

ttime

A MAGAZINE FROM TRELLEBORG GROUP

3-2023

Solutions that seal, damp and protect critical applications.

PLUS

MARINE FENDER
GROWTH IN AFRICA

MAKING RENEWABLE
ENERGY FLEXIBLE

THE DAMPING SECRETS
OF SILENT CARS



Shock absorbers

Why suspension seals are the secret to a smoother ride

CONTENT

08

AFRICAN BOOM

Port expansions power marine fender business.

15

ENJOY THE SILENCE

Damping shim technology for quieter automotive brakes.



EDITORIAL

Don't rock the boat!

It is fascinating how port infrastructure develops according to different needs. Take for example the emerging ports in Africa, which you can read about in this issue of *T-Time*. Africa's coastline measures 26,000 kilometers and includes nearly 40 countries.

In Europe, specialized ports such as the one in Wilhelmshaven, Germany, currently operates five Floating Storage and Regasification Units (FSRU) pending the completion of a fixed terminal. Trelleborg is a proud supplier of the SafePilot technology platform, which is used as a marine positioning and monitoring system in the port. Read more about the port and our technology on page 20.

Trelleborg is also a sponsor of youth sports through the Trelleborg SportsClub initiative.



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GERMANY BETS ON LNG

Trelleborg tech plays key role in new harbor terminal.

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SOCIAL SPONSORSHIP

How AFC Chellaston helps girls into football.

The initiative builds further on our established direction of community engagement to support the development of younger people, in this case, sports, training, and coaching. A fine example of that is the football club AFC Chellaston in England. Who knows if that is not where the next Alexia Putellas, Ballon d'Or winner 2022, will come from in the future?

Enjoy your reading!



Peter Nilsson,
President and CEO



Cover photo:
Daniel Milchev, Getty Images.

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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 had annual sales of about SEK 30 billion (EUR 2.83 billion, USD 2.98 billion) in 2022 and operations in about 40 countries.

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

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LET'S OFF-ROAD

At first glance, a mountain bike seems to be much the same as your average bicycle. But look closer. These machines are full of impressive technology, including special seals that allow riders to propel their bikes over the most demanding terrain.

TEXT DONNA GUINIVAN PHOTO GETTY IMAGES ►

Right:
The first prototype of the JBX1 Breezer 1 mountain bike was hand built by Joe Breeze in 1977. It was the first bicycle frame designed specifically for mountain biking.



PHOTO: NATIONAL MUSEUM OF AMERICAN HISTORY

Would you launch yourself on a bike down a steep mountain trail or a flight of steps? Perhaps not, but some riders do it – for fun. Extreme cyclists ride their bikes off vertical cliffs and do cartwheels while flying or perform tricks when careering over craggy hillsides, seemingly heedless of any danger.

For these adrenaline junkies, mountain bikes are their trusted tool, and they have come a long way since the introduction of the first purpose-built model in 1978. Soon after that, the sport of mountain biking was born in Marin County, California, just across the bay from San Francisco.

Initially, the bicycle industry viewed mountain bikes as a passing fad that would soon die out, but in the following decades the boom in adventure sports and off-road cycling made them a long-term prospect. The heavier tubing, modified geometry and wider frame, fork and tires of the first mountain bikes soon gave way to the use of high-tech, lightweight materials and sophisticated suspension systems.

The suspension allows the wheels of a mountain bike to move up and down to absorb bumps while keeping the tires in contact with the ground for better control. Suspension also helps the rider and bike absorb the shocks produced when they land from the many jumps common in the sport.

FROM PASSING FAD TO OLYMPIC EVENT

Marin County, California, which lies just across the Golden Gate Bridge from San Francisco in the US, is generally accepted as the birthplace of the sport of mountain biking. The inaugural mountain bike race took place there in 1976, and the winner was the only one who managed not to crash.

The first purpose-built mountain bike was the Breezer Series 1, with the prototype made in 1977 by the US inventor Joe Breeze with initial sales occurring the following year. Preserved for posterity at the prestigious Smithsonian Museum in Washington, D.C., this basic two-wheeler looked nothing like the sophisticated high-tech machines we know today.

Although bicycle manufacturers initially regarded mountain bikes as a passing fad, the sport soon took off and it is here to stay. Mountain biking even became an official event at the Atlanta Olympic Games in 1996.



PHOTO: ALBA VASCONCELOS

Above:
MTB pioneer Joe Breeze in his machine shop in Mill Valley, California, in 1984.

The longer the travel or stopping distance of a shock-mitigating device, the better it will lessen an impact and ensure a smooth ride. It is the biking equivalent of gently applying the brakes on a car, allowing it to roll to a halt over some length. Original suspension designs made do with a mere five to seven centimeters of suspension travel, but soon some downhill bikes had travel of 25 centimeters or more.

As riders continue to push the envelope of what they can do, seals are becoming more and more important for effective suspension and thus the overall performance of the bike. With its long experience of creating sealing solutions, Trelleborg has

Bicycle sealing system

A surprising number of seals and seal configurations are used on today's technologically advanced bicycles. Each seal has a vital function in ensuring user safety, cycle performance and a comfortable ride.

Seat post

Complex sealing configurations ensure the effectiveness of the air spring damping system.



Rear shock absorber

Seals for floating piston, main piston, shaft housing and air spring.

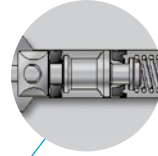


Wheel hub system

Seals prevent ingress of external media into the wheel hub bearing.

Seals for bottom bracket

Seals protect the bearing in the bottom bracket from ingress of external media.



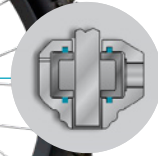
Brake lever

Seals for the brake cylinder.



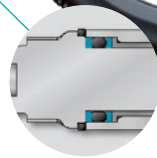
Front fork

Damping /Air spring configurations include seals for air spring, rebound and lockout systems.



Disc brake

Safety critical seals assist piston movement.



Pedal

Seals keep lubricant within the pedal.

“Seals play critical roles within a mountain bike’s suspension system, including in the rear shock absorbers and the front fork.”

Kevin Lai, Trelleborg

successfully supported its customers to meet the requirements of riders.

“Seals play critical roles within a mountain bike’s suspension system, including in the rear shock absorbers and the front fork,” says Kevin Lai, general manager of the Trelleborg sealing solutions facility in Taiwan. As an important base for the research and production of high-end cycles, the country is a strong link in the global bicycle industry supply chain. According to the Taiwan Bicycle Association, exports reached a record high of more than 5 billion USD in 2021.

“I don’t think that anyone looking at suspension components would realize that they incorporate so many seals, each with their own role to play,” adds Lai. “In front

forks there is a complete configuration of seals in the air springs, and in both the forks and shock absorbers there are bumpers, static, dynamic and rotary seals, plus scrapers and bushes. All of the sealing materials are matched to the requirements of the suspension, including characteristics such as low friction, lubricant compatibility and wear resistance.”

Lai explains that there is a constant innovation process in bicycle manufacturing, which in turn directs the development of Trelleborg’s own sealing solutions.

“The bicycle market has become a bit like the motor industry,” he says. “The top cycle manufacturers now bring out new models each year, trying to better the performance



PHOTO: ©DAMIER AG

of previous models every time. That means we are always working with engineering departments on the next project to fine-tune mountain bike sealing systems.”

The latest evolution in mountain biking is the electric mountain bike. These types of bikes have a small motor powered by a rechargeable lithium-ion battery. In e-bikes, the motor provides power when riders are pedaling, adding power to each pedal stroke. So, for the e-mountain biker, it feels like pedaling a normal mountain bike, except with supercharged legs.

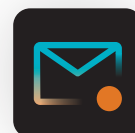
“E-mountain bikes are expected to drive growth in the mountain bike market in the future,” says Lai. “Whether for the traditional or electric versions of mountain bikes, we at Trelleborg expect to maintain our position as one of the leading suppliers of seals to manufacturers in Taiwan. We put our success down to the fact that we do not just provide the product, but the engineering services and expertise too.” ■

“We are always working with engineering departments on the next project to fine-tune mountain bike sealing systems.”

Kevin Lai, Trelleborg

Above:

In Schladming, Austria, in 2018, Amir Kabbani and Patrick Schweika, descended the 1,074.75 meters altitude as often as possible in 24 hours and covered a total of 40,840.5 meters altitude to establish a new Guinness World Records™ title.



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NEWS

Global capabilities with local presence

MALTA

European cleanrooms

In response to the rising demand for silicone tubing and hoses produced in cleanroom environments, Trelleborg has announced the expansion of its European biopharmaceutical manufacturing capabilities in Malta. The expanded Maltese center, which will start production in 2024, follows a similar development of Trelleborg's biopharma facility in Massachusetts in the US.

BULGARIA

Doubling up

By the end of 2023, Trelleborg will have doubled the production capacity of its facility in Pernik, in western Bulgaria, which has been manufacturing high-precision seals made of Liquid Silicone Rubber (LSR) since 2007. Key customers for LSR seals include those from the automotive, sanitary, electronic, food & beverage and potable water industries.

JAPAN AND FRANCE

Global boots

To help fulfil the demands of the Japanese automotive industry for boots, Trelleborg has opened an automotive boots manufacturing facility in Odawara, near Tokyo. In addition, to further strengthen Trelleborg's global presence in the automotive boots market, the company has moved to a brand-new global center for the development and production of automotive boots in Carquefou, near Nantes in France.

INDIA

Growth response

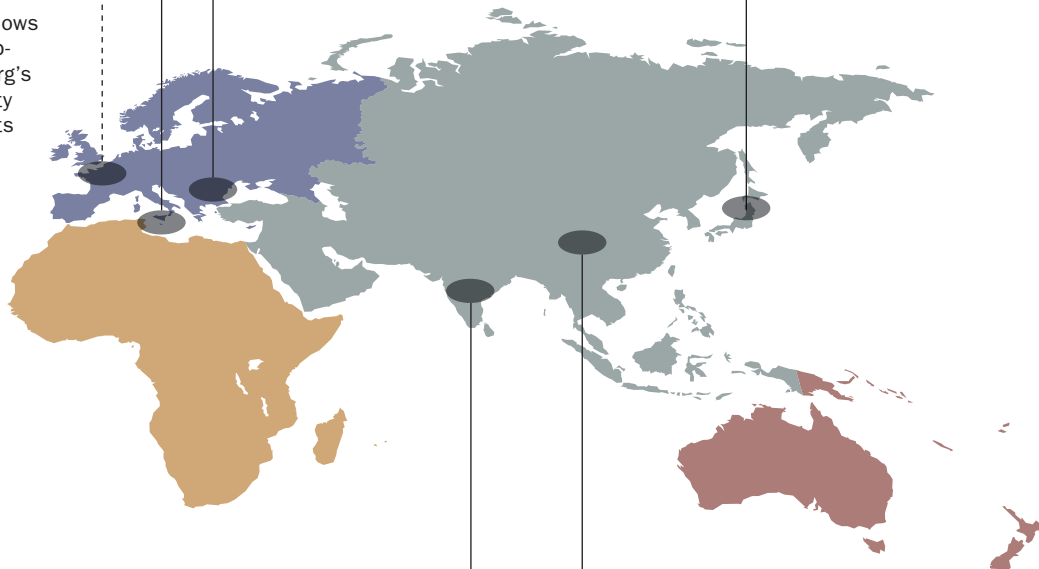
Trelleborg is investing 300 million SEK in a brand new, purpose-built production center for sealing solutions in the Indian city of Bengaluru. The investment reflects the continuing strong growth seen in the Indian market and is part of Trelleborg's strategy to strengthen its positions in attractive and profitable industries and geographic areas.

"The new production facility for seals will increase production capacity by more than 60 percent, compared with our current facilities," says Peter Nilsson, President and CEO of the Trelleborg Group. The development will take place over three years from 2023 to 2026.

CHINA

Rubber-to-metal expansion

Trelleborg has relocated its Chinese production site for isolation, attenuation and suspension solutions to a new, larger and more modern manufacturing facility in the city of Suzhou in eastern China. Trelleborg uses advanced rubber-to-metal bonding for the removal of undesirable noise and vibration for a wide range of industrial applications, including in the rail, marine, industrial and off-highway industries.







AFRICAN GROWTH STORY

LARGE PORT DEVELOPMENT PROJECTS AND STRONG ECONOMIC GROWTH IN AFRICA ARE PROPELLING THE DEMAND FOR TRELLEBORG'S MARINE FENDERS.

TEXT ANDREW MONTGOMERY
PHOTO SIDDHARTH SIVA

Ahmed Abusalem

Background: Trained mechanical engineer who has worked with engineering projects and construction equipment. Joined Trelleborg in 2013 and became IMEA Regional Director in 2019.

Job: Manages 16 people in sales, technical engineering and project management. The Dubai office runs the Middle East and Africa, while the India office looks after the Indian market.

Lives: Moved to Dubai in 2007. Is a Saudi-born Jordanian citizen.

Continuing education: During his time at Trelleborg, Abusalem has obtained an MBA from Hult Business School in Dubai.

The marine fenders sector is project-driven. Large infrastructure programs are the key to propelling sales growth, as ports need the latest smart fenders to help container ships berth safely and securely.

In just a few years, Trelleborg's India, Middle East and Africa (IMEA) region has gone from being the smallest regional market for marine fenders to becoming the largest. Two huge container port developments in the Egyptian towns of Ain-Sokhna and El Dekheila, along with other projects in the Middle East and India, have played their part. But a big reason for IMEA's surge to prominence is Africa and its fast-moving growth story.

"Over the years we've heard 'it's the year for Africa,'" says Ahmed Abusalem, IMEA Regional Director for Trelleborg's marine fenders. "But it's now truly in focus worldwide. Nowadays all big companies, developers and players need to have a footprint in Africa."

The United Nations reports that Africa has the highest population growth among

Right:
Ahmed Abusalem says the countries in the African continent must build ports.

major global regions, and expects that more than half of the world’s population growth between now and 2050 will occur in Africa. In 2022, the continent’s gross domestic product growth rate was a healthy 3.8 percent.

“There’s still great untapped potential in Africa,” Abusalem says. “The continent has a huge coastline, and its countries must build ports as their economies develop because goods and materials need to be shipped in.”

Abusalem cites a growing list of port infrastructure expansion plans, including the billion-dollar development of the Port of the Future in Senegal, the Lekki Deep Sea Port in Lagos, Nigeria, three mega port projects in Morocco and the Nacala port and rail project in Mozambique. Other schemes are pending in South Africa, Kenya and Angola, subject to further investment.

In most cases, the plans are for oil and gas or container terminals; in Africa the sustainability trend is still in its infancy. Most funding is through public-private partnerships, whereas the Middle East has state-funded projects and India is seeing more privately funded projects. “Foreign investment drives the projects in Africa,” Abusalem says. “There’s Chinese influence in certain areas but also Japanese involvement, and still French investment in West Africa.”

What they all have in common is Trelleborg’s marine fenders, testament to the company’s long-term presence in Africa, plus its market-leading solutions.

From his base in Dubai, Abusalem leads 16 people, including two sales managers for the African markets, Farida Guembour and Yasin Seker. The Africa team has a wide network of local partners. These are its contacts on the ground who help the company maintain its profile between projects and that identify new business.



PHOTO: GETTY IMAGES

Abusalem describes working in Africa as a multi-layered challenge, where geopolitics have a big influence on when and if projects come together.

“It’s a complex stakeholder map in Africa that requires a different value proposition for each stakeholder,” Abusalem explains.

“The port end user’s key performance indicator (KPI) is different from that of the consultant working for them, whose KPI is different from that of the contractor, and so on. We therefore need the right messages to reach all of them. Complicated stakeholders with different needs make it more challenging to deliver a project on time.”

The cultural aspects to doing business in African countries are important too.



“There’s still great untapped potential in Africa.”

Ahmed Abusalem, Trelleborg



PHOTO: GETTY IMAGES

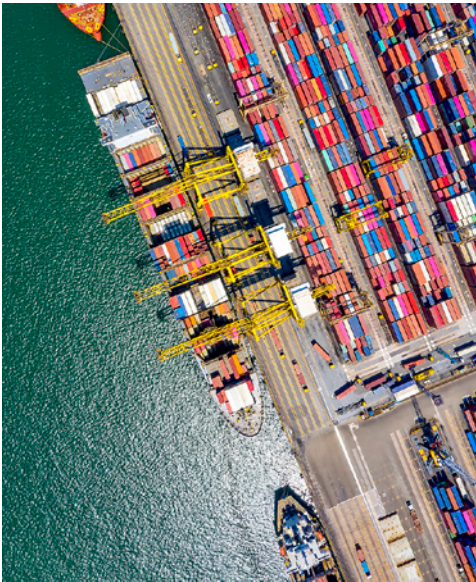


PHOTO: TRELLEBORG



Above: Super Cone Fenders from Trelleborg are suited for the most demanding marine environments.

Left: The Deep Sea Port in Nigeria was inaugurated in January 2023. It is the deepest and most technologically advanced deep sea port in Africa.

“For sales work in Africa building trust with customers is the key to a strong and long-lasting relationship.”

Farida Guembour, Trelleborg



Above: Farida Guembour is one of the two Trelleborg marine fenders sales managers for the African market.

Algeria-born Farida Guembour takes nothing for granted. “You think that as an African yourself you know what’s needed,” she says, “but my country is different from the country next to it, and the country further south is different again. The variation is incredible.”

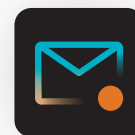
Guembour speaks Arabic, French and English and says that this undoubtedly helps, but communication can still be tricky. In fact, in some African cultures, indirect communication is more common and directness can be seen as rude or confrontational. A team with local expertise can help Trelleborg navigate these differences by providing guidance on appropriate communication styles and helping to bridge any gaps in understanding.

“For sales work in Africa, building trust with customers is the key to a strong and long-lasting relationship,” Guembour says. “It is important to create a genuine face-to-face connection. Customers will want to know you first as a person before knowing your products or the company you represent. People skills are crucial for sales in Africa.”

Trelleborg has refined those skills over many years. “We have long felt Africa was the place to be, so we have the right team there and a good agent network to support us,” says Abusalem. “We’ve now been in Africa for over 20 years, and through our extensive marketing efforts the brand awareness is there. From market share and inquiries, we can say we’re the market leader for marine fenders in Africa.”

Abusalem says that African countries will continue to build or modernize ports, thus increasing the demand for marine fenders but also the company’s wider portfolio, including smart port solutions.

“Africa certainly promises much for Trelleborg,” Abusalem says. “There’s much more to come.” ■



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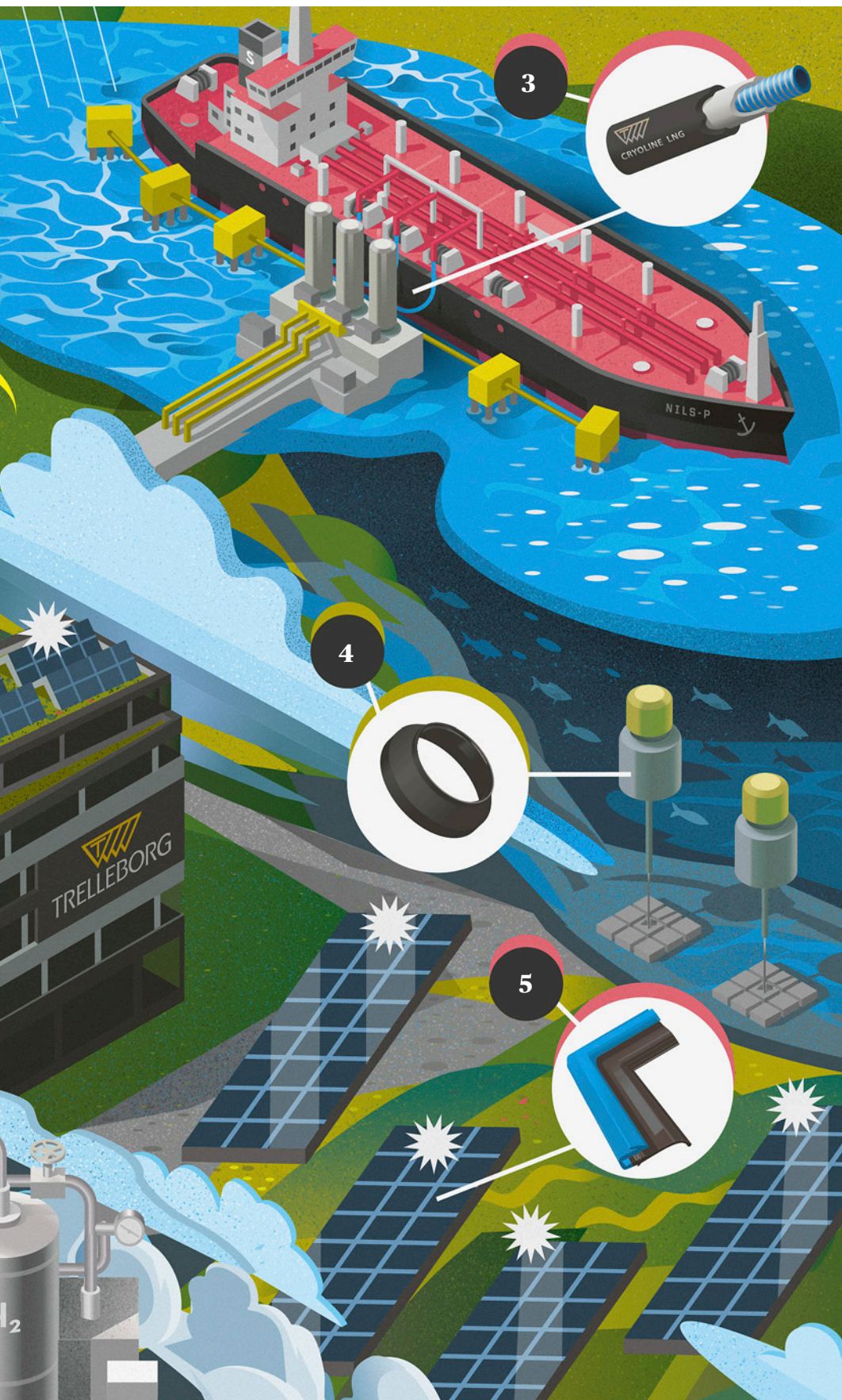
SUSTAINABLE SPIRIT

Trelleborg products and solutions have a key role to play in supporting the world's transition to green energy.

TEXT DONNA GUINIVAN

ILLUSTRATION NILS-PETTER EKWALL





WHAT IS ESSENTIAL?

As the world looks to a future that will run on sustainable energy, Trelleborg supports the wind, solar, hydro, tidal and wave power industries with innovations that are making a reality out of what was once a dream. The company is also playing a critical role in the hydrogen sector, which is projected to be fundamental in managing a completely green electricity grid. And in the transition phase from fossil fuels to cleaner options, Trelleborg is using its expertise to make LNG transport safer and more efficient.

1. Wind energy

Turbines onshore and offshore require grout seals to keep them stable, as well as unique sealing solutions in their hydraulics.

2. Electricity grid

New sealing options, such as permeation-resistant materials, allow hydrogen to take a part in backing up wind and solar power in the electricity grid.

3. LNG mooring

Liquefied Natural Gas (LNG) is a volatile fuel, and ensuring safe mooring through smart technology is paramount.

4. Wave power

Trelleborg is focusing development of its sealing solutions on emerging technologies, such as wave power.

5. Solar panels

Trelleborg provides application expertise for sealing profiles on solar panels that provide long service life in demanding conditions.

6. Trelleborg facilities

Trelleborg has a strategy for moving to renewable energy in its facilities. At the end of 2022, the share of renewable energy used by the Group was 46.6 percent.



PHOTO: GETTY IMAGES

Sunny nights

Have you heard the one about the solar panels that work at night? No, we're not joking! Scientists at Stanford University in the US have developed solar panels that absorb energy from the heat of the sun during the day and radiate the heat back out into the cooler air at night-time. It could be a breakthrough that helps the 770 million people worldwide who have no access to electricity.



PHOTO: GETTY IMAGES

A FAIR WIND BLOWS

Wind power is booming; another 77.6 gigawatts of capacity were added in 2022. Energy market analysts Westwood Global Energy Group predicted that 2023 would see 55 percent more capacity added than in 2022, with China and Europe leading the way. Could the answer to the world's energy issues be blowin' in the wind?



86 feet or 26.21 meters is the height of the biggest wave ever surfed. The Guinness World Record was set by Germany's Sebastian Steudtner on a cold winter's day in January 2018 at the legendary big wave mecca of Praia do Norte, in Nazaré, Portugal. Not bad for someone who says he suffers from vertigo!

“Electricity is really just organized lightning.”

US comedian George Carlin (1937–2008)

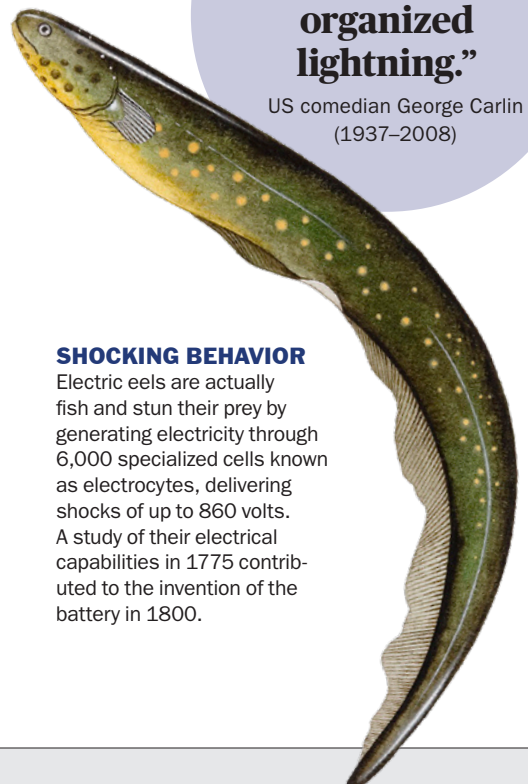


ILLUSTRATION: GETTY IMAGES

SHOCKING BEHAVIOR

Electric eels are actually fish and stun their prey by generating electricity through 6,000 specialized cells known as electrocytes, delivering shocks of up to 860 volts. A study of their electrical capabilities in 1775 contributed to the invention of the battery in 1800.



All around the world, there is a demand for quieter cars.

A QUIETER FUTURE

THERE'S A GOOD CHANCE THAT THE CAR IN YOUR GARAGE RELIES ON A PRODUCT PROVIDED BY TRELLEBORG TO ACHIEVE QUIETER OPERATION OF BRAKES. THOUGH ALREADY A GLOBAL MARKET LEADER IN TECHNICAL LAMINATES, TRELLEBORG IS STRIVING FOR NEW SOLUTIONS REGIONALLY.

TEXT DANIEL DASEY PHOTO GETTY IMAGES

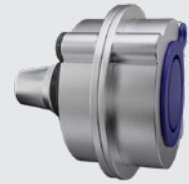
Concepts of damping

Trelleborg combines polymer and metal to help solve noise and vibration challenges.



Shims/Insulators

Unique rubber-to-metal composite materials solve noise and vibration issues.



Tuned Absorbers

A cost-efficient solution for low frequency brake noise – moan, groan and squeal.

Right: Americans have a special bond with their vehicles, reflected in a remarkable aftermarket dominance in the sale of replacement brake components.

Modern passenger cars are heavy objects. When a driver makes the decision to brake, close to two tons of steel, glass and rubber need to be brought to a halt in a matter of meters. The fact that today’s vehicles can perform this task with minimal shaking, noise, and disruption to passengers, relies on good brake design – and very often Trelleborg’s Technical Laminates.

One major application for the technical laminates are noise damping shims that sit between the brake pad and caliper in disc brakes. Attached to the friction pad backing in the brake mechanism, such shims can help to significantly reduce vibration during braking, delivering the smooth ride that modern drivers expect.

While some market drivers and trends are global, those related to the technical laminates vary worldwide.

People in the United States have a unique relationship with their vehicles, thanks to long driving distances and a historically strong automotive manufacturing base. The market for replacement brake components is also unique, with a far higher proportion sold via aftermarket retailers, as opposed to Original Equipment Manufacturers (OEMs), than in the other regions.

“Traditionally, people saved money by going to aftermarket retailers, picking up parts and doing repairs themselves,” says

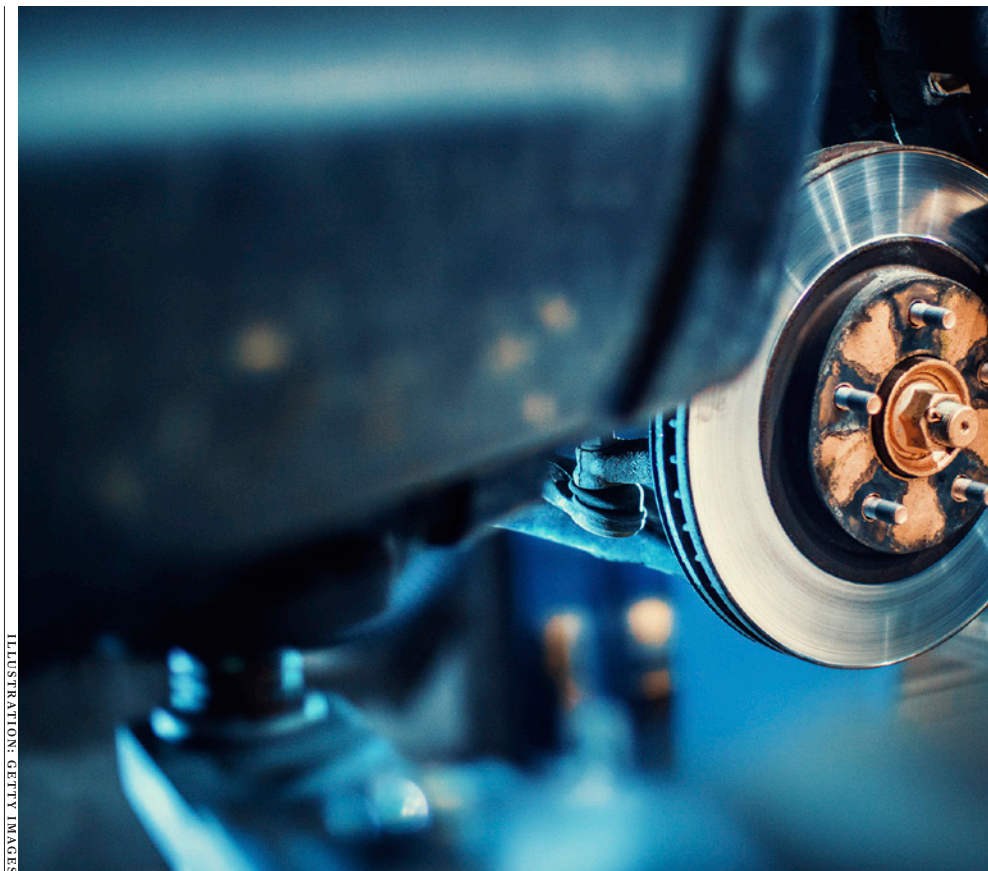


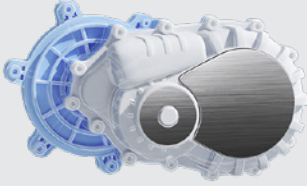
ILLUSTRATION: GETTY IMAGES

John Bennett, Regional Manager for North and South America for damping solutions. “Today, brakes are far more complex, and it’s more difficult for individuals to do repairs, but the local market still has the same reliance on aftermarket retailers, as this is where repair and maintenance very often source parts.”

The Trelleborg team in the US is typically a third- or fourth-tier supplier to the automotive industry, working with everyone from friction material to brake component manufacturers, aftermarket retailers to OEMs. Test equipment includes ten



John Bennett, Regional Manager for North and South America for damping solutions.

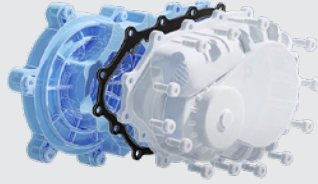


Structural damping

The high loss coefficient of metal to polymer materials reduce structural vibration.

Vibration isolation

Metal-to-polymer materials effectively isolate a structure from vibration sources.



Noise encapsulation

Shapes formed of metal-to-polymer materials encapsulate the surface of a structure preventing noise transmission.



“Traditionally, people saved money by going to aftermarket retailers, picking up parts and doing repairs themselves.”

John Bennett, Trelleborg

dynamometers (dynos) that allow the noise solutions requested by customers to be evaluated and assessed under close-to-real-life operating conditions.

Over 30 years in the United States, Trelleborg’s noise damping brake shims have grown to become market leader.

Bennett says three key pillars have driven this growth: team, product and service. “We have a really good team, not just in our region but across the globe,” he says. “We also have a highly engineered product that meets or exceeds the demands of the marketplace. What ties it all together is our service. From our dyno testing to delivering samples same-day and more, we go above and beyond for our customers.”

A key challenge in the Americas going forward will be the way electric vehicles (EVs) are reshaping the use and lifespan of brakes. With regenerative braking in EVs reducing brake component wear, there may come a time when one set of brake pads lasts the vehicle’s entire life. In the meantime,

TRELLEBORG NOISE DAMPING PRODUCTS

Trelleborg manufactures a wide range of noise damping shims and insulators for use when endurance against thermal, chemical and mechanical stress is required.

Solutions for brakes include shims, slippers, piston clips and sliding clips.

Advanced laminate solutions reduce noise and vibration in a range of automotive applications, including inverter covers, valve covers, chain covers and oil pans, as well as in nonautomotive sectors.

Bennett says, the quieter operation of EV motors is creating additional demands on OEMs to optimize noise reduction within such vehicles.

The team is also looking for opportunities for its vibration damping technologies in other sectors. “A few that come to mind are the aerospace market and the motors used in household appliances and industrial applications,” he says.

Unlike the US market, most brake replacement parts sold in Europe go through OEM channels. Alessandro Baggi, OE/OES Shim Director Europe, says only about 20 percent of Trelleborg’s vibration damping shims in the region end up in aftermarket channels.

“I see the European automotive market as a little bit like an incubator, where new ideas and trends are created,” says Baggi. “China and the US both have bigger volumes than Europe, and they move much faster. But we’re creating many of the ideas that end up in production.”

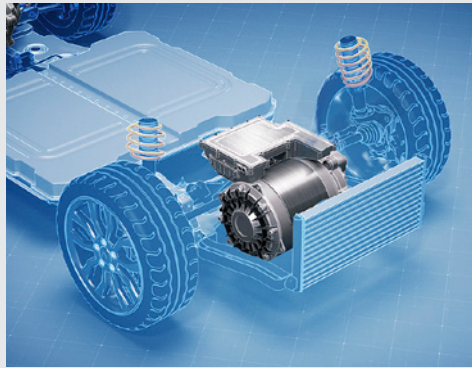


CONTACT

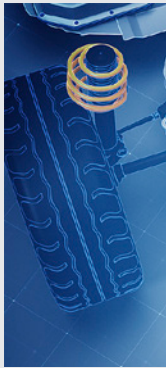
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No more noise

Specially engineered damping materials minimize vibration and noise.



Applied Damping Material
ADM provides superior damping of structure-borne noise and can be cut and formed to fit most surfaces.



Trelleborg products are market leaders in Europe, and Baggi says a number of factors are driving the success there.

“In terms of shims, our success comes down to winning as many projects as possible,” he says. “We need to be present to win this work. Meanwhile, in terms of technical laminates, our success relies on finding new applications where they can be of use.” Baggi says the biggest trend affecting the European vibration damping business is the electrification of vehicles.

“We have been asked to increase the damping of the material for shims and other components at low temperature because in EVs the braking system is cooler,” he says. “The next phase is to create new rubbers with the same lower temperature damping characteristics and to produce stronger shims, because more stress is now being applied to the brake pad.”

Baggi believes one potential opportunity moving forward may be supplying materials to help lessen vibration within drum brakes.

“Drum brakes are an old-fashioned way of braking,” he says. “However, the new Euro 7 emission standard means that vehicles can’t pollute by spreading dust. The drum brake is a good solution to this because the brake is closed. They are already being used by manufacturers, and we are looking for ways to try to damp the noise that they make.”



Alessandro Baggi,
OE/OES Shim
Director Europe

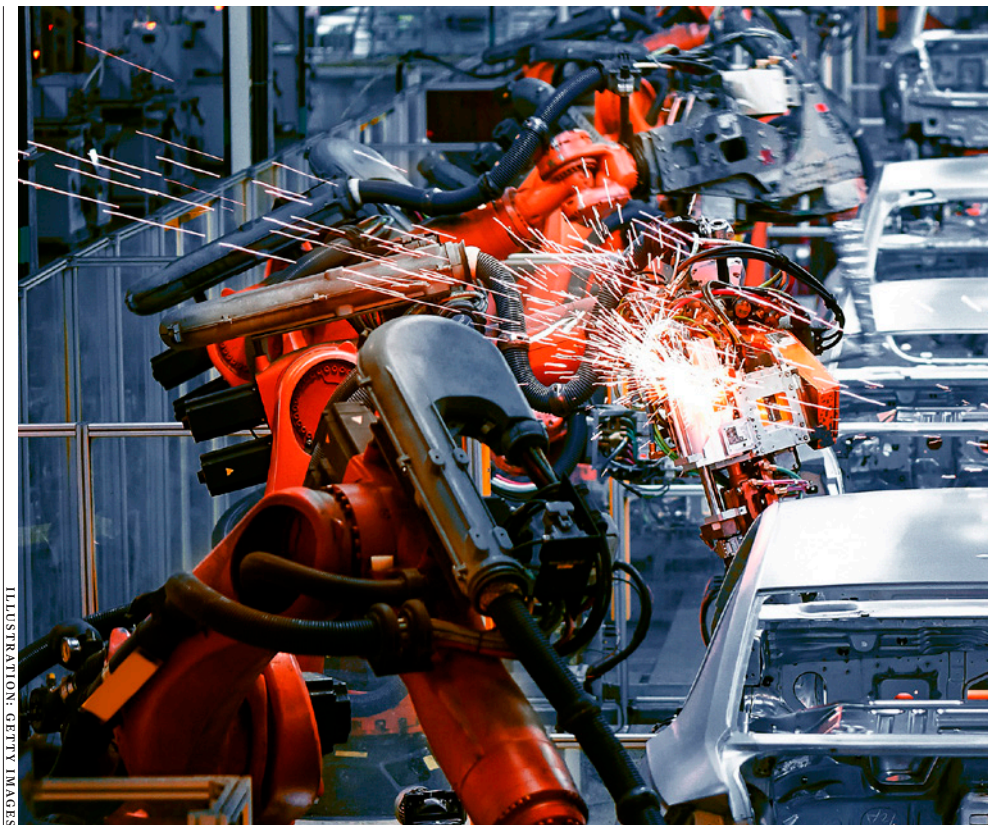


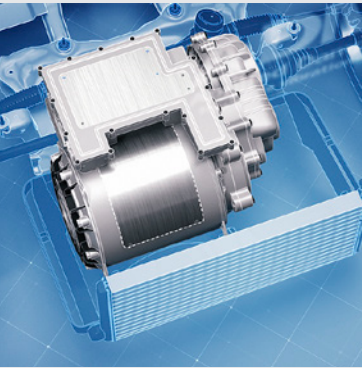
ILLUSTRATION: GETTY IMAGES



ILLUSTRATION: TRELLEBORG

Above:
In China, 27 million cars were sold in 2022. Local brands compete with international companies.

Left:
The biggest trend affecting the European vibration damping business is the electrification of vehicles.



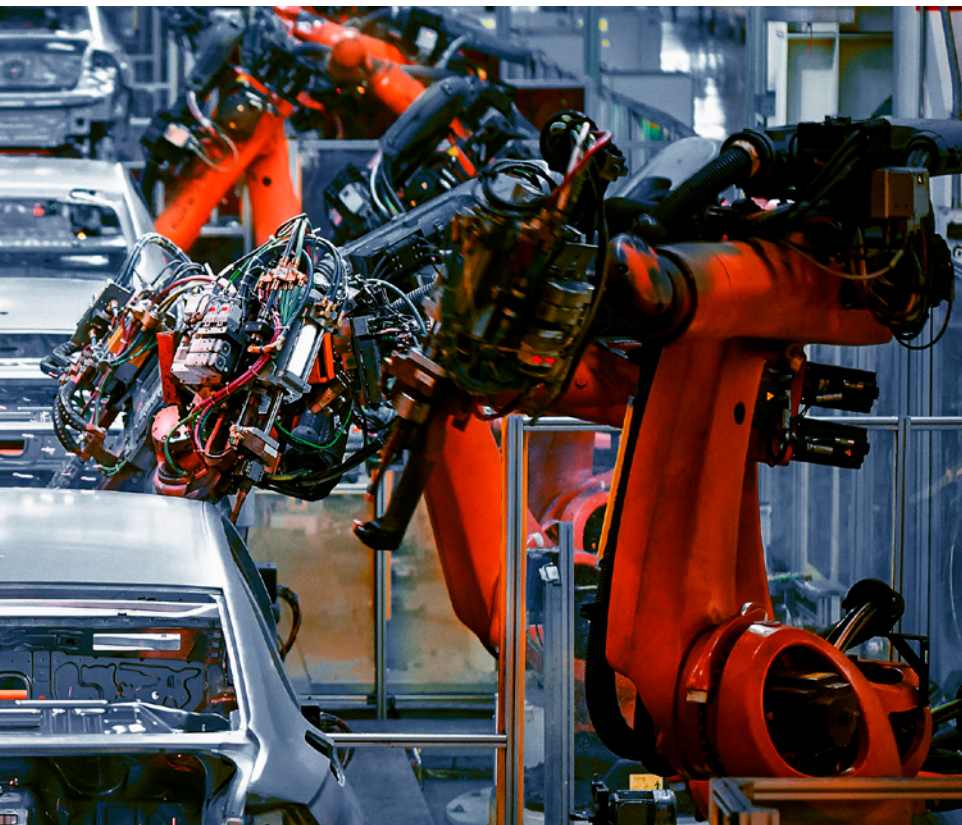
Applied Damping Foam

ADF reduces structural-borne noise by combining damping and isolation.



Visco-LAM and Duru-LAM

Both are sandwich materials comprising two metal sheets laminated with a viscoelastic polymer layer. They are used to replace resonant components.



Weidong Yao,
General Manager for damping solutions in China.

“We have eight dynos in Shanghai that let us work with customers on noise testing to find solutions.”

Weidong Yao, Trelleborg

Weidong Yao, General Manager for damping solutions in China, says the Chinese automotive market is large, fragmented and very competitive. As well as local Chinese auto makers, many international brands are based in the country. The Chinese domestic automobile market is the largest in the world, with nearly 27 million cars sold in 2022.

Yao says that while competition is fierce, the diversity of the market has worked in the favor of Trelleborg in recent years.

“Our business sales trend has been very strong. That’s due to the work we have done developing the business here and also due to the strength of local Chinese brands. They

keep on growing and getting a greater share of the Chinese market.”

He explains Trelleborg has steadily grown to become a market leader in shims and vibration damping solutions for brakes and other vehicle components in China.

Yao says the key drivers for the business in China are the strong local market, the strength of the product and the hard work of the sales team.

“This work is supported by strong R&D,” he says. “We have eight dynos in Shanghai that let us work with customers on noise testing to find solutions.”

Yao says Chinese auto buyers, more than in many other markets, are embracing electric vehicles. While this may slowly reduce requirements for shims, he sees great potential for selling technical laminates that reduce noise and vibration in other parts of EVs.

“One problem with EVs is the noise generated by the inverter in the electric driving system and also the electric motor,” he says. “These often have custom aluminum covers that work like speakers, increasing the noise level. By putting a piece of applied damping material on top of the cover and bonding it, we can significantly reduce that noise.” ■

A SAFE HARBOR

A NEW FLOATING IMPORT TERMINAL FOR LNG IS HELPING TO SECURE GERMANY'S NATURAL GAS SUPPLY. TRELLEBORG'S SAFEPILOT OFFSHORE ENABLES A SAFE AND EFFICIENT LNG TRANSFER.

TEXT ANDREW MONTGOMERY
PHOTO NPORTS/ANDREAS BURMANN

Germany is one of the world's biggest natural gas importers, sourcing 95 percent of its consumption needs from abroad. Historically, its biggest suppliers have been Russia, Norway and the Netherlands.

It was only recently that Germany had its own facility for regasification, the process of converting transportable Liquefied Natural Gas (LNG) back into its gaseous state for consumption. Before that, the finished product was piped or freighted from neighboring countries, such as the Netherlands and Belgium.

However, the geopolitical uncertainty and the steep increase in global gas prices that were caused by the war in Ukraine have made national energy security an urgent priority, prompting the German government to plan the development of two new domestic import terminals for LNG.

The terminals will not be ready for a few years, so the country will use five offshore

Floating Storage and Regasification Units (FSRUs) in the meantime. These are specially adapted ships moored at purpose-built jetties from which the natural gas travels onward.

In mid-December 2022, the first of these floating terminals began operations at the port of Wilhelmshaven, Germany's only deep-water port. The maiden delivery to the terminal amounted to 170,000 cubic meters of LNG (equivalent to 97,147,000 cubic meters of natural gas) – enough to supply about 50,000 German households with energy for a year.

Trelleborg's SafePilot range, a critical component of SmartPort technology, is crucial to the safe and efficient operation of the Wilhelmshaven terminal. In cooperation with marine energy infrastructure specialist Höegh LNG, Trelleborg has supplied its SafePilot Offshore solutions to make the complex vessel positioning and berthing process more accurate and





Above:
Diamond Gas Victoria delivering an LNG shipment to Høegh Esperanza at Germany's first LNG import facility in Wilhelmshaven.



“Trelleborg offers many solutions for vessel berthing and fuel delivery processes.”

Tommy Mikkelsen, Trelleborg

precise. The portfolio of solutions includes SafePilot CAT MAX portable pilot units and SafePilot control units, which combine the functions of a berthing aid system and a vessel positioning system.

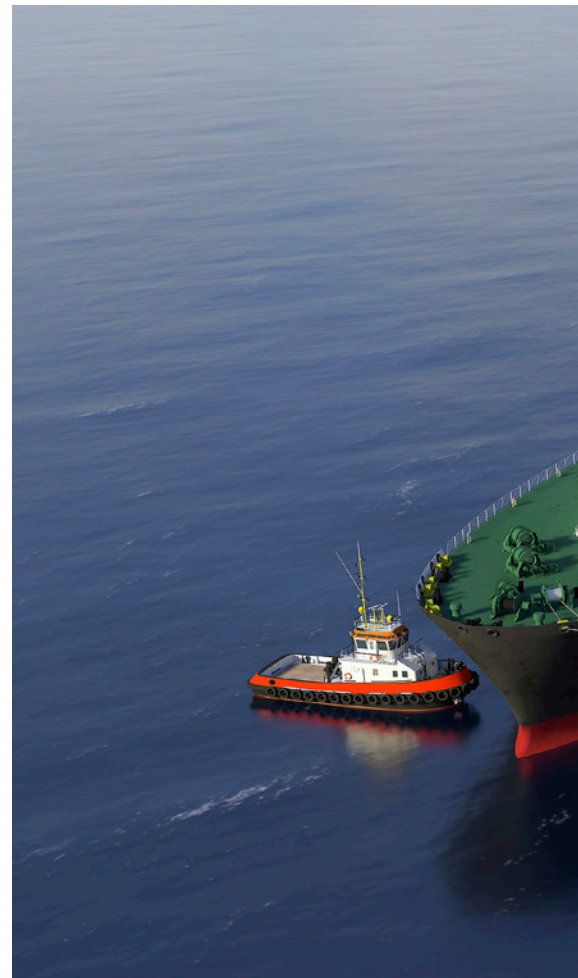
When deployed to the regasification unit, Trelleborg’s vessel positioning system works in combination with portable piloting units on LNG carriers and support vessels. The system provides 360-degree visibility and six-axis monitoring of all floating assets and serves as a unified monitoring system for pilots, tugs and FSRUs.

“Trelleborg offers many solutions for vessel berthing and fuel delivery processes,” says Tommy Guldhammer Mikkelsen, Managing Director for navigation and piloting at Trelleborg, who has played a pivotal role in creating and developing the SafePilot navigation and piloting solutions.

Aside from SafePilotPro, which delivers situational awareness and centimeter-level accuracy, he reels off an impressive list of Trelleborg’s comprehensive LNG portfolio, including environmental monitoring and high-pressure natural gas transmission. Gen3 Ship-to-shore link (SSL) and slide-in, slide-out (SISO) fender systems are among the other solutions that facilitate seamless and efficient LNG transfers.

In comparison with other countries, the German port authorities have strict regulations regarding LNG facilities and related operations. This creates a significant challenge due to the dynamic nature of the LNG-delivery vessel and the floating FSRU. Even the slightest impact during berthing could potentially cause the FSRU to collide with the jetty, causing significant damage.

“When a vessel approaches a berth, the authorities look at the centimeters-per-second speed of approach because it’s such a heavy



FROM GAS TO LNG AND BACK AGAIN

Converting gas into a liquefied state makes the gas easier and more stable to transport, by ship, rail or road.

Methane liquefies under pressure once cooled below its critical temperature of $-82.3\text{ }^{\circ}\text{C}$. It becomes liquefied natural gas at $-162\text{ }^{\circ}\text{C}$.

At its destination, seawater heats LNG back to its gaseous state at atmospheric temperature – the regasification process.

object going toward the infrastructure,” explains Mikkelsen. “The jetty can withstand considerable berthing forces. While the fenders along the jetty provide some protection, there is still a risk of potential damage. As an LNG vessel comes side-by-side with a fixed FSRU at the berth, these fenders experience an impact.

“Arriving at the FSRU, the LNG needs to have visuals on its speed of approach and berthing maneuvers to monitor and safeguard the berthing operation,” Mikkelsen says. “The approach speed of the LNG carrier is critical, as it has a great influence on the berthing energy and therefore the fenders between the LNG carrier and FSRU and the fenders between the FSRU and the berth.”

Many terminals use laser docking systems for berthing. However, Mikkelsen explains, with an FSRU moored to the jetty, you would not have any measuring tools or displays accessible in a traditional



ILLUSTRATION: TRELLEBORG

Above:
Trelleborg is a versatile provider of solutions for large-scale LNG transfer operations.



CONTACT
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laser docking design. This was brought to Høegh's attention, who then suggested that Uniper, the FSRU terminal operator, contact Trelleborg.

“Our system utilizes Real-time Kinematic (RTK) corrections to deliver the positional awareness and speed accuracy of global navigation satellite systems to one centimeter per second and an independent heading accuracy to 0.01 degrees,” says Mikkelsen. “It’s a bit like when you’re parking your car. The reflection of the sensor tells you the wall is nearby. In this case, the FSRU is the wall you don’t want to hit, but you have to be close to it to align the vessels and connect the hoses from ship-to-ship.”

“We installed a fixed piloting unit on the FSRU as the base location and a portable piloting unit on board the LNG carrier. Based on the signal transmitted between those two units, you can get a centimeter-level accuracy of the carrier’s location.”

And, adds Mikkelsen, “Uniper brought in independent experts to measure if the navigation system was operating correctly. Once they signed it off, we started receiving requests from various engineers to replicate what we did at Wilhelmshaven.”

Although Trelleborg’s positioning and berthing technology features in different configurations elsewhere, its successful deployment at Wilhelmshaven – after just two months of preparation – has created great interest. So has a similar project at the new Gasgrid LNG terminal in Inkoo, Finland, which uses SafePilot Offshore software with SafePilot CAT MAX portable pilot units (PPUS), SafeTug software and Gen3 SSL systems.

“It’s interesting that within just three to four months we took on two LNG terminal projects,” says Mikkelsen. “The authorities of Germany and Finland trust and value the solution we’re offering.” ■

FLEXIBLE ENERGY

Creating a sustainable and secure energy mix is not just about building more solar and wind farms, it is far more complex, says professor Jinyue Yan.

TEXT ANDREW MONTGOMERY PHOTO CARSTEN SCHAEEL

While global warming has shown us the climate risks of being so reliant on fossil fuels, the conflict in Ukraine has also highlighted the significant strategic and economic vulnerabilities. Energy security, flexibility and renewability are key issues for our planet today.

Jinyue Yan, Chair Professor of Energy and Buildings at the Hong Kong Polytechnic University, is a leading researcher into future energy. He describes our current situation as a multifaceted problem.

“It’s a complex issue that’s affected by many different factors,” says Yan. “Our dependence on fossil fuels has left us vulnerable to supply disruptions and price fluctuations. Furthermore, the concentration of oil and gas reserves in a small number of countries has led to geopolitical tensions and conflicts.”

Even those less dependent on fossil fuels do not escape.

“The complex and interconnected nature of the energy supply chain can have ripple effects throughout the system,” says Yan.

“For example, in Sweden there’s almost no dependence on natural gas for electricity production, and since 1970 the country has managed to increase its gross domestic product while significantly reducing its use of fossil fuels. But because of the supply chain’s use of natural gas and market turbulence, the electricity price can still see changes led by fluctuation of the natural gas price.”

Some are responding with long-term proposals to secure and stabilize future energy supply. For example, the European Union’s REPowerEU strategy aims to make Europe independent of Russian fossil fuels before 2030 and speed up the EU’s transition to green, renewable energy.

Renewables are the cleanest and sometimes cheapest energy available and can be generated domestically, so they are helpful in addressing energy security concerns. “We need to diversify our energy sources and invest more in renewable energy technologies such as solar and wind power,” says Yan.

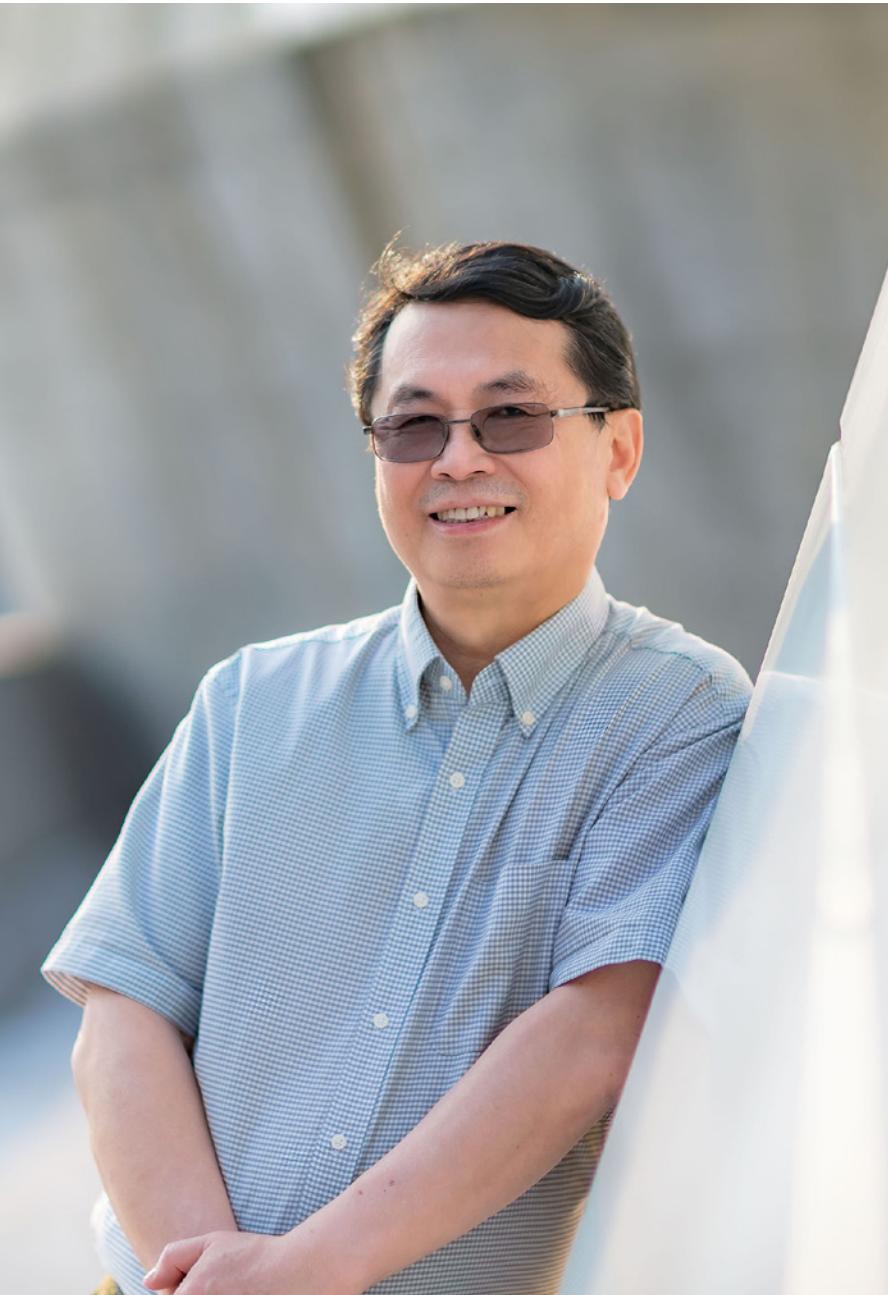
75%

Global renewable capacity will increase by nearly 75 percent between 2022 and 2027 according to The International Energy Agency (IEA).

“The complex and interconnected nature of the energy supply chain can have ripple effects throughout the system.”

Jinyue Yan





Jinyue Yan

Job: Professor Jinyue “Jerry” Yan is one of the world’s leading future energy specialists, researching the challenges to society that are linked to energy technologies and sustainability.

Works:

He is Chair Professor of Energy and Buildings at the Hong Kong Polytechnic University.

Background:

He lived in Sweden for more than 30 years and was Professor and Director of Future Energy Profile at Mälardalen University.

Yan previously held a professorship at KTH Royal Institute of Technology, Sweden, and is a member of the European Academy of Sciences and Arts. He is also founding Editor-in-Chief of the academic journal *Advances in Applied Energy*, and was Editor-in-Chief of the journal *Applied Energy*.

Above:

Energy researcher Jinyue Yan is a strong advocate for energy flexibility based on renewable sources.

It seems that the world is listening. The International Energy Agency (IEA) projects that global renewable capacity will increase by almost 2,400 GW (nearly 75 percent) between 2022 and 2027; that is equivalent to the entire installed power capacity of the People’s Republic of China. The IEA’s estimate was revised upward by almost 30 percent from the previous year’s report because China, Europe, the United States and India have been quicker in implementing

existing policies, as well as regulatory and market reforms and new policies, in response to the global energy crisis.

But it is not simply a case of investing in solar panels and wind farms and expecting endless cheap renewable energy. We also need to build flexibility into energy systems to cope with peaks and troughs in daily usage. How do we ensure there is enough capacity when demand is high and systems are under stress?

One leading European practitioner of energy flexibility is the UK. There, the national energy regulator Ofgem has been encouraging the growth in distribution system operators who use flexibility from decentralized energy resources to complement or replace national grid-based electricity. This solves problems with congestion management, reducing the likelihood of power outages and avoiding grid expansions. Similar best-practice flexibility initiatives are taking shape in Norway and the Netherlands.

“There are several ways to improve the flexibility of energy systems,” explains Yan. He classifies these as *time matters*, *location matters*, *people matter* and *data matters*.

“The first thing is to create a better dynamic balance between supply and demand,” Yan says. “Time matters because we need to have a better understanding of the characteristics of electricity production, as well as more accurate forecasting of how much can be produced in relation to the electricity market through using variable renewable energy.”

In other words, better forecasting of when there will be less or more wind or sun will allow us to manage demand. This will mean we can store excess energy when it is not needed and use it when the sun doesn’t shine or the wind drops. But that will also mean solving the challenges of energy storage. The lack of a standardized battery technology, space considerations and high maintenance costs are just some of the barriers to battery solutions, although converting excess energy and storing it as hydrogen gas is one emerging alternative.

“We need a completely new business model that encourages consumers to play a role in the energy system.”

Jinyue Yan



PHOTO: CARSTEN SCHAEEL



PHOTO: GETTY IMAGES



“We also need to improve the profiles of energy supply and demand, with consideration to local conditions,” Yan adds. Location matters because geography, climate and even the industrial, technological and socio-economic profiles of local areas can affect energy supply and demand. When that is considered, we can better understand which structures and renewable energy technologies we require for each area.

People matter too.

“We need a completely new business model that encourages consumers to play a role in the energy system,” says Yan. “People who install solar panels on their houses can sell their excess electricity, and the energy system can be

Above:

Tanks of hydrogen and wind turbines stand near the hydrogen electrolysis plant at Energiepark Mainz, in Mainz, Germany.



PHOTO: GETTY IMAGES

changed to include new, demand-side sources of variable renewable energy when required. People are no longer just consumers; they're producers, or prosumers. But they and the market must be convinced to support society's energy transition effort."

Yan adds that data matters because big data can help us simulate the likes of extreme weather events that cause power outages to stress-test the systems and be prepared. Data and digital tools generally offer effective, robust technologies that were impossible before, but we need to be better at sharing them and their results for the greater good.

However, there are no easy wins. Instead, Yan says, "we need

long-term solutions with a strong and motivated strategy, such as flexible market strategies, rather than a quick solution."

Ultimately, society will always be dependent on energy. But by switching from fossil fuels to renewables we will transition to mainstream sustainable and affordable energy from alternative sources.

Otherwise, Yan warns, a very challenging future awaits. "If we don't change now we will be forced to change in the future, perhaps within just a decade or so, in a harder way," he says. "The longer we wait to act and transition to more sustainable energy systems, the more difficult and costly it will be later on." ■

"If we don't change now we will be forced to change in the future, perhaps within just a decade or so."

Jinyue Yan



PHOTO: CARSTEN SCHAEL





KICKING OFF

TRELLEBORG WANTS TO CONTRIBUTE TO A POSITIVE SOCIAL DEVELOPMENT IN EVERY COMMUNITY WHERE IT OPERATES. THE COMPANY'S SOCIAL ENGAGEMENT EFFORTS MAINLY FOCUS ON YOUNG PEOPLE, IN RECOGNITION OF THEIR IMPORTANT ROLE IN THE FUTURE OF THE COMPANY AND SOCIETY AS A WHOLE.

TEXT CARI SIMMONS **PHOTOS** GUY BETTISON

Left: Seventeen-year-old Holly participated in a coaching course sponsored by Trelleborg and is now coaching younger girls in the club.

Trelleborg engages in various activities dedicated to supporting children and young people in their development. The initiatives are often related to learning, leadership, or sport.

Sporting initiatives around the world, including the Trelleborg SportsClub, encourage healthy physical activity by making sport widely accessible. Activities also promote an equal and inclusive society and aim to strengthen motivation and leadership skills.

A recent initiative that primarily benefits teenage girls is the funding of coaching courses at AFC Chellaston, a soccer club located near Trelleborg's manufacturing operation in Leicester, England.

AFC Chellaston started as a football club for boys in 1992 but has expanded enormously, thanks to various sponsorships and the efforts of its volunteers.

One of those volunteers is Laura Barron, a physical education teacher. In addition to managing two mixed football teams, she is a member of the AFC Chellaston committee that is responsible for girls' football development. ▶



Left: Budding coach Holly discusses tactics with team manager Laura Barron.

“It has given the girls a chance to explore leadership in a professional setting, which may then further fuel career pathways.”

Laura Barron

GIVING TO THE COMMUNITY

Roger Grooms, Purchasing Director at the Trelleborg facility in Leicester, spotted an excellent opportunity in his community with AFC Chellaston, which has more than 700 registered players in more than 50 teams.

“I want my own daughter to have chances like this when she is older, and that starts with these types of initiatives. Combining the club’s ideas together with Trelleborg’s social engagement was a perfect solution for everyone.

“In recent years the club has made huge strides in offering opportunities for girls ages four and above to play in a safe and trusted environment, often with older girls coaching them; we want to continue encouraging these ideas going forward.”

As part of its local social engagement, Trelleborg offered AFC Chellaston a sponsorship.

“It was decided that the Trelleborg sponsorship needed to provide a pathway to further opportunities rather than be a one-off event,” says Barron. “The idea was that it enabled personal development and future employability through fun and engaging learning.”

So far, 31 teenagers have participated in two coaching courses, which took place in 2022. Six of the girls are already coaching others and three more will start after their school exams. All of the girls are currently volunteering through Derby County Community Trust at various sporting events.

Seventeen-year-old Holly has been playing football since the age of eight and says that it makes her happy. The teenager participated in one of the courses and is now coaching younger girls. “I like seeing the players progressing and enjoying the sessions with their friends,” she says.

“I like the challenge and the intensity

Below: Laura Barron combines managing two teams with membership of the AFC Chellaston committee.

and also the friends I have made playing football. The course was a good introduction to coaching. It also helped me with my self-confidence.”

Following the success of the courses, Barron explored ways to help the teenage girls develop more career opportunities. One of the best ways to do this was through a refereeing qualification course, which has now been planned and is being funded by Trelleborg. A total of 24 girls will attend.

“The sponsorship highlighted the demand and need for girls-only opportunities,” Barron says. “Many girls felt more empowered and confident after attending the girls-only session rather than the mixed gender one. It has given the girls a chance to explore leadership in a professional setting, which may then further fuel career pathways.”

Barron says that without the funding from Trelleborg, the courses would not have taken place. “The funding enabled the course to be advertised and the venue to be sourced. As it was a whole event, the girls would not have been able to secure a position on the course independently.” ■



NEWS



PHOTO: JUST WOOD

A bench made out of wood waste.

Wood you believe it?

One of the cleverest and most interesting community projects currently supported by Trelleborg is *Just Wood Leicestershire*, an English social enterprise that collects wood waste to recycle and convert into furniture, preventing it from going into landfill. *Just Wood* is

benefiting from the support of Trelleborg's facility in Leicester, which has set aside a specific wood waste area for the non-profit organization. By doing so, Trelleborg is cutting wood waste, helping the wider community and reducing the cost of wood disposal, all at the same time.

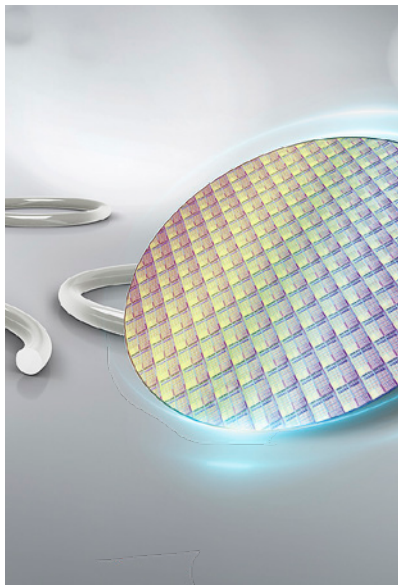
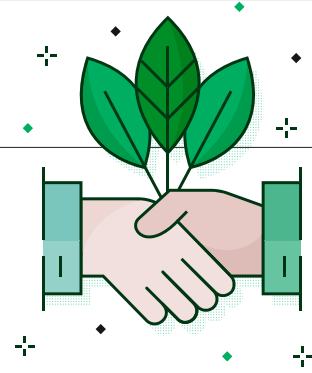


PHOTO: TRELLEBORG

The new material is specially engineered for critical semiconductor applications.

Fabulous PureFab

Trelleborg has announced the launch of two new Isolast® PureFab™ FFKM semiconductor materials; an ultra-high temperature perfluoroelastomer (FFKM) and an excellent all-round sealing compound with superior chemical compatibility for semiconductor applications. The new materials join the already extensive Isolast® PureFab™ range, which meets the most demanding challenges of sealing solutions for front-end and subfab processes.



New climate target application

Trelleborg Group has submitted a new climate action target application to the Science-Based Targets initiative (SBTi), a project partnership involving the Climate Disclosure Project, the United Nations Global Compact, the World Resources Institute and the World Wide Fund for Nature. It counts more than 1,000 companies as members that have signed up with their own climate goals. Trelleborg intends to apply the new target to its entire value chain through 2030.

Patient care patent

Trelleborg has received a patent for its Dartex Zoned Coatings®, which allow zoning of a support surface cover so that a single cover can have multiple physical and stretch properties across different zones, without joins, welds or seams. It is suitable for production of mattress covers, moving, handling and positioning devices, specialist medical furniture, theatre tables, trollies and stretchers.

Trelleborg has also launched Dartex® Repel, a groundbreaking surface technology that creates a fast-acting antimicrobial surface without any chemical additives.



PHOTO: TRELLEBORG

Dartex Zoned Coatings® can be applied to any coated fabric option for use in healthcare applications.

Protecting the essential

OPERATIONS

COMPLIANCE



**SOCIAL
ENGAGEMENT**



PROTECTING THE ESSENTIAL

Protecting the essential is about minimizing our negative impacts and maximizing our positive impacts, making sustainable changes vital for the planet and for society. Our focus areas stretch from the environment to health and safety; from compliance to ethical relations with all our stakeholders and society as a whole. While considering the big picture, we also need to focus on areas where we can make a genuine difference.