提供最新的电缆线束，工厂也是一家合资企业，由Daimler AG和

其中国合作伙伴BAIC合作建设。中国合资公司为Leoni提供了获得BBAC及其它汽车制造商新订单的机会。合资企业将成为Leoni强劲拓展亚洲业务和盈利增长战略目标的关键因素。Leoni在中国的其它活动不受影响，它们将独立于新的合资企业继续发展。

Leoni AG – 德国
网址: www.leoni.com



○ SV 400 D type double spooler for insulated wires with filled and empty spools (Niehoff Package System)

Efficient, safe and economic cable handling

For almost 20 years, cable and wire harness manufacturers have been working with the Niehoff Packaging System NPS.

It has been in continuous development since its beginnings and has proven to be a highly efficient, safe and economic handling system for primary automotive cables as well as bunched wires, strands, conductors and cables.

The NPS comprises special spoolers and collapsible multi-way spools made of ABS plastic. The spoolers are designed to operate in line with extrusion lines.

Changeover from full to empty spools is carried out at full production speed allowing non-stop operation.

The spools made in different sizes offer a secure, stable and tangle-free

package both when full or partially empty and enable highest cable pay-off speeds into downstream processes.

When empty, spools can be fully dismantled and nested into each other and returned to the cable manufacturer where they can be easily and quickly re-assembled, reloaded and then re-used.

To protect the NPS spools from foreign spools which are not compatible with NPS, new original NPS multi-way spools are equipped with an RFID transponder.

In this way NPS users can identify if a spool belongs to the system and is compatible with it – or not.

In this case considerable disturbances would be the consequence.

The RFID transponder also simplifies spool labelling. As the spool identification is stored in RFID, no label is needed.

The NPS packaging system allows trouble-free and tangle-free paying-off of automotive cables made of copper, copper alloys and aluminium at the highest speeds.

Even signal cables made of copper alloys with a cross-section of 0.13mm² can be processed without any problems.

More than 420 NPS spooler units are now in use all over the world with more than three million NPS spools in operation.

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

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VNT dies offer multiple advantages



○ VNT dies from Ajax & Turner

Ajex & Turner Wire Dies has introduced a line of innovative VNT dies (Vitrified Nanocrystalline Technology) that can replace PCD and carbide dies for multiple applications in drawing and compacting.

VNT dies offer more wear resistance, and have an extremely smooth surface with immensely low friction. The dies can draw stainless steel wire or carbon steel wire up to 0.6%C, aluminium or Al alloy wire, and nickel silver wire as well as copper/brass tubes and for compacting/stranding copper and aluminium.

The dies, which are offered for a range of 0.8mm to 70mm for stainless or carbon steel wire, provide a two to three per cent improvement in raw material use for metal savings.

The dies can provide a perfect surface finish, holding a zero tolerance for up to 500 metric tons (stainless steel and carbon steel wire up to 0.6%C) at a price that is 2-10 times lower than PCD dies (depending on bore diameter).

These dies produce a smooth wire due to the unique diamond technology used. "The diamond coating is very thin, thus it will not peel off as in the case of a thick coating, thus increasing the life of the die and providing better performance, which is evident by the overwhelming responses by our overseas customers who have used these dies for copper, aluminium, stainless steel, aluminium alloy, etc," said a statement.

"For high and low carbon, in association with TKT, Italy, we have developed pressure dies for long life. These dies are used for dry and wet drawing respectively. With its revolutionary concept of disassembled die, it improves lubrication, gives 30 per cent more nib or pallet life and produces higher quality wire. Our pressure dies contribute significantly to increase drawing speeds and improve productivity to the wire plant."

By using the pressure die, the re-cutting or refurbishment is eliminated and the wire drawing speed also increases up to 50 metres per second.

Ajex has developed different grades of Masterlube lubricants, which have high viscosity and low consumption.

Ajex & Turner Wire Dies Inc – India

Website: www.ajexturner.com

Cables

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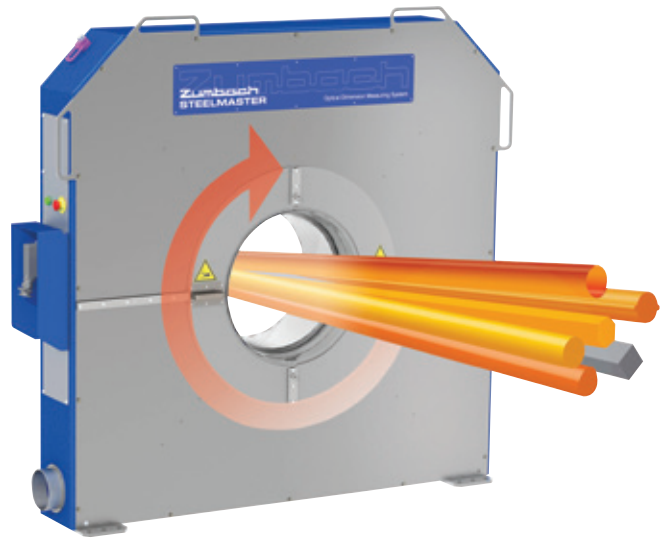
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○ Steelmaster SMR 400-S2 modular measuring unit, and a range of equipment possibilities

Modular rotating gauges for high-speed dimension measurement

Zumbach Electronic has introduced new modular additions to its line of the rotating gauges. The SMR product line is claimed to offer significant advantages over other gauges in the fast and accurate capture of dimensions in longitudinal and radial direction.

SMR gauges rotate continuously at 60 or 100rpm. Up to three ODAC[®] laser heads take 2,000 measurements per second per head, fully synchronised. This results in up to ten complete profiles per second, which is faster than previous gauges.

Alternatively, the SMR can operate in static, orientable mode with 2,000 diameter dimension measurements per second in each direction. At 100m/sec this means a set of measurements every 50mm.

The mechanical concept is simple and robust: no wear parts, no collector rings and no brakes. The transmission of power and signals to and from the laser heads is fully contactless.

Standard and special software features include EPM function for true section display, with polygonal and asymmetric shape deviations; special functions for three-roll mills; head and tail scrap calculation; and flexible, personalised screens.

Benefits include faster start-up, less scrap, tighter tolerances, display of true shape, and trouble-free maintenance with quick and easy access to the maintenance points. The gauges are suitable for hot and cold processes and QC.

Zumbach Electronic AG – Switzerland
Website: www.zumbach.com

Descaling wire and rod in high-speed drawing lines

Steeltec, part of the Wheelabrator Group, is a producer of special steels with manufacturing locations in Denmark, Germany, Sweden, Switzerland and Turkey. At its two sites in Emmenbrücke, Switzerland, the company draws wire rod and bar stock into bright steel rods.

The company originally used chemical descaling to clean the wire rod and bars before drawing. It installed its first high-performance single-strand shot blast machines in the 1970s and, over time, mechanical descaling using Wheelabrator's shot blast machines has gradually replaced chemical descaling (in immersion baths).

In 2008 the last pickling bath was decommissioned in Emmenbrücke. All high-speed drawing lines at the two sites now feature an integrated Wheelabrator FL shot blast machine, spanning several generations of the FL-concept.

FL machines are designed to focus the blast media onto narrow work pieces using guide plates, which can be adjusted to suit individual workpiece diameters. The latest blast machine to join the fleet at Steeltec is an FL-4-37/55, which has been integrated into the most powerful drawing line

on site. Due to its high blast power and new blast wheel arrangement, the machine can keep up with the highest drawing speeds, even when processing demanding new materials. For the first time, this latest machine adjusts guide plates automatically to the correct wire diameter, making the overall drawing line more efficient.

Andreas Sieber, head of operations, Plant 1, at Steeltec, commented, "The transition from chemical treatment to mechanical descaling had a range of positive effects on operations here in Emmenbrücke. In addition to much more straightforward waste disposal, we've also noticed the wire surface is now much better prepared for the drawing process. Depending on blast media type and size, the blast process creates little pockets on the surface, which improves adhesion and distribution of the drawing oil."

"This is incredibly important in order to achieve the desired drawing quality and to extend the life of drawing dies. Compared to immersion baths, blast machines also take up less room and fit snugly into the drawing line."



○ FL blast machine for wire and rod

Depending on drawing speed, wire or rod diameter, material and desired surface cleanliness, FL machines can be equipped with three, four or six blast wheel units with a range of motor capacities. The machines are slotted into the line ahead of the drawing machines, from which they fetch relevant settings and parameters.

To date, more than 600 FL blast machines have been manufactured and are in operation in wire and rod production around the world.

DISA Industrie AG
(Wheelabrator Group) –
Switzerland

Website:
www.wheelabratorgroup.com

see at:
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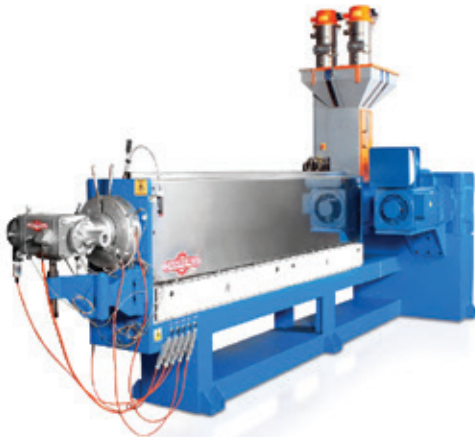
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www.micro-weld.com



Based in USA, Micro-Weld is a pioneer in manufacturing of high performance electric-resistance butt and flash welders. Built for over 85 years, these welders are easy to operate and designed specifically to be used in wire and cable industry. There are over 50 models to choose from, for a wide range of applications and capacities.

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E-mail: Sales@supermacindia.com

Precision wire EDM

Makino's HEAT U3 features a split precision V-guide wire system and four-sided work table, and is said to have the lowest wire consumption in the industry. Like the Makino U3, the U3 HEAT (High Energy Applied Technology) has five programmable axes.

"This machine is fast, reliable and requires very little maintenance," said technical equipment president Lou Olson. "It was designed to be user friendly."

The U3 and U3 HEAT feature a new cutting technology called HyperCut, designed for superior part accuracy and surface finish. HyperCut is capable of producing a 3umRz surface finish with three-pass machining, and represents a 20 per cent reduction in cycle time and 14 per cent saving in wire consumption when compared to previous technologies.

Materials for steel and carbide have been developed and support both sealed and non-sealed flushing applications. The U3 HEAT also features Makino's technology for wire EDM machining speed and accuracy in parts featuring poor or difficult flushing conditions.

The U3 and U3 HEAT contain a comprehensive cutting condition library, with over 2,200 settings for many material types and flushing conditions from 0.004" to 0.012" diameter wire. These settings include optimised conditions for standard hard brass wires, high-speed coated wires and high-taper soft wires.

The depth and versatility of the entire cutting condition library ensure that all applications can be machined at optimum productive levels.

Makino – Japan

Website: www.makino.com

New plenum cable compounds with enhanced flame and smoke performance

New flame retardant and smoke suppressant technologies have enhanced the performance of wire and cable compounds that were already the leading PVC-based low-flame/low-smoke products for plenum applications, according to Teknor Apex Company.

Four new grades in the Fireguard® line of plenum cable compounds exhibit oxygen indices from 49 to 51.5 per cent. Shore C hardness levels range from 80 to 90.

The new grades are Fireguard 910A-72-NL for jacketing 'hybrid' insulation in Category 5e and Category 6 unshielded plenum cables; Fireguard 910A-76-NL for jacketing 'hybrid' insulation in Category 5e and Category 6 shielded plenum cables; Fireguard 910A-79-NL for jacketing RG6 coaxial cable; and Fireguard 910A-80 UVF-NL for jacketing indoor/outdoor fibre optic distribution cables.

"In NFPA 262 flame tests, these new compounds generate lower levels of smoke and flame spread than any generically similar compound in the marketplace," said Mike Patel, director of marketing and business development for the vinyl division of Teknor Apex. "They require no special equipment to process and can be extruded at the same high rates as standard Fireguard compounds."

Teknor Apex Company, a privately held firm founded in 1924, produces flexible and rigid vinyl, thermoplastic elastomers, nylons, colour masterbatches, speciality chemicals and hoses.

Its vinyl division manufactures compounds based on PVC, including Apex flexible and rigid vinyl, Flexalloy vinyl elastomers, Fireguard low-flame, low-smoke compounds for wire and cable, and BioVinyl™ compounds with bio-based plasticiser. The division is an international supplier to the appliance, automotive, construction, medical device, wire and cable and other industries.

Teknor Apex – USA

Website: www.teknorapex.com

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○ SV 400 D型双转子收线机，适用于绝缘导线，线轴可满载或空载（Niehoff包装系统）

高效、安全和经济 加工电缆

近20年来，Niehoff包装系统NPS一直是电线电缆束制造商的最佳选择。自成立以来，公司不断发展，现已成为业界高效、安全和经济电缆加工系统制造商，产品广泛应用于汽车电缆、线束、绞线、导线和各种电缆。

NPS系统包括特殊收线机以及由ABS塑料制成的可折叠多路线轴。收线机根据挤出生产线进行设计和运行。线轴在满负荷生产速度下完成从满载到空载的切换，保证无间断运行。线轴尺寸各异，因此在完全空载或部分空载的情况下，都能够提供安全、稳定和无打结包装，并且保证以最高的电缆放线速度进入下游加工过程。

一旦放空，线轴可完全拆卸和相互嵌套，并返回到电缆制造商那里快速简便地进行重新组装和使用。为防止线轴与NPS系统不配套，全新原装NPS多路线轴配备了RFID转换器。

因此，NPS用户能够识别线轴是否属于系统或与之兼容。这种情况下会造成相当大

的干扰。RFID转换器简化了线轴标记。由于线轴标识存储在RFID里，因此不需要标签。

NPS是世界上独一无二的包装系统，允许在最高运行速度下无故障、无缠绕放线汽车电缆，这些汽车电缆通常由铜、铜合金和铝制成。

即便是铜合金信号电缆，横截面达到0.13mm²也能够顺畅加工。在全球各地有420多台NPS收线装置在使用，超过三百万NPS线轴在运行。

**Maschinenfabrik Niehoff GmbH
& Co KG – 德国**
网址: www.niehoff.de

柔韧的7类数据电缆

Dätwyler公司推出新的CU 7003 4P绞合系列Category 7 S/FTP安装电缆，该电缆使用绞合导体制造而成，因此电缆非常柔韧。AWG23电缆有三个版本 - 设计用于办公室布线、恶劣的工业环境和海上应用。Dätwyler供应柔韧的安装电缆(最长90m)，外护套可无卤、阻燃、低烟，适合于结构内部布线，而聚氨酯护套则适用于恶劣的工业环境，以及适合于海上应用的坚韧无卤SHF1护套（DELTA和DNV认证）。三个版本运行达到600MHz，据称有突出的电值，例如，用于串扰和系统噪音。另外，为用户提供最小弯曲半径，设计用于大量的弯曲循环。

Dätwyler Cabling Solutions AG – 瑞士
网址: www.cabling.datwyler.com

新的阻燃电缆化合物具有增强的阻燃防烟性能

新的阻燃和抑烟技术进一步增强了电线电缆化合物的性能，使得高级基于PVC的低火/低烟产品更适合于阻燃应用，Teknor Apex公司表示。

阻燃电缆化合物Fireguard®系列四个新等级氧指数从49%到51.5%。肖氏C硬度水平范围从80到90。

新等级 Fireguard 910A-72-NL 用于 5e 类和 6 类非屏蔽阻燃电缆护套“混合”绝缘；Fireguard 910A-76-NL 用于 5e 类和 6 类屏蔽阻燃电缆护套“混合”绝缘；Fireguard 910A-79-NL用于护套RG6同轴电缆；Fireguard 910A-80 UVF-NL用于护套室内/室外光纤配线电缆。

“在NFPA 262阻燃测试中，这些新的化合物产生的烟雾和火焰蔓延水平比市场上任何类似化合物都低，” Teknor Apex公司乙烯事业部营销与业务发展主任Mike Patel先生说道。“它们不需要特殊设备来处理，并且可以在相同的高速率下作为标准防火化合物来挤压。”

Teknor Apex公司成立于1924年，是一家私人控股公司，专门生产柔性与刚性乙烯、热塑性弹性体、尼龙、色母粒、特殊化学品和软管。

公司乙烯事业部制造基于PVC的化合物，包括Apex柔性与刚性乙烯、Flexalloy乙烯弹性体、电线电缆防火低烟阻燃化合物以及具有生物基增塑剂的BioVinyl™化合物。该部门是一个国际性的供应商，应用范围包括家电、汽车、建筑、医疗设备、电线电缆等行业。

Teknor Apex – 美国
网址: www.teknorapex.com

简化电缆布线应用的刷架

M Buttkerit Ltd扩充了其icotek电缆入口产品的范围，新添KEL-BES系列。这些产品的聚酰胺框架结合包埋聚酰胺刷，从而为电缆部署到互联网机柜和控制箱提供快速简便的一键通进入。KEL-BES产品还适用于计算机中心架高地板应用的出口/进口孔。目前可提供的三种架尺寸都能为10、16和24-极标准工业连接器的切口尺寸提供完全的匹配。所有框架在安装服务上都具有一个10mm厚的投影，并容纳圆形、扁形和预端接电缆等广泛组合。

每个框架中包含的双刷条提供自封闭，适用于任何标准或混合布线，因此限制和防止几乎所有尘埃进入。目前所有的框架固定和电缆布线应用都可以被简化，这样可节省时间和获得更高的灵活性。框架由黑色聚酰胺制造而成，阻燃等级UL94-Vo，框架和电刷的材料相同。这些产品均无卤、无硅，操作温度范围在-20°C到+90°C之间。

M Buttkerit Ltd – 英国
网址: www.buttkerit.co.uk

VNT模具提供多种优势

Ajex & Turner Wire Dies推出了一系列创新 VNT 模具（玻化纳米技术），可取代PCD 与硬质合金模具，应用于拉伸和压实等工艺。VNT模具耐磨性更好，并具有低摩擦、非常光滑的表面。模具能够拉伸0.6%C的不锈钢丝和碳素钢丝、铝、铝合金、镍银线及铜/黄铜管，用于压实/绞合铜和铝。

模具可供范围在0.8mm到70mm之间，适用于不锈钢或碳钢线材，节省2-3%的原材料。该系列模具可提供完美的表面光洁度，重达500吨也是零公差（高达0.6%C的不锈钢和碳钢线材，价格要比PCD模具低2-10倍（取决于孔径）。

这些模具由于使用了独特的金刚石技术，因此生产的线材非常光滑。“金刚石涂层非常薄，在厚涂层的情况下也不会剥离，同时增加了模具的寿命，并提供更好的性能。这是显而易见的，我们海外的客户已将这些模具应用于铜、铝、不锈钢和铝合金等材料中，充分验证了其可靠的性能，”公司声称。

“对于高低碳，我们与意大利TKT公司联手开发了压力模，使用寿命更长。这些模

具分别用于干、湿法拉伸。凭借其革命性的拆卸模具理念，压力模改善了润滑性，使得模孔或模板寿命得以延长30%，从而生产更高品质的线材。我们的压力模显著提高了拉丝速度和改善了线材制造的生产率。”通过使用压力模，不需要进行再切割

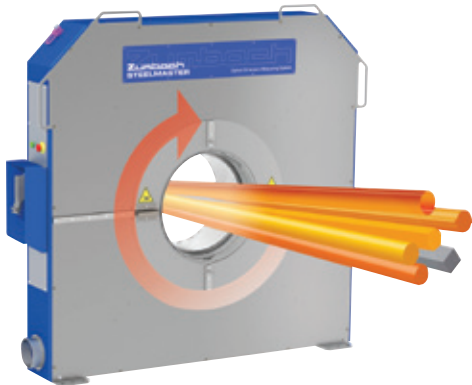
和修整，拉丝速度每秒提升至50米。Ajex开发了不同等级的Masterlube润滑油，具有高粘度和低消耗等特点。

Ajex & Turner Wire Dies Inc – 印度
网址: www.ajexturner.com



Ajex & Turner 制造的VNT 模具

用于高速尺寸测量的模块旋转仪



Steelmaster SMR 400-S2 模块化测量装置和一系列设备可能性

Zumbach Electronic日前推出新的模块旋转仪。SMR产品系列声称较之其它测量仪具有显著优势，能够快速精确采集纵向和径向的尺寸。

SMR测量仪在60或100rpm转速下连续旋转。三个ODAC®激光头每秒每头进行2,000次测量，并且完全同步。

每秒实现了高达十个完整轮廓，比之前的测量仪速度更快。

此外，SMR能够在静态、定向模式下运作，在每个方向上每秒能够进行2,000次直径尺寸的测量。100米/秒的速度，这意味着每50毫米就是一组测量。

机械概念简单而强大：无损件、无集电环和无制动器。激光头电力和信号的传输完全无接触。

标准和特殊软件的特点包括用于真实截面显示的EPM功能，具有多边形和不对称形状的偏差；三辊轧机的特殊功能；头尾废料计算；灵活个性化的屏幕。

优势包括启动更快、废料更少、公差更严格、显示真实的形状和无故障维护，简单快速接入维护点。该测量仪适合于冷、热工艺和质量控制。

Zumbach Electronic AG – 瑞士
网址: www.zumbach.com

高速拉丝线中线、棒材除垢

Schmolz + Bickenbach 集团是全球最大的钢材生产商之一，在丹麦、德国、瑞典、瑞士和土耳其有生产工厂，Steeltec是旗下的瑞士工厂。位于瑞士Emmenbrücke的两家工厂主要将线、棒材拉伸成亮钢材。

公司原先在拉伸前使用化学除垢清洁线材和棒材。上世纪70年代，公司安装了第一台高性能单股喷丸机，随着时间的推移，使用Wheelabrator喷丸机机械除垢逐渐取代了化学除垢（浸浴）。

2008年，Emmenbrücke工厂的最后一个酸洗槽退役了。瑞士两家生产工厂的高速拉丝线目前拥有一个集成Wheelabrator FL喷丸机，跨越几代人的FL设计理念。FL机器设计，利用导向板将喷砂介质聚焦到狭窄工件，从而能够进行调整以适应个别工件的直径。

Steeltec最新喷砂机FL-4-37/55与工厂最强大的拉丝生产线集成。由于其高爆破功率和新的抛丸设计，机器能够跟上最高的拉伸速度，即便加工最苛刻的新材料也不影响。

如果是第一次，这台最新的机器将自动调节导向板到正确的线径，使得整个拉丝生产线更加高效。

Steeltec一工厂运营总监Andreas Sieber表示：“从化学处理过渡到机械除垢对Emmenbrücke工厂的运营产生了积极的影响。除了更直接的废物处理，我们也意识到，线材表面更适合拉伸工艺。根据喷砂介质的类型和尺寸，喷砂工艺在表面



线材、棒材FL喷砂机

创建小槽，从而提高拉丝油的粘附性和改善分布。这对于获得理想的拉伸质量和延长拉丝模的使用寿命来说非常关键。相较于浸浴，喷砂机占用空间更小，与拉丝线和谐融合。”

根据拉丝速度、线或棒材直径、材料及所需的表面清洁度，FL机器可配备三、四或六个喷砂轮装置，这些装置具有不同的电机容量。机器在拉丝机前进行开槽，以获取相关设置和参数。

迄今为止，公司已制造了超过600台FL喷砂机，在世界各地的线、棒材生产线上运行。

DISA Industrie AG
(Wheelabrator Group) – 瑞士
网址: www.wheelabratorgroup.com

精密线切割加工

Makino公司推出的Makino HEAT U3具有拆分精密V型导丝系统和4边工作台，据称，在业界线材消耗最低。正如Makino U3, U3 HEAT（高能应用技术）具有5个程序轴。

“该机器快速、可靠，并且维护频率低，”技术装备总裁Lou Olson表示。“机器设计用户友好。”

U3和U3 HEAT拥有新的HyperCut切割技术，可提供卓越的部件精度和表面光洁度。

HyperCut机床加工3刀能够达到3umRz光面光洁度，相较于过去的技术，减少了20%的周期运转时间和节省了14%的线材。

钢和硬质合金材料已被开发和支持密封或非密封冲洗应用。U3 HEAT采用了Makino技术，线切割加工速度和精准性可确保各部件之间的运行适应任何场合的加工。

U3和U3 HEAT含有一个全面的切割条件库，有超过2,200种设置，以应对多种材料和冲洗条件，线材直径范围在0.004" 到0.012" 之间。

这些设置包括用于标准硬黄铜线、高速涂层线和高锥度软线的最佳条件。

整个切割条件库的深度与通用性确保所有应用都可以在最佳的生产水平下进行加工。

Makino – 日本
网址: www.makino.com



power of



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Transforming power

ALSTOM has delivered India's first 800kV HVDC power transformer for the Champa-Kurukshetra UHVDC phase 1 link.

The 1,365km transmission line project will connect a power station, near Champa, to the demand centre in Kurukshetra, northern India.

This is the first of nine power transformers needed for the project, built in Alstom's transformer manufacturing and testing facility in India.

The 13m-long, 5.3m-high and 5.1m-wide transformer weighs 310 tonnes. It has taken the unit over three months to cover a distance of over 2,000km to reach the project site at Champa.

The second transformer, already dispatched, was expected to reach Champa by December 2015.

Patrick Plas, senior vice president, grid power electronics and automation, Alstom Grid, said: "These massive transformers will substantially improve grid connectivity by seamlessly transferring power across five electrical regions of India.

"Alstom has been a key player in HVDC for over 50 years and the company is currently executing two 800kV UHVDC bi-pole projects in India."



○ First transformer for the Champa-Kurukshetra UHVDC phase 1 link

Alstom has delivered over 40 HVDC projects worldwide, with current projects including DoIWin3 in Germany and Rio Madeira in Brazil.

Alstom – France
Website: www.alstom.com

Power link to Agra

Power Grid Corporation of India Ltd has announced the commissioning of the first phase of its transmission link between the north east region and Agra. The line crosses through four states and around 40 rivers, and uses 7,000 pylons.

“The first pole of the 1,730km-long 800kV HVDC transmission line has been completed, and power can flow in either direction,” said Power Grid chairman and managing director RN Nayak.

“This transmission link will help in getting supply of surplus hydro power from the north eastern region, in the monsoon months, to north and western India, while in the winters it will be the other way around.”

The link is believed to be the world’s largest multi-terminal 800kV HVDC project, comprising 3,000MW HVDC terminals at Biswanath Chariyali and Alipurduar and a 6,000MW terminal at Agra.

The north eastern region, together with Sikkim and Bhutan, has huge hydro generation potential, estimated at around 65,000MW.

Power Grid Corporation of India Ltd – India
Website: www.powergridindia.com

Elite acquisition

India’s Sterlite Technologies will acquire Elitecore Technologies, a telecom software company, for an enterprise value of around \$27.3 million.

Established in 1999, and majority owned by investment firm First Carlyle Ventures Mauritius, Elitecore delivers business support systems, packet core and carrier wi-fi solutions for 52 communication service providers across 40 countries. Its other products include 24 online access gateway and NEOX IP telephony.

Sterlite explained that the acquisition opens up access to a multi-billion dollar market which, when combined with the existing large and expanding market for optical products globally, significantly enhances its overall growth opportunity.

Both Sterlite and Elitecore cater to some of the largest telecom service providers globally and this acquisition will enable both companies to cross-sell their products.

Sterlite is committed to growing its optical products business and has implemented expansion plans to increase capacity. The acquisition of Elitecore allows Sterlite to offer solutions for operations support, business support and revenue management.

Elitecore Technologies will be merged into Sterlite Technologies, once the transaction has been completed.

The transaction is expected to be value accretive by FY

2017 and is expected to be closed shortly, subject to the completion of regulatory and statutory formalities.

Sterlite Technologies – India
Website: www.sterlitetechnologies.com

Elite Technologies Pvt Ltd – India
Website: www.elitecore.com

Powering ahead

The Andhra Pradesh government plans to expand power generation capacity, in response to the prediction that demand will more than double by 2018.

The AP power sector is working towards a total installed capacity of 29,000MW, from the present installed capacity of around 10,222MW. By 2019 the additional generation capacity will come from thermal (7,090MW), hydro (1,010MW), solar (4,530MW), wind (4,000MW), and a 1,600MW share of central generating stations.

Among other energy-efficient initiatives, the chief minister last year launched an LED bulbs distribution programme in Guntur, Srikakulam, Anantapur and West Godavari districts, which will now extend to other regions.

To ensure 24/7 power to all consumers, the state chief minister, N Chandrababu Naidu, is looking to develop Amaravati, the new capital city of Andhra Pradesh, as an energy-efficient city. Now under development, Amaravati will incorporate energy saving systems from the design stage onwards.

Andhra Pradesh Government – India
Website: www.aponline.gov.in

Festival power safety

To ensure full safety for the anticipated thousands of visiting pilgrims, underground cables are being laid around the Mahamaham tank at Kumbakonam to take electric wires to houses, halls and buildings. The Mahamaham festival will be held on 22nd February 2016.

“We are doing away with overhead electric lines and are laying underground cables as a safety measure in view of the crowd expected to take a holy dip in the Mahamaham tanks,” said engineers of the Tamil Nadu Generation Distribution Corporation (Tangedco).

Cables have been laid for a distance of 1.7km around the tank and a total 3.4km, including connections, taken to houses and other establishments. Street lights maintained by the Kumbakonam municipality are already supplied by underground cables.

Tangedco is fencing transformers at vantage points as a safety measure. New transformers and wires have already been installed at various places in the temple town.

Tamil Nadu Generation Distribution Corporation – India
Website: www.tangedco.gov.in

LPWANs may represent a dynamic and potentially game-changing development in the M2M/IoT market

According to London-based Beecham Research, low-power wide area networks (LPWANs) are poised to give traditional cellular networks some stiff competition when it comes to machine-to-machine (M2M) and Internet of Things (IoT) connections. In the recent report *Low-Power Wide Area Networks for IoT Applications*, Beecham said that – from zero in 2015 – it expected low-power WANs for IoT to account for 26 per cent of the overall market for IoT connectivity – 345 million connections – by 2020.

Reviewing the report for *Telecompetitor*, Andrew Burger noted Beecham's point that LPWANs, cheaper and less power-hungry than cellular networks, are nevertheless able to transmit and receive data over long distances. The suggestion is that this could give them an advantage over cellular connections, at least at the present stage of market development and especially when it comes to connecting IP-enabled and other networked devices installed at sites far from power sources. ("Report: Low-Power WANs for IoT Threaten Cellular Dominance," 15th October). Beecham said that budget constraints on cellular network operators – limiting their rollouts of connected M2M and IoT devices – enhance the potential of LPWANs to enable a wider range of M2M and IoT applications.

The author of the Beecham report, senior analyst David Parker, acknowledged that lower transfer speeds are the trade-off for the longer distances over which LPWANs can carry data. But in his view this is compensated by what LPWANs offer networks optimised for machine connectivity: much lower deployment costs than traditional cellular networks. Mr Parker cited the expectation of industry observers that low-power WANs for IoT providers will compete and collaborate with cellular network operators in meeting demand for IoT connectivity. Having a wider variety of options will in turn stimulate market growth, he told *Telecompetitor*.

➤ Another Beecham officer, CEO Robin Duke-Woolley, said that the company's look at LPWANs disclosed many applications that are not "big data" and not necessarily real-time, interactive, or immersive. Urging a sceptical attitude toward the alleged requirement for LPWANs to supply the 3Vs – velocity, volume, variety – in full, he envisioned a near future of shared responsibility and opportunity in telecom. "From a connectivity point of view, the market will move towards 4G-5G for satisfying big data IoT," said Mr Duke-Woolley. "While, on the other side, LPWANs and equivalent networks will address the low data IoT requirement."

Microwave is seen as gaining ground on fibre 'on the road to 5G' – and quickly

The Swedish telecom technology and services provider Ericsson predicts that, by 2020, microwave technology will support multi-gigabit capacities in traditional frequency bands and support over 10GB in the millimetre wave (E and V) bands. The company in a recent report said it believes E band spectrum to be key in meeting the need for in backhaul as well as fronthaul capacity increases.

"Microwave networks are a vital ingredient for operators to provide the best possible performance and quality

of experience in the most cost-efficient way," Karolina Wikander, who heads Ericsson's microwave division, told Guy Daniels of London-based *TelecomTV* (1st October). "Capacity needs will continue to increase on the road to 5G, and keeping up requires continued technology evolution and re-imagining network efficiency."

Ericsson foresees that microwave will continue to be the dominant backhaul technology and that, within five years, 65 per cent of all cell sites will be connected by microwave solutions. It notes that markets with existing deep fibre investments, including China, Japan, South Korea and Taiwan, will be the holdouts. In Ericsson's view, the choice between fibre and microwave in backhaul networks will

no longer be dictated by capacity but by fibre presence and calculations of total ownership costs.

Ericsson believes a sevenfold capacity increase can be achieved with the use of a wide, low-availability link in the E band (70-80GHz) to boost a high-availability link in traditional bands. Accordingly, reported Mr Daniels, the company looks for major growth in E band usage, which would account for up to 20 per cent of new deployments by 2020.

The USA looks into claims by smaller players that big telecoms have a grip on the 'special access' market

For at least a decade, American telecoms including Sprint Corp, XO Communications LLC and Level 3 Communications Inc have complained that large phone companies abuse their market power in what Ryan Knutson of *Dow Jones Business News* terms "an obscure but important part of the telecommunications market." In October, the Federal Communications Commission said it was opening an investigation into the practices of AT&T Inc, Verizon Communications Inc, Frontier Communications Corp and CenturyLink Inc. As Mr Knutson reported on *nasdaq.com* (16th October), the investigation centres around "special access" – the bulk data connections that businesses buy to connect cell towers, ATMs, retail outlets and the like.

The FCC estimates the size of that market at roughly \$20 billion. AT&T, Verizon, CenturyLink and Frontier dominate the special access market because, Mr Knutson explained, they effectively control the wires that were built by the legacy AT&T monopoly, which was broken up by the government in 1984.

He wrote: "The smaller companies accuse the carriers of locking up the market by forcing them to sign volume commitments and by charging monopoly prices and early termination fees." For example:

➤ Citing a scarcity of alternative providers, Level 3 says it has no choice but to buy 90 per cent of its special access from Verizon in some markets to avoid substantial fees.

- Sprint, which uses the special access to connect its cell towers, says it had to pay huge termination fees to the larger carriers when it switched many of its 38,000 cell towers to alternative providers. Denying the allegations, AT&T, Verizon and the other large carriers say the market is competitive. Frank Simone, AT&T vice president of federal regulatory, said in a statement: "The terms the commission is reviewing are commonplace in most commercial contracts." According to an agency official the FCC investigation would take at least a few months. Any action taken as a result of the findings will require approval from a majority of the five commissioners.
- Mr Knutson noted that the Telecommunications Act of 1996 gives the FCC authority to police competitive behaviour in the telecom market, but the agency's jurisdiction over these types of contracts mainly covers older technologies. AT&T, Verizon and other carriers have invested in newer network technologies that are not subject to comparable FCC oversight. The investigation announced on 16th October is separate from an FCC effort to collect data about the special access market as it considers a broader set of new regulations.

Elsewhere in telecom . . .

- State-owned China United Telecommunications Corp – the second-largest Chinese operator – has joined with SK Telecom Co Ltd of South Korea for development of fifth-generation (5G) communication technologies. As reported by Ma Si in *China Daily* (10th October), the partnership is expected to deepen the ties of the two companies and foster mutual progress in mobile-based services. SK Telecom is the largest Korean wireless carrier.
- In October the US telecom services provider Verizon said it was retiring copper network facilities in parts of New York, Virginia and Rhode Island. Though small markets for Verizon, their conversion figured in a steady advance toward the company's stated goal of switching a total of 200,000 current customers to fibre by the end of 2015. When its copper-to-fibre migration is completed Verizon will no longer maintain nor offer services over copper wires.
- It will continue to accommodate private and business consumers served by those facilities with a 64 Kbps grade PSTN (public switched telephone network) over the fibre connection. The migration to fibre has prompted claims by some rival providers that Verizon may have engaged in de facto copper retirement: permitting copper plant to deteriorate to the point at which replacement becomes a necessity. And some murmuring about heavy-handed persuasion was reported in the areas converted in October.
- As reported by Stephen Clark on *spaceflightnow.com*, on 16th October a Russian Proton rocket boosted a Turkish telecommunications satellite into space from the Baikonur Cosmodrome in Kazakhstan, and nine hours after liftoff a Breeze M upper stage injected the 5.4-ton broadcasting craft into orbit 22,300 miles over the equator. Turksat 4B's on-board propulsion system will circularise it. The satellite's owner, Turksat AS of Ankara, said the spacecraft – produced by the Khronichev State Research and Production Space Center – was to be commissioned in December. Based on the DS2000 satellite platform made in Japan by Mitsubishi Electric Corp, Turksat 4B is designed for a 15-year service life. With an on-target orbit following the October launch, engineers expect the satellite will have enough fuel reserves for 30 years of operation.
- A wave of mergers in Europe's telecommunications industry will not necessarily boost investment in networks and should be closely scrutinised, the European Union's digital chief Andrus Ansip said on 13th October, echoing a warning from the bloc's antitrust chief that consolidation could simply lead to higher prices. As reported from Brussels by Tom Fairless of the *Wall Street Journal*, the

comments, to a conference of telecom executives there, are the latest indication that the EU's executive arm will look closely at a number of recent deals in the sector.

Telecom operators have argued that they need to be allowed to merge with rivals in the same country to increase investment in networks and share costs. Mr Fairless noted, however, that the EU's new antitrust chief, Margrethe Vestager has signalled her scepticism of such arguments. Ms Vestager, blocked a mobile telecom merger in her native Denmark in August, saying she failed to see how promised investments would materialise.

"Relaxing competition rules is not the answer" to attracting investment in telecom networks, Mr Ansip said, according to the *WSJ*. "That would only shift the cost of the required network investments onto consumers [who] would then have less choice and higher prices."

- Citing data from the Telecom Regulatory Authority of India (TRAI), on 16th October, the Press Trust of India reported that, driven by growth in mobile phone usage, Indian telecom subscribers crossed the 1.01 billion mark in August. In its subscribers report for the month the regulator said: "The number of telephone subscribers in India increased from 1,009.31 million at the end of July to 1,014.70 million at the end of August, thereby showing a monthly growth rate of 0.53 per cent."

Growth in mobile over the period was led by Bharti Airtel with an addition of 1.312 million subscribers. But the landline subscriber base continued its contraction, with landline or wireline connections declining from 26.1 million in July to 26.0 million by the end of August. Sistema Shyam and Reliance Communications – both in process of consolidation – lost 182,000 and 491,000 users, respectively.

Reliance experienced the most erosion in Bihar where its right to use the 900MHz spectrum (2G) would expire in December.

低功率广域网可能代表机对机/物联网市场中一项动态和潜在的全新进展

据总部在伦敦的比切姆研究公司称，低功率广域网（LPWANs）在机对机（M2M）和物联网（IoT）连接领域会对传统蜂窝网络形成重大冲击。比切姆在最近关于应用于物联网的低功率广域网报告中说，他们预期使用低功率广域网的物联网占整个物联网连接市场的比重将从2015年的0提高到2020年的26%，即3.45亿件连接件。

安德鲁·伯格在评论Telecompetitor报告时说，比切姆指出低功率广域网比蜂窝网络成本和能耗更低，也能够长距离传输和接收数据。这意味着低功率广域网较蜂窝网络具有优势，至少在目前市场发展阶段，特别是涉及IP化和其他远离电源地点安装的网络设施时优势更明显。

比切姆说，蜂窝网络运营商的预算约束——制约他们退出现有的机对机和物联网设备连接——提升了低功率广域网用于更广泛的机对机和物联网应用的潜力。比切姆报告的作者，高级分析师大卫·帕克承认，低功率广域网为了达到更长的传输距离，牺牲了部分传输速度。但他认为，作为补偿，低功率广域网提供了最优的机器连接网络：比传统蜂窝网络的架设成本低很多。

帕克先生引用行业观察家的展望说，用于物联网提供商的低功率广域网和蜂窝网络运营商在满足物联网连接需求方面有竞争也有合作。他告诉Telecompetitor，提供更广泛的可选空间反过来可以促进市场增长。

比切姆的另一名高管，即首席执行官杜克·伍利说，该公司对低功率广域网的看法表明，许多应用不是“大数据”，没必要实时、互动或有身临其境感。这促使我们对低功率广域网满足全部的所谓3V要求——速度、容量、多样化持怀疑态度，他预见到不久的将来，电信业将共享责任和机会。“从连接的角度来说，市场为了满足大数据物联网需求将向4G-5G发展，”杜克·伍利说。然而，另一方面，低功率广域网和同类网络将应对低数据物联网需求。

微波被认为将“在通往5G的路上”接近光纤——并且很快

瑞典电信技术和服务提供商爱立信预测，到2020年为止，微波技术将支持千兆位级容量的传统频段和超10GB的毫米（E和V）波段。该公司在最近一份报告中，称其相信E带状谱是满足回传和前传扩容需求的关键。

“微波通讯网是运营商以最节约成本的方式提供尽可能好的性能和高品质体验的重要组成部分，”爱立信微波部门负责人卡罗利纳·维坎德对总部位于伦敦的TelecomTV（10月1日）的盖伊·丹尼尔斯说。“在通往5G的路上，扩容需求会持续存在，不断的技术创新和提高网络效率也要齐头并进。”

爱立信预见到微波仍将是主导性回传技术，并且在五年以内，65%的蜂窝基站将运用微波解决方案连通。该公司注意到，现有的大规模光纤投资地区（包括中国、日本、韩国和台湾）仍会坚持使用光纤。在爱立信看来，回传网络到底选择光纤还是微波将不再由容量决定，而是由光纤效果和业主总成本计算决定。爱立信相信，采用E波段（70-80千兆赫）中广域的、低可用性链接能够扩充七倍的容量，以促进传统波段的高可用性链接。相应的，丹尼尔斯报道，

该公司正在想办法大幅提升E波段使用率，以期到2020年为止，新设备使用率能达到20%。

美国调查小型运营商申诉电信巨头垄断“特殊权限”市场事件

至少十年以来，包括斯普林特公司、XO通信有限责任公司和Level 3通信股份有限公司等美国电信公司一直抱怨说大型电信公司滥用他们的市场权力，《道琼斯商业新闻》瑞安·克努森称他们所说的市场为“电信通讯市场一项模糊但重要的部分”。

10月，联邦通信委员会称其将对AT&T公司、威瑞森通讯公司、边境通讯公司和美国世纪互联公司展开公开调查。nasdaq.com（10月16日）克努森先生说，调查集中在“特殊权限”上——企业购买的连接蜂窝基站、自动取款机、零售商店等的批量数据传送服务。联邦通信委员会估计该市场市值大约为200亿美元。克努森先生解释说，由于AT&T公司、威瑞森和边境通讯有效控制着老AT&T垄断企业架设的电缆（该垄断已于1984年被政府打破），因此他们主导着特殊权限市场。

他写道：“小型公司控诉这些运营商强迫他们签署容量承诺，索要垄断价格和早期终端费用，从而封锁市场。”

Level 3称由于可选供应商少，他们没的选择，在一些市场上只能从威瑞森购买90%的特殊权限，以节省大量费用。

斯普林特称其在将38,000个蜂窝基站中的许多基站转向替代提供商时，为使用特殊权限连接到其蜂窝基站，不得不向大型运营商支付终端费。AT&T公司、威瑞森和其他大型运营商否定这些控诉，称市场是竞争性的。AT&T的联邦监管副总裁在声明中说：“委员会正在审查的条款是大部分商业合同中的常见条款。”一名政府官员称，联邦通信委员会的调查至少要花几个月时间。调查后采取的任何行动都要求五个委员会中的绝大部分批准方可通过。

克努森先生注意到，《美国1996年电信法》赋予了联邦通信委员会监管电信市场竞争性行为的权力，但该机构对这类协议的管辖权大部分只涵盖旧有技术。AT&T公司、威瑞森和其他运营商投资建立的新型网络技术不受联邦通信委员会竞争性监管。由于10月16日宣布的本次调查纳入了一系列更广泛的新规章，因此它将独立于联邦通信委员会收集有关特殊权限市场数据的工作。

电信业其他消息.....

国有中国联通公司——中国第二大运营商——已与韩国SK电讯公司联合开发第五代（5G）通讯技术。正如《中国日报》（10月10日）马思所报道的，此次合作预计将深化两家企业之间的联系，促进移动通讯服务的共同进步。SK电讯是韩国最大的无线载波运营商。

10月，美国电信服务提供商威瑞森称，他们将在纽约、弗吉尼亚和罗德岛部分地区停止使用铜缆网络。虽然这只是威瑞森的一小部分市场，但他们的转变标志着该公司正朝其声称的“到2015年末，使200,000个现有用户转向使用光纤”的目标稳步前进。威瑞森在完成铜缆到光纤转移之后，将不再维护铜缆或通过其提供服务。该公司将继续致力于使先前使用64 Kbps级公用交换电话网络服务的私营和企业用户适应光纤连接。威瑞森向光纤转移已激起了一些竞争对手的控诉，他们说威瑞森可能实施了事实上的铜缆退出计划，即任由铜设备退化到不得不替换的程度。还有一些竞争对手私底下说，该公司在10月份替换区域采用的说服方式据说很粗鲁。

Energy

Electric utilities are among the early adopters of advanced robotics technologies, notably aerial drones

According to a new report from Navigant Research (Boulder, Colorado), which tracks global technology trends, the utility market for drone and robotics technologies is expected to see revenues grow from \$132 million in 2015 to about \$4 billion in 2024.

As reported by William Pentland of *FierceEnergy*, to Navigant “the value proposition” is simple enough: drones and robots can enhance the reliability of the electric grid and reduce costs, even as they improve safety in the performance of line inspection and maintenance tasks. In a 2013 review by *Time* magazine of the most dangerous jobs in the USA, electrical power line installation and repair ranked in seventh place. Drones and robots also have the potential to reduce restoration times after a grid outage. Given these benefits, observed Mr Pentland, it is not surprising that robotics and drones have already gained a foothold in the utility industry, especially for transmission and distribution (T&D) providers. (“Utility Industry Is Ripe for Robots, Says Study,” 1st October)

For a utility company in Lenox, Massachusetts, the Electric Power Research Institute (EPRI) developed an inspection robot, known as “Ti”, which crawls along transmission lines searching for high grass and low tree branches. Equipped with high-definition infrared cameras and ranging sensors, it provides information about the condition of specific infrastructure. A single Ti robot can perform condition-based monitoring and asset management for about 80 miles of transmission line.

Another, emergency-related, EPRI initiative cited by Mr Pentland concerns distribution line damage assessment in the wake of storms, a frequent choke point in power restoration due to obstacles such as downed trees or icy conditions. Tests were conducted recently at the Flight Test Center of New Mexico State University using aerial drones equipped with high-resolution video cameras to transmit live streaming video of power lines from a height of 5,000 to 7,000 feet.

EPRI (Palo Alto, California) determined that, following a major storm, unmanned aerial drones could assess damage on large areas of the electric grid more rapidly than ground-based crews.

Other robot-centred applications on the way include manhole inspection, remote-controlled repair, and measurement of outdoor lighting levels. Taken as a whole, the activity in this area does indicate a productive match-up of robotics and electric utilities.

As James McCray, a senior research analyst with Navigant Research, told *FierceEnergy*: “The use of drones and robotics for transmission and distribution inspection and maintenance [represents] a rapidly growing revenue stream for technology and outsourced services providers.”

Climate-change impacts to power generation and the electric grid loom for nearly every region of the United States

US Energy Secretary Ernest Moniz has released a report from the Energy Department that examines threats to the domestic energy sector posed by climate change. Reviewing it for *Smart Grid News*, Barbara L Vergetis Lundin put the message of the report in stark terms: as weather extremes become commonplace, energy infrastructure designed to perform across a known range of historical conditions may not be able to withstand the projected changes.

Dividing the USA into nine regions, the Energy Department foresees region-specific impacts ranging from severe droughts and wildfires to heavier rainfall, more powerful hurricanes and storm surge, and record heat waves. Because electricity usage rises with temperature, demand for electricity is a key concern for nearly every region, given the potential for taxing the performance and integrity of energy systems, particularly those with aging infrastructure. During a visit to California, in October, Mr Moniz said, “To address the harsh impacts of climate change and extreme weather we need innovative solutions that will make our energy sector more resilient, more flexible, and more efficient, as we build a cleaner, more climate-friendly energy system.”

The Southwest section of the report details how the regional energy system, including power lines north of Los Angeles, are vulnerable to wildfires that could increase due to climate change. But the city has begun to marshal its defences. Ms Lundin cited the example of a local fire station that will soon be equipped with a backup solar energy and battery storage system. (“Tightening Up Technology: Energy Sector Vulnerabilities to Climate Change,” 9th October)

While fuel transport will be a worry in every region, diminishing supplies of water from reduced snowpack will particularly constrain upstream oil and gas operations in the Southeast, Southern Great Plains and Alaska. Limited water availability will likewise jeopardise hydropowered thermoelectric generation in most regions, but particularly in the Midwest, Great Plains and South. While the impacts will vary across regions, the general thrust of the Energy Department report is clear: climate change is already having a significant effect, with worse to come – probably sooner rather than later.

Britain’s withdrawal of its solar-power subsidy is seen as ‘draconian’ by the American installer SunEdison

It is of course too early to analyse the effects on the British solar energy industry of the decision by Prime Minister David Cameron’s government to cut solar subsidies by as much as 87 per cent, with implementation set for this month (January). The rationale for the cuts is that solar power in Britain no longer requires that support. The cuts will not affect solar installations already in place, but new systems will not be eligible for subsidies.

Nearly three-quarters of a million British households are now equipped with solar panels, compared with virtually none five years ago. While solar energy still accounts for only about four per cent of power generation in Britain, despite an unpropitious climate for solar the country led the European Union in new installations in 2014. Unquestionably that showing is largely due to the programme of subsidies – on which the government has been spending about \$1.9 billion a year – that is popular with homeowners but has proved anathema to Mr Cameron’s supporters.

Environmentalists were prompt to denounce the cuts in incentives, which according to analysts’ estimates enabled participating Britons to reduce household energy bills by as much as \$1,000 a year. But in September Mr Cameron’s new energy and climate change minister, Amber Rudd, asserted that, “as costs continue to fall it becomes easier for parts of the renewables industry to survive without subsidies.”

What was immediately clear is that – as of the New Year – the Missouri-based American company SunEdison, which had figured prominently in Britain’s solar energy boomlet, would no longer be offering the free installations that had facilitated much solar conversion in the British Isles. Since 2010 the company and its customers had benefited from an initiative to encourage the generation of low-carbon electricity on a small scale. Through subsidised payments known as feed-in tariffs, homeowners received around 12 pence per kilowatt hour for the electricity generated by their systems.

While SunEdison would, it said, continue to “look after” some 1,000 households which had signed on with the company for 20-year terms, it will be shifting its focus to the USA, Latin America, India and China. Betraying some bitterness, SunEdison said in a statement: “[We are] extremely disappointed that the draconian policy proposals made by the government” will “essentially eliminate the solar” market in Britain.

☎ James Basden, head of utilities at the Oliver Wyman consulting firm in London, was less pessimistic. “I don’t think it’s the end of solar in the UK by any means,” he told Stanley Reed of the *New York Times*. “Removing subsidies is going to mean there is going to have to be a lot more innovation.” (“As British Solar Industry Loses Subsidies, Big US Backer Pulls Back,” 9th October)

☎ For his part, Mr Reed drew this lesson from his consultations with solar industry analysts: “Don’t bet your company on a subsidised market.”

Technology

New fluorescent lighting phosphors conserve on rare-earth elements, in short supply in the United States

Today the phosphors in fluorescent lighting consume more than 1,000 metric tons per year of rare-earth oxides including europium (Eu), terbium (Tb), cerium (Ce), and lanthanum (La), as well as even larger amounts of yttrium (Y) oxide.

This holds significance for the USA, which produces only a very limited amount of rare earths and must rely on imports. While LED lighting will likely replace fluorescent eventually, low-cost linear fluorescent lighting is expected to remain a dominant feature in American infrastructure for more than a decade to come. Therefore, according to Anne M Stark of the Lawrence Livermore National Laboratory, in California, because of its high rare-earth consumption the current triphosphor blend based on a mixture of blue, green and red emitters – in use for over 30 years – required to be replaced. (“Better Fluorescent Lighting Through Physics,” 8th October)

Teamwork among Livermore, the lighting division of General Electric Co, and Oak Ridge National Laboratory has reportedly succeeded in identifying a green phosphor which reduces Tb content by 90 per cent and eliminates La, and a red phosphor which eliminates both Eu and Y and is rare earth-free. The phosphors reportedly hold promise of meeting stringent requirements for long lamp life, high efficiency, precise colour rendition, and low cost. The blue phosphor reportedly has inherently low rare-earth content and need not be replaced. Funded by the US Department of Energy and its Critical Materials Institute research centre, the work is now concentrated on improving the efficiency of the new phosphors to the level of those in commercial lighting. According to Steve Payne, the CMI leader on the project, “The fundamental physics of these phosphors is compelling.”

Of related interest . . .

☎ As described in the journal *Science* (1st October), connecting ultrathin metal wires to nanotubes holds promise for enhancing the speed of computer processors – stalled for a decade – by enabling the semiconductor industry to shrink transistors beyond present limitations. A team of scientists at IBM’s Thomas J Watson Research Center in Yorktown Heights, New York, reported development of a new method of transistor production that permits shrinking the width of the wires without increasing electrical resistance.

Resistance and heat increase as wires become smaller, thus curtailing the speed of the chips containing the transistors and presenting a major challenge to chip makers. The advance announced by the IBM researchers would, they said, permit shrinkage of the contact point between carbon nanotube and metal wire to just 40 atoms in width, probably by early in the next decade. Three years on, they projected further contraction to just 28 atoms.

Steel

Chinese steel exports may have peaked in 2015 but shipments are expected to remain high

According to JPMorgan Chase & Co, Chinese steel exports probably will have peaked last year as the doubling of shipments over the previous two years provoked protectionist sentiment around the world.

In the first eight months, steel cargoes out of China surged 26.5 per cent to 71.9 million tons, customs data shows.

China's shipments of steel ballooned to a record in 2014 as mills – faced with shrinking domestic demand and slowing economic growth – pursued overseas sales, driving down global prices and spurring trade tensions with the USA, India and Africa.

JPMorgan said steel demand in China would shrink four per cent last year and two per cent in 2016.

“Booming steel exports have helped steel production hold up relatively better than steel demand, but we believe exports have reached a peak,” Daniel Kang and other analysts wrote in a 4th October report from the New York-based banking and financial services company.

Net tonnage shipped from China was expected to total 86 million last year, 87 million in 2016, and 83 million in 2017, according to the bank, which put the 2020 projected total at 90 million tons and left that unchanged through to 2035.

As noted by Jasmine Ng of *BloombergBusiness*, mills outside China “are pushing back.” ArcelorMittal South Africa Ltd, a unit of the world's biggest steelmaker, has asked Pretoria to extend tariffs on steel imports. And the European Union steel industry is assembling data for a complaint to the European Commission alleging that Chinese exporters are dumping hot-rolled coil in the EU. (“JPMorgan Says ‘Waves of Protectionism’ Will Cap China Steel,” 4th October)

China may try to rein in steel exports by adjusting taxes to achieve a situation that benefits both the country and its trading partners, Wang Liqun, vice chairman of the China Iron & Steel Association, told Ms Ng and other reporters in Qingdao in September.

Still, shipments will surpass 100 million tons this year as overseas sales remain strong, Mr Wang said.

Chinese mills are making more steel than the economy needs as they are benefiting from supplies of cheap iron ore, Lourenco Goncalves, chief executive officer of Cliffs Natural Resources Inc (Cleveland, Ohio), said in August.

Bright spots in automotive and construction support a somewhat improved outlook for the steel industry of North America in 2016

From the 49th annual World Steel Association conference, held on 12th October in Chicago, Christopher Davis of *Platts* reported on a cautiously optimistic WSA short-term outlook for the steel industry in the North American Free Trade Agreement (NAFTA) region.

While finished steel demand across the region – comprising the USA, Canada and Mexico – was expected to show contraction by 2.7 per cent in 2015, to 140.8 million metric tons (mt), WSA looks for growth of 2.1 per cent, to 143.7 million mt, in 2016.

In the USA, the largest steel producer and consumer of the three NAFTA countries, WSA expected a three per cent dip in demand in 2015, to 103.8 million mt, followed by a return to growth of 1.3 per cent in 2016, for a total of 105.2 million mt. (“NAFTA, US to See Steel Demand Dip in 2015, Growth in 2016,” 13th October)

At a press briefing at the conference the incoming WSA vice chairman, Nucor Corp CEO John Ferriola, said the automotive sector is among the key end-user drivers of the expected modest growth in USA steel demand.

Recent estimates put production at between 17.6 million and 17.9 million cars and trucks this year, up from about 17.2 million units in 2015.

While USA non-residential construction is showing “slow but steady improvement,” with growth of about five to six per cent last year, WSA took note of a “sluggish” US energy sector. Mr Ferriola said, “Almost no steel is going into the energy sector at all.”

At the same press briefing the president of the German Steel Federation, Hans Jürgen Kerkhoff, said that much of last year's likely 1.7 per cent decline in global steel consumption – to around 1.51 billion mt – could be attributed to the slowing Chinese economy.

According to Mr Kerkhoff, who with JPMorgan Chase believes that steel demand in China has peaked (see “Chinese steel exports,” above), “The [Chinese] steel industry is now experiencing low growth, which will last for the time it takes for other developing regions of sufficient size and strength to produce another major growth cycle.”

Immigration

Meant to attract ‘the best talent in the world’ to the USA, the problematic H-1B visa programme hits another speed bump

As reported by Suryatapa Bhattacharya of the *Wall Street Journal's* Delhi bureau, the USA “staged a rapid retreat” from plans to speed up the green-card application process in a way that would have been especially helpful to Indian holders of the H-1B temporary visa.

This programme allows American employers to hire foreign professionals with college degrees and “highly specialised knowledge,” mainly in science and technology, to meet their needs for particular expertise.

A green card certifies the holder as a lawful permanent resident entitled to reside and work in the United States. To an H-1B visa holder, a pending green card application entails certain benefits in the meantime, including job mobility and greater freedom to travel outside the United States.

Additionally, the privileged status extends to the children of such applicants, even if these minors should become adults during the waiting period. The yearly cap on new green cards is 140,000.

The State Department on 9th September ramped up the number of people who would be permitted to apply for green cards in October, prompting a rush by thousands of people from India, China, Mexico and the Philippines who had been waiting years for their turn to apply.

Many potential applicants readied their extensive paperwork – some of it requiring to be translated into English – only to learn on 25th September that the department had reversed itself. A lawsuit challenging the about-face asserts that this thwarted up to 30,000 immigrants.

Apparently an ordinary bureaucratic mix-up, with officials citing a communications failure between the departments of State and Homeland Security, the glitch is emblematic of the problems attendant on President Barack Obama's efforts to streamline the deeply flawed USA immigration system.

Even applicants in favoured categories can be kept waiting decades for a green card. According to an immigration lawyer consulted by Ms Bhattacharya, the new rules announced – and then revoked – in September would have enabled Indians holding H-1B visas to apply for their green cards up to six months earlier than under the present system. (“How Are H-1B Holders Affected by the US Green Card Application Flip Flop?,” 6th October)

☛ Frustration and anger at the government's reversal were not confined to those prevented from submitting their green-card paperwork. Writing in the Washington-based political newspaper *The Hill* (10th October), Mario Trujillo quoted from a 5th October letter from several large technology companies to the State Department, the Homeland Security Department, and the White House:

“This is a truly unfortunate example of poorly-conceived execution by your respective departments, one that furthers, rather than mitigates, an ever-growing impairment to our country's ability to attract and retain the best talent in the world.”

The letter was signed by officials of Microsoft, Google, Intel, Hewlett-Packard, Oracle and Cisco, as well as a number of trade groups.

Telecom

In the latest fallout from the Snowden leaks, Europe's highest court strikes down a data-transfer accord between the EU and the USA

“What we need now is to work closely with the Americans to find a solution to get a safe, safe harbour, which is in the interest of both Europeans and Americans.”

No doubt Andrus Ansip, the vice president in charge of digital affairs for the European Commission, was making a particular point when he used the word “safe” twice. Only days before, on 6th October, the Court of Justice of the European Union had declared invalid a long-standing

data-transfer agreement between the European Union and the United States on suspicions that transmissions from Europe are insufficiently protected in the USA. The title of the agreement: Safe Harbor.

The court in its ruling declared that an EU-level agreement with a third country may be overridden if national data-protection authorities find cause for concern about the privacy of data originating in Europe.

Given the 2013 revelations by Edward Snowden, an American sub-contractor with the National Security Agency, about surveillance of electronic correspondence on the part of the NSA, it was clear which secret sharer the EU's highest court had in mind.

As noted by Natalia Drozdiak, a Brussels-based blogger for the *Wall Street Journal*, the ruling will likely hit European small businesses especially hard, imposing costs for switching over to “more bureaucratic methods of transferring data.”

Ms Drozdiak also pointed out that it creates uncharted legal terrain: the regulator in one country may now block a company's data transfers to the USA while the regulator in another might allow them.

“I'm afraid small and medium-sized companies will face difficulties,” acknowledged Mr Ansip, who said he would be meeting with businesses to discuss practical concerns.

But his priority was clearly to keep the EU and the USA beavering away at a new transatlantic deal that would keep the data flowing between two of the world's largest trading partners.

“We have to create a fruitful environment that will encourage free data flows from Europe with the US,” he declared. “The free flow of data is a main aim of the digital single market.” (“After Court Ruling, EU Digital Chief Urges Rapid Data Accord,” 9th October)

☛ Since the Snowden leaks of classified information, the EU and USA had been working to reform Safe Harbor and address European concerns, with limited success.

When the high court announced its invalidation of the original framework, EU Justice Commissioner Vera Jourova – whose department is negotiating with the USA on a new agreement – said that more time was needed to overcome disagreements.

☛ For his part, Mr Ansip on 9th October expressed optimism that the two sides were inching closer, telling Ms Drozdiak: “Before the European Court of Justice decision we were making good progress towards an agreement with the Americans.”

Then the man charged with coordinating plans to unify the EU bloc's fragmented digital market reverted to an earlier theme, giving it even greater emphasis: “So there should be a way to ensure that this new safer Safe Harbor is really safe.”

Dorothy Fabian
Features Editor

能源

公用电力是先进机器人技术，尤其是无人机的早期采用者

据专门从事全球技术趋势追踪的Navigant研究公司（科罗拉多州博尔德）的最新报道称，他们预期到2024年，公用市场上无人机和机器人技术收入有望从2015年的1.32亿美元增长到40亿美元。据FierceEnergy的威廉·彭特兰向Navigant所述，这个“价值主张”非常简单：无人机和机器人在提升线路检测和维修工作效率的同时，能够提升电网的可靠性并降低成本。在2013年《时代周刊》杂志公布的美国最危险工作的评论中，电力线路安装和维修排第七位。

无人机和机器人也可以缩短电网故障后的复位时间。彭特兰观察到，机器人和无人机凭借这些优势已经在实用市场，特别是输电供电市场占据一席之地不足为奇。（《机器人应用于电力行业的时机已经成熟》，Study报道，10月1日）电力科学研究院，位于马萨诸塞州雷诺克斯的一家电力公司，开发了一种检测机器人“Ti”，这种机器人配备高清红外摄像机和测距传感器，沿着输电线爬行，探查高草和低矮树枝，提供与专项基础设施相关的信息。单台Ti机器人能够执行大约80英里输电线路的状态监测和资产管理。

彭特兰先生援引的另外一项电力科学研究院创新项目与暴风雨后输电线路损失评估有关，暴风雨后输电线路损失评估常常是倒地树木或冰冻环境下电力恢复的瓶颈。近期，研究院在新墨西哥州立大学飞行试验中心从事了一项试验，采用装载高分辨率摄像机的无人机从5,000到7,000英尺的高空传送输电线路的实时流媒体视频。电力科学研究院（加利福尼亚州帕洛阿尔托）确认，猛烈的暴风雨过后，无人机要比地面人员更迅速地评估出暴风雨对大范围电网造成的毁损。

其他处在研发进程中的以机器人为核心的应用包括：检修孔检查、远程控制维修以及室外照明级测量等。总的来说，这个领域的活动的确表明机器人学与电力公用事业的结合卓有成效。Navigant研究公司的高级研究分析师詹姆斯·麦克雷对FierceEnergy如是说：“无人机和机器人在输电检测和维护领域的应用将为技术和外包服务提供商带来日益丰厚的利润。”

气候变化几乎影响到了美国所有地区的发电和电网绝缘线束

美国能源部发布了一份能源部长欧内斯特·莫尼兹的报告，其中审视了气候变化对国内能源部门造成的威胁。智能电网新闻的芭芭拉·L·弗吉提斯明确传达了这份报告中的信息：极端天气司空见惯，原来设计的用于常见历史条件范围内运行的能源基础设施可能承受不了预期变化。能源部将美国分为九大区域，分别预测不同区域受严重干旱和森林大火到暴雨、更强飓风、风暴潮以及罕见热浪的影响。由于用电量随着温度升高而增加，考虑到对业绩征税和能源系统完整性，尤其是能源系统中基础设施老化的可能，电力需求几乎是每个区域的关注重点。

十月，莫尼兹先生在访问加利福尼亚州时说道：“为了应对气候变化和极端天气的影响，我们需要创新出能够提高能源部门适应能力、灵活性和效率的解决方案，同时打造一套更清洁、更环境友好的能源系统。”该报告的西南部章节详细阐述了包括洛杉矶以北的输电线路在内的地区能源系统在面临气候变化引起的山火增加时是何等的脆弱。但是城市已经开始部署预防措施，比如当地消防局很快会安装一块备用太阳能和电池储能系统，伦丁先生举例说。（《改进技术：能源部门面对气候变化的脆弱性》，10月9日）

尽管各个州都担心燃料输送问题，但融雪减少导致水源减少将特别地制约南部大平原和阿拉斯加州的上游油气运行。水源有限同样会危及大部分地区的水力发电，但对中西部、大平原和南部的影响更甚。虽然（气候变化）的影响因地区而异，能源部报告的总体论调很明确：气候变化已经造成重大影响，而更糟的情况还没有到来——可能更早，而不是更晚到来。

美国太阳能设备安装公司——迪盛新能源科技公司（SunEdison）认为英国削减太阳能补贴是一项“残酷的”决定

现在分析首相大卫·卡梅伦政府削减高达87%的太阳能补贴这一决定（定于本月（1月）执行）对英国太阳能产业的效应还为时尚早。本次削减的理论依据是，在英国，太阳能已不再需要此项支持。这次削减将不会影响到现有的太阳能装置，但新系统将丧失享受补贴的资格。目前百万英国家庭中有将近四分之三装有太阳能电池板，而五年前还几乎一台都没有。尽管2014年英国的新增太阳能装置数量领先欧盟各国，但该国的气候不适合太阳能发展，太阳能仍然只占英国发电量的百分之四。这样的表现毫无疑问很大程度上是缘于补贴项目——政府为此每年耗费19亿美元——这很受私房屋主欢迎，但却被卡梅伦的支持者们所厌恶。研究环境问题的专家谴责削减计划，原因是据分析师估计，英国参与者每年每户平均可节省能源支出1,000美元。但是卡梅伦先生9月新任的能源与气候变化大臣安布尔·鲁德声称：“随着成本下降，即使没有补贴，部分再生性能源产业也更容易生存。”

现在能明确的是——到新年为止——总部位于密苏里州的美国迪盛新能源科技公司，此前在英国太阳能短暂繁荣时期表现出色，不再提供免费太阳能设备，而先前这项免费政策有力地促进了不列颠群岛的太阳能转换。自2010年起，该公司及其客户便从鼓励小范围低碳发电的动机中获益。私房屋主利用他们的系统每发1千瓦时的电，即通过“上网电价补贴政策”获得约12便士的补贴。虽然美国迪盛新能源科技公司称其将持续“照顾”约1000户与公司签订了20年期合同的私房屋主，但他们将会把业务重心转移至美国、拉丁美洲、印度和中国。迪盛新能源科技公司在—篇声明中略带苦涩地说：“（我们）对政府提出的严苛政策建议表示非常失望，”这一政策“实质上将消灭英国的太阳能市场。”

伦敦奥纬咨询公司公共事业部负责人詹姆斯·巴斯登倒没这么悲观。“我认为无论如何这不会是英国太阳能产业的终结，”他对《纽约时报》的斯坦利·里德如是说。“取消补贴意味着未来将会产生更多的创新。”（《重要美国支持者随着英国太阳能产业失去补贴撤退》，10月9日）

另一方面，里德先生从与太阳能产业分析师的咨询中得出的教训是：“不要把公司押在靠补贴生存的市场上。”

技术

新型荧光灯荧光粉保护美国供应短缺的稀土元素

如今荧光灯中的荧光粉每年消耗超过1000公吨的稀土氧化物，其中包括铕（Eu）、铽（Tb）、铈（Ce）、镧（La）以及更大量的氧化钇（Y）。由于美国只能生产非常少量的稀土矿，必须依赖进口，因此这对美国有重大意义。虽然发光二极管（LED）照明最终可能会替代荧光灯，但预计在未来十年内，低成本线性荧光灯仍将在美国占主导地位。

因而，根据加利福尼亚州劳伦斯·利弗莫尔国家实验室的安妮·M·斯塔克的说法，由于现在已使用了超过30年的基于蓝、绿和红色发射体的三基色混合物大量消耗稀土资源，需要采用别的

元素替代。(《运用物理学改进荧光灯》，10月8日) 据称，利弗莫尔实验室与通用电气公司和橡树岭国家实验室通过合作，成功地发现一种绿色磷光体，可降低90%的铍含量且不使用镉；以及一种红色磷光体，不使用铟和钇且几乎不含稀土元素。这些磷光体据说有望满足长时间灯泡寿命、高效能、精准显色性以及低成本等严苛要求。报道称，蓝色磷光体本身含有少量稀土元素，无需替代。这项工作由美国能源部及其关键材料研究所研究中心资助，目前正集中于改进新磷光体的效能，使其能够达到商用照明的水平。据关键材料研究所项目负责人史蒂夫·佩恩说：“这些磷光体的基本物理结构令人着迷。”

与此相关的.....

正如《科学》杂志(10月1日)所描述的，将超薄金属丝连接到纳米管上有望提升计算机处理器的速率——十年来停滞不前——使半导体行业将晶体管缩小到超出目前限制的范围。位于纽约约克镇高地的IBM托马斯·J·沃森研究中心报道称，他们发现了一种晶体管生产新方法，可以在不增加电阻的情况下压缩电线宽度。电阻和热能随着电线变小而增大，因而降低了晶体管芯片的速度，并且对芯片制造商提出了重大挑战。IBM研究人员宣布的这项进展据称允许缩小碳纳米管与金属线材接触点至宽度仅有40个原子，可能最早下个十年内就能做到。其后三年，他们预计接触点会进一步收缩至28个原子。

钢铁业

中国钢材出口可能在2015年达到顶峰，但出货量预期仍将保持高位

据摩根大通预测，由于前两年中国钢材出货量翻番激起世界贸易保护主义情绪，中国钢材出口量去年可能已经达到峰值。海关数据显示，前8个月，中国钢材出口量激增26.5%，达到7190万吨。2014年，由于钢厂面临国内需求萎缩和经济增长放缓，钢厂只好寻求在海外销售，使中国钢材发货量飙升到顶峰，拉低了全球价格，激发了与美国、印度和非洲的贸易紧张。摩根大通估计，去年中国钢材需求萎缩了4%，2016年将萎缩2%。

“钢材出口暴涨有助于使钢材生产维持在相对高于钢材需求水平，但我们相信出口已经达到最大值了，”来自这家总部位于纽约的银行和金融服务公司的丹尼尔·康和其他分析师在10月4日如是报道。该银行报告称，去年中国的净载重量为8600万吨，预计到2016年将达到8700万吨，2017年达到8300万吨，2020年预计为9000万吨，并一直保持到2035年不变。正如《美国商业周刊》贾斯明·吴注意到的，中国以外的钢厂“正在反击”。世界最大的钢铁制造商的成员单位——安赛乐米塔尔南非有限公司已经要求比勒陀利亚政府扩大对钢铁进口的征税范围。欧洲钢铁行业正在收集资料，用于向欧盟委员会提出中国出口商向欧盟倾销热轧带卷的申诉。(《摩根大通称“保护主义浪潮”席卷中国钢铁行业》，10月4日) 中国可能试图通过调节税收达到同时使本国及其贸易伙伴国获益的状态，9月份，中国钢铁工业协会副会长王利群在青岛对吴女士和其他记者如是说。王先生说，今年海外销售仍很强劲，发货量将超过1亿吨。8月份，克利夫斯自然资源公司(位于俄亥俄州克利夫兰)首席执行官洛伦索·贡萨尔维斯说，中国钢厂得益于廉价铁矿石供应，制造的钢材已超出了经济需求。

汽车和建筑业亮点为2016年北美钢铁行业前景改善提供了一定支撑

在10月12日芝加哥召开的世界钢铁协会第49届年会上，普氏能源资讯的克里斯托弗·戴维斯称，世界钢铁协会对北美自由贸

易区的钢铁行业短期前景持谨慎乐观态度。虽然世界钢铁协会预计2015年，该地区——包括美国、加拿大和墨西哥——成品钢需求将萎缩2.7%，达到1.408亿公吨(mt)，他们仍寄希望于2016年这一增长率能够达到2.1%，即1.437亿公吨。美国是北美自由贸易区三个成员国中最大的钢铁生产和消费国。世界钢铁协会预计，2015年，美国需求将下降3%，达到1.038亿公吨，随后在2016年复苏，增长1.3%，达到1.052亿公吨。(《北美自由贸易区，美国2015年钢铁需求下降、2016年上升》，10月13日) 在会议新闻发布会上，即将就任的世界钢铁协会副会长——纽柯钢铁公司首席执行官约翰·法罗力说，汽车行业是美国钢铁需求预期适度增长的关键性终端驱动力。近期有人预测，今年汽车和卡车产量在1760万至1790万辆之间，高于2015年预测的1720万。“尽管美国非住宅建筑表现出“缓慢但稳定的增长态势”，年均增长5—6%，然而世界钢铁协会还是注意到美国能源行业“发展缓慢”。法罗力先生说：“能源行业几乎用不着钢铁”。

在同期新闻发布会上，德国钢铁联盟的汉斯·于尔根·凯阔福说，去年全球钢材消费下滑了近1.7%——将近15.1亿公吨——应归因于中国经济增长放缓。凯阔福先生与摩根大通一样，相信中国钢铁需求已经达到顶峰(参见以上《中国钢铁出口》)，[中国]钢铁行业目前正在经历低速增长期，且这个时期将一直持续到其他发展中地区的规模和能力足以支撑另一个重要生长周期以后。

移民

旨在吸引“全世界最棒的人才”到美国的悬而未决的H-1B签证计划撞上另一条减速带

《华尔街日报》德里分社的苏腊巴亚·巴特查亚报道说，美国“上演了一场飞速退出”加快绿卡申请进程的计划，这项计划对持有H-1B临时签证的印度持证人尤为有利。此计划允许美国雇主雇佣拥有大学学历和“高度专业化知识”(特别是科技方面)的外国专业人士，以满足雇主对特定专业技能的需求。绿卡证明持有人为合法永久居民，有权在美国居住和工作。对于H-1B签证持证人而言，待解决的绿卡申请也可同时带来一些好处，包括职业流动性以及前往美国以外地区更大的自由。此外，这种特权身份可延伸到申请人的子女，即使这些未成年人在等待期内成年也适用。每年美国发行这种新型绿卡140,000份。

国务院于9月9日提高了10月份允许申请绿卡的人数，激起上千来自印度、中国、墨西哥和菲律宾的历经多年等待尚未轮到申请的申请人一阵紧张。许多潜在申请人准备好了大量文件——其中一些要求翻译成英文——结果到9月25日却获悉国务院已推翻了自己的决定。一场针对本次计划变化的诉讼案件称，这使得30,000名移民受挫。显然这是一次普通的官场混乱，政府称这是国务院与国土安全部沟通失灵引起的，但这一小事件标志着总统巴拉克·奥巴马努力改进有着深层缺陷的美国移民体系还伴随着一些问题。绿卡申请人即使处于支持名录里，也要等待几十年之久。据巴特查亚先生询问的一位移民律师说，九月份先公布后被撤销的新规定允许印度H-1B签证持证人在早于目前体系规定期限6个月前申请绿卡。(《美国绿卡申请反复变化对H-1B持证人的影响》，10月6日)

不止那些不得提交绿卡申请文件的申请人对政府出尔反尔的行为感到沮丧和愤怒。马里奥·特鲁希略在总部位于华盛顿的政治报纸《国会话题》(10月10日)中，援引10月5日一些大型技术公司写给国务院、国土安全局和白宫的信说：“这真的是你们各自为政导致执行不力的不幸案例，一个促进、而非减轻对我们国家吸引和保留全世界最好人才的能力造成日益损害的案例。”

这封信经由微软、谷歌、英特尔、惠普、甲骨文和思科以及许多贸易集团联合署名。

专栏编辑: Dorothy Fabian



Photo credit: Messe Düsseldorf

wire 2016 preview

Mention Düsseldorf and thoughts of German food and hospitality spring immediately to mind. For everyone involved in the wire and cable industry it also means the largest exhibition in the calendar at the city's Fairgrounds.

And it is from 4th April this year that wire 2016 will throw open its doors for a week-long festival of technology and innovation – all viewed by thousands of eager and enthralled visitors.

Exhibitors have taken up more than 58,000m² of floor space, dedicated to wire manufacturing and finishing machinery; process technology tools; auxiliary process technology materials; materials, special wires and cables; measuring and control technology; and test engineering.

wire 2016 runs alongside Tube 2016 and between them occupy 17 halls at the site on the outskirts of the city.

Show dates:
Monday 4th April - Friday 8th April 2016
Show opening hours:
9am-6pm Monday to Thursday
9am-4.30pm Friday

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A list of exhibiting companies starts on the next page. Listings are correct at the time of going to press, December 2015. Stand descriptions are being taken now for the March issue and should be sent to david@intras.co.uk

Stand descriptions can also be found in the March issue of our sister publication, *EuroWire*.



Alphabetical list of Exhibitors

Listing correct at time of going to press, December 2015

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3View.Com Inc	15 G48	Anu Extrusions Pvt Ltd
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Aachener Maschinenbau GmbH	15 C36	ArcelorMittal Commercial Bars and Rods SA
AB Elektrokoppar / Liljedahl Bare Wire	12 A43	ArcelorMittal WireSolutions SA
Acciai Speciali Zorsetto Srl	12 D59	Area Sistemi Srl
Acciaierie Bertoli Safau SpA	17 C04	Arma-Plus SAS
Acciaierie Valbruna SpA	12 C60	Artofil BV
Acciaierie Venete SpA	12 C40	ASA-RT Srl
Acenta Steel Ltd	12 E43	Asahi Intecc Co Ltd
ACIMAF Italian Wire Machinery Manufacturers Association	11 A52	Asahi Sunac Corporation
ACM A/B	09 F40	Ascometal GmbH
ADC SARL	09 C02	Ascotex Limited
Adelys EURL	16 H04	AseA Wire & Cable Machinerie Spare Parts Pvt Ltd
Advaris Informationssysteme GmbH	09 B54	ASEL – Spring Machine Production
Aeroel Srl	09 B53	Asil Celik San ve Tic AS
Aesa SA Aesa Cortailod	10 A38	Aslanli Tel Sanayi
Aferpi Acciaierie e Ferriere di Piombino SpA	11 J33	ASPE SAS
AFH-Antriebstechnik GmbH	12 A50	Assembling Srl
AGC Chemicals Europe Ltd	17 B11	Associated Engineers & Industrials Ltd
Agibi Progetti Srl	16 G21	Assomac Machines Ltd
Agir Technologies SAS (Mouto – Rivom)	10 G56	Astecq Srl
Agro Steel Wire GmbH	10 C31	AstroPlast Kunststofftechnik GmbH & Co KG
AGST Draht- & Biegetechnik GmbH	10 A32	AT Wire GmbH & Co KG
Aichelin Holding GmbH	15 F56	ATE Applicazioni Termo Elettroniche Srl
AIM Inc	11 A21	ATR Srl
Ajex & Turner Wire Dies Co	11 C03	August Herzog Maschinenfabrik GmbH & Co KG
Akcelik Demir Celik Sanayi ve Ticaret AS	17 B09	August Hildebrandt GmbH
Akdeniz Civi Tel Nakliyat San ve Tic Ltd Sti	15 J36	Aumann GmbH
Aksh Optifibre Limited	09 E55	Aurubis AG
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Alfred Wertli AG	11 J60	AW Machinery LLC
Alloy Wire International Ltd	11 E26	AWM SpA Reinforcing Business
Almetha GmbH	11 J68	Aymak Makine Mühendislik Hiz San ve Tic Ltd Sti
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Alok Ingots (Mumbai) Pvt Ltd	17 E10	Aztech Lubricants LLC
Alpha Converting Equipment Ltd	12 D23	B + B Eisen- und Stahlhandel GmbH
Alroc SAS	12 A51	B S Shakti Steel Pvt Ltd
Altec Srl	11 B25	B2K Co Ltd
Altman Technologies Inc	09 D16-5	Baicheng Fujia Technology Co Ltd
Altrimex Packaging Equipment BV	15 F14	Balloffet SAS
Ambica Stainless Steel Limited	17 E37	Bansal Alloys & Metals Pvt Ltd
Ambica Steels Limited	17 E27	Bansal Wire Industries Ltd
Ambrell BV (Ambrell Group)	11 H31	BAR Products & Services Ltd
Amic SARL	10 H22	Baremo GmbH Revisionen Montagen
AMPAC International Inc	11 A02	BASF Polyurethanes GmbH
Ampere Deutschland GmbH	11 J49	Bass GmbH & Co KG Technik für Gewinde
Anand Arc Ltd	11 D49	Bavaria Schweisstechnik GmbH
Anbao Qinhuangdao International Corp	16 E48	BB Spring Technology Srl
Anglia Metal Limited	12 A37	Bedeia Berkenhoff & Drebes GmbH
Ann-Chain Enterprise Co Ltd	16 G68	Beekay Steel Industries Ltd
Anordica AB	12 E25	Begra Granulate GmbH & Co KG
		Beijing Orient PengSheng Tech Co Ltd
		Beijing Tongdaxinming International Trading Co Ltd



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Besel Basim San Tic ve Tic AS	12 D13	Ching Chan Optical Technology Co Ltd	15 C59
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Boffi SpA	10 H67	Clifford Welding Systems (Pty) Ltd	16 B40
Bogdany Petrol Kft	12 E29	Clinton Instrument Company	09 E40
Bogimac nv-sa	09 E01	CM Manzoni SpA	17 C32
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Boockmann Engineering GmbH	09 C34	Coats PLC	16 G39
Borealis AG	10 D72	Cogebi as	10 H38
Borkener Kistenfabrik GmbH	09 A59	Cogeim Europe Srl	11 D57
Boryszew SA Oddzial Nowoczesne Produkty Aluminiowe Skawina	10 D30	Cogne Acciai Speciali SpA	11 H22
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Bozaliloglu Inaat Taah Muh ve Orman Urunleri San Tic Ltd Şti	17 D65	Colorant Chromatics BV	09 B50
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Brouwer Metaal BV	16 A25	Compomec Oy Cable Machinery	11 C52
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Wire Lab Company	10	H42
Wire & Cable ASIA magazine	11	D26
Wire & Plastic Machinery Corp	09	E20
Wire World Internet Inc	EN	10
WireCo World Group	17	C66
WiredInUSA magazine	11	D26
Wirex Dies & Steel India Private Limited	10	D39
WiTECH Wire Technologies SL	09	E33
WiTechs GmbH	10	H39
Witels-Albert GmbH	09	E39
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Wolf-Signiertechnik Stempel-Wolf GmbH	09	F55
Woodburn Diamond Die Inc	09	C14
Worles SL	15	D39
Woywod Kunststoffmaschinen GmbH & Co Vertriebs-KG	09	A42
Wrentham Tool Group	15	J37
WSD GmbH Werkzeuge-Schrauben-Drehteile	15	A26
WTN Werkzeugtechnik Niederstetten GmbH & Co KG	15	B42
Wuxi Aotian Steel Wire Products Co Ltd	17	E66
Wuxi Quantong Cable Material Co Ltd	09	F77
Wuxi Sima Meida Electro-Technical Co Ltd	11	B18
Wuxi Xingcheng Special Materials Co Ltd	16	H73
X-Compound GmbH	10	F60
Ya Sih Technology Co Ltd	11	C06-6
Yeswin Machinery Co Ltd	15	A37
YHM Springtech Machinery Co	16	G22
Yield Management Corporation	09	D16-6
Yih Shen Machinery Co Ltd	11	C06-1
Young Heung Iron & Steel Co Ltd	17	B52
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Zami 1950 Srl	09	C03
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Zeller+Gmelin GmbH & Co KG	09	F60
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Zeus Techno Inc	15	F06
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Zhejiang Senwang Metal Product Co Ltd	17	E64
Zhejiang Tenglong Stainless Steel Products Co Ltd	16	F66
Zink Körner GmbH	12	A61
Zollern GmbH & Co KG	12	C71
ZT Srl	11	F14
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Zwez-Chemie GmbH	15	C56
Zwick GmbH & Co KG	16	H55

Fire Risk and Safety Philosophy in Indoor Cabling

By Jörg Bör

Abstract

The fire performance of cables is a very important issue, especially in indoor cabling. On the one hand cables must not ignite by their own in case of any perturbation. But in most cases cables connect different rooms or devices with each other. Thus on the other hand fire propagation is no less important than self-ignition. Thirdly, fire ratings are defined for safety relevant applications. IEC 60331 specifies a period of time during which the intended performance has to be maintained while a permanent flame is burning the cable.

Although this knowledge is common, experts often wonder why fire performance requirements seem to be weak in some regions. But the understanding of the specific fire safety philosophy leads to understanding the different approaches to achieve fire safety in different countries.

Every risk is defined as the product of two factors: one is the probability of an accident and the other is the extent of damage. The risk is quantified by multiplication of these factors. This is the same for the risk of fire.

In some countries fire safety philosophy focuses exclusively on the avoidance of any fire. So the target is to reduce the probability of fire close to zero. In other regions both factors of risk are considered. Thus the burning characteristics are much more important. If a fire appears, negative effects on the health of persons or technical goods shall be as low as possible. This includes the aspects of corrosive fumes, which may transform to acids by reaction with any water, as well as the reduction of smoke density, which might cause bad sight in case of fire and confuse any people looking for emergency exits.

For this reason, the criteria “halogen free” and “low smoke” are much more important in Europe than, for example, in America. Halogens there are used especially for fire avoidance, because these elements have self-extinguishing effects. The highly reactive elements of the 7th principal group collect oxygen and help to stop a fire. But compounds of halogens with oxygen are acid radicals, which react with the omnipresent water and turn into an acid. These corrosive smokes are a danger for personal health and might damage technical goods as well.

This paper discusses the different approaches of fire safety, threats and advantages.

1 Introduction

American experts often ask why European countries have weak fire protection regulations. On the other hand European people wonder why Americans are not aware of the tremendous danger of acid smoke caused by halogen fumes. This difference is often discussed between experts in standardisation committees as well as with customers in cable sales presentations.

Looking at European fire safety regulations, for example the “Constructive Products Regulation” (CPR)^[6], may be confusing. Why don't European governments protect their inhabitants better against the risk of fire? Looking at American fire safety regulations does not confuse less: Why don't American governments protect their people against the risk of acid fumes?

In a democratic world, laws and regulations are not given to the people, but are made by the people. Laws and regulations are a result of the general public opinion and mentality. In a business market it should not only ask for standards and regulations but for the ideas behind them.

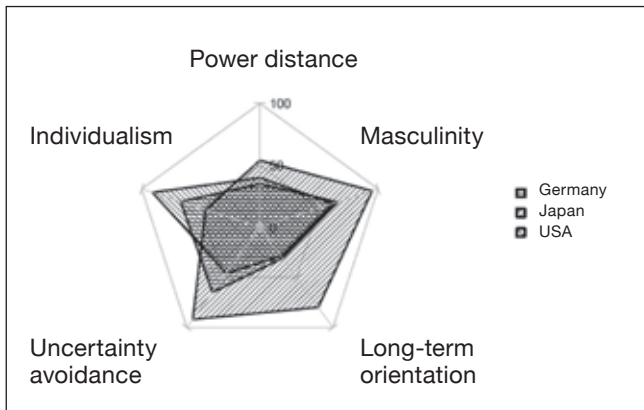
Neither customs nor any other trade barriers prevent the sales of American products in Europe and vice versa, but the missing acceptance of those products by the final consumer.

2 Intercultural Differences

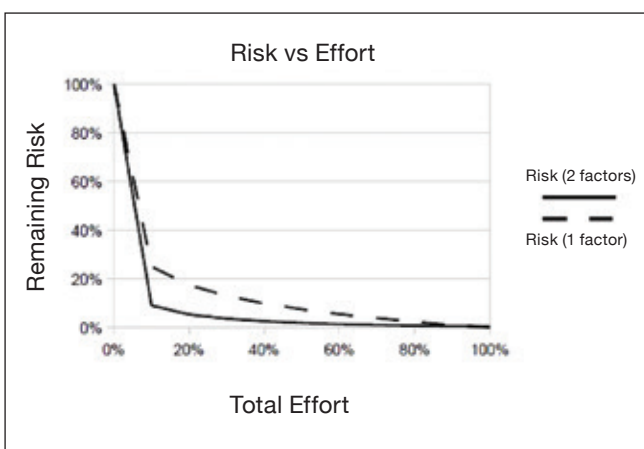
The first step of knowledge of intercultural understanding is the experience that there are differences. The second step is to recognise that these differences cannot be evaluated to be better or worse, but just different.

The reasons for intercultural differences cannot be investigated in this paper. Intercultural differences are often established by historic experience or by the influence of the geographic situation. Deeper explanations are given in the appropriate literature.

One might think this might be an issue for typical consumer markets (B2C) but not in markets of industrial goods (B2B). But be aware, the managers in the B2B market are often women or men born in that specific region and living there, and they have to take into account the requirements of their selling markets which are usually in the same region. Hofstede^[1] names this “cultural relativity”.



○ **Figure 1:** Cultural relativity for three selected nationalities according to Hofstede^[1]



○ **Figure 2:** Remaining risk versus total effort for reduction efforts on one factor or both factors

Several publications by social scientists as well as by economic scientists show the huge regional difference regarding different parameters. Hofstede^[1] defines the five parameters power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation. The detailed meaning of these parameters is explained in his paper^[1], but the regional difference can be demonstrated in general without detailed understanding of these parameters (Figure 1).

All these parameters are scaled from zero to 100. A value close to zero means the opposite position is extremely strong. So, for example, an individualism factor of three means collectivism is in high gear. Keeping in mind that there are huge regional differences regarding cultural relativity, it is easy to understand that in every region of the world, safety feelings and safety needs are different, too.

This is also valid in respect to fire safety. For this reason the threat of fire is estimated differently. This results in different national or regional approaches for fire protection. To look deeper into these approaches it is important to understand the threats of fire and the theory of risk.

3 Risk of Fire

3.1 Threats of Fire Events

In occurrence of fire there are different aspects that people are to be protected against. In almost all cultures the most important aspect should be the protection of life and the avoidance of personal injuries.

Protection of goods against combustion or secondary damages such as corrosion are important. This depends on the value of these goods, which might be estimated differently in different cultures. Further economic loss can be caused by less physical effects of a fire such as loss of information or downtime of any infrastructure.

3.1.1 Personal Health

The threats for personal injury by a fire are much more than suffering burns. Huge danger in case of fire is generated by smoke. In dense smoke people may lose orientation and not find the emergency exit. In the same way smoke may restrict the work of rescue teams. Further acid fumes cause asphyxiation which is the most often lethal consequence of a fire.

3.1.2 Damage of Goods

In case of fire, damage of goods might happen by combustion but also by corrosion effects due to the presence of acid smoke. Smaller damages by acid smoke often remain undetected when a halogenated material burns and a layer of acid radicals covers some electronics.

When weeks or months later humidity increases due to weather changes or else, this film reacts to an acid and causes failures by corrosion which are not detected as a long-term consequence of that fire some time ago.

3.1.3 Economic Loss

The financial damage caused by a fire might be much higher than the real value of any devices burnt down. In the industrial field we know a production downtime caused by machinery damage may exceed the cost of the machinery itself many times over. Especially in banking and finance the loss of information is another important economic threat of a fire event. Thus additional aspects are to be included when considering fire protection. Repairability, data safety and backup strategies are just a few of them.

3.2 Risk Assessment

Quantitative risk assessment requires calculations of two components of risk: the magnitude of the potential loss, and the probability that the loss will occur. So risk (R) is determined as a product of two factors: The probability of any failure (p) is multiplied by the magnitude of the potential loss (L) caused by that failure, further shortly called impact of failure.

$$R = p \cdot L \quad \text{Equation (1)}$$

This is common knowledge according to Wikipedia^[5] and is used in standard engineering methods as the well known failure method and effect analysis (FMEA)^[3] as well as in insurance risk assessment procedures. Insurance companies use the risk calculation according to Equation (1) in risk assessment which is basic to determine insurance premiums. Here both factors – probability and impact of failure – are taken into account, too.

Equation (1) indicates that it is worth taking both factors into account. In many realistic cases both factors of risk depend on each other. To name an example taken from this fire protection topic, the use of halogenated materials reduces the probability of failure but increases the possible impact on personal health by asphyxiation or something else.

Experience from FMEA practice reveals the advantage to keep both factors on a similar low level. If both factors may vary in a range from 1 to 10, the risk varies from 1 to 100.

If the probability is reduced down to 4 and the impact down to 5, a risk level of 20 as a product of the factors 4*5 is achieved. If the impact remains on its high level of 10, the probability must be reduced down to 2 to achieve the same risk level. Keeping in mind the Pareto principle, it will be clear that the effort to achieve this extremely low level of one factor will exceed the effort to keep both factors on a medium level.

The advantage to distribute the efforts of risk reduction to both factors (avoidance and impact reduction) is shown in *Figure 2*. The dashed line shows the risk depending on reduction efforts if all efforts are invested into threat avoidance. The continuous line shows the risk if the reduction efforts are distributed to both avoidance and impact reduction in the same quantity.

Some simplifying assumptions are done in this approach to show the basic principle easily. It can be clearly seen that just in the medium part of the range, the distribution of efforts to both factors brings clear advantages.

This paper does not dive into statistics to investigate the probability of failure nor into economic sciences to quantify financial impacts of any damages. The focus here is the fire protection strategy concerning in-house cabling.

3.3 Cable Fire Performance

Cables are important elements in fire protection concepts of buildings. There are different kinds of ingredients which increase the fire performance of cable compounds. Halogenated polymers are self-extinguishing by chemical reactions, but in case of fire they generate toxic gases. Halogens are elements of the 7th principal group: Cl, F, Br, J.

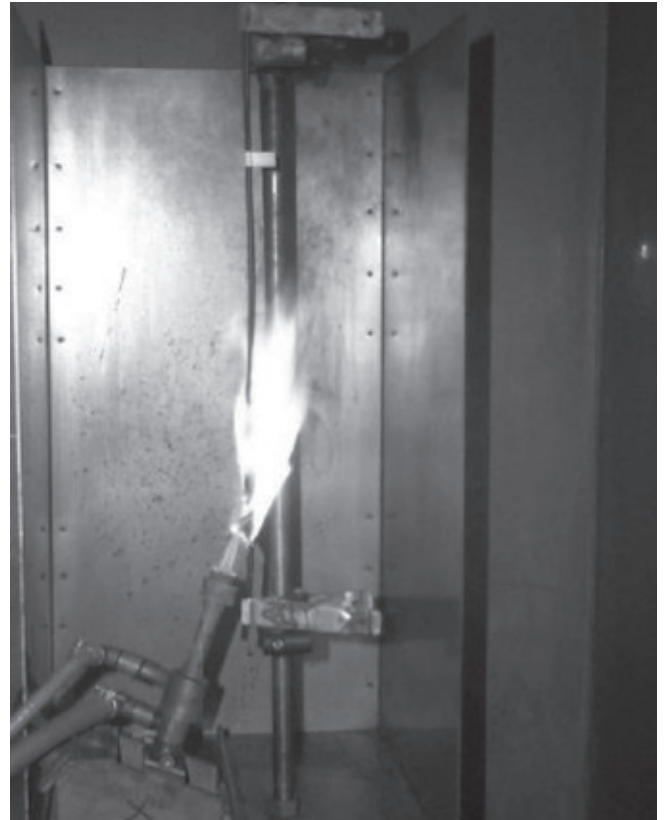
In the oxidation process they react to acid radicals, which generate acids by reaction with hydrogen. When halogens are burning at low temperatures, dioxins are generated. The consequences of personal injury or damage of goods are described above.

Halogen-free flame retardants, for example Mg(OH)₂ or Al(OH)₃, prevent fire propagation by catching oxygen. The chemical reaction generates water which gives an additional extinguishing and cooling effect. These mineralic flame retardants generate very little smoke when burning, and the fumes are non-toxic and contain no acids.

But this class of material is not the perfect solution, either. To achieve a very good fire performance one must use these ingredients in higher concentration. This reduces the mechanical performance of that cable, causes embrittlements or reduces the operating temperature range.

○ **Table 1:** Fire performance parameters and their correlation to fire risk elements

Parameter	Avoidance	Impact reduction
Self-ignition	X	-
Flame propagation	X	X
Fire resistance	(X)	X
Smoke exhaustion	-	X
Halogen free	-	X



○ **Figure 3:** Test set-up flame propagation

Several cable fire-testing procedures are defined by national and international standardisation bodies. Each of them alone represents just one of the different threats of fire. An overview is given in *Table 1*.

3.3.1 Self Ignition

Cables should be designed in a proper way so that neither voltage peaks nor high ampacity should lead to self-ignition. Voltage and ampacity testing determines the ability of a cable regarding self-ignition. The parameter self-ignition is connected to the probability of fire.

3.3.2 Flame Propagation

Cables are connecting devices. So cables carry the threat that a fire may propagate along the cable from one building part into another. This is the effect of a fuse cord.

To determine the flame propagation (or fuse cord) properties of cables, IEC 60332 defines test methods on several levels (eg IEC 60332-1-2, *Figure 3*). The common idea of all these tests is the same: a burning cable in a defined position shall extinguish before the flame has propagated a specified distance.

The sample position may be horizontal or vertical, and the sample may be a single cable or a cable bundle. Flame propagation parameters are related to both fire avoidance and impact reduction.

3.3.3 Fire Resistance

Especially for cables used in fire protection application there are specific fire resistance requirements defined in IEC 60331. This means a cable in a fire shall maintain its function at least for a defined time.

These cable types are used, as an example, for fire exit lighting, alarm and warning devices and similar purposes.

The test purpose is to prove that no short circuit appears when a defined burner flame works on the cable for the required time. Fire resistance is more an aspect of impact reduction.

3.3.4 Smoke Exhaustion

The quantity of smoke and fume is an important indicator. Smoke reduces the sight of escaping people and rescue teams, thus the translucence of smoke emissions is tested according to IEC 61034. A high quantity of exhaustion as well as very dense fumes reduces the light transfer. The reduction of fire impacts is clearly the purpose of smoke exhaustion parameters.

3.3.5 Absence of Halogens

There are different test methods described in IEC 60754: to detect the acidity of smoke the quantity of halogen carboxylic acid is determined (IEC 60754-1). The electrical conductivity of smoke indicates the quantity of acid radicals. This is to be tested according to IEC 60754-2.

Another test procedure in this standard is the toxicity of smoke, measured by the pH value which indicates the acid content of the smoke in a liquid solution.

All the tests and parameters to prove a cable to be halogen free are aspects of impact reduction, too.

3.4 Cable Construction Aspects

In cable construction a lot of parameters affect the cable fire performance. The selection of materials is of main importance. Thus *Table 2* gives an overview for some common compounds for cable insulation and jacketing regarding the fire characteristics. This deals with the basic material.

Of course compound engineering improves continuously and by use of specific additives there are materials of the same family available with far better fire performance.

Nevertheless we should remain realistic and keep in mind that there will never be the perfect material. The addition of mineralic fire retardants keeps the material halogen free and reduces flame propagation, but it also reduces mechanical properties such as elongation and elasticity.

But not only material affects the fire performance of cables. A lot of detailed construction parameters are important. So for example the tightness of a jacket should be taken into account.

Interstice filling jackets provide more combustive material to a fire, but they prevent the air flow inside the interstices and reduce the oxygen available to the flame. A jacket extruded as a tube has a similar effect as a funnel when the cable is burning, especially in vertical fire tests.

4 Fire Protection Strategies

Fire protection is not only a cabling issue. There must be a general fire protection concept regarding all construction elements of a building. This need is taken into account in the European Constructive Products Regulation^[6].

We have seen there are two aspects of fire protection: fire avoidance and reduction of fire impacts. How do these aspects correlate to the regional differences in fire protection strategies?

Material	Flame retardant	Low smoke	Halogen free
PVC	X	-	No
Polyolefin	--	X	Yes
Polyurethane	--	X	?
TPE	-	X	?
FRNC	+	X	Yes
Fluorpolymer	++		No!

○ **Table 2:** Typical fire performance properties of cable compounds

4.1 Fire Avoidance

The common fire protection philosophy in America is to prevent fire at any cost. There are high amounts invested into research and investigation and the results are very challenging regulations regarding the fire performance of indoor cabling in terms of self ignition, flame propagation and fire resistance.

To meet these requirements there is no other way than to use halogens as flame retardants in cable compounds, as well as in building materials.

This approach risks the threat of personal injury by acid fumes and of emergency exits being hidden by dense smoke.

4.2 Reduction of Fire Impacts

It seems to be complete nonsense to reduce potential fire impact but to do nothing to avoid fire. And it really is, because there are so many and various impacts of fire.

There may be very specific situations where such a scenario makes sense, but such an exotic application shall not be discussed in this paper. Nevertheless we do not know any regulations which just support this approach.

Reduction of fire impact cannot be a fire protection strategy itself but it should be an important part of a combined strategy, as it is European standard.

4.3 Diverse Redundancy

It is said that Europeans and especially Germans have a preference for multiple safety. We are happy to know there is a second protection instrument if the first protection instrument should fail.

Combined safety strategy is well-known in many technologies relevant to safety. So in safety discussions regarding nuclear power plants the idea of diverse redundancy is a basic approach.

This means there must be an additional safety procedure which works completely independently from the first one in case the basic safety procedure does not work.

So in Europe it is the consensus to avoid fire as much as possible but at the same time to keep low the consequences on health or goods if a fire happens.

Due to physical reasons a better reduction of the effects is achieved by reduced fire avoidance. But in total the risk according to *Equation (1)* is significantly lower. This is also shown in *Figure 2*.

To protect people's health in case of fire it is widely required to use halogen free, low smoke materials for buildings including indoor cabling. This is mandatory in public premises but also recommended in residential areas.

5 Conclusions

Due to cultural differences the focus of fire protection in America is to reduce the probability of fire, but in Europe mainly the dimensions of possible health injuries and material damages are to be controlled.

Due to these differences in fire protection strategies there are wide differences in technical standards, requirements, and specifications for cables as well as for other construction components regarding fire performance.

The European approach follows the theory of diverse redundancy. Even if the requirements to each single parameter for cable fire performance are lower, there is a much better protection with less effort in total.

Different fire protection strategies are related to intercultural differences. To sell a product in a region it is not only necessary to meet all specifications but to understand the needs and fears of humans living there.

Just by addressing these aspects it is possible to convince potential customers of the advantages a product offers.

Thus cultural relativity has to be taken into account in worldwide business. Cross-cultural awareness is an important skill in global product management.

6 Acknowledgments

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ICYE (International Christian Youth Exchange) and its national sub-organisations whose activities intensified the experience of cross-cultural awareness.

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室内布线的火灾风险与安全理念

作者：Jörg Bör

摘要

电缆的防火性能是一项非常重要的课题，尤其在室内电缆铺设中更是如此。一方面，当存在任何干扰时，电缆不得自燃。但在大部分情况下，不同房间里或不同设备上的电缆相互连通，因此另一方面，火灾蔓延与自然问题同样重要。第三，防火等级对安全相关应用进行了界定。国际电工委员会60331说明了电缆中持久火焰在燃烧时，电缆应当维持预期性能的期间。尽管这些知识是常识，然而专家们常常想弄明白：为什么一些地区的防火性能规定看起来要弱一些？但是，了解特定消防安全理念有助于理解在不同国家保障消防安全的不同方法。每一种风险都是两种因子的乘积：一是事故发生可能性，一是损坏程度。风险由这两个因子的乘积进行量化。这对于火灾风险也同样适用。

一些国家的消防安全理念仅仅关注避免任何火情，因此他们的目标是把火灾可能性降至接近于零的水平。而其他地区将风险的这两项因素都考虑在内了，因此，燃烧特性要更重要得多。如果发生火情，火灾对人体健康或技术产品的不利影响应当越低越好，其中包括可能与任何水体发生反应转换为酸性物质的腐蚀性气体以及降低烟雾浓度，因为浓烟可能导致火灾发生时人们视线不清，迷迷糊糊找不到紧急出口。基于上述原因，“无卤”和“低烟”两项标准在欧洲的重要程度要远高于其他国家，如美国。卤素由于有自熄效应，常被专门用于防火。这些位于元素周期表第七主族的高度活跃的元素能够吸收氧气，有助于灭火。但是卤素与氧的化合物为酸基，会与无处不在的水反应，转变为酸性物质。这些腐蚀性气体会对人体健康构成威胁，也可能会破坏技术产品。本文讨论了消防的不同方法及其威胁和优势。

1 引言

美国专家常常对欧洲国家消防法规之薄弱感到疑惑，而另一方面欧洲人却惊讶于美国人为什么没有意识到卤素烟雾引起的酸性烟尘的巨大危害。这一区别常常是标准委员会专家和电缆销售企业之间经常探讨的话题。查看欧洲消防法规，例如《欧盟建筑产品规定》（简称CPR）^[1]可能令人感到困惑：为什么欧洲政府不能更好地保护其居民免受火灾之苦？而再看看美国消防法规，同样让人疑惑：为什么美国政府不能更好地防止人民受到酸雾的危害？

在民主社会中，法律法规不是强加于人民的，而是由人民制订的。法律法规是公众意志与智力的成果。商业市场不仅应当要求政府出台标准和法规，而且应当要求知晓背后的理念。阻碍美国产品在欧洲销售或欧洲产品在美国销售的因素既非来源于关税，亦非来自其他贸易壁垒，而是缘于最终消费者对产品的接受度不够。

2 文化间差异

理解多元文化的第一步是体验，即体验有所不同。第二步是认识到这些差异不能用好坏来评价，它们只是不同而已。

本文不对文化间差异的原因加以调查。文化间差异通常因历史经验或地理特征影响产生，关于文化间差异的更深层次的解释参见相关文献。人们可能会觉得这是典型的消费市场（B2C）而非工业品（B2B）市场问题。但请注意，工业品市场中的经理常常是在那些特定地区出生和生活的人，他们的销售市场通常与他们居住地处在同一区域，他们必须考虑销售市场的需求。霍夫斯塔德^[2]称此现象为“文化相关性”。

社会学家和经济学家的一些出版物展现了与不同参数相关的巨大地区差异。霍夫斯塔德^[2]定义了五个尺度，即：权力距离、不确定性规避、个人主义、男性气质以及长期取向，他的论文^[3]中具体阐释了这些参数的含义，但即使不详细了解这些参数，也可以大体说明地区差异（参见图1）。所有这些参数的取值范围都是从0到100，取值接近于零意味着相反的情形极端强烈，比如个人主义因素取值为3意味着集体主义达到极高水平。

切记，就文化相关性而言，地区差异很大，因而很容易理解，在这个世界上的每个地区，安全感和安全需求也不同，这对于消防安全也适用。因此对火灾威胁的估计不同，导致不同国家或地区防火方法也不同。为了更深层次地了解这些方法，了解火灾的威胁和风险理论便很重要。

3 火险

3.1 火灾的威胁

发生火灾时，人们需要被保护的方面不同。虽然几乎所有文化都认为最重要的方面是保护生命，防止人员伤亡，但是防范财产受氧化或次生损坏也很重要。这取决于这些财产的价值，而不同文化对相同财产的价值估计可能不同。火灾的次要物理效应，如信息丢失或任何基础设施瘫痪，可能引起进一步的经济损失。

3.1.1 人身安全

火灾对人员伤亡的威胁要比灼伤的风险大得多。火灾发生时，烟雾会引发巨大危险。人们在浓烟中可能迷失方向，找不到安全出口；同理，浓烟可能妨碍救援队伍的工作。此外，酸雾会引发窒息，这是火灾最常见的致命后果。

3.1.2 财产损失

在火灾中，酸雾产生的氧化和腐蚀作用可能会造成财产损失。卤化材料燃烧时产生的酸基附着在一些电子设备上，由此造成的损失更小，常常不易被察觉。几周或几个月以后，由于气候变化或其他原因，湿气加重，这层薄膜发生反应转变为酸，腐蚀引发故障，但人们不会发现这是不久前那场火灾导致的长期后果。

3.1.3 经济损失

火灾造成的经济损失可能比任何被烧毁的设备的真实价值要高很多。在工业领域中，我们知道机器损坏造成停产可能超过机器自身成本的很多倍。特别是在银行和金融领域，信息丢失是火灾的另一项重要经济威胁。因此消防应当考虑其他因素，适修性、数据安全和备份策略只是其中少数几个因素。

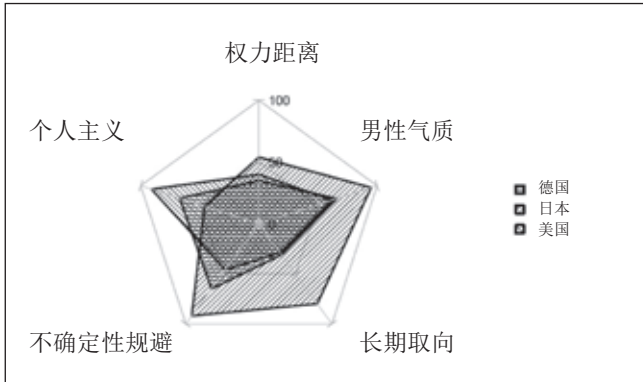


图1: 根据霍夫斯塔德^[1], 三个选定国家的文化相关性

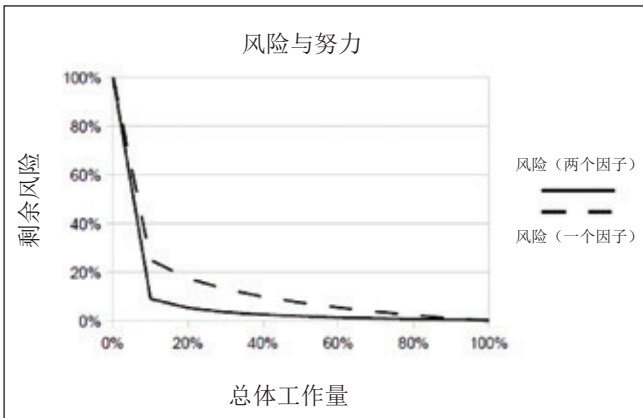


图2: 剩余风险与总体工作量: 在一种或两种因子上付出的减轻努力

3.2 风险评估

定量风险评估要求计算风险的两个组成部分: 潜在损失的大小, 以及损失发生的可能性。因此风险 (R) 是这两个因子的乘积: 任何故障发生的可能性 (p) 乘以故障造成潜在损失的大小 (L), 进而被简称为“故障效应”。

$$R=p*L \quad (\text{等式1})$$

根据维基百科^[5], 这是常识, 常被用于标准工程学方法 (即著名的“故障模式与效果分析” (FMEA) ^[3]) 以及保险风险评估过程。保险公司进行风险评估是确定保费的基础, 因此要运用等式 (1) 估算风险。这里也同样考虑到了故障可能性和故障效应两个因子。等式 (1) 表明有必要对两个因子都加以

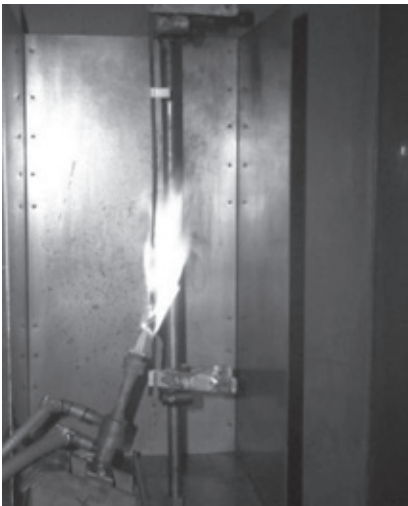


图3: 火焰传布的测试设置

考查。在许多实际案例中, 风险的两个因子是相互依存的。举一个消防话题的例子, 使用卤化物降低了故障可能性, 但同时也增加了窒息或其他情形对人体健康的影响。

故障模式与效果分析实践经验揭示了将两个因子同时保持在类似低水平的益处。假设两个因子取值范围均为1到10, 则风险的取值范围为1到100。如果可能性降至4, 效应降至5, 两个因子

乘积4*5得到风险水平为20。而如果效应保持在10的高水平, 可能性必须降至2, 才能达到相同的风险等级。回想帕累托原理, 就会明白, 保持一项因子在如此极低水平所付出的努力超出了让两个因子都保持在中等水平的努力水平。

图2展示了从两个方面 (规避和减轻影响) 努力降低风险的好处。虚线表示将所有努力都投入到规避威胁方面时由降低努力决定的风险。实线表示将降低努力平均分配到规避和减轻影响两个方面时的风险。这种方法运用了一些简单假设来容易地展现基本原理。我们可以清楚地看到, 只有在中间取值处, 在两个方面同时付出努力才会带来明显的好处。本文既不深究用于考查故障可能性的统计学, 也不钻研对任何破坏的经济效应进行量化的经济学, 而是集中于与室内电缆铺设有关的消防策略方面。

3.3 电缆防火特性

电缆是建筑物消防理念中的要素。人们采用多种不同的原料来增强电缆料的防火性能。卤化聚合物通过化学反应自动灭火, 而在火灾中会同时释放有毒气体。卤素是位于元素周期表第七主族的元素: 氯、氟、溴、碘等, 它们在氧化过程中反应产生酸根, 酸根与氢反应后产生酸。卤素在低温下燃烧时会产生二恶因。上面已经探讨过因此对人体或财产造成的损伤后果。无卤阻燃剂, 如氢氧化镁或氢氧化铝, 通过捕捉氧气来防止火势蔓延。这类化学反应生成的水会起到额外的灭火和冷却作用。这些无机阻燃剂在燃烧中产生的烟很少, 其烟尘无毒且不含酸性物质。但这类材料也不是完美的解决方案。

为了真正获得良好的防火性能, 人们必须使用更高纯度的这类化合物, 而这将降低电缆的机械性能, 造成脆化或缩小电缆的应用温度范围。国内和国际标准化组织颁布了多种电缆防火测试程序。每一套程序仅测试不同火灾威胁中的一种。这些程序的概览见表1。

3.3.1 自燃

人们应当恰当地设计电缆, 使其无论在遇到电压峰值或高载容量时都不至于自燃。电压和载容量测试被用于确定电缆的自燃特性。自燃参数与火灾发生的可能性相关。

3.3.2 火焰传布

电缆连着设备, 因而电缆承载着火灾沿着电缆从建筑物的一个部分传导至其他部分的风险。这是保险丝的作用。国际电工委员会60332为测定电缆的火焰传布 (或保险丝) 特性, 公布了几种级别的测试方法 (如国际电工委员会60332-1-2, 见图3)。所有这些测试的共同理念是一致的: 指定位置上燃烧的电缆应当在火苗传布到特定距离之前便熄灭。试样位置可以是水平或垂直的, 试样也可以是单一电缆或电缆束。火焰传布参数与防火和减轻后果相关。

3.3.3 耐火性

国际电工委员会60331专门对消防应用电缆做出了耐火性规定, 这意味着在火灾中, 电缆应当在特定时间内能维持性能。这种类型的电缆常被用于火灾疏散照明、警报或加热装置以及类似用途中。这项测试的目的是验证当特定喷灯火焰作用于电缆一定时间内不会发生短路。耐火性更多地与减轻后果相关。

3.3.4 排烟

烟尘量是一项重要指标。烟会影响逃生人员和救援队伍的视线, 故而要根据国际电工委员会60134对烟尘排放的半透明性进行测试。烟雾大量排出和高浓度阻碍了光传递。减轻火灾后果显然是排烟参数的目的。

3.3.5 无卤性

国际电工委员会60754规定了几种不同的测试方法: 测试确定烟尘的酸性和卤酸酸的含量 (国际电工委员会60754-1)。烟尘的导电率代表酸根的含量, 对其测试体现在国际电工委员会60754-2中。该标准中的另一项测试程序是烟尘的毒性, 用pH值衡量, pH值代表溶液中烟尘的含酸量。所有这些验证电缆为无卤电缆的测试和参数也都是减轻后果的内容。

3.4 光缆施工方面

在光缆施工中，有很多参数会影响光缆的防火性能。材料的选择是首要因素。因此表2概述了用于电缆绝缘和护套等防火性能的一些常见复合物。这解决的是基础材料的问题。当然，人们总在不断地改进复合物设计，并且通过运用特定添加物，同族材料的防火性能可能得到很大提升。但我们应当保持现实，切记永远没有完美的材料。

添加无机阻燃剂使材料无卤且延缓了火势蔓延，但同时也削弱了材料的延伸率和弹性等机械性能。但不止材料会影响到光缆的防火性能。许多具体施工参数，如护套的密封性也很重要，因此，也应考虑这些因素。空隙填充护套材料遇火更易燃，但它们能防止空气流入空隙，从而减少火苗需要的氧气。光缆着火时，护套挤出成管状与烟囱有类似作用，尤其在垂直燃烧试验中更是如此。

4 消防策略

消防不仅仅是电缆铺设问题。所有建筑物结构构件必然有总体消防理念。欧盟建筑产品法规^[6]便体现了这一需求。我们已经讨论过消防的两个因素：防火和减轻火灾的影响。这两个因素是如何与消防策略的区域差异关联的呢？

4.1 防火

在美国，常见的防火理念是不惜一切代价防止火灾发生。美国人进行了大量研究和调查，结果是从自燃、火焰传布和耐火性方面对室内电缆铺设做出了苛刻的要求。为了符合这些要求，人们除了在电缆复合物和建筑材料中使用卤素作为阻燃剂外，没有别的办法。这种方法将产生以下风险：酸雾导致人身伤亡和紧急出口被浓烟遮蔽。

4.2 减轻火灾影响

减轻火灾的潜在影响，而不采取任何措施防火听起来毫无道理。确实是这样的，因为火灾有各种各样的后果。可能在某些特定情况下这种假定是有道理的，但本文中不对这般奇特的应用加以讨论。然而，我们并不知道任何仅用于支持此方法的规章制度。虽然减轻火灾影响本身不构成消防策略，但它是综合策略的重要组成部分，事实上欧盟标准即是如此。

4.3 多样性冗余

据说欧盟，尤其是德国偏爱多种安全方案。我们很高兴地了解到，如果第一种保护措施失败了还会有第二套防护措施。综合安全策略在许多技术安全方面非常有名。在核电站的安全讨论中，“多样性冗余”的理念是基本方法。这意味着必须准备一套与第一套安全方案完全独立运行的额外安全方案，以便在基础安全方案不起作用时启用。

因此在欧洲，人们已就尽可能防火、同时将火灾发生对人身或财物安全的影响降低至水平达成共识。由于物理原因，减少防火工作可以更好地减轻火灾影响。但根据等式（1），总体风险却要低很多。这点也在图2中有所体现。为了保障火灾中人身安全，包括内部光缆铺设在内的建筑物都有必要使用无卤、低烟材料。这在公共场所是强制性要求，而在居民区也是推荐使用的。

表1:防火性能参数以及它们与火灾风险因子的关联性

参数	规避	减轻影响
自燃	X	-
火焰延燃	X	X
耐火性	(X)	X
排烟	-	X
无卤	-	X

材料	阻燃剂	低烟	无卤
聚氯乙烯	X	-	否
聚烯烃	--	X	是
聚氨酯	--	X	?
热塑性弹性体	-	X	?
阻燃无腐蚀	+	X	是
含氟聚合物	++		否

表2:电缆复合物的典型防火性能

5 结论

由于文化差异，美国的消防重心在于降低火灾发生的可能性，而欧洲则主要关注控制可能的人身损伤和财产损失。消防策略的这些差异导致电缆的技术标准、要求和规格以及防火性能的其他建筑构件有很大差别。欧洲方法遵循的理念是多样性冗余。即使对电缆防火性能的每项单一参数要求更低一些，总体努力付出少一点，却能提供更好的防护。

不同防火策略与文化间差异相关。在一个地区销售产品时，不仅必须满足所有规格要求，而且要理解当地人们的需求和恐惧，而你仅通过了解这些方面可以说服潜在消费者相信你所提供的商品的优点。因此国际商务必须考虑文化相关性。跨文化认知是全球产品管理的一项重要技能。

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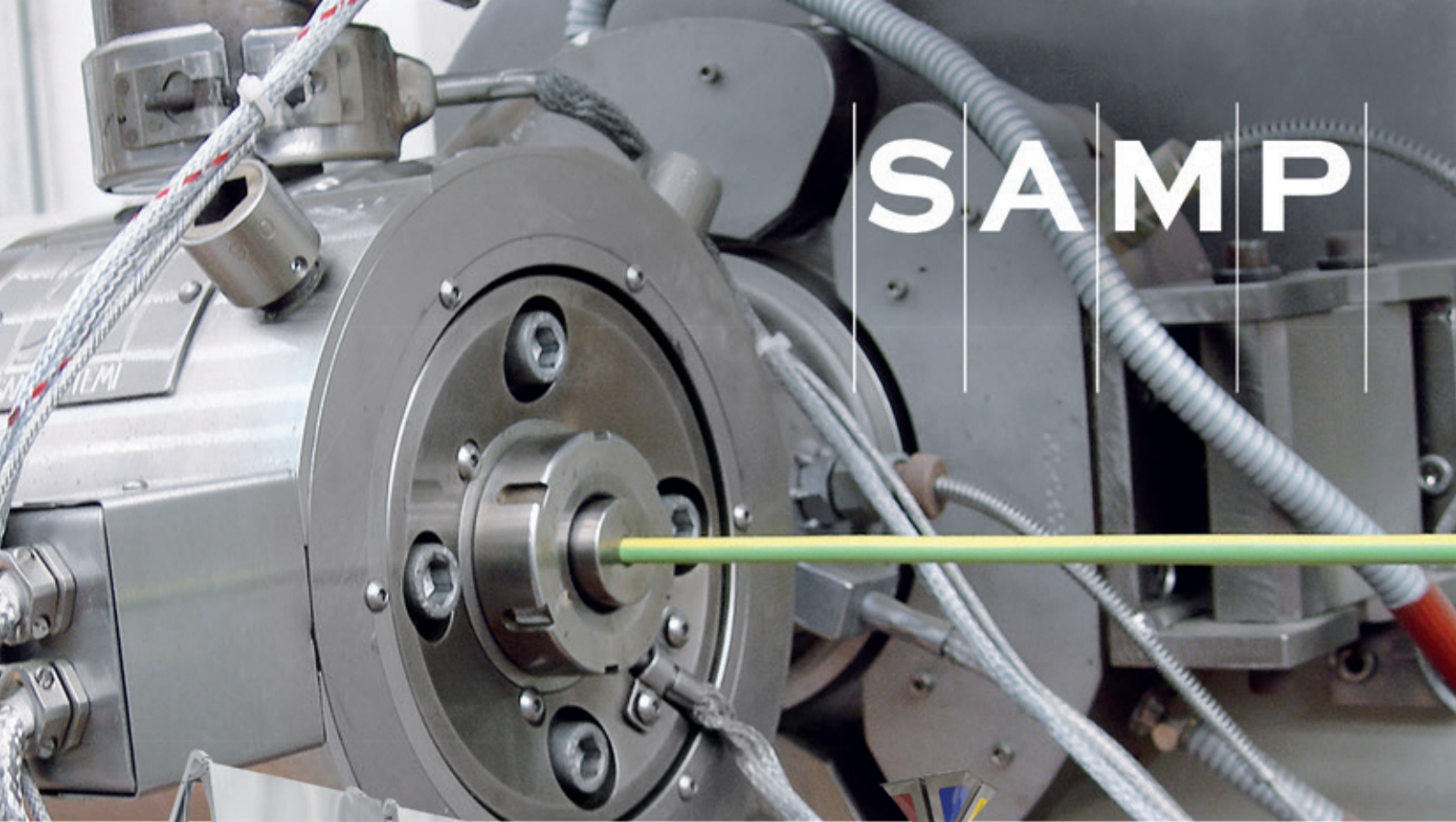


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