

# POWER

Issue  
**#8**  
2018/01

## Tunnelling the way forward

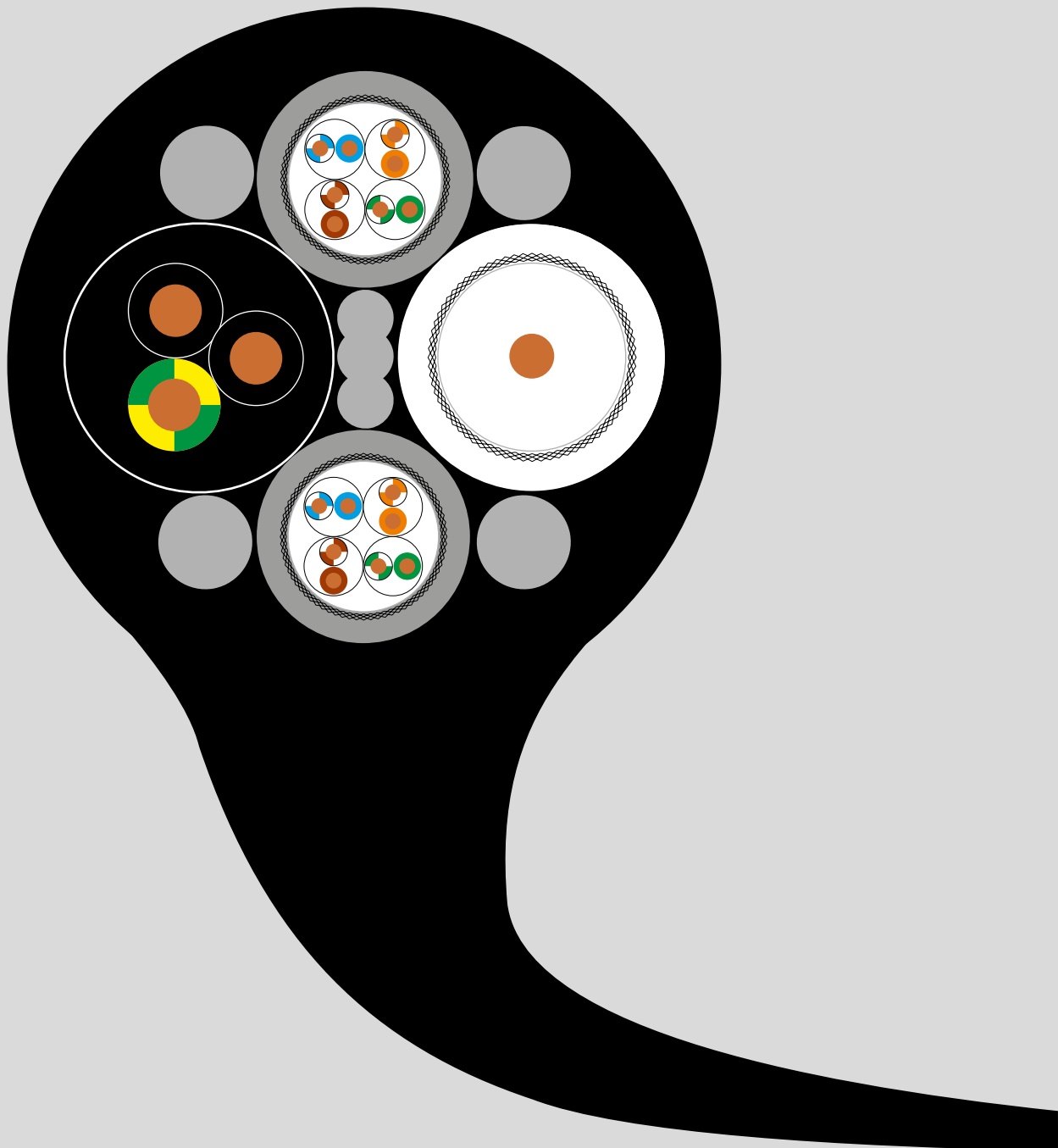
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# WHERE DOES CABLING GO?



DEAR READER!

**W**hat do chocolate-covered marshmallows and HELUKABEL have in common? Quite a lot!

Don't worry, I'll explain. Nearly 30 years ago, our cable and wire business was doing so well that we urgently needed new supply sources. We decided the best solution was a DIY solution. But where? From the start, the local district of Ansbach proved to be a reliable source of employees and soon we were able to acquire an experienced plant manager for our ideas and plans. However, it wasn't quite so easy to find a suitable building. Eventually we found an empty factory in nearby Windsbach that used to make chocolate-covered marshmallows.

From a handful of cable fanatics and enthusiasts three decades ago, today our team is made up of over 200 highly-qualified employees successfully developing, designing and manufacturing custom cables. Using state-of-the-art production machinery, our cables are made in Germany to customer specifications. This special anniversary is an occasion to introduce a new series on our production process (p. 22). In each issue we will explain step by step how these high-tech cables are made.

As usual, this edition of POWER continues to report on the diverse applications in which our cables are used. In the cover story, find out why Herrenknecht, the global market leader in tunnelling machines, needed a high-tech cable (p. 12). Or how it came to be that our cables are found in oil and gas drilling rigs in both the arctic cold and searing heat of the desert (p. 18). I do hope you enjoy reading this issue of POWER!



Yours sincerely,

Helmut Luksch  
Managing Director, HELUKABEL GmbH



# POWER

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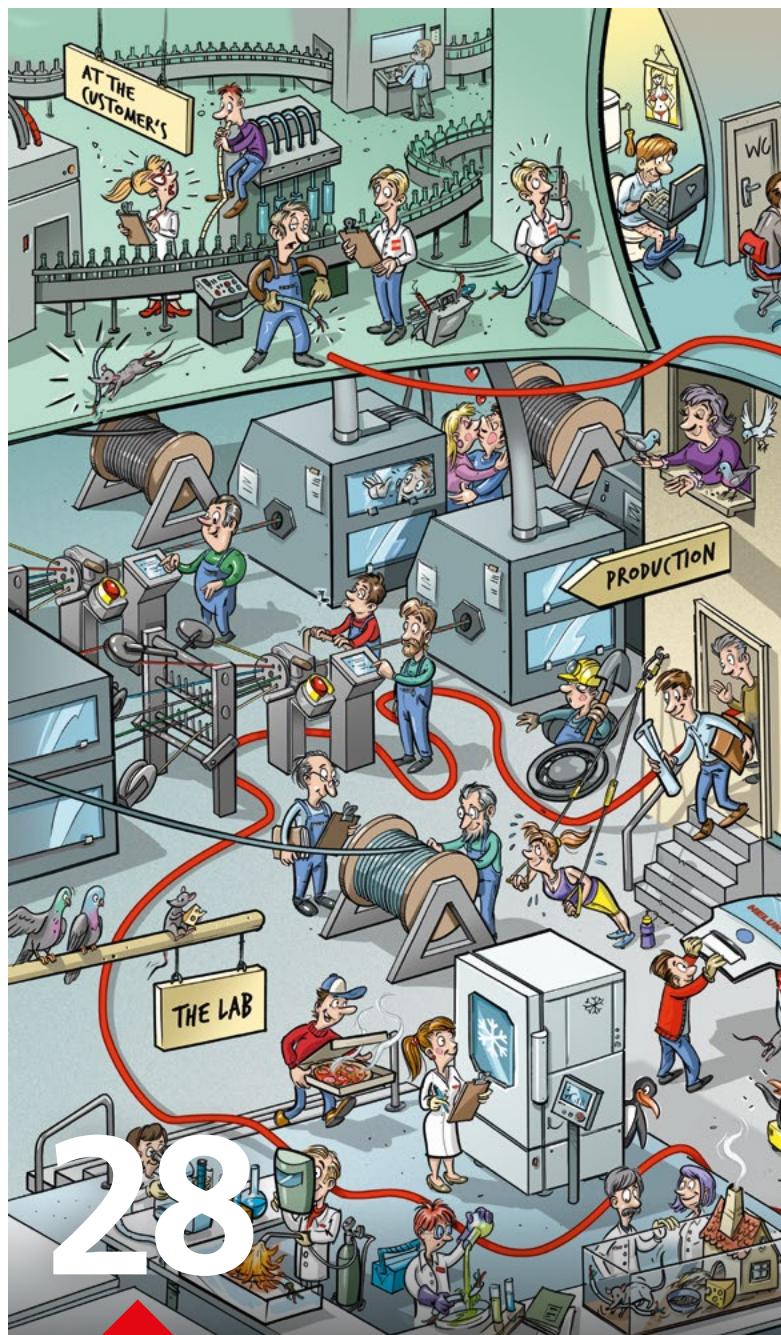
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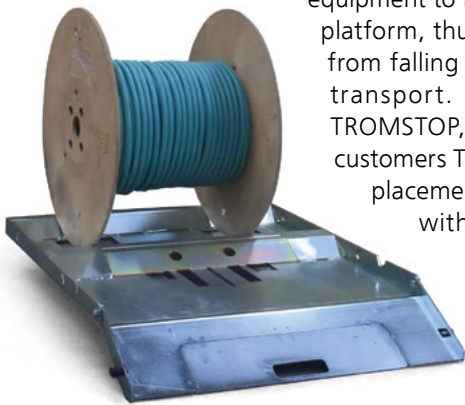
# THE WORLD OF HELUKABEL

This comic provides a not-so-serious  
look behind the scenes.

# MOVING SAFELY AROUND THE FACTORY

**SAFETY IS PARAMOUNT** when transporting cable drums from point A to B. Therefore, KABELMAT paid particular attention to this aspect while designing the latest version of their cable drum placement tool, TROMSTOP. The result: a CE-certified platform suitable for use with almost all electric lifting equipment and capable of carrying drums with diameters ranging from 400 to 1000 millimetres (1 to 3 feet). Extra safety is provided by a mechanism that allows the prongs of the lifting

equipment to lock into the TROMSTOP platform, thus preventing the drums from falling off the platform during transport. As a supplement to TROMSTOP, KABELMAT offers their customers TROMPLAT, a cable drum placement tool designed for use with forklifts. Its adjustable prongs mean TROMPLAT can be individually tailored to the needs of the customers. ■



**Playing it safe:**  
the prongs of the forklift lock  
into the TROMSTOP platform during transport.

## NOW IN BULGARIA

**With their new subsidiary,** HELUKABEL is now represented in Bulgaria as well. Managing Director, Jaroslaw Gibus explains: "Our aim is to attract and enthuse customers through high quality standards and first class on-site services." Close proximity to customers and their needs have been the focus of the globalisation strategy pursued by HELUKABEL for many years. The Bulgarian subsidiary, headquartered in Sofia, is the company's 28th foreign subsidiary.

HELUKABEL is the first German cable manufacturer with its own site in Bulgaria. At a time when demand for cables and wires is steadily increasing in the country, industries in the automotive, agriculture, and forestry sectors as well as the mining industry are surging ahead just as much as the information and telecommunications technology and energy sectors. HELUKABEL wants to realise this potential. The new subsidiary offers optimal conditions for strategic and personal engagement with new and existing customers. ■

# Hot. Hotter!

**HELUKABEL IS THE FIRST EUROPEAN** manufacturer to upgrade their motor and feedback cable product portfolio (TOPSERV and TOPGEBER) from 80°C to 90°C UL styles. According to Thomas Pikkemaat, Business Manager at the Windsbach plant and Drive Technology Product Manager at HELUKABEL, one of the reasons for doing this is the higher temperatures often found in areas near the motor, such as motor terminal boxes. "The present market norm is 80°C UL styles, but optimised materials and manufacturing methods allow for higher heat resistance. It also makes sense from a technical viewpoint, as it extends the service life of the cores," he explains.

HELUKABEL uses polypropylene materials (PP) for the core insulation. The higher heat resistance is the result of technical improvements to these materials. "In theory, PP is thermally stable up to 110°C. We've intensively tested the material in climate chambers and can confirm thermal stability up to 90°C over an operating period of 30,000 hours," reports Thomas Pikkemaat. Polyurethane (PUR) is then used to sheath servo and feedback cables. This material offers plenty of benefits for dynamic drag chain applications where the focus is on long-lasting flexibility and high abrasion resistance.

The market launch of the TOPSERV and TOPGEBER 90°C UL style assortment started in November 2017 and has been continuing since. ■



**HELUKABEL's new feedback and servo cables**  
are heat-resistant up to 90°C.





## SIMPLY THE BEST!

### JÖRG KLÖSSINGER SMILES BROADLY:

After six years, he was once again standing on top of the podium at the German Forklift Driving Championship upon winning back his "German Master" title. He outcompeted 63 drivers who had also qualified for the championship in Aschaffenburg, Bavaria in September 2017. The drivers demonstrated their skills in various disciplines over a challenging course. But skill alone isn't enough to secure victory Jörg Klößinger explains: "What's important is to drive quickly while working precisely and calmly." Klößinger, a metalworker by trade, has

worked as a forklift driver at HELUKABEL in Windsbach for 10 years. "I gained my forklift driving permit while still an apprentice and I really enjoy my job here," he relates. At the Windsbach plant, Klößinger supplies his colleagues in production with materials and loads the finished products onto lorries. He doesn't drive quite so fast doing this as during the championship, but just as safely and skilfully. He was particularly pleased to be congratulated by HELUKABEL's Managing Director Marc Luksch after his victory: "I am very appreciative of this recognition!" ■

## PRODUCT TICKER



### SOLAR CABLE

HELUKABEL offers SOLARFLEX®-X H1Z2Z2-K — a high quality, TÜV-certified product for cabling solar panels. Thanks to application-specific sheathing and insulation materials, the cable is flame-retardant, halogen-free, and UV-resistant. A rodent-proof version is also available for photovoltaic systems installed in agricultural areas, such as farms. **For more information, e-mail us at:** [solar@helukabel.de](mailto:solar@helukabel.de)

### HELUPOWER H07RN-F LS0H

The rubber-sheathed cable is UV- and oil-resistant, halogen-free, flexible at low temperatures and features an enhanced current-carrying capacity. It is recommended for use in diverse applications, including permanent immersion in stagnant water to a depth of 100 metres (328 feet) (standard AD8).

### CATALOGUE UPDATE

A French version of the bestselling main catalogue, Cables, Wires and Accessories, can be downloaded under [www.helukabel.de/fr-catalog](http://www.helukabel.de/fr-catalog). The catalogue is almost 400 pages long and contains HELUKABEL's top-selling products.



# LET THE WATER FLOW!

*Lake Geneva's fountain is spouting again. Thanks to a custom cable from HELUKABEL, it can be safely controlled.*

**LAKE GENEVA WOULDN'T BE** the same without its landmark. The 140-metre (460-foot)-high fountain is a major tourist attraction. Two pumps with a total power of 1,000 kilowatts send 500 litres (132 gallons) of water up into the air at a speed of 200 km/h (124 mph) every second. When it was first built in 1886, the water jet was originally a safety overflow valve for a high pressure hydraulic plant. At that time, the water sprayed 30 metres (98 feet) high. In 1891 the fountain was moved to a new location. As part of the relocation to the harbour basin,


the water pressure was increased and the fountain was fitted with a lighting installation.

## **Custom-made control cable**

Between November 2015 and June 2016, Geneva residents had to do without their Jet d'Eau. The city council had plans for a new boardwalk jetty made of wood that would also give disabled individuals easy access to the fountain. This required a rework of the water jet's control system and simultaneously provided the chance to implement other

optimisations. "Our job was to renew the pump supply cable, the cable for the control system and the power cables to the lighting installations," recalls Kevin Wilde who managed the project for Geneva-based utility company, SIG. The 400-metre (1,312 foot)-long control cable presented a considerable challenge to him: "As the existing control unit had to be kept, we couldn't just install a new fibre-optic cable. We needed a customised cable compatible with the existing system." At the same time though, its design had to allow





Lake Geneva without its Jet d'Eau? Unimaginable for many. The 140-metre-high fountain is a popular landmark in the city.

for a future replacement of the control system. Since the cable was lying on the bed of the lake, it also needed to be totally waterproof. Wilde thus embarked upon his search for a suitable cable. "Most manufacturers either couldn't make a cable according to these specifications or, if they could, they couldn't deliver on time," recalls Wilde.

### Durable and flexible

At HELUKABEL AG in Spreitenbach, Switzerland, he finally found what he was looking for. They were able to both develop and manufacture an appropriate cable. "To ensure a certain flexibility when it comes to the future design and installation of a new control system, we twisted together shielded conductor pairs in the 16-core control cable," reports Product Manager Gernot Springer, who headed the project at HELUKABEL AG. "But this increased the outer diameter,"

he recalls. "For the installation in Lake Geneva, the new cable's minimum bending radius and tensile load capacity weren't allowed to be significantly different from the values of the existing cable. We achieved this by optimising the twisted pairs' lay-lengths and using steel wire braiding instead of steel tape for the armouring." Yet there was still one problem remaining: Wilde only needed a cable 500 metres (1,640 feet) long. The minimum order length for custom cables is 1,000 metres

(3,280 feet). Together with Gernot Springer, a solution was found here as well and six weeks later HELUKABEL delivered the specified cable in the requested length to the construction site at Lake Geneva. "The new cable complies with all our requirements and was delivered punctually," points out a satisfied Kevin Wilde. Geneva was given back its landmark in summer 2016: the fountain is now barrier-free, and even a couple of centimetres higher, Wilde confides with a wink. ■



### GERNOT SPRINGER

is product manager at HELUKABEL AG in the Swiss municipality of Spreitenbach. He advises customers such as SIG when it comes to finding the appropriate cables for their applications. He impressed Kevin Wilde with a tailored technical solution for the fountain in Lake Geneva.



# JOINT EFFORT

*The second generation of Sumitomo (SHI) Demag's fully electric IntElect injection moulding machines combines long-standing know-how with the cable expertise of HELUKABEL's sales representative, Uwe Wohner.*

**A**t an in-house trade fair hosted by Sumitomo (SHI) Demag last May, the 500 or so invited guests are very impressed by the 50-tonne IntElect 50 injection moulding machine before them. The fully electric injection moulding machine series is equipped with special high-torque direct drives that provide maximum precision and dynamic performance. The IntElect 450, previously the largest injection moulding machine available, is an integral part of a highly efficient electric production cell that manufactures polycarbonate headlight covers for the automotive industry. The machine can be operated as intuitively and easily as a smartphone, thanks to the NC5 plus control system, which has a colour touch screen with a glass surface.

## Strong partners

This development has been made possible thanks to the know-how acquired by the Sumitomo Group over decades in the field of electric drives. More than 65,000 of the company's fully electric machines are in

operation throughout the world. The consistent alignment with customer requirements has contributed to their widespread use. "After the trade fair, we more or less completely reworked the prototype," reports Marc Spenner, Sumitomo's series design engineer in Wiehe. When it comes to making sure the cables also meet machine requirements, he relies on the expertise of HELUKABEL's sales representative, Uwe Wohner. "About 90 percent of the machine's cables are from HELUKABEL. Some of them are exposed to great stresses which means they must have certain qualities. We also find his advice invaluable when it comes to using UL-style cables in machines for the export market," explains Spenner. ■



## FLEXIBLE

Injection moulding machines from Sumitomo (SHI) Demag are designed for use in series production and multishift operations, such as the automotive industry. HELUKABEL's special drag chain cable, the MULTIFLEX 512-PUR, is ideal for this type of application.

## OIL-PROOF

Even electric machinery cannot completely avoid using oil-operated hydraulic power units for certain processing steps, so it is important that cables in injection moulding machines be oil-proof. Common oils, greases, and lubricating coolants do not damage the highly flexible "I-BUS Drag Chain" BUS cable.

## SCREENED

In fully electrical-operated machinery, perfect screening is essential for the secure transmission of signals and feedback. The rounded TUBEFLEX-(ST)-CY ribbon cable is double-screened for reliable protection against electrical interference.



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## THE PLASTIC EXPERTS

**Who:** Sumitomo (SHI) Demag Plastics Machinery GmbH, Schwaig and Wiehe, 3,000+ employees. **What:** The injection moulding machine specialist for plastics processing is a global leader in this sector along with its Japanese parent company Sumitomo Heavy Industries.

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## INTERNATIONAL

Sumitomo (SHI) Demag produces the IntElect series in Germany for the international market. The cabling must comply with the respective regulations and standards. MULTINORM control cables such as the HELUKABEL JZ-603-CY are approved in many countries, which simplifies the export process.

**Marc Spenner (left), a design engineer at Sumitomo, worked with HELUKABEL's Uwe Wohner to fit the new IntElect with cables.**

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## THE CABLE EXPERT

Uwe Wohner is area sales manager for Thuringia. He has been attending the needs of the Sumitomo (SHI) Demag subsidiary since 2008. The subsidiary in Schwaig has been a HELUKABEL customer since 1996. Uwe Wohner's valuable advice is especially sought after when it comes to the tricky task of finding the right cable for the export market.

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# TRENCH DIGGING IS OUT

*A new technique from Herrenknecht promises to transport electricity generated by wind farms in Northern Germany to the south of the country underground, without spoiling the countryside.*

**B**erlin, 2nd July 2015: At the energy summit, the government coalition votes to expand power lines. One of the core decisions: the wind-power electricity generated in the north of country should be transported to the south via new DC lines. And where possible, the 2,400 kilometres (1,491 miles) of high-voltage DC transmission lines should be laid underground.

Varel, 10th November 2017: Tobias Engel stands in mud as fine sleet falls on his helmet. It's cold and inhospitable – and there's a lot of activity going on around him. A nine-metre (30-foot)-long jacking pipe hanging from a crane is about to be lowered into the construction pit. "When this pipe is out of the way, we'll have completed the second pipe run," says Engel. He is Herrenknecht's Utility Tunnelling R&D project

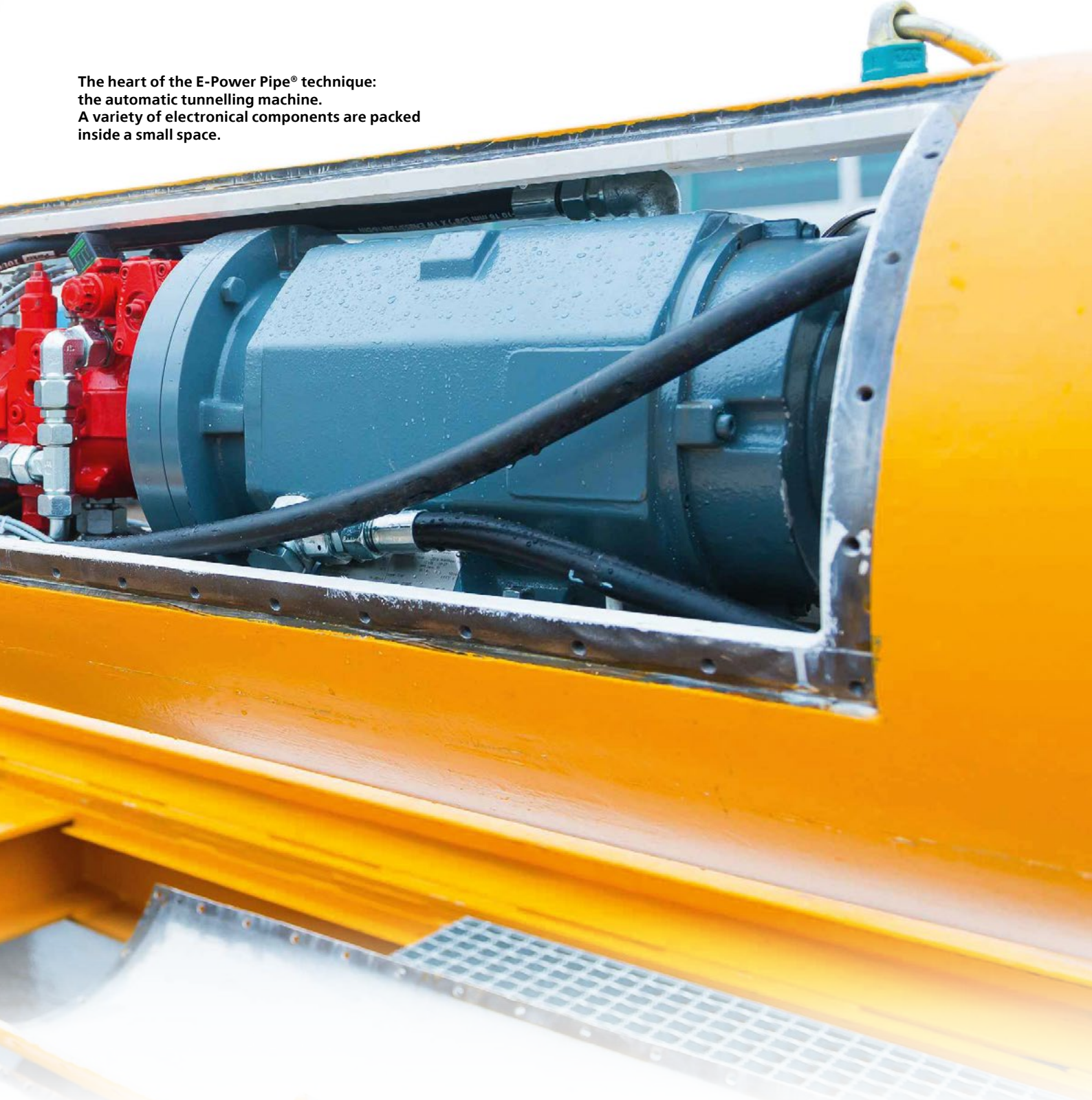
manager. Based in Schwanau on the edge of the Black Forest, the company is best known for its impressively large tunnel boring machines. Together with his colleagues, Engel has developed a technique that seems unimpressive at first glance: E-Power Pipe®. This concept makes the Berlin government representatives' resolution to lay power lines underground feasible. It's also the reason Engel is currently standing in the middle of a construction site in Lower Saxony, for here is where E-Power Pipe® is being put to use for the first time since its market launch.

## Down and away into the ground

Walking around the building site, Engel explains why E-Power Pipe® is so revolutionary: "With the conven-



The heart of the E-Power Pipe® technique:  
the automatic tunnelling machine.  
A variety of electronical components are packed  
inside a small space.



tional cut-and-cover technique, a 45-metre (148-foot)-wide strip of top soil has to first be removed, followed by the soil layers of the corresponding ditch profile. Each layer has to be stored in a separate pile and shovelled back afterwards in the same order when the work is complete. This makes it an extremely cost-intensive process with a huge impact on nature," he explains. In particular, densely populated areas and route sections with many physical obstacles such as residential neighbourhoods, protected water and nature reserves, and military land pose challenges to the planners.

Up to now, there has been no alternative as the cables have to be laid just below ground, a specific distance apart, and as accurately as possible over long distances. All previous trenchless solutions for under-

ground cables have failed due to cost, safety, and time issues. E-Power Pipe® is expected to change this. "We're now able to achieve pipe runs exceeding 1,000 metres (3,280 feet). This means we can bore this distance

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## THE TUNNEL EXPERTS

**Who:** Herrenknecht AG, Schwanau, with approx. 5,000 employees. **What:** Herrenknecht is a leading manufacturer of tunnelling machines for all diameters and the broadest diversity of geologies. The machines are used in a variety of applications including railway, metro, road, utility, pipelines, hydropower, mining and exploration.

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all at once at a depth of just 1.5 metres (5 feet) below ground.

*Schwanau, 10th November 2017:* When he looks out of his office window, Stefan Pabst sees meadows, fields and overhead power lines. The latter should start disappearing from the landscape in the future thanks to his work. Stefan Pabst is the process engineering manager for Utility Tunnelling at Herrenknecht. Along with his colleague, Michael Huser, he has equipped the tunnelling machine with the electronics and software needed for the new technique. This was no easy feat as its outer diameter of 490 millimetres (19 inches) left little room for the required components.

"The lack of space for the power supply and data communication was a headache too. We had to fit both into a single cable with a diameter less than 70 millimetres (3 inches)," recalls Pabst. Separate cables were out of the question: "When the new jacking pipes are installed, quick and easy cable-coupling is a must. It takes about twelve minutes to push a pipe forward,



**"We can now bore distances of 1,000 metres in one go."**

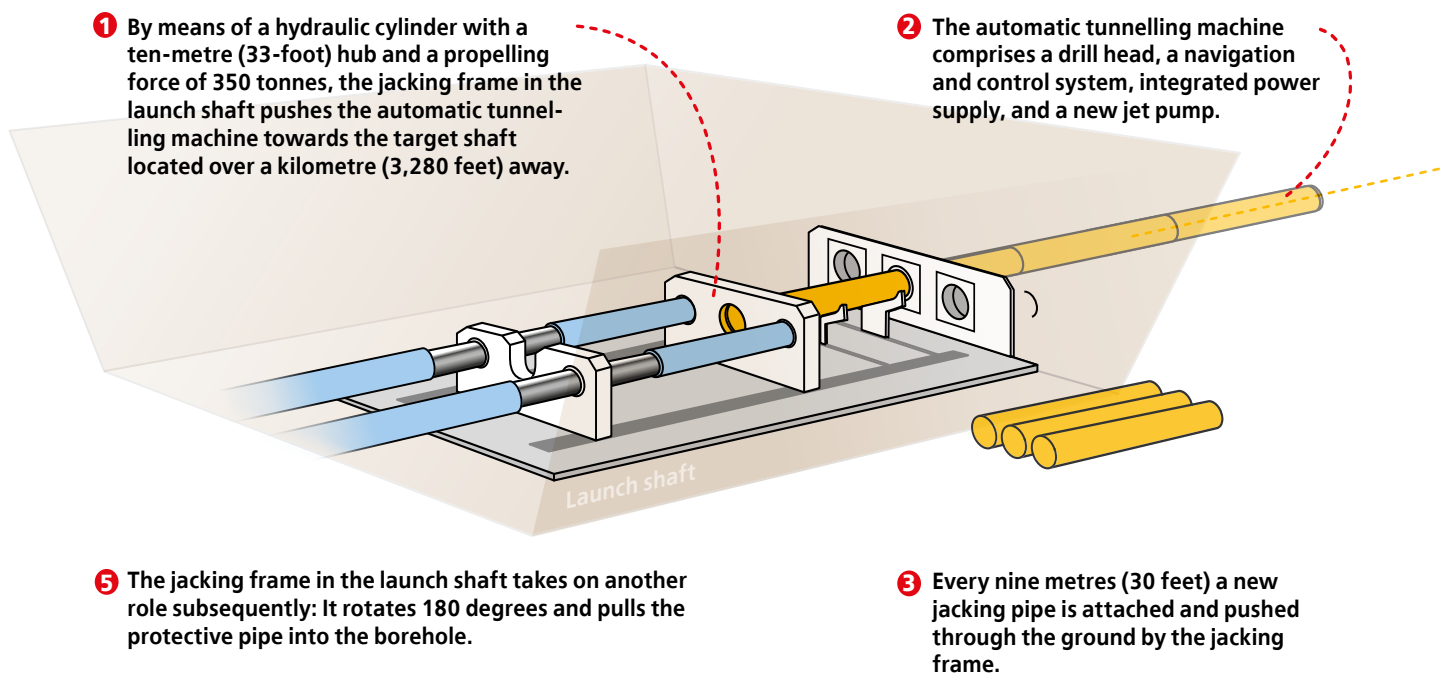
*Tobias Engel, Herrenknecht's Utility Tunnelling R&D project manager*

and if coupling takes too long, we lose the benefit of our good tunnelling time. Two cables would be too cumbersome. What we needed was a single, multi-purpose cable," says Pabst. But an off-the-shelf solution didn't exist. So he contacted Rainer Maier, HELUKABEL's regional sales manager: "I told him we needed a cable capable of transmitting 22 kilowatts at 690 volts, and that it had to include a data cable as well," explains Pabst. Not an easy task: "The challenge of carrying energy, equivalent to the amount used to power two homes, via an extremely small cable over a distance of 1,500 metres (4,921 feet) is no straightforward matter," he notes.

### Maximum power, minimum diameter

Rainer Maier knew immediately that a hybrid cable for the power and data transmission was the solution. "The wealth of experience gained from previous joint projects made the task easier for our development experts in

## Pipe by pipe – how E-Power Pipe® works





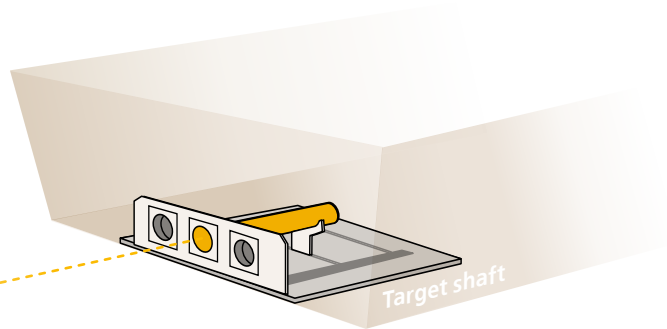
## THE MAN FOR THE TRICKY TASKS

As regional sales manager and qualified electrician, Rainer Maier has been Herrenknecht's partner for many years. He finds the right solution for even the most demanding tasks. Not least because of this, HELUKABEL has been officially named an 'A' supplier for Herrenknecht.



The custom-made cable for Herrenknecht contains a wealth of expertise. HELUKABEL's Regional Sales Manager Rainer Maier (middle), Michael Huser (left), and Stefan Pabst (right) are satisfied with the result.

Windsbach," he says. With the focus on a small diameter, the team got down to work and soon presented Stefan Pabst and Michael Huser with a first suggestion: a 25 square millimetre (4 AWG) cross-sectional power supply cable. "But then specifications changed and more power was needed which is why the present cable now has a cross section of 35 square millimetres (2 AWG). Through the intelligent layout of the various components, we were able to further reduce the diameter," reports Maier. This greatly helped Herrenknecht with the design of the connector says Stefan Pabst: "As this takes up even more space, the small cable diameter was essential to keep the connector's diameter below the maximum 70 millimetres (3 inches).



- 4** When the tunnelling machine reaches its target, workers detach the jacking pipes and connect a cable protection pipe to it instead.

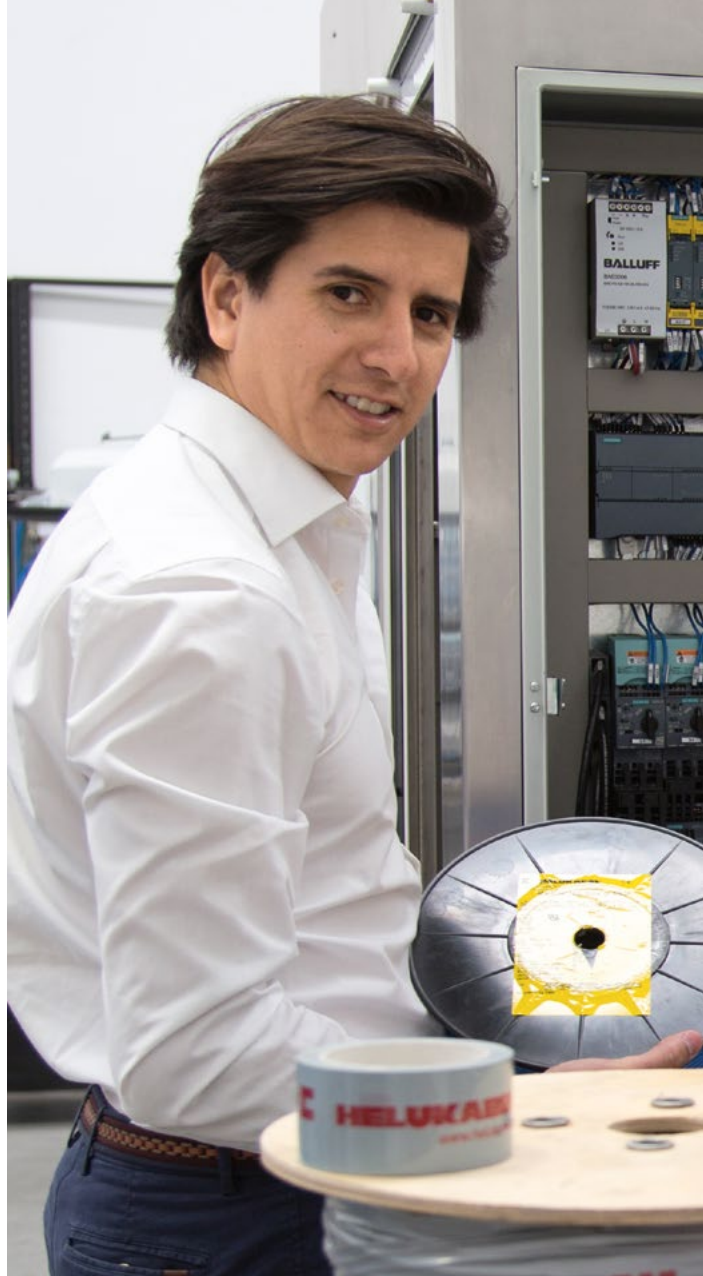
## Two plus three

The development partners also proceeded step by step with the component design of the data transmission cable. "Initially we intended to have two data conductors," explains Herrenknecht's electronics engineer, Michael Huser. "One for navigation and one for control. However, when we realised we needed even more precise tunnelling-machine control, we had to add a second navigation system which meant an additional conductor pair for the CAN bus." The Windsbach experts made this possible by creating an impressive complete

package containing a five-component, small-diameter cable for voltages between 375 and 690 volts. Today, the HELUKABEL solution powers the two navigation systems, the control unit and the drill head, while ensuring reliable data communication between the machine and control console. Huser and Pabst are satisfied along with their colleague Tobias Engel in Varel. There, the jacking frame is already retracting the cable protection tube. Another section of the south-bound route has just been completed. ■

# CUSTOMISED CLEANING

*Washing machines made by the Mexican company WashTech are used in the automotive and aviation industry to clean components. Each machine is individually manufactured to make sure it complies with the customer's requirements.*



Clean work is important; a creed that particularly applies to the aviation and automotive industries. During the production process, individual components must be cleaned repeatedly, for example, after each grinding stage or prior to assembly. This is what the machines from WashTech do. This specialised company based in Querétaro, Mexico manufactures customised cleaning machines. "At the start of development, we always try to fully understand the requirements of the customer," explains Mathieu Fresco, managing director of WashTech. "We then evaluate how we can best clean the components and adapt the machine to their exact geometry."

## Custom-made solutions for individual challenges

Depending how the motors, gear units, steering systems or brakes are contaminated, WashTech offers different cleaning methods including spraying, immersion in detergent solutions, or ultrasonic cleaning.

"Besides the appropriate method, it's always important to ensure our machines can be seamlessly integrated into the customer's production process," explains Fresco. After all, every second of processing time and square metre of space counts in the automotive industry. That's why, when designing the machines, WashTech's primary focus is on compactness, speed, and reliability. The same quality standard applies to the cables and wires used in their one-of-a-kind machines. "Until recently, WashTech was buying products from

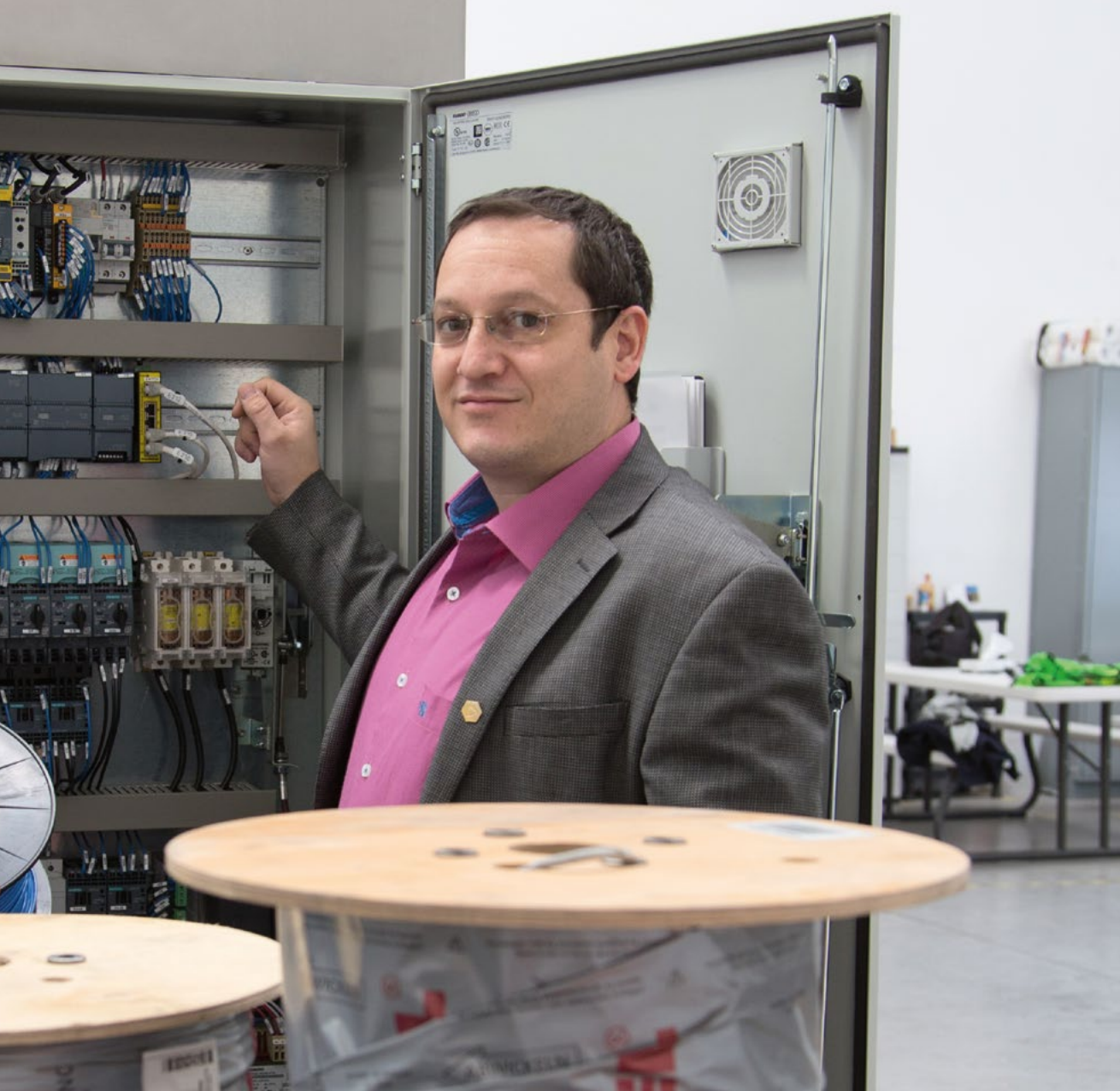
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## THE PIONEER

Gerardo Montenegro Aznar established the HELUKABEL subsidiary in Querétaro and is its managing director. WashTech, headquartered nearby, was one of the first customers of the young Mexican subsidiary.

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**Cleaning in action:** Gerardo Montenegro Aznar, managing director of HELUKABEL Mexico (left), and Mathieu Fresco, managing director of WashTech, stand at WashTech customer Le Bélier. There, the cleaning machines are running 24/7.

various manufacturers. The company then began to look for a single-source supplier for the control system and control cabinet cables," explains Gerardo Montenegro Aznar, managing director of HELUKABEL Mexico.

Montenegro Aznar met up with those in charge at WashTech and presented them with HELUKABEL's product portfolio. For WashTech, a key advantage of HELUKABEL was their approvals for the American and European market. After all, the up-and-coming company isn't just selling its machines in Mexico, it's also steadily increasing its exports. "WashTech procures all its components from leading manufacturers, and HELUKABEL is a globally recognised brand whose products distinguish themselves through reliability, resilience, and high-quality materials. These key features are demanded of us by our customers worldwide," says Fresco. "Their cables are very rugged and withstand the high temperatures at which our parts-washing machines operate."

Montenegro Aznar explains that the control system and control cabinet cables are just the start of an intensive cooperation. "We are now cooperating with

## THE CLEANING EXPERTS

**Who:** WashTech – the cleaning technology experts; Querétaro, Mexico; 20 employees

**What:** The machine builder makes specialised machines to clean components in the automotive and aviation industries. Each machine is adapted to the precise needs of the customer.

WashTech to look at how we can optimise the design of the servomotors in the machines and how our cables can contribute," explains Montenegro Aznar. "This early integration in the development process means we can offer WashTech even better support." To which Fresco adds: "We're growing rapidly and steadily. We want to continue to collaborate with HELUKABEL in the future, as we need first class materials for our machines to further our growth."

# DESERT AND ARCTIC DRILLING

*Bentec drilling rigs are used to drill for oil and gas all over the world, particularly in extreme climates. This is a challenge for engineers and materials.*





**Cables are especially put to the test at the drill head. Continuous torsion and up and down movements cause material degradation. Run-of-the-mill cables cannot meet these demands.**



**A**n icy wind blows across the seemingly endless expanse of Siberia. The double-digit sub-zero temperature makes everything appear frozen and lifeless. It's not a place where you'd want to stay outside longer than necessary. A few thousand kilometres away, on the Arabian Peninsula, the opposite extreme prevails. Here, the sun beats down relentlessly on the hot desert sand; the temperature often tops 40 degrees Celsius (104 degrees Fahrenheit). However, it's in these very regions that vast treasures lie dormant beneath the earth's surface: huge reserves of oil and gas that are waiting to be extracted to meet the world's insatiable demand for energy. The climate is not only tough for humans; machines too have to cope with the extreme environmental conditions. The drilling rigs used to extract these resources are truly put to the test by both the weather and the complex task.

sized company that designs and builds deep drilling rigs for oil, gas, and geothermal wells. "Our drilling rigs are used around the world. In principle, you'll find them in every climate zone, but mostly in Russia and the Middle East," says Klein, who is responsible for the installation and commissioning of the drilling rigs. Bentec supplies customers with ready-made rigs and in doing so, takes care of all the other drilling equipment components, from the control cabinets to the steel framework. According to Klein: "We have to be certain that every single component can withstand the extreme weather conditions." Given the currently low oil and gas prices, the company's customers are under considerable cost pressure. "Every malfunction costs money. With our innovative products, we want to make sure that this never occurs," stresses Klein.

### High tech on wheels

A Bentec drilling rig is a complex object. At its heart is the derrick with the top drive that turns the drill string. The various sensors fitted to the end of this drill string send important information to the operator in the rig's control-and-command centre. It also comprises pumps, draw-works and other mechanical components, not to mention diverse superstructures. As all oil and gas wells eventually dry up, the complete drilling rig is designed to be mobile so that it can be easily transported to the next location to continue working there.

### Every component counts

In temperate Germany, or to be more precise, in Bad Bentheim, Lower Saxony, it's Christian Klein's job to take up the challenges posed by these extreme conditions. He works for Bentec GmbH, a medium-



### THOMAS THOMAE

is HELUKABEL's northern sales manager. Together with Steffen van de Sand from sales support, he manages standard cables for Bentec GmbH. The company has been a regular customer of HELUKABEL since 2004.

In desert regions, the rig is transported on wheels; in arctic areas, via rails. "We need large amounts of cable for the sophisticated control system. This starts with the central

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***"Cables like this are not just off-the-shelf."***

*Christian Klein,  
Bentec GmbH*

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power supply from the generator and goes through to the multitude of cabling in the enclosure containing control cabinets, which regulate the control system and power distribution," explains Klein.

Some of these cables are outside and hence exposed to the elements the whole day: sun and desert storms, or snow and ice. Therefore, they must not only be able to cope with high mechanical stresses but also a spectrum of temperatures ranging from minus 45 to plus 80 degrees Celsius (-49 to +176 degrees Fahrenheit). In addition, they should be UV- and oil-resistant. "We always keep a stock of cables, so long shelf life is important as well. A cable that is already brittle after six months is of no use to us," says Klein. That's why Bentec has been procuring its standard cables from HELUKABEL for many years. "We know we can rely on the excellent quality and the good service."



**The drilling rigs from Bentec are often located in arctic regions.**

### **Extreme forces**

Standard cables however are not sufficient for some applications in the rig, such as drilling engineering. Here, the demands on the power supply and data transmission cables

are particularly high. With a force exceeding 1,000 hp, the top drive gradually turns the drill string into the ground. The latter travels up and down the drilling rig up to a hundred times a day. While doing so, the cables are subjected to great stresses, not only through rotation, but each time they are reeled in and out. "A cable capable of dealing with such stresses is not so easy to come by. That's why we contacted HELUKABEL," says Klein.

### **Complex, high-tech cable**

When Hanss Bruss, key account manager for custom cables at



### **HANSS BRUSS**

is based in the custom cable division of HELUKABEL. Together with Thomas Thomae and Steffen van de Sand, he has now completed delivery of the complex, high-tech cable solution for the drill head.





Many cables are run outside and have to cope with the bitter cold of Siberia as well as the blazing sun of the desert.

HELUKABEL first heard about these requirements, he knew this wasn't going to be an easy task. "There are very large currents flowing here. The single conductor for the main power supply alone has a cross section of 300 square millimetres (600 kcmil). On top of this are up to 45 wires for the sensor and control system signals. At the same time, the cable has to remain flexible and withstand torsional movements.

Bruss and his R&D colleagues at HELUKABEL's Windsbach plant didn't have to start from scratch though. "We've been able to gain a lot of experience from the torsional movements in wind power plants, and regarding alternating bending stress, we were able to draw on our crane construction know-how. What we needed to do, was to satisfy both requirements and select materials capable of withstanding the extreme environmental conditions," explains Bruss. During development, the engineers paid attention to even the smallest

## THE DRILLING SPECIALISTS

**Who:** Bentec GmbH, in Bad Bentheim, approximately 600 employees worldwide. **What:** Manufacturer of drilling rigs for the gas and oil mining industry. The company develops all the main components itself and offers special rig solutions for both arctic and desert regions, as well as for applications in more temperate latitudes.

detail. What would be the best way to strand the wires so they don't break? How should they be bundled to keep the cable flexible? Which material would be suitable for the outer sheath? "The key here was the interaction among all components. Designing the support braiding was particularly challenging. On the one hand, it couldn't be too thick as this would impair the cable's flexibility. On the other, it had to provide a certain stability," explains Bruss. Once the cable's structure had been defined, diverse material and stress tests

took place. "During the entire development, we were in very close communication with Bentec," he recalls.

### Special order completed

Klein in Bad Bentheim is very satisfied with the result. He says: "We were present during testing, and performance lived up to expectation. We can trust the materials and are able to kill two birds with one stone as the high-tech cable can be used in both the desert and arctic regions." ■



The emulsion is used for cooling and lubrication while also stopping the wire from oxidising.

# WIRE DRAWING

**WITH THE EXCEPTION OF FIBRE-OPTIC CABLES, ALL CABLES AND** wires have a metal conductor, typically made of copper. Part 1 of our new series on cable production offers insight into how conducting wires, including very fine ones, are manufactured.

The starting material is wire that has been roughly rolled. The copper wire is then cold-drawn through a tapered opening known as a drawing die. This type of metal forming is referred to as “wire drawing”. State-of-the-art wire-drawing machines, such as those used at HELUKABEL, simultaneously draw wires through multiple drawing dies to the desired size in a single step.

Copper however, is particularly prone to strain hardening. When its structure is elongated in the forming direction, it becomes hard and brittle. An annealing process known as recrystallization annealing is needed afterwards to restore the copper’s original ductility.

After the final drawing, the end products are fine and extra-fine copper wires with diameters as small as 0.05 mm (0.002 inches). The individual wires are then laid together to form a stranded conductor. Such conductors are much more flexible than a single solid conductor and hence less likely to break when bent, but the costs of manufacturing them are considerably higher. You can discover how these stranded conductors are made in Part 2 of our “How Cables are Made” series.

## COPPER: DID YOU KNOW?

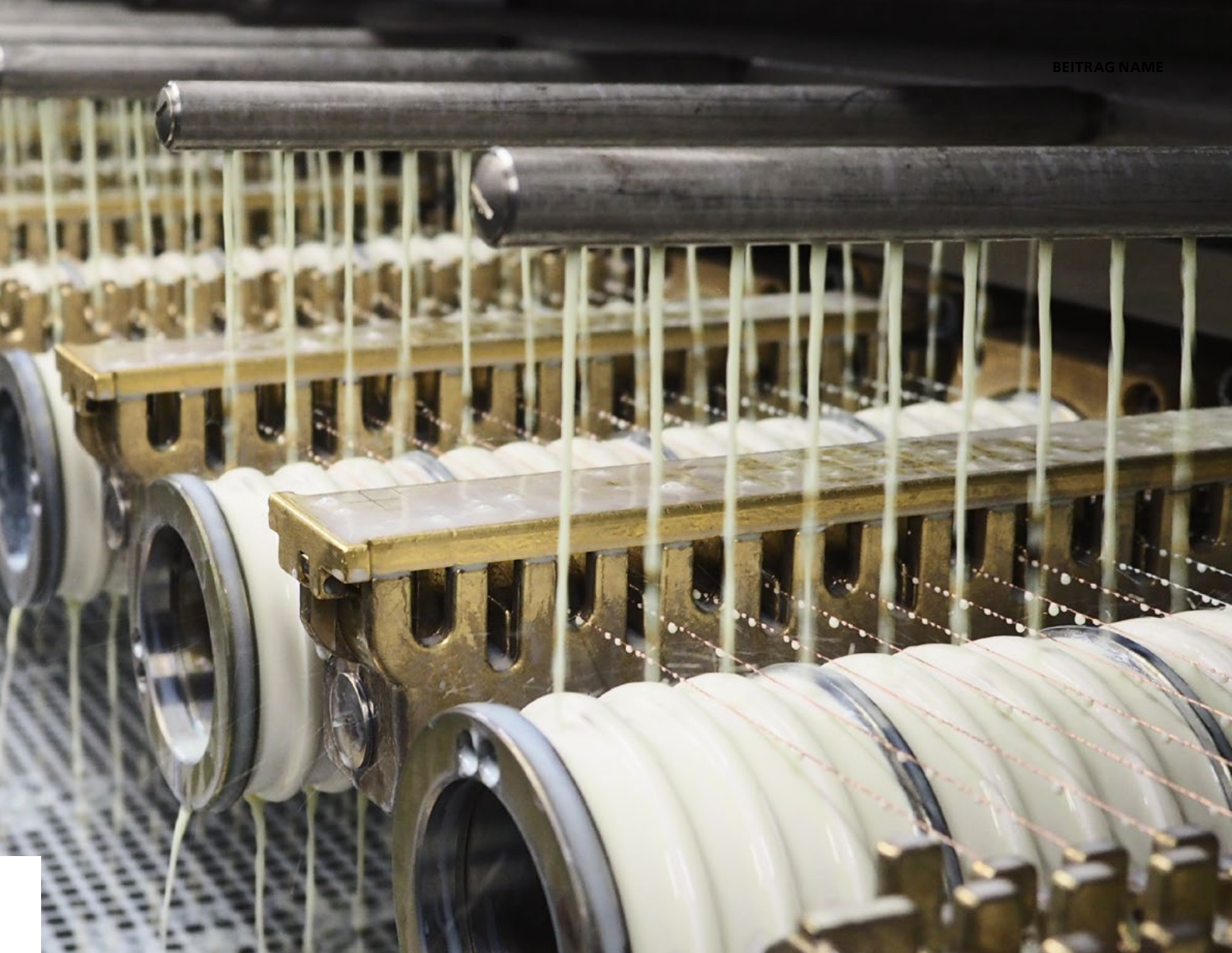
- a kilogram (2.2 pounds) of copper can be drawn into a 57.12-kilometre (35-mile)-long wire (0.05 mm diameter).
- state-of-the-art drawing machines can achieve speeds of up to 32 m/s (105 ft/s), depending on factors such as the quality of the copper, emulsion, drawing dies, dimension, etc.
- global production of copper reached 19.4 million tonnes in 2016
- the world’s biggest producer of copper is Chile with 5.5 million tonnes (2016), followed by Peru (2.3 Mt in 2016) and China (1.74 Mt in 2016)



HOW CABLES ARE MADE:

**WIRE DRAWING** // STRANDING // CORE INSULATION // LAY UP // BRAIDING // SHEATHING // MARKING





***Mr. Mann, which material copes best in the long term with the stresses associated with forming cold copper?***

These days, the die itself is made from PCD (polycrystalline diamond) or diamond, the hardest material in the world. It is held in place by a stainless-steel setting. This ensures it retains its form even after long periods of use, which is important, as these dies must be absolutely precise. Some dies have a diameter of 0.001 mm or less! Wires as thin as this are normally only used for medical purposes. The diameter of the finest wires in our cables is 0.05 mm. Natural diamond dies with tiny hole sizes are needed to make these cables, but even diamond wears down eventually.

When this happens, the die is polished to the next biggest diameter in size.

***Isn't the copper wire totally black, i.e. covered with an oxidation layer after the annealing process?***

Yes, it would be if it came into contact with oxygen during recrystallization annealing. We avoid that though by feeding the wire through an induction annealing machine containing a controlled atmosphere. The inert gas displaces the oxygen and hence stops the hot metal surface from oxidising.

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## ABOUT THE PERSON:

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Thomas Mann is the chief technology officer (CTO) at HELUKABEL. He is an expert and can answer all questions about cable production.

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# TRADE FAIR DATES



## Instagram

### APPRENTICES ON INSTAGRAM

**IN JANUARY, HELUKABEL** apprentices launched their own Instagram account to show what their work day is like. Whether it's the morning coffee break, joint seminars or a placement in one of the many HELUKABEL departments, short videos and photos give insight into their apprenticeship at the company.

[www.instagram.com/helu\\_youngsters](http://www.instagram.com/helu_youngsters)

### LEGAL DETAILS

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#### ■ APRIL 2018

**Hannover Messe**

23. – 27.04.2018 Hanover, Germany

**FEIMEC – Feira Internacional de Máquinas e Equipamentos**

24. – 28.04.2018 São Paulo, Brazil

#### ■ MAY 2018

**AWEA Windpower Conference & Exhibition**

07. – 10.05.2018 Chicago/IL, USA

**SPS IPC Drives Italia**

22. – 24.05.2018 Parma, Italy

#### ■ JUNE 2018

**Expo Eléctrica**

05. – 08.06.2018 Mexico City, Mexico

**ProPak Asia**

13. – 16.06.2018 Bangkok, Thailand

**Automatica**

19. – 22.06.2018 Robotec Systems, Munich, Germany

#### ■ JULY 2018

**AMTS Shanghai**

04. – 07.07.2018 Shanghai, China

#### ■ SEPTEMBER 2018

**Electra Mining Africa**

10. – 14.09.2018 Johannesburg, South Africa

**IMTS – International Manufacturing Technology Show**

10. – 15.09.2018 Chicago/IL, USA

**Technische Industriële Vakbeurs**

18. – 20.09.2018 Hardenberg, Netherlands

**InnoTrans**

18. – 21.09.2018 Berlin, Germany

**China International Industry Fair**

19. – 23.09.2018 Shanghai, China

**WindEnergy**

25. – 28.09.2018 Hamburg, Germany

#### ■ OCTOBER 2018

**Vakbeurs Energie**

09. – 11.10.2018 's-Hertogenbosch, Netherlands

**Scanautomatic**

09. – 11.10.2018 Gothenburg, Sweden



# FAQ

*Some questions are asked again and again. In each issue, one of our experts answers one of these "FAQ".*

## WHEN CHRISTOPH BECHTOLD

switches on his computer in the morning, the first thing he looks at are the prices of copper on the metal exchange. Bechtold is neither a broker nor a speculator, but the purchasing manager at HELUKABEL. He buys about 10,000 tonnes of copper each year for the production plants in Germany, and more than 1,000 tonnes of ready-made cables and wires containing copper. It goes without saying that he keeps an eye on copper prices so he can buy when they're favourable. The prices are constantly changing: no other precious metal experiences so much fluctuation than this reddish, glimmering raw material. There are many reasons for this, Christoph Bechtold explains: "Copper prices used to be purely based on the traditional economics of supply and demand. Nowadays, other factors play a role too. For example, the price we pay is affected by fluctuations in the US dollar/euro exchange rate because the London Metal Exchange trades in dollars, but we pay in euros." Copper prices have been extremely volatile since some large equity funds started using the raw material as a speculative currency. The global political situation also directly affects the stock exchange climate and thusly, copper prices. "It's part of my job to read the newspaper every day," says Bechtold, grinning.

## COPPER PRICES – HOW DO WE MINIMISE THE RISKS FOR OUR CUSTOMERS?

His experience and intuition do not only benefit HELUKABEL; customers profit from it too. "When customers have large orders, with large cross sections containing lots of copper, we recommend they secure the value of the material," explains Bechtold. First of all, this involves discussing how much material is needed when. HELUKABEL procures the copper at the best possible price. This is the price the customer pays later when the

delivery is released, regardless of any interim fluctuations in price. Other customers buy a certain amount in advance and get it delivered in small batches over a fixed period of time. For these customers too, the price paid by Bechtold is the price that applies for the whole amount over the whole period. "Order details are entered in our books and suppliers are instructed to deliver the material as the customer needs it," he explains and adds: "The benefit to our customers is obvious. They have a fixed value for a certain amount over a fixed time span, which allows them to calculate their prices without worrying about fluctuations. This is how we help them minimise their risk. ■

## ABOUT THE PERSON

Christoph Bechtold is head of procurement | technology at HELUKABEL and is in charge of buying material for the in-house production of cables and wires, as well as products from subcontractors.



# GREAT RESPONSIBILITY

As logistics manager at HELUKABEL, **Michael Doering** is in charge of one of the largest and most modern cable and wire logistics centres in Europe. We shadowed him for a day to see what he gets up to at work!

## 7:40 A.M.

During a coffee break, staff in the shipping department keep Michael Doering up-to-date about the latest developments. Naturally, this includes the odd chat about personal matters.



## 07:55 A.M.

Arrival at his desk: the phone call to Asia has to be made early in the morning, and the first emails begin to arrive.



## 08:30 A.M.

Briefing with team leaders from the incoming goods, outgoing goods, and engineering departments: Is there anything to turn special attention to today? How's order processing going? Do we have to take action anywhere?

## 10:30 A.M.

A customer tour through the high-bay warehouse with space for 40,500 Euro-pallets, as well as the automated small-parts warehouse boasting 16 aisles with 36,800 containers – customers are always impressed by this.







### 13:00 P.M.

Lunch in the canteen is an opportunity for Michael Doering to exchange information with colleagues. Sitting at the table today are (from left to right): Northern Sales Manager Ingo Wolf, Managing Director Marc Luksch, Michael Doering, International Business Development Manager Maurizio Bez, and National Sales Manager Jörg Kairies.



### 14:15 P.M.

A regular afternoon appointment is a walk through the various logistics departments. Are the machines working properly? Are there problems anywhere? Michael Doering also finds the one-to-one contact with staff important.



### 16:00 P.M.

An appointment at DB Schenker in Ilsfeld: Michael Doering discusses how workflow operations can be further improved with Borek Heininghoff (left) and Mahmut Tecelli (right) from DB Schenker. His particular concern is the safe transport of goods and the optimal use of cargo space.



### 18:05 P.M.

One more visit to the outgoing goods department just before leaving work. Has everything been shipped on time?



### 18:20 P.M.

Finished for the day! His running gear is waiting for him in the car. A jog in the evening helps Michael Doering switch off and clear his thoughts.

# THE WORLD OF HELUKABEL

**W**e wanted to give you a special look behind the scenes at HELUKABEL with this edition of POWER. This scene illustrates the path of a custom cable; from the customer's request to the sales team, through the

cable design engineering process, manufacturing, and testing facility, all the way to delivery to a happy customer. Some of the characters from the poster are introduced on the second page of this spread. Have fun discovering the world of HELUKABEL!



## **SAM SALES REPRESENTATIVE**

Around 40 sales representatives for HELUKABEL make sure that the customer comes first. Find your right contact person here:  
[www.helukabel.com/worldwide](http://www.helukabel.com/worldwide) ■



## **DEREK DESIGN ENGINEER**

If you can't find the right cable in our catalogue, our design engineering team in Windsbach is there for you. Our engineers have the experience and expertise to develop a product that fits every customer's needs. ■

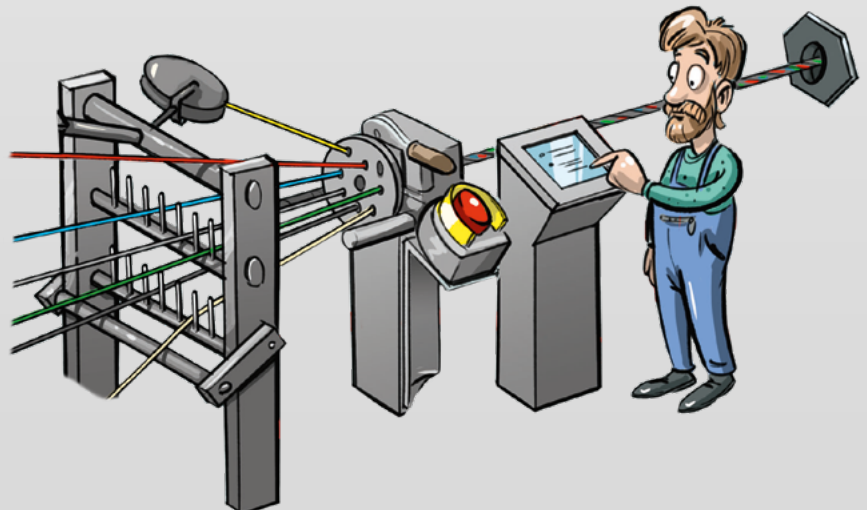


## **LAURA LAB TECHNICIAN**

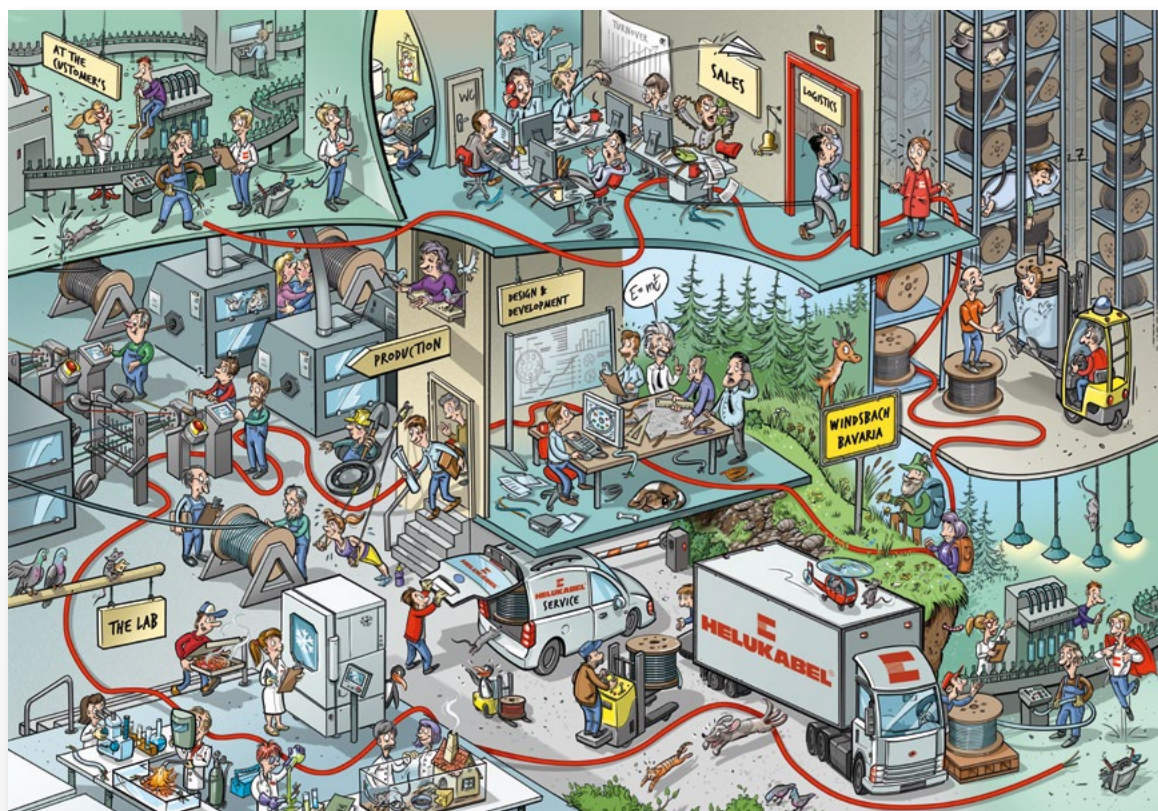
Whether it's extreme cold, chemical, or mechanical stresses, every cable is subjected to rigorous testing in our research and development centre according to the customer's requirements. ■

## **TEDDY TECHNICIAN**

Teddy Technician and his colleagues know the machinery and equipment in Windsbach inside and out. Their expertise makes for a top-of-the-line product. ■



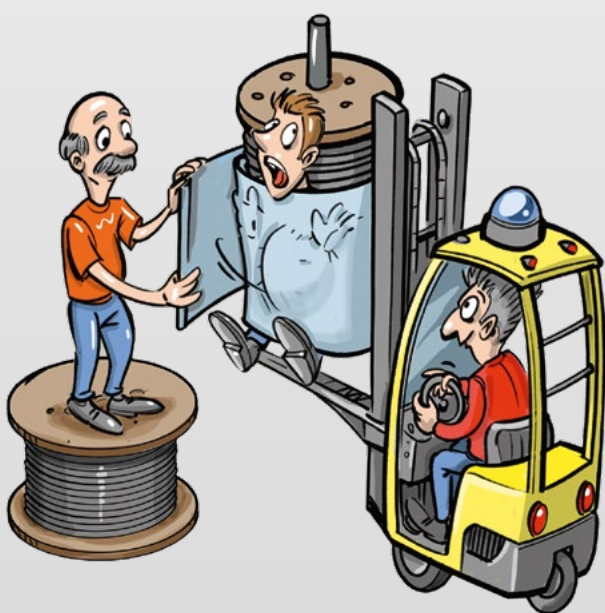
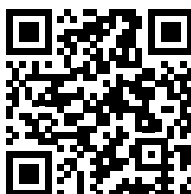




**DOWNLOAD THIS POSTER HERE:**  
[www.helukabel.com/comic](http://www.helukabel.com/comic)

### **WILLIAM WINDER**

William Winder and his colleagues assemble each order with care and precision, and ensure that the goods are safely packaged for transport. ■



### **TREVOR TRUCK DRIVER**

Over 40,000 products are always ready for dispatch and are shipped to more than 200 countries every day. We ship quickly and reliably by land, air, and sea. ■



# WELCOME TO SINGAPORE!

*Facts about our subsidiary and the city-state.*

- HELUKABEL's first subsidiary outside of Europe began operation in Singapore in 2000.
- Currently, eleven members of staff are employed in administration, sales, and the warehouse. The Singaporean subsidiary has a permanent stock of more than 800 items.

- In the beginning, most customers came from the oil and gas industry; today however, the majority are suppliers for the semiconductor and electronics industry.
- The top-selling items in Singapore are JZ-500 control cables and single cores with multiple international approvals: UL, CSA, VDE, HAR and CCC.

## FUNFACTS

### Singaporean pedestrians

are the fastest in the world.

According to a British Council study of 32 metropolises, Singaporeans zoom through the streets of their city at an average of 6.15 kilometres per hour (4 mph). That's equivalent to the flying speed of a bumble bee.



**Singaporeans love waterfalls,** which is why they build artificial ones wherever they can. In parks, shopping centres and hotel lobbies, the sound of babbling water can be heard from every corner.



**Official mosquito inspectors** regularly check Singaporean homes for mosquito eggs and larvae to prevent the spread of dangerous infectious diseases. The big anti-mosquito campaign's slogan is: "Either they die or you do".



There are only **three city-states** in the world: Singapore in Asia, and Monaco and Vatican City in Europe. With a population of 5.6 million, Singapore has 140 times as many citizens as the two other city-states combined.



Singapore is a multi-ethnic city with four official languages: English, Chinese, Tamil, and Malay. Singaporeans celebrate their **diverse culture with parades and artistic events** during an annual week-long river festival.



# THREE, TWO, ONE – ACTION!

*THE HELUEVENT HYBRID COMES TO TELEVISION.*

## **AN APPLICATION-SPECIFIC HYBRID CABLE FOR ZDF, A GERMAN**

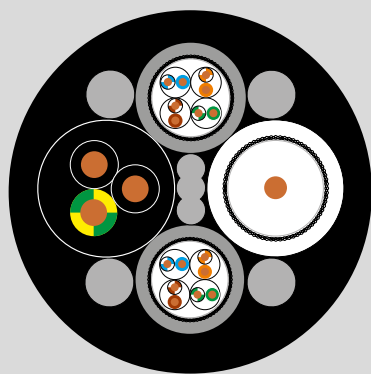
broadcaster, connects multi-output cameras as well as mixing and editing desks. Image, sound, and power transmission are combined in a highly flexible single cable. Alongside the traditional areas of studio and stage engineering, the HELUEVENT HYBRID cable is also designed for building and security technology, for example, CCTV on trains.

### **HALOGEN-FREE AND FLAME-RETARDANT**

for indoor use

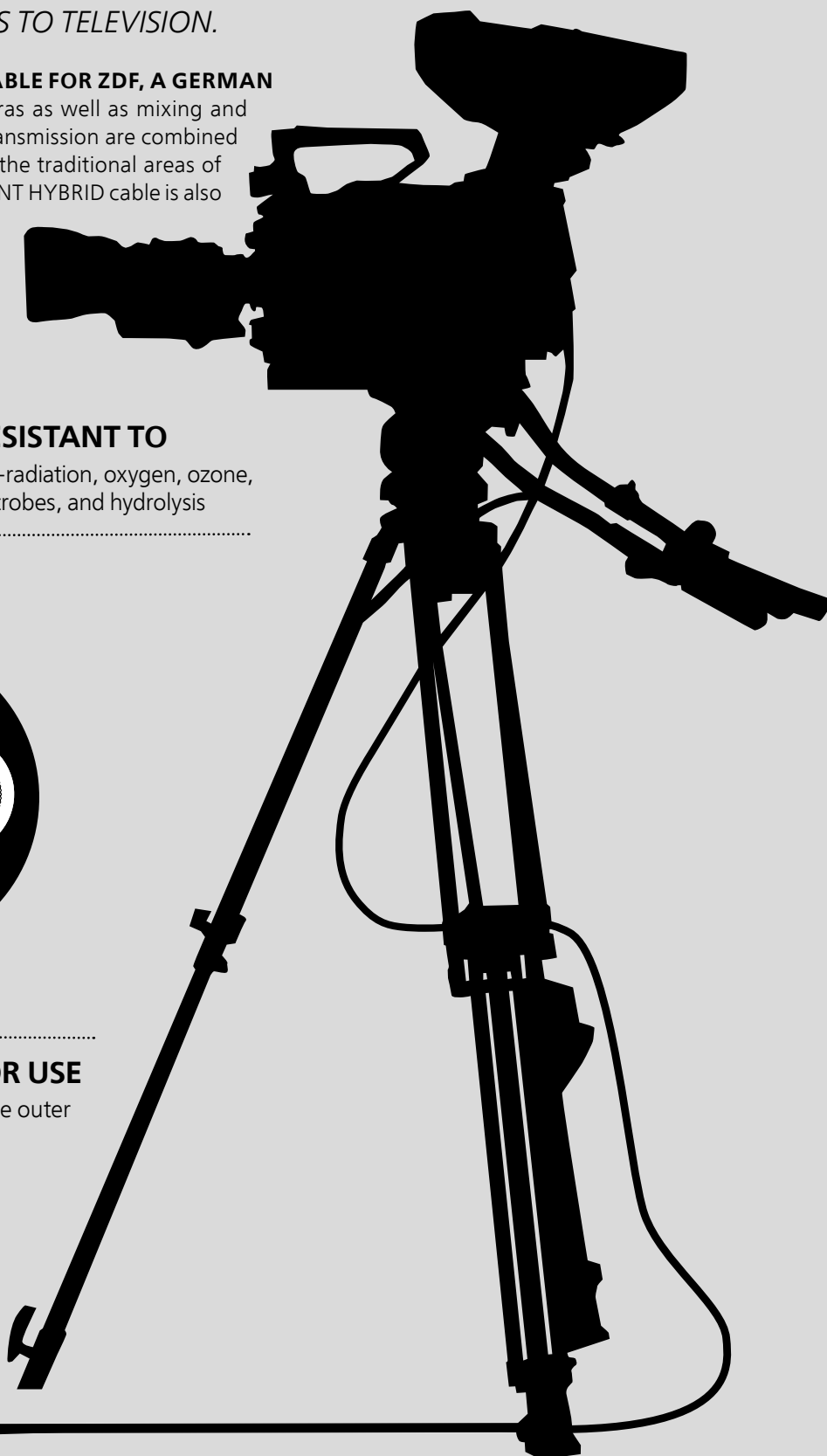
### **RESISTANT TO**

UV-radiation, oxygen, ozone,  
microbes, and hydrolysis



### **SUITABLE FOR OUTDOOR USE**

thanks to a special TPU-composite outer  
sheath



# WELL ORGANISED

**Maurizio Giordano** has been working in marketing at HELUKABEL for over 20 years. One of his main tasks is to ensure HELUKABEL looks its best at the various trade fairs.

Whether it's light+building, Hannover Messe or SPS IPC Drives, almost every month HELUKABEL is present at the industry's leading trade fairs. But a lot of preparation needs to be done before visitors can be received at the exhibition stand. As the interface between HELUKABEL departments and the exhibition stand builder, Maurizio Giordano has his hands full: from choosing a suitable place, planning the stand with the exhibition contractor, discussing the key themes with the departments, to inspecting the stand when it's finished. Maurizio Giordano designs the wall panels and sample boards alongside graphic designers, and makes sure that both the exhibits and marketing material arrive at the stand on time.

He also advises and supports the international subsidiaries with their trade fair preparations. An annual highlight for him is the SPS IPC Drives in Parma. Italian by birth, this event gives him an opportunity to speak his mother tongue.

