t·time

A MAGAZINE FROM TRELLEBORG GROUP | 1·2017

Solutions that seal, damp and protect critical applications.

The BorWin3 project, 130 kilometers off the German coast, heralds a new era in offshore energy production.

NORTH SEA: GET ENERGY TO THE MAINLAND

GRAND ÉLÉPHANT
Stability offered to artistic project

FLUID POWER
Meet technology specialist Mandy Wilke

FUTURE PORT
Safer and more efficient piloting

president and ceo PETER NILSSON

Seal tight

Seal, damp and protect – that is Trelleborg's business concept. Over the past years the company has developed a portfolio of seals for a wide variety of applications.

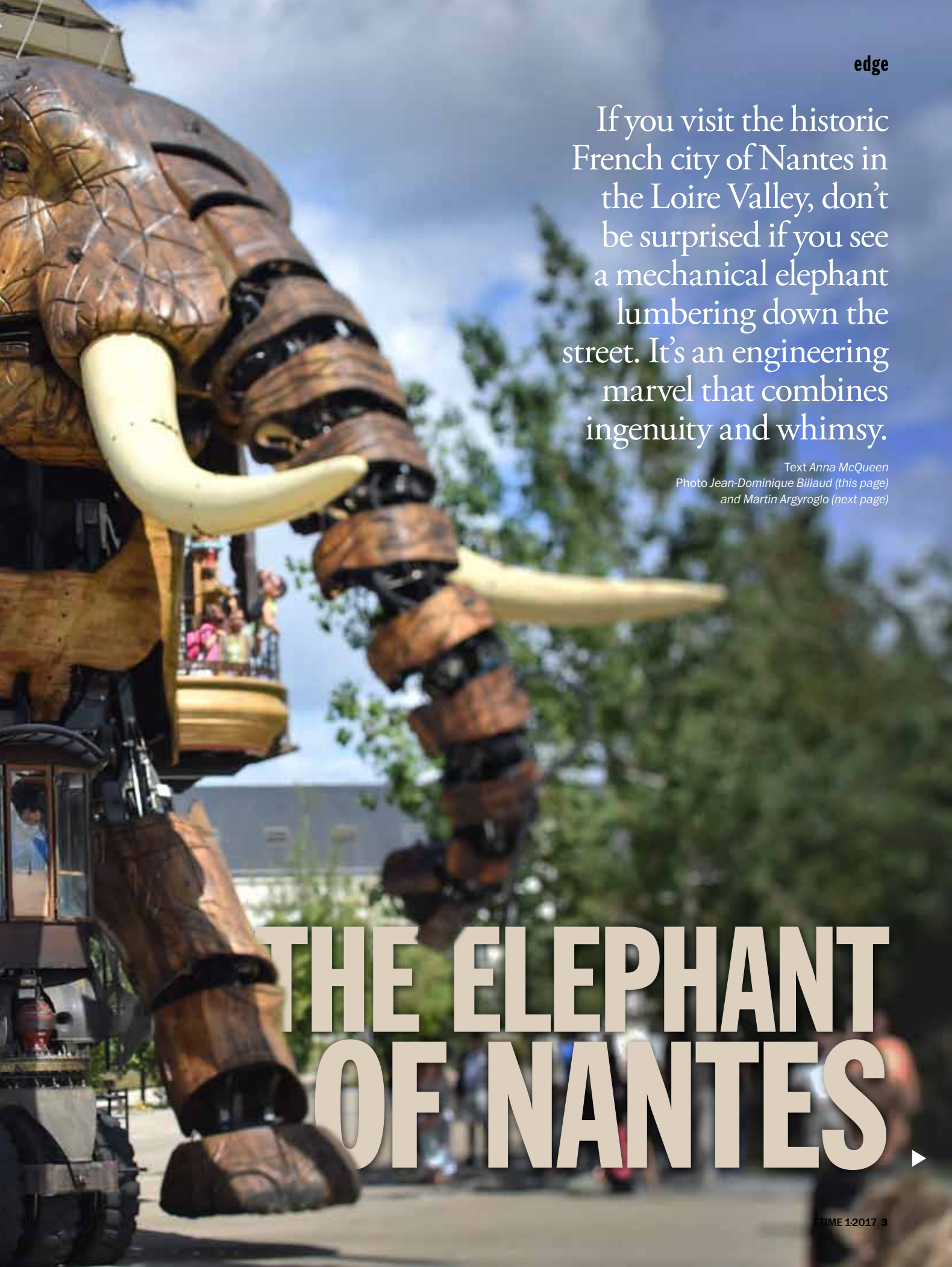
Sealing technology is about keeping a tight seal between two surfaces. In a static sealing application there is no movement between sealing surfaces or between the seal surface and its mating surface. In dynamic seals there is motion between the sealing surfaces. You can find dynamic seals in, for example, hydraulic systems that make lift mechanisms and mechanical arms work.

But sealing technology is about more than the seal itself. In this issue of *T-Time*, Trelleborg Technology Specialist Mandy Wilke explains how all the elements in a sealing system must work together in tandem: the seals, the counter surface, the pressure fluid and the lubrication.

Meanwhile, you'll note that the *T-Time* team has made some adjustments in the design of the magazine. We hope you like the new look!

contents 1·2017

Cover photo: Christopher Furlong/ Getty images
Next issue of *T-Time* will be released June 20.



If you visit the historic French city of Nantes in the Loire Valley, don't be surprised if you see a mechanical elephant lumbering down the street. It's an engineering marvel that combines ingenuity and whimsy.

Text *Anna McQueen*
Photo *Jean-Dominique Billaud (this page) and Martin Argyroglo (next page)*

THE ELEPHANT OF NANTES

At an amusement park in the French city of Nantes, visitors can enjoy a ride on a mechanical elephant. The driver regales passengers with stories about the elephant. For its part, the elephant occasionally blasts water through its trunk onto unsuspecting passersby.

When you think of Nantes, the sixth-largest city in France, you might consider its naval history, Gothic cathedral, the spectacular château of the dukes of Brittany or its key position on the River Loire, surrounded by vineyards producing the famous Muscadet white wine. What you might not expect as you wander the city's recently renovated shipyards on the Île de Nantes, the island in the city's center, is being sprayed with water from the trunk of a 12-meter-high mechanical elephant out on a stroll with 50 passengers on board.

But in 2007, an unusual menagerie settled in the heart of the city. The western part of the Île de Nantes was transformed into a leisure and cultural destination, with bars, restaurants and nightclubs, along with an artistic and cultural project called Les Machines de l'Île.

François Delarozière and Pierre Orefice, co-founders of Les Machines de l'Île, have been key players in the French street theater scene since 1985. Their aim is to make a connection between urban and cultural development through living architecture with a futurist vision that transforms the way we view our cities.

At the heart of Les Machines' artistic process is motion. They create fantastical contraptions using a huge range of materials, including steel, leather, wood, glass, fabric and metal. These machines then "come to life," captivating audiences.

The Grand Éléphant has been a star of the Nantes installation since it began. It carries 50 passengers on its back between the warehouses, home to Les Machines' workshop and Gallerie des Machines, and the maritime-themed Carrousel des Mondes, on the banks of the Loire. It moves along at between one and three kilometers an hour, piloted by a driver who regales passengers with stories about the creature, and it gives the occasional blast of water through its trunk onto unsuspecting passersby.

From their perch atop the giant pachyderm, passengers can enjoy some breathtaking views of the former shipyards and beyond. They stand on balconies and terraces, accessed from a comfortable indoor lounge on the elephant's back, with every part of it moving in a natural way.

Blinking its eyes, flapping its ears and waving its trunk, this incredibly lifelike creature appears to stride along on fully jointed powerful legs. Whereas, in fact, the elephant is driven from behind by a 450HP motor, while the driver sits in a cab tucked between the animal's front legs. And underpinning it all, the cab and engine run on Trelleborg Elite XP tires, whose square footprint offers excellent stability, thanks to a greater contact area that has proven to be perfect for supporting such a spectacular work of art. ■

Premium tires

The tires used for the Nantes elephant are the 16.00-25 model from the Trelleborg Elite XP premium range. Indeed, Trelleborg supplies similar products to other amusement parks and elephants. The Elite XP range offers premium non-marking tires made with special compounds for demanding material handling environments. An optional Pit Stop Line wear indicator ensures that users optimize the value of their product by replacing them at the right moment and provides reassurance that their tires are always safe to use. ■

For more information: james.pick@trelleborg.com

The Grand Éléphant

- Measures 12 meters high, 8 meters wide and 21 meters long
- Weighs 48.4 metric tons
- Made from tulip tree wood
- Metal body uses 2,000 liters of hydraulic oil
- Powered by a 450-horsepower motor
- Travels at 1 to 3 kilometers per hour
- Animated using 62 cylinders, 46 of which are hydraulic, six are pneumatic and 10 are gas-powered.

Smooth Running

Although not necessarily visible, hydraulic systems are everywhere. They are what make lift mechanisms and mechanical arms work. Advanced seals keep these systems performing effectively. Such seals are now enhanced by the new Trelleborg Lubrication Management System.

Text *Nigel J. Luhman* Photo *Uwe Ditz (portrait) and Istockphoto*

Long life and performance of hydraulic systems depend on a sealing configuration within a rod and piston housing that involves multiple seals. Best practice is to use both a primary and a secondary seal. The primary seal does the job of sealing in lubricant and the secondary seal takes over when needed. Because the lubricant is sealed within the hydraulic system, the secondary sealing element runs under dry conditions. The more effective the primary seal, the drier the running conditions of the secondary seal. This lack of lubrication can lead to wear, reduced seal life and ultimately downtime for an operator.

This dilemma in terms of optimizing the performance of both the primary and the secondary seal

"We can achieve the best possible solution despite the many increasing challenges in the world of fluid power."

Mandy Wilke

Watch Mandy Wilke tell us about her job in a video on trellborg.com

has resulted in the creation of the Trelleborg Lubrication Management System, a new discipline in which Trelleborg Sealing Solutions is investing a substantial amount of R&D time and resources. Lubrication management involves adjusting the conditions for the individual sealing elements, such that the load on each element is reduced to ensure performance of the primary seal and the extended life of the secondary seal.

"It's not enough to know about sealing technology," explains Mandy Wilke, Technology Specialist, Fluid Power Europe within Trelleborg Sealing Solutions. "You also need to know about the operating conditions. When you think of a sealing system, all the elements must work together as a team: the seals, the counter surface, the pressure fluid and the lubrication."

First exhibited as a design study at the Hanover Fair in 2014, the Trelleborg Lubrication Management System uses a thicker oil film under the first sealing element to reduce the load on that seal. The amount of fluid film moving past the primary seal is then controlled, normally by an integrated check valve in the primary seal. "This means we can achieve the best possible solution despite the many increasing challenges in the world of fluid power," Wilke says.

"These challenges include an increasing demand in terms of power, performance and efficiency.

Mandy Wilke

Lives: In Germany, in the greater Stuttgart area. She is originally from Hamburg.
Education: A graduate of Hamburg Harburg Technical University, where she studied mechanical engineering, specializing on sealing solutions in her doctoral studies.
Work: Following work as a scientific assistant at Hamburg-Harburg Technical University, Wilke joined Trelleborg Sealing Solutions in 2012, first as a test and development engineer and then, two years later, in the fluid power sector.
Interests: Enjoys walking in the countryside around Stuttgart. She also likes to return to her hometown, Hamburg, whenever possible.
Best thing about her job: "It's never boring; it covers many different areas. We're a small, close-knit team and get to work closely with lots of other teams globally."

As hydraulic systems reduce in size and weight, this leads to an increase in pressure as well as higher speeds in hydraulic applications. At some point, all seals reach their physical limits, but through lubrication management the sealing system in these cases can be enhanced."

Wilke is head of the Global Surface Competence Team, which is currently concerned with counter surfaces in hydraulic applications. The type of counter surface within a hydraulic system is often decided for technical reasons, without considering the sealing system. Yet the counter surfaces can play a significant role in limiting the service life of seals within an application.

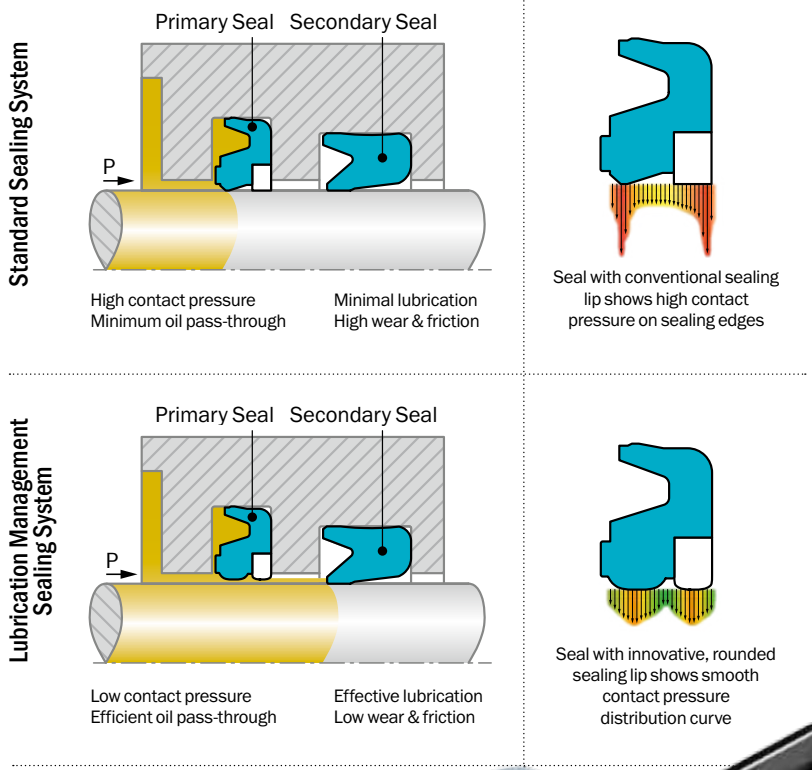
"By maintaining good contacts with our customers, we're integrated on a regular base in their development process from the start," Wilke says. She also points out that teaming up with clients can easily work the other way around. "We often have specific solutions for concrete applications and then transfer these ideas to other markets so as to multiply the benefit." One example of this is the new switch seal, which incorporates a sealing and a guiding element, with any number of innovative possibilities.

This teamwork has proven important in optimizing the performance of sealing systems in fluid power applications and is a key reason why customers work with Trelleborg: The company can bring a wealth of knowledge, experience and materials to each individual fluid power design, and that now includes an understanding of lubrication management. "We have to stay ahead of the competition," Wilke explains, "and it's our determined-to-be-different mentality that makes us outstanding." ■

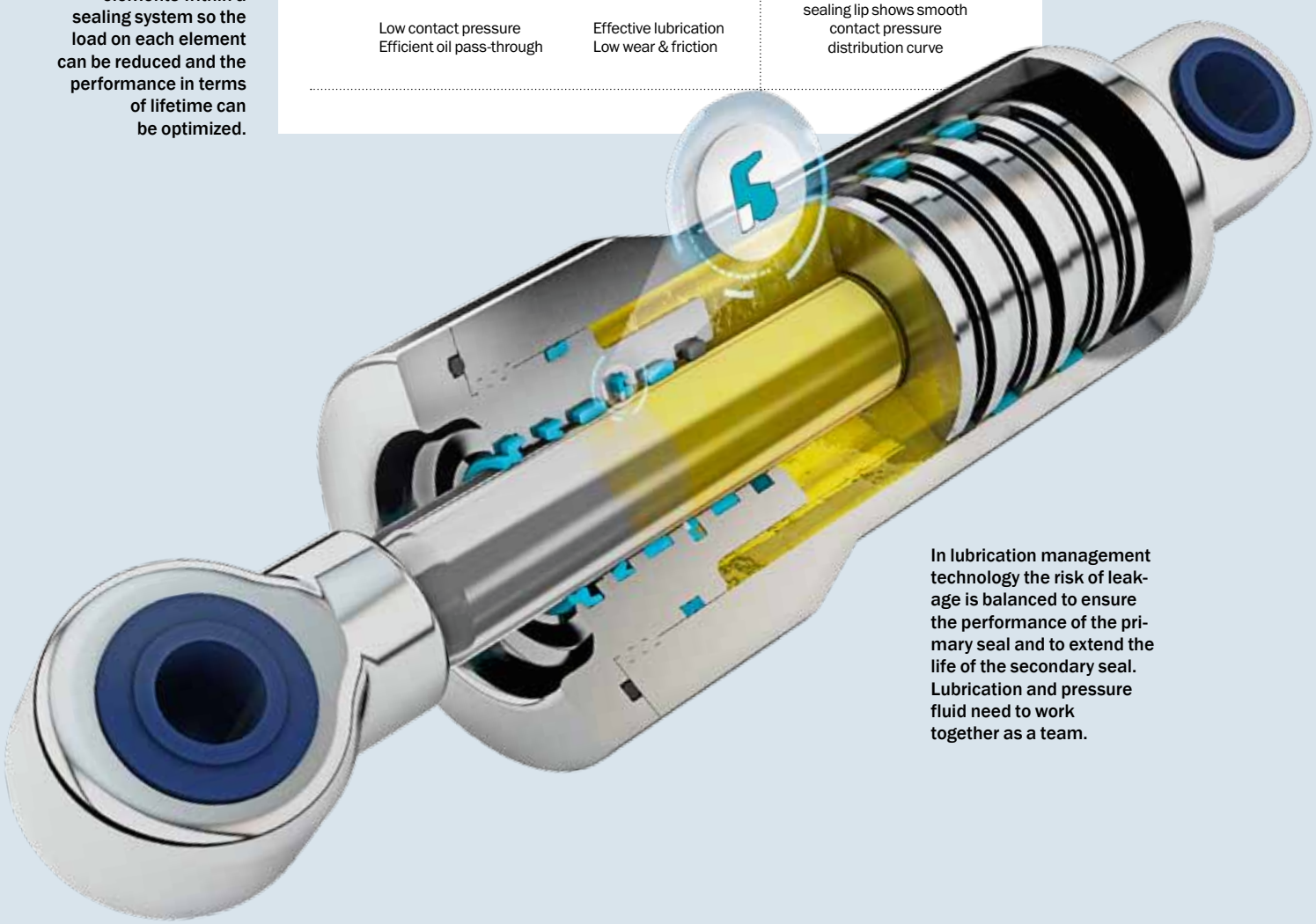
For more information:
mandy.wilke@trelleborg.com

Keeping hydraulic applications performing effectively comes down to advanced seals.

Lubrication management



Lubrication management is about adjusting lubrication conditions of all single sealing elements within a sealing system so the load on each element can be reduced and the performance in terms of lifetime can be optimized.



In lubrication management technology the risk of leakage is balanced to ensure the performance of the primary seal and to extend the life of the secondary seal. Lubrication and pressure fluid need to work together as a team.

A DAY AT A DAIRY FARM

DID YOU KNOW...

260 million There are more than 260 million dairy cows worldwide.

22 liters Some 22 liters of milk per cow per day is typical in Europe. The average yield in the United States is higher, more than 30 liters per cow per day. Milk production per cow has more than doubled in the past 40 years.

747 million tons World milk production has increased by more than 50 percent since 1983; in 2013 it was 747 million tons.

1/10 milk Milk for drinking accounts for about 1/10 of total dairy production.

11–23 liters The cow's udder contains 11 to 23 liters of milk.

2 percent of milk comes from goats, 1 percent from sheep, 11 percent from water buffalo and 85 percent from cows; 0.4 percent comes from camels.

18 percent India is the world's largest milk producer, with 18 percent of global production.

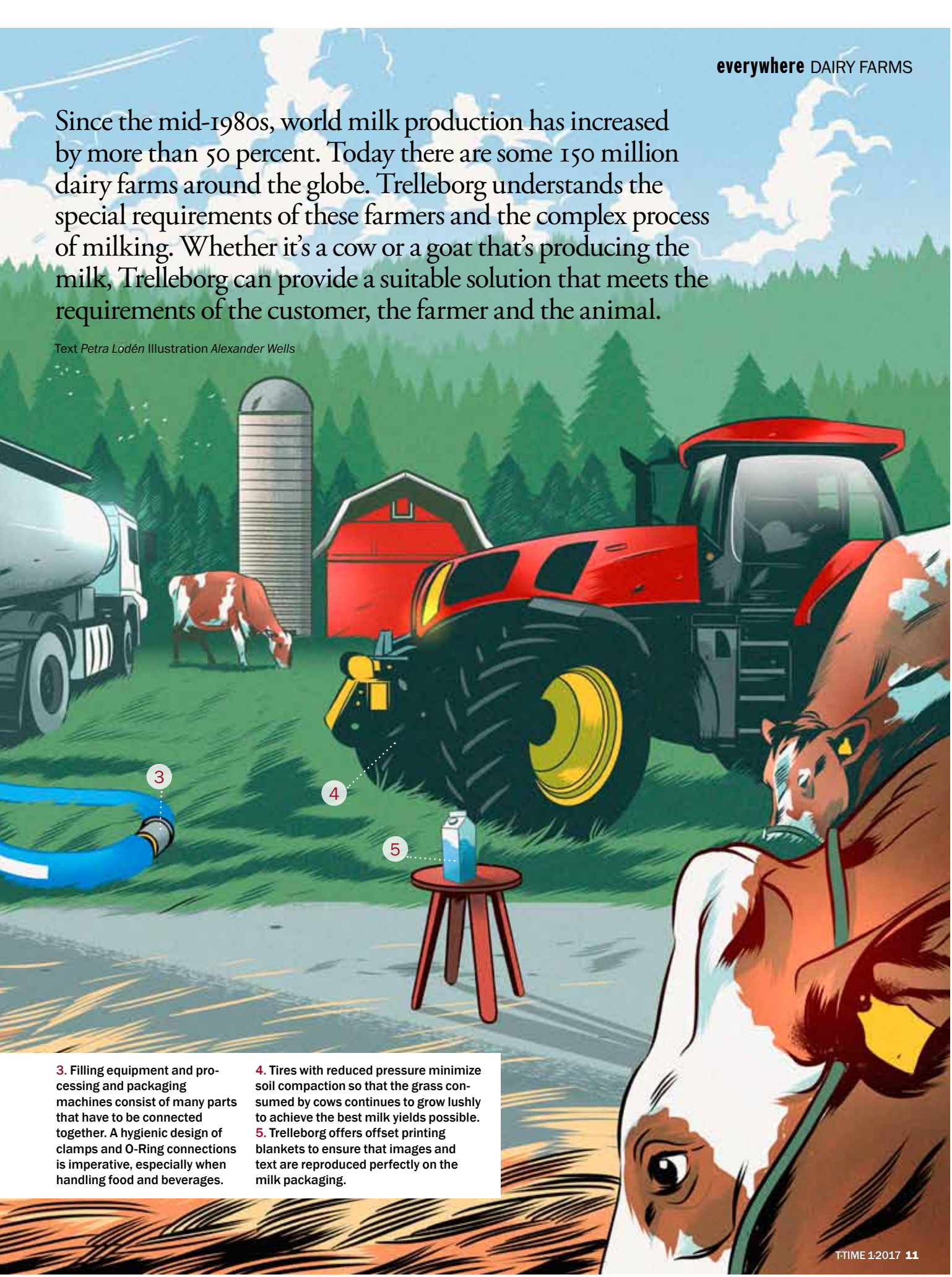
Source: FAO, CIWF

The agricultural environment is often demanding, calling for reliable solutions with a long service life. Trelleborg cooperates with original equipment manufacturers, supplying hoses for complete milking systems.

1. Milk liners are designed, produced, branded, packed and distributed according to customer specifications.
2. Citerdial and Lactadial: Hoses for milk handling and collection as well as processing and filling plants.

Since the mid-1980s, world milk production has increased by more than 50 percent. Today there are some 150 million dairy farms around the globe. Trelleborg understands the special requirements of these farmers and the complex process of milking. Whether it's a cow or a goat that's producing the milk, Trelleborg can provide a suitable solution that meets the requirements of the customer, the farmer and the animal.

Text *Petra Lodén* Illustration *Alexander Wells*



3. Filling equipment and processing and packaging machines consist of many parts that have to be connected together. A hygienic design of clamps and O-Ring connections is imperative, especially when handling food and beverages.

4. Tires with reduced pressure minimize soil compaction so that the grass consumed by cows continues to grow lushly to achieve the best milk yields possible.

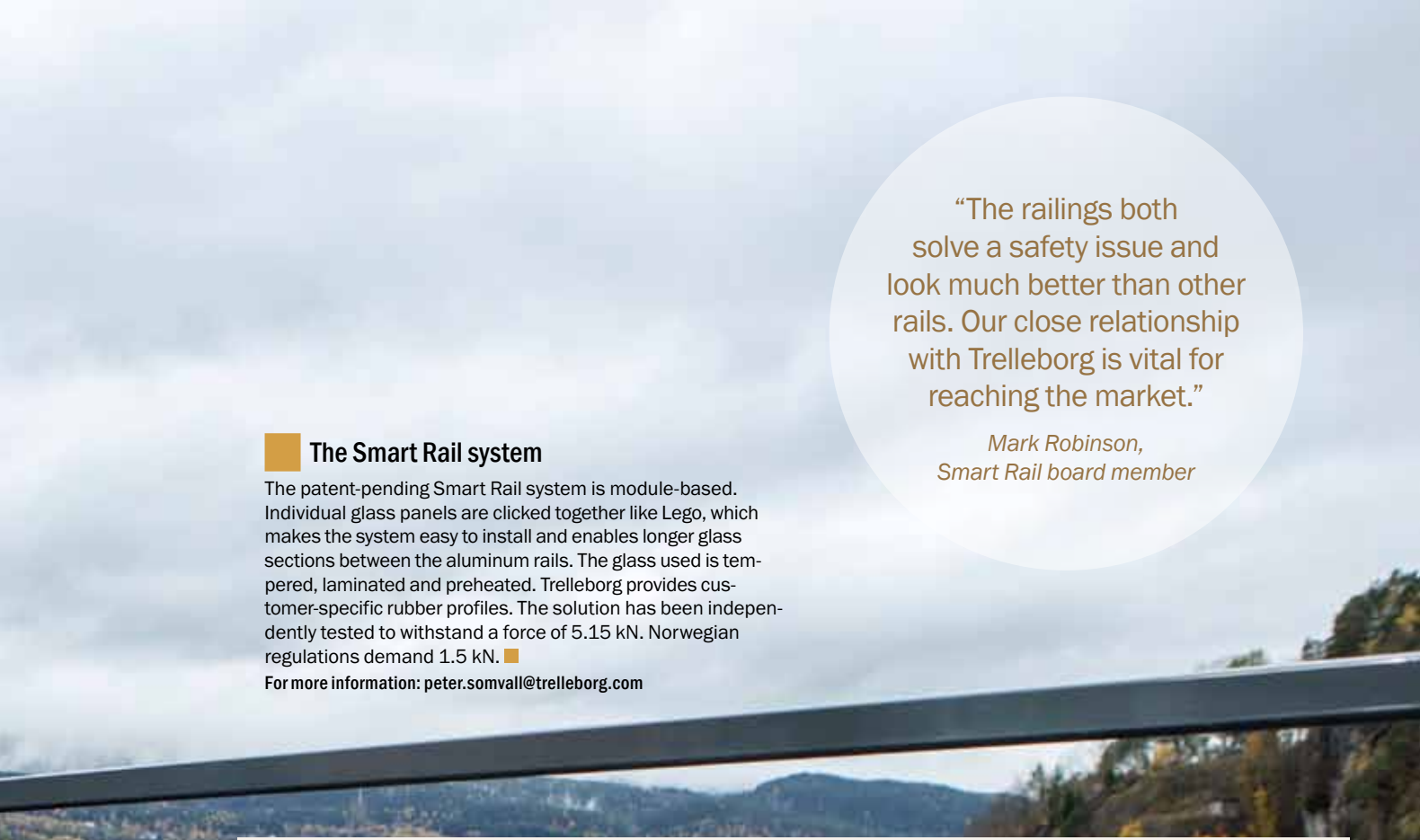
5. Trelleborg offers offset printing blankets to ensure that images and text are reproduced perfectly on the milk packaging.

Owner and founder of Smart Rail, Johan Kohmann (left), and Peter Somvall, Market Development Manager, Trelleborg.

THE SMARTEST COMBO

Text *Björn Raunio* Photo *Johnny Syversen*

With a glass balcony railing system that has unprecedented strength, Norwegian startup Smart Rail is plotting to conquer the world of construction while making us all safer.



> "The railings both solve a safety issue and look much better than other rails. Our close relationship with Trelleborg is vital for reaching the market."
>
> *Mark Robinson, Smart Rail board member*

The Smart Rail system

The patent-pending Smart Rail system is module-based. Individual glass panels are clicked together like Lego, which makes the system easy to install and enables longer glass sections between the aluminum rails. The glass used is tempered, laminated and preheated. Trelleborg provides customer-specific rubber profiles. The solution has been independently tested to withstand a force of 5.15 kN. Norwegian regulations demand 1.5 kN.

For more information: peter.somvall@trelleborg.com

Startup companies are often built on brilliant ideas.

Realizing your potential, however, is a lot easier if a well-established company such as Trelleborg takes on a wider role than simply being a provider.

"When the owner and founder of Smart Rail, Johan Kohmann, first contacted me and explained his concept, I was impressed," says Peter Somvall, Market Development Manager within Trelleborg Industrial Solutions. "Instead of simply selling a rubber profile, I became more deeply involved in his business, connected with his other providers and helped to make sure that we developed the best possible solution together."

The Smart Rail system takes safety in glass railings to a whole new level, while at the same time enhancing aesthetic qualities and making the railings much easier to install and maintain. It's a module system, using a 'Lego' style principle for joining the glass panels together without tools. Compared with other solutions, the aluminum rails can be placed much farther apart.

"The idea behind Smart Rail comes from realizing a need for better security when it comes to glass balcony railings," says Kohmann, who started working on the Smart Rail project in 2010 after retiring from his job as an official valuer of machinery and building constructions.

"Having an engineering background, I was convinced that there was a market for safer products, provided you set up stringent demands and could document that you could meet them."

Using glass that is tempered, laminated and preheated, aluminum rails that meet Norwegian safety standards and a special sealing profile from Trelleborg, the patent-pending Smart Rail system is now on the market. The glass railing offers unequaled safety and has been third-party tested to withstand a force more than three times greater than regulations stipulate.

"The support from Trelleborg has been key to getting this far," says Kohmann. "We have set up the common task of achieving excellence and being the best. Trelleborg's backing goes beyond the product. They help us develop our market. I'm doing brain robbery, free of charge!"

Somvall comments: "As a sales representative, there is great potential in helping to develop a customer's business as their sparring partner. You can achieve so much more working together."

Seasoned Silicon Valley entrepreneur Mark Robinson has also realized Smart Rail's great potential and serves as a board member.

"Our collaboration with Trelleborg is a true win-win situation," he says. "Trelleborg help us in getting the word out while achieving an improved offer to their customers, with a solution they would not have access to without our mutual collaboration. The potential market for Smart Rail is huge, since the railings both solve a safety issue and look much better than other rails. Our close relationship with Trelleborg is vital for reaching the market."

Kohmann comments, "We are now developing a complementary system for glassing in balconies, using the same simple, 'Lego' style solution to click glass panes directly onto our railing."

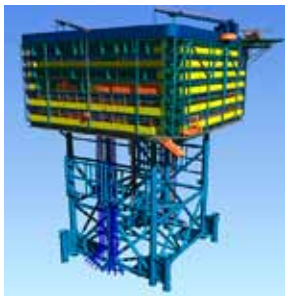
blue dimension*

*Blue Dimension™ refers to Trelleborg solutions for better sustainability. They protect people, the environment, infrastructure and assets.

Winds *of* change

With interest in renewable energy growing worldwide, Trelleborg is adapting its oil and gas solutions for use in the offshore wind sector, with outstanding results.

Text *Daniel Dasey* Photo *Istockphoto*



PHOTOS: TRELLEBORG

Trelleborg is delivering a number of solutions for HVDC BorWin3, a high-voltage link that will allow power generated by wind turbines in the North Sea to be transmitted to the German mainland.

With much of the world looking for fossil-free energy sources, wind power is becoming increasingly popular. To more efficiently capture this resource, wind farm operators are frequently choosing offshore locations for their plants, where higher-velocity winds are present and there is less impact on communities.

Trelleborg is currently delivering a number of unique solutions for HVDC BorWin3, a high-voltage link that will allow power generated by wind turbines in the North Sea to be transmitted to the German mainland. Due to commence operation in 2019, BorWin3 is the third in a series of such links operated by the transmission system operator, TenneT, with each named after the nearby island of Borkum.

BorWin3 is significant in that its converter platform is being constructed using "floatover" technology. This is only the third time that this approach, common in the oil and gas industry, is being used on a wind farm project.

Vincent Tan, Sales and Marketing Manager within Trelleborg Offshore & Construction in Singapore, explains that the converter platform consists of a six-legged base (or jacket) and a separate topside. The base will first be secured in place and then the topside will be transported by barge to the site and lowered on top of it.

Trelleborg was chosen by Petrofac, the company responsible for construction and installation work on the project, to supply six deck support units. These sit between the topside and the deck support frame on the barge used to take the topside to site and absorb impact loads as the topside is mated to the jacket.

Trelleborg is also supplying six leg mating units (LMUs) that reduce impact forces during the mating operation, allowing topside movement to be progressively reduced to zero during load transfer.

While LMUs are generally welded to the topside prior to the transport operation, the BorWin3 project calls for the external tubular cans to serve as individual supports during the construction phase. "This will entail immersion in seawater, and Petrofac expressed concern about the effects on the LMU's internal parts performance," says Tan. "Trelleborg responded by creatively proposing that the LMU be delivered in two stages – first the tubular cans in January 2017 and then the internal components in January 2018."

While this satisfied the customer, it created another challenge as the internal components of the leg mating unit are usually bolted and welded to the tubular can prior to its being welded to the topside. Because the cans are being fitted to the topside in advance, Trelleborg engineers devised a unique clip system that allows the internal components to be easily fitted once the topside is complete.

As well as allowing the BorWin3 project to proceed, the solution has potential for other applications, and Tan says there are now plans to use it on other Trelleborg projects. ■

For more information:
vincent.tan@trelleborg.com

INNOVATIVE CABLE SOLUTION FOR WIND FARMS

Trelleborg has long delivered effective cable and flowline protection solutions for the oil and gas industry. Used to protect the lines that transfer oil and gas from rigs back to the mainland, they play a crucial role in protecting the natural environment from potential spills.

Now, with the world looking increasingly for more sustainable forms of energy, Trelleborg has devised an equally reliable solution for wind farms. NjordGuard is a cable protection system for the renewables market, used to protect the cables carrying the electrical power generated by wind farms from the converter platform back to shore.

John Deasey, Sales Manager-Renewables within Trelleborg Offshore & Construction in the U.K., says that adapting the cable protection system for use by wind farms involved rethinking a number of design features. "One of the challenges was to stop being so conservative," he says. "After doing some analysis we realized that the cables don't have to be so large and that we could reduce the wall thickness of the polymer used." Deasey says another modification was ensuring that the cable protection could manage the increased amount of heat generated by power cables.

With the design challenges successfully overcome, NjordGuard is now ready for rollout on offshore wind projects. "This really is a massive opportunity," Deasey says. "Renewable energy has a massive future and could help establish a different culture, different manufacturing methods and a different outlook." ■

For more information:
john.deasey@trelleborg.com

It takes a lot of power to pull a massive cultivator on heavy clay. The right machine with the right tires is what's needed.

Text *Trelleborg*
Photo *Trelleborg*

TIRED UP

JJ & TH Haylock replaced a conventional tractor with the equal-wheeled, four-wheel-steer Claas Xerion 5000, specifying Trelleborg High Power TM900s for maximum traction.

The temperamental East Anglian weather and the need to cover more cropland in the brief periods when soil conditions are optimal pushed British farm operator JJ & TH Haylock Ltd. into investing in a new tractor. One important part was choosing the right tires.

The company cultivates 1,200 hectares (3,000 acres) of cropland in Haverhill, in Suffolk County, England. They work with such crops as wheat, barley, rapeseed and beans, applying a system of minimum tillage. Ensuring the timeliness of operations and working soils only when they are in good condition are critical elements of this system.

Tillage and drilling tasks for the company's cropland had been entrusted to a conventional 370 hp John Deere 8370R wheeled tractor, but increased contracted acreage meant a new tractor was needed.

The company chose a 530 hp Claas Xerion 5000, an equal-wheeled machine that offered both tractive abilities and ease of road travel. The rigid-frame, four-wheel-steer tractor featured a 17,450-kilogram unladen weight. The tractor's mid-mounted cab, allowed for ballast on both the rear and front wheels.

The right tires were key to turning this power and weight into traction. After researching the options, the company specified Trelleborg TM900 High Power 900/60R42 tires.

Traffic operator Daniel Mayes points out that the new tractor needed to work well with a variety of demanding equipment. "The services of Trelleborg in setting up the tractor with the best combination of weights and pressures for the equipment it was expected to work with were invaluable in getting the most from the machine in its first season," says Mayes.

With both primary and secondary cultivations and drilling to take care of, and with spring as well as winter crops, the Xerion averages 900 to 1,000 hours a year on the job.

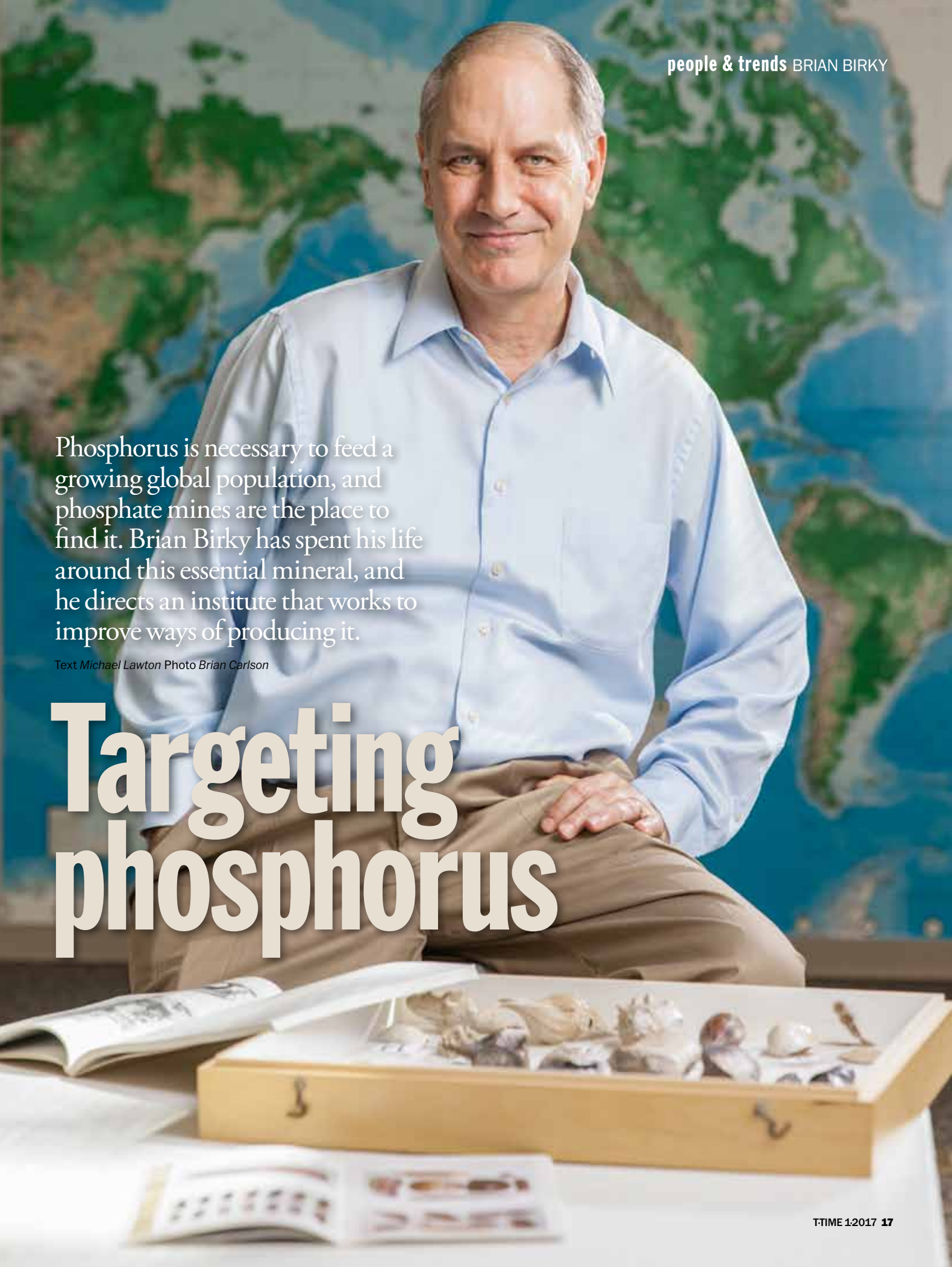
Mayes has been keeping wear records, and he says he was impressed with levels during the Xerion's first full year on the farm. "In total the tire tread bars wore by eight millimeters (0.32 inch) during their first season, and they stood up well to abrasion and cuts," he says. "We have to do a fair bit of travel between fields, and the tires also performed well on the road, giving a very comfortable ride.

"We've learned that it's essential to have the best tires, the correct pressures for the jobs the tractor is asked to do, and the correct ballast to make full use of the traction that the tractor and its tires are capable of," Mayes says. "I've been really pleased with both the Xerion and the TM900 High Power Trelleborg tires." ■

"Tires also performed well on the road, giving a very comfortable ride."

Daniel Mayes

For more information:
bruce.lauder@trelleborg.com



Phosphorus is necessary to feed a growing global population, and phosphate mines are the place to find it. Brian Birky has spent his life around this essential mineral, and he directs an institute that works to improve ways of producing it.

Text *Michael Lawton* Photo *Brian Carlson*

Targeting phosphorus

Phosphorus is essential for life and needed in the energy cycle, reproduction and in bone structure. It cannot be manufactured, so it has to be mined.

Brian Birky's task is to make phosphate mining more efficient and to reduce its environmental and public health impact.

PHOTO: WIKIMEDIA

Brian Birky has spent his life around phosphates. He grew up in Bone Valley, Florida, which got its name from the fossils thrown up by phosphate mining.

"In those days, when people weren't so litigious, we children had access to the mining sites, so we could collect the fossils," he says.

He still lives in Bone Valley and he's still looking into phosphate mines, even if he's no longer so interested in the fossils. As Executive Director of the Florida Industrial and Phosphate Research (FIPR) Institute, his task is to make phosphate mining more efficient and to reduce its environmental and public health impact.

Florida has had a phosphate mining industry for more than a hundred years. "In the old days, they just had pickaxes and mules," says Birky, "so they could only get at the easy high-quality deposits."

No one knew back then about the radioactivity and heavy metals that are always found with phosphate rock. It was the environmental movement of the 1970s that drew attention to the risks. Now efforts are being made to recover uranium and rare earth elements so that they can be used, even returning to old mines to exploit their tailings.

"We're part of the U.S. Department of Energy's Critical Materials Institute," he says, "and we've been working on the characterization of rare earth elements in beneficiation and chemical processing streams, as well as on technologies for their recovery."

But the main target is phosphorus. "It's essential for life," Birky explains. "It's needed in the energy cycle, reproduction and in bone structure, and you can't manufacture it, so you have to mine it."

A mine is a concentrated deposit of phosphorus. Once it's mined and used in fertilizer, the phosphorus doesn't get lost, but it gets dispersed so that it's much harder to get at.

"Only some of the phosphorus gets into the crop," Birky explains, "and only a small amount of that gets into animals and humans. Their waste goes into a treatment plant, so you can get some phosphate out of the sewage, but that doesn't help for all those parts of the world that don't have advanced sewage treatment."

So mining it is. "Phosphates are a finite resource," Birky warns, "although I'm sure we have more than a few decades' worth. Here in Florida, we always say we have 30 to 40 years, but it goes on being 30 to 40 years because there are always improvements in technology."

For example, the FIPR Institute has been working with Florida-based JDC Phosphate to develop an alternative to the traditional wet acid method, using a kiln to produce a purer phosphoric acid. In addition, instead of the radioactive waste product phosphogypsum, the process leaves an aggregate that can be used in road building.

"The method can be used for lower-grade ore, which we would just leave in the ground with the wet acid process," says Birky.

There's also an improved method of removing and recovering magnesium from the phosphate rock. "We developed it in the '80s, and it was on our website," he recalls, "but it wasn't picked up until 30 years later, when some people in Europe showed an interest. So we went back to it and developed it further for them."

As in that example, although the FIPR Institute is a Florida state institution, its significance goes well beyond the state's borders. "We're funded with a small proportion of the state of Florida's severance tax on phosphate mining," Birky says, "but we are national and international in

Dr. Brian Birky

Lives: In the United States in Lakeland, Florida, in the heart of Bone Valley.
Education: B.S. in zoology and M.S. and Ph.D. in health physics, all from the University of Florida.
Job: Executive Director of the Florida Industrial and Phosphate Research Institute
Family: His wife comes from Laos, and he has a stepdaughter.
Hobbies: Traveling. The family is going to Laos soon, where his wife will be returning for the first time since she fled the country for political reasons 35 years ago.
Favorite book: "I read all day, so reading is no fun any more. When I did read for pleasure, I consumed everything John Irving wrote."
Favorite film: "An obscure choice: *Whose Life Is It Anyway?* with Richard Dreyfuss. And my wife and I both enjoy *Game of Thrones*. I mainly like to watch Tyrion for his strategic thinking."

scope – we publish for the world."

In 2012, the FIPR Institute, which was founded in 1978, was brought into the newly established Florida Polytechnic University, giving it access to areas of expertise that fit the needs of the industry. Birky complains that the industry tends to underinvest in technology and innovation, but it needs just the skills that the new partnership can offer. "Key areas for high-tech improvements include nanotechnology, big data analytics, robotics, remote sensing, etc.," Birky says.

Whatever technology can do, it cannot prevent mining from being an environmentally sensitive activity. Strip mining disrupts the environment, but Birky knows the good side of that, too. After playing in mining areas as a child, he now lives on the edge of a lake left behind by phosphate mining. As he notes, "Having a lot of available phosphorus, the lake is over-productive, but it hosts many species of birds, fish and reptiles, including turtles that come to be fed, and some large alligators are always lurking nearby."

"We've been working on the characterization of rare earth elements in beneficiation and chemical processing streams, as well as on technologies for their recovery."

Dr. Brian Birky

DEVELOPING THE PORT OF THE FUTURE

As global trade continues to grow, ports and marine pilots are facing a number of major challenges. Through a recent acquisition, Trelleborg can now offer its SafePilot system for safer and more efficient piloting and port management.

Text *Björn Raunio*
Photo *Istockphoto and Marimatech*

To increase profitability, shipping vessels are getting larger. At the same time, it is very difficult to expand ports in many locations, which in turn results in serious safety issues as well as a lack of berth space. Bottleneck effects are worsened by the fact that vessels' estimation of arrival times is generally very poor.

"Some 45 percent of all container vessels are delayed by more than eight hours," says Tommy Mikkelsen, Chief Technology Officer within Trelleborg Offshore & Construction in Denmark. "The potential for increased efficiency is huge."

Mikkelsen has worked for more than 20 years for Marimatech, a Danish company that Trelleborg acquired in January 2016. Since it was founded in 1988, the company has provided the port and marine industry with a wide range of products and systems.

"In 2011, we switched focus to the development of a new kind of software solution specifically for marine pilots," he says. "To get it right, we continuously engage pilots in our development cycle, building on their input and feedback."

The resulting SafePilot Portable Pilot Unit (PPU) provides pilots with a toolbox supporting all tasks from navigation to administrative duties. The PPU consist of a lightweight and very accurate GPS antenna unit with a precision of up to one centimeter (in the most advanced model), and a tablet (iPad) with piloting software. It's extremely easy to use. With the touch of a finger the pilot has access

"Our system makes it easier to do a good job, faster and safer."
Tommy Mikkelsen

to all relevant data via a 3G link, up to date and in real time.

For example, the pilot can overlay the latest survey data onto a sea chart, thereby seeing exactly where to steer the vessel. There is also a prediction system for guiding the vessel's movements with great precision, cutting the number of adjustments necessary. The pilot gets a traffic overview of all the ships in the port's vicinity as well as weather station information in real time, and can access a database with information on vessels that have been serviced before.

"Our system makes it easier to do a good job, faster and safer," Mikkelsen explains. "A very experienced British pilot has told us that SafePilot cuts the maneuvering time for large vessels by 25 percent. Danish pilots using the system estimate that it makes it possible to handle one more vessel per pilot daily."

Furthermore, the module-based SafePilot system can be expanded into a full-blown pilot and port management system with all port and pilot functions, data and schedules integrated, enabling full transparency, information sharing and live access to relevant information in real time. The system can also be customized to meet the needs of a specific port.

"We are helping to build the smart port of the future and are unique in being the only manufacturer offering a comprehensive solution," Mikkelsen says. ■

The SafePilot Port Concept

The module-based SafePilot Port Concept ranges from a basic Portable Pilot Unit (GPS, tablet and server), which provides the pilot with all necessary real-time information for improved safety and efficiency, to a comprehensive piloting and port management solution putting pilots, ports and ship owners on the same page. The latter links functions, data and schedules together, enabling full transparency, information sharing and simple, live access for everyone to all relevant information in real time. ■

For more information:
tommy.mikkelsen@trelleborg.com

New maintenance service

Trelleborg has launched a new maintenance service for boat landing systems, which are installed on offshore platforms to reduce the external load of a berthing vessel, protecting both the vessel and the platform.

The new service is designed to identify degradation in the performance of the boat landing system before it has the potential to cause damage to the platform and to the berthing vessel's structural integrity, which can result in huge costs and downtime.

JP Chia, Engineering Manager within Trelleborg Offshore & Construction, explains that boat landing systems come under general inspection during routine maintenance schedules of the entire platform, a task usually carried out by a maintenance contractor. However, if they are not surveyed accurately, cracks on the rubber surface of the eccentric bumper ring, de-bonding of the rubber and pipe and deformation and/or corrosion can go undetected, potentially resulting in costly remedial repair and even replacement of the system.

Trelleborg has launched a new maintenance service for boat landing systems.

PHOTO: ISTOCKPHOTO

Colin Turnbull

RedFine+ is suitable in mining applications.

NEW STANDARD FOR ABRASION RESISTANCE

The new RedFine+ is an advanced abrasion-resistant sheet rubber for equipment preservation and wear protection that is suitable for use in a range of mining applications, including pipe and spools, cyclone launders and vibrating screens under pans and hoppers.

Colin Turnbull, General Manager of Mining within Trelleborg Offshore & Construction, says: "Across the mining industry, operational excellence and the ability to find new productivity gains and cost-down initiatives are most important. Mine downtime as a result of unscheduled maintenance repairs due to material failure directly results in costly downtime and reduced output. At Trelleborg, we are constantly looking at ways we can improve abrasion resistance in our materials to ensure maximum throughput in processing plants is achieved."

SEALS-SHOP

Trelleborg Sealing Solutions has launched Seals-Shop.com. It's an e-commerce platform focusing on hydraulic seals for the MRO (maintenance, repair and operations) market and smaller OEM (original equipment manufacturers) market in Europe.

"The objective with this new e-commerce platform is to cost-effectively reach a higher share of the aftermarket and the smaller OEMs across Europe," says Peter Hahn, President Global Business Development at Trelleborg Sealing Solutions.

The web shop is starting out with about 5,000 products. These include a wide range of standard seals such as O-Rings and rod and piston seals, as well as rotary and static seals, primarily for hydraulic equipment and applications.

Has there been a new dinosaur discovery?

Click here to find the answer.

PHOTO: TRELLEBORG

Editorial

Responsible under Swedish Press Law:
Patrik Romberg, patrik.romberg@trelleborg.com
Editor-in-chief: Karin Larsson, karin.larsson@trelleborg.com
Co-editors:
Rosman Jahja, rosman.jahja@trelleborg.com, Donna Guinivan, donna.guinivan@trelleborg.com
Production: Appelberg Publishing
Project manager: Petra Lodén *Editor:* Eriq Agelii
Language coordinator: Maggie Hård af Segerstad
Art director: Magdalena Taubert
Printing: Trydells Tryckeri
Cover photo: Christopher Furlong/Getty images
Subscription: trelleborg.com/subscribe
Address: Trelleborg AB (publ) Box 153, SE-231 22 Trelleborg, Sweden Tel: +46 (0)410-670 00 Fax: +46 (0)410-427 63 *T-Time* is published three times a year. The opinions expressed in this publication are those of the author or people interviewed and do not necessarily reflect the views of Trelleborg. If you have any questions about Trelleborg or wish to send us your comments about *T-Time*, please email: karin.larsson@trelleborg.com

www.facebook.com/trelleborggroup
www.twitter.com/trelleborggroup
www.youtube.com/trelleborg
www.trelleborg.com

About Trelleborg

Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way. The Trelleborg Group has annual sales of SEK 31 billion (EUR 3.23 billion, USD 3.60 billion) and operations in about 50 countries.

The Group comprises five business areas:
Trelleborg Coated Systems, Trelleborg Industrial Solutions, Trelleborg Offshore & Construction, Trelleborg Sealing Solutions and Trelleborg Wheel Systems, and the operations of Rubena and Savatech.

The Trelleborg share has been listed on the Stock Exchange since 1964 and is listed on Nasdaq Stockholm, Large Cap.

TRELLEBORG

recent acquisitions by trelleborg group

Aerospace

With its portfolio of more than 300 advanced materials and formulations, the El Segundo, Californian-based subsidiary of U.S.-based CoorsTek Inc. helped clients optimize products to meet application-specific requirements. The operation specialized in the manufacture of precision seals for the aerospace industry. The acquisition will further strengthen Trelleborg's presence in North America and in sealing solutions for major aircraft programs. In 2015 sales amounted to SEK 115 million (USD 13.1 million).

Precision seals

Anderson Seal LLC, a privately owned U.S.-based company, specialized in the distribution and service of seals, gaskets and custom-molded products for original equipment manufacturers in several industries, including small engine, medical, water treatment, hydraulic, powertrain and automotive. The acquisition will increase Trelleborg's presence in the U.S. Midwest.

The acquired business has its office and warehouse in New Berlin, Wisconsin. In 2015 sales amounted to SEK 145 million (USD 16.4 million).

Off-the-road tires

International Tyre and Wheel Solutions Ltd. (ITWS), a privately owned U.K.-based distributor of large, solid off-the-road tires for the waste, recycling and demolition industries. The acquisition complements the recent acquisition of Mitas pneumatic construction tires that gives Trelleborg a broad offering in both pneumatic and solid tires across Europe, Middle East and Africa.

The acquired operation is headquartered in Lowton, England. In 2015 sales amounted to SEK 40 million (USD 4.5 million).

Industrial antivibration

Schwab Vibration Control was owned by the Freudenberg Group and is a German and Swiss technology-leading supplier of industrial anti-vibration components and systems mainly for the rail market. The acquired company is headquartered and has its production site in Velten, Germany. In 2015 sales amounted to SEK 575 million (USD 65 million).

At Trelleborg, we believe that the benefits of our solutions stretch beyond functionality and business performance. Whenever possible they should also contribute to better sustainability. In fact, many of our solutions protect the environment and people, as well as infrastructure and assets. This is what we call Blue Dimension™ – Solutions for Better Sustainability.
trelleborg.com/bluedimension