

The background image is a high-angle, aerial shot of a person kayaking down a narrow, rocky channel. The water is a vibrant turquoise color, and the surrounding rock walls are dark and textured. The kayaker is wearing a blue and orange outfit and is positioned in the lower right quadrant of the frame, moving towards the viewer.

ttime

A MAGAZINE FROM TRELLEBORG GROUP

1-2022

Solutions that seal, damp and protect critical applications.

Waterproof wilderness

Coated fabrics enhance the experience of nature.

RAPID DEVELOPMENT CENTER
ACCELERATES TIME TO MARKET

KING SIZE FENDERS
FOR SUPERTANKERS

TOWARD MORE
SUSTAINABLE FLYING

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ALL KNOWING

Tara Schrock grew up on a farm in the American Midwest. Now she sells agricultural tires.

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British marine company SafeSTS supplies pneumatic fenders to supertankers. Yvonne Mason is the CEO.



Cover photo:
Thor Tingey/Alpacka Raft

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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 has annual sales of about SEK 34 billion (EUR 3.34 billion, USD 3.95 billion) and operations in about 50 countries.

The Group comprises three business areas: Trelleborg Industrial Solutions, Trelleborg Sealing Solutions and Trelleborg Wheel Systems.

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

www.trelleborg.com



TRELLEBORG

EDITORIAL

FASCINATING ENGINEERING

Engineered solutions, be it for airplanes, light vehicles or medical devices are fascinating. Sky high quality and product safety requirements are combined with deep materials knowledge and a desire to do things better. At Trelleborg, we are involved in creating sustainable industrial solutions, driven by trends such as electrification, industrial automation, and new sustainable materials. The pace of development at Trelleborg is high, and new products and solutions are launched regularly.

In this issue of T-Time I am proud to present Trelleborg's contribution to electric roads, which are roads with heavy traffic that can

be adapted for electrification. You can also read about Trelleborg's Rapid Development Center that responds to healthcare & medical customer needs to accelerate time-to-market for new products, reduce the production cost of parts already in market and improve the transition from design to serial production.

Peter Nilsson,
President and CEO



Ultimate rafting

Rafting is on the rise as more and more people discover the rush of paddling through whitewater. Lightweight and compact packrafts from Alpaca Raft are enabling more people to join the river action.

TEXT CARI SIMMONS PHOTOS THOR TINGEY ►



“Packrafts allow people to go further and use the rivers on the map as another form of travel.”

Emily Ledergerber, Alpaca Raft

Packrafters tend to be a passionate and determined bunch of people.

Their packrafting stories are adventurous to say the least, such as battling bad weather and hiking for days to paddle the remote Kaitum River in Lapland; drifting down Canada’s Fraser River after a challenging mountain ski traverse; or paddling in melted snow and sunshine in Slovenia’s Soča River – after hiking up and down a 1,557-meter-high mountain.

What all these packrafting adventures have in common is that they involved Alpaca Raft packrafts.

“We are continually in awe at the trips people are taking with our packrafts,” says Emily Ledergerber, marketing director at Alpaca Raft’s headquarters in Colorado, in the U.S.

“There have been so many great adventures. One example of an epic trip is a North Pole Arctic Expedition, in which explorers Børge Ousland and Mike Horn used Alpaca Raft packrafts for part of their 87-day ski traverse of the Arctic Cap.”

In September 2019, the experienced duo began a mission to ski across the top of the world and investigate the melting Arctic ice caps. Along with tents, skis and emergency equipment, they had

their Alpaca Raft packrafts.

But it’s not just daredevils who are purchasing packrafts. Backpackers, hikers, anglers, paddle sports enthusiasts and others are also using them.

As the name implies, Alpaca’s packrafts are packable. They roll up and fit easily onto a bike or into a backpack until the user is ready to inflate them and hit the water. Packrafts are more lightweight than the average raft. They tend to weigh between two to six kilograms, depending on the model, whereas standard rubber rafts are much larger and heavier, and are not foldable. Packrafts’ packability helps make rafting more spontaneous and flexible.

“Packrafts allow people to go further and use the rivers on the map as another form of travel.



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different models of packraft are sold by American Alpaca Raft. All of them are inflatable, lightweight and made with Trelleborg’s engineered coated fabrics.

Alpaca’s inflatable rafts make it possible to both hike and raft on the same trip.



Emily Ledergerber is the marketing director at Alpaca Raft and an outdoor fan.



Rafting in the Grand Canyon is an amazing way to experience nature.



Trelleborg's versatile coated fabrics

Trelleborg's engineered coated fabrics are used in many applications within the outdoor and recreational segment and within manufacturing, marine, aerospace, and other industries. Trelleborg employees utilize polymer expertise and the latest coating, lamination, and hot melt technologies to simultaneously achieve multiple material performance objectives, such as extreme thermal management, flame resistance, water resistance, anti-bacterial, and UV and smoke toxicity protection.



Whether they are backpacking, bike rafting, or hunting and fishing, packrafts are a great tool to redefine access," says Ledergerber.

Alpacka Raft started in 2000, after CEO Thor Tingey was determined to develop a better-performing packraft, following his own 600-mile traverse of Alaska's Brooks Range in a raft that didn't hold up as well as expected. Tingey turned to his mother, Alpacka Raft founder Sheri Tingey, an avid kayaker, clothing designer and former owner of a custom ski clothing shop, for help designing a better raft. Their first collaboration resulted in 'The White Boat' packraft and the rest, as they say, is history.

Today, Alpacka Raft's

packrafts come in about a dozen different models, with names like Wolverine, Expedition and Forager. Each packraft is made-to-order and can be fully customized with various fabrics, configurations, add-ons and colors. The packrafts are all designed and made in the U.S., and cut, sewn and handcrafted by Alpacka Raft's skilled in-house team. With the current boom in outdoor recreation, the company has grown to keep up with the high demand for its products.

Thor and Sheri Tingey's passion for the outdoors and the sport of packrafting reflects in the craftsmanship of their products and in their approach to continuous improvements and innovation when it comes to quality and materials. Their packrafts come with a lifetime warranty.

EDGE PACKRAFTS

Rafting is challenging.
The right equipment makes
it safer and easier.

Alpacka Raft has manufactured packrafts for over two decades and Trelleborg became an integral part of the company's success early on, says Ledergerber.

"Trelleborg is our partner in materials as we continue to make the most innovative packrafts on the market. Our fabrics are superior and set us apart."

The packrafts are all made with Trelleborg's engineered coated fabrics. The yarn and weave of the material, combined with chemistry and application of the polyurethane laminates, are critical for the packraft's fabric performance.

The fabrics used to make the packrafts are in bright, bold colors. The coated fabrics offer the highest tear strength, PU adhesion, UV protection and the most extended durability in the industry to withstand the most challenging elements for wear and tear.

"We have customized a solution specifically for Alpacka Raft," says Jenny Nichols, Marketing Communications Manager for engineered coated fabrics within Trelleborg Industrial Solutions. She adds that Alpacka Raft and Trelleborg innovate and evolve together.

Trelleborg continues to expand its solution portfolio in the outdoor and recreation world, says Nichols, adding that the company offers many coated materials in the industry for rock climbing harnesses, hydrophobic insulation, inflatable camping mattresses, life jackets, dry bags, diving suits, and more.



"Customers give us the application and the characteristics they need to achieve, and we work to combine the best fabrics, substrates, films and machinery to achieve a customized solution for them," says Nichols.

"We have a rapid prototype center for both rubber and polyurethane. We can quickly produce samples for testing to meet the customer's specifications in terms of application, cost, and so on. The customized solutions we work on allow us to build close relationships with our customers to understand what they want to achieve and how they want to evolve." ■

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"Trelleborg is our partner in materials as we continue to make the most innovative packrafts on the market."

Emily Ledergerber, Alpacka Raft

NEWS



PHOTO: UNSPLASH

New Green Bond

Trelleborg Group issued its first-ever Green Bond. Managed by Scandinavian bank SEB, the bond will support sustainable production and administration initiatives. The inaugural bond contributes to the Group's climate target of 50 percent reduction of CO₂ emissions by 2025, '50 by 25', and a vision of net-zero emissions by the end of 2035. The nominal amount of the bond is SEK 1 billion, with a tenor of 5,5 years.

'Draw Your Tire' challenge

Proud Mitas agricultural tire users were invited to submit illustrations – from sketches to paintings and graphic designs at any artistic level – to pay homage to the tires they know so well and use every day.

The idea was to showcase the tires that make a difference in their lives. All submissions featured on the Mitas challenge website at drawyourtyre.digitalcontest.it/mitas/ and the best three design ideas will be considered for future Mitas advertising campaigns and also earn rewards for their creators.

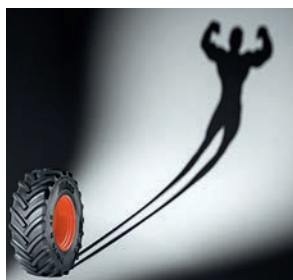


PHOTO: MITAS



PHOTO: SHUTTERSTOCK

Trelleborg hosts Malta e-mobility press conference

The Trelleborg facility in Hal Far, Malta, recently played host to a Maltese Government press conference that announced a €3 million investment in electric car charging infrastructure across the Mediterranean island nation. Malta will install 130 new electric car charging pillars across the country, increasing the total number of charging points to 360 by the end of 2021. Trelleborg is one of several companies manufacturing electric vehicle parts in Malta.

Flood relief

During the catastrophic floods that affected the Ahr Valley in Germany in the summer of 2021, an industrious Trelleborg employee who lives in the area, helped the rescue efforts by repairing damaged tires on

emergency vehicles. Receiving news of his efforts, Trelleborg in Germany and its White Baumaschinenreifen GmbH (White) brand of tires stepped in to provide similar on-site repair services free of charge.



PHOTO: WHITE BAUMASCHINENREIFEN



THE INSIDE TRACK

Choosing the right agricultural tire is vital. Tara Schrock, Sales Director for Ag Replacement, knows all about it. She grew up in the Midwest and still helps her parents farm their land.

TEXT ANDREW MONTGOMERY
PHOTOS SAVERIO TRUGLIA

When Trelleborg Wheel Systems recruited Tara Schrock as its new North American Sales Director for Ag Replacement in March 2021, the business was appointing someone with the inside track on its end customers: farmers.

“I’m from a farming background. Where I grew up in western Illinois is a very small and remote farming community,” Schrock explains.

“My folks own and operate farms and I grew up working with them until I went to university. I still get to go and ‘play farm’ and help out, though my dad takes care of all the big stuff.”

The benefit of Schrock’s background is clear when it comes to knowing what products farmers are looking for and what will not harm their farmland.

Soil compaction, where the soil becomes densely clumped together and loses its richness and porous qualities, can have a significant effect on crop growth, yield, and quality. It can arise from the natural drying and wetting process known as soil consolidation, but the cause is often the tractors and other heavy machinery that are crucial to modern farming.

“A lot of people think about compaction but don’t understand the importance of it,” says Tara Schrock. ►

Tara Schrock grew up working on a farm.
Now she sells agricultural tires.



Tara Schrock

Job: North America Sales
Director for Agricultural
Replacement at Trelleborg.

Lives: Keithsburg, Illinois, USA.

Family: Married with three
children.

Career: Sales and marketing
roles. Computer programmer.
MBA.

Free time: Boating, camping
and the outdoors.

Fun fact: Her maternal
grandfather Ronald Reason, born
in 1900, was a farmer but also
invented the heated tractor seat.

Right:

On the field again. Tara Schrock has driven tractors since her childhood.

“Soil types are extremely important, and the farmer knows his soil better than anyone. You can be talking to farmers who have farmed their fields for 50 years. They know the soil inside and out. They are more aware of their soil types, and this was long before we had digital agriculture.

“Now that we have a big focus on agronomy and digital agriculture in general, it’s an awesome benefit to the farmer because agronomists can actually come in, do soil samples for the farmer, give them results and tell them exactly what kind of soil they have all over the farm.”

The tire industry is aware of the soil compaction issue, and Schrock has insights here too, having worked in sales for several other tire brands before joining Trelleborg.

“From the tire industry’s point of view, it’s interesting to note that soil type varies every time you go into and leave a field. Your field is not the same type of soil throughout,” she says.

“We have sandy spots on our farm and in these areas compaction is not so much of an issue. We also have bottom or wet ground that pose a lot of other challenges because it’s marshier ground that tends to stay wet; and all that contributes to what equipment you’re going to use on your farm.

“Compaction is a significant

consideration for us. Dad has a fit if you drive the truck down the side of a field because that’s compaction too. And the weight of farm and field equipment is so much larger and heavier than it ever used to be.

“Farmers around our farm run wheeled as well as track machines. Trelleborg is getting into the agricultural track side as well. What they’re going to run on their equipment is a significant farm decision by farmers.”

One of Trelleborg’s answers to the soil compaction issue and the wider problem of limited arable land

Stronger and softer. This tire can carry more, but puts less pressure on the soil.

The solution for sustainable farming

Compared to the industry-standard technology, the new VF TM1000 ProgressiveTraction® tire can carry up to 40 per cent more load at the same pressure, or work with 40 per cent less pressure at the same load.

Conceived to cope with the latest generation of machinery, the ProgressiveTraction tread design of the tire provides better transmission of power to the ground, more efficiency from the engine to the field and reduced soil compaction. Engineered to decrease tread vibration, the special double-edge tread design of the tire contributes to lower energy dissipation, minimizing fuel consumption, improving driver comfort, while extending the tire life.



and extreme weather include the TM1000 ProgressiveTraction® line-up, which it bills as ‘The solution for sustainable farming’. Schrock adds that the company is focused more than ever on its customers and end customers’ needs:

“We work with very large wholesalers and distributors, all the way through to independent tire dealers, throughout North America. A critical part of the job is to educate these folks on the benefits and features of Trelleborg products because they are the ones with direct connection to the farmers. I’m glad to say that, despite industry-wide supply shortages caused by the Covid-19 crisis, our transparency and support for our network are greatly appreciated. We are on an upward incline in the North American market.”

According to The 2020 World Population Data Sheet the population is expected to grow from 7.8 billion to 9.9 billion people by 2050. Consequently finding ways to farm productively, efficiently, and sustainably are vital. As the provider of key equipment that helps farmers do their job, Trelleborg is playing its part in achieving that goal.

“We’re also focusing on becoming better at talking directly to the farmer too. What keeps Trelleborg fresh is this emphasis on farmers. And kudos to Trelleborg for

understanding geographically what is needed because different regions have different crops, use different machinery and are subject to the challenges of extreme weather events. When we understand the growers and their needs it keeps us innovating.”

As the interview ends, Schrock speaks of her plans for the weekend: helping out on the family farm, as she’s done ever since she was little. Always the farm girl. ■

For more information:
www.trelleborg.com/en/career

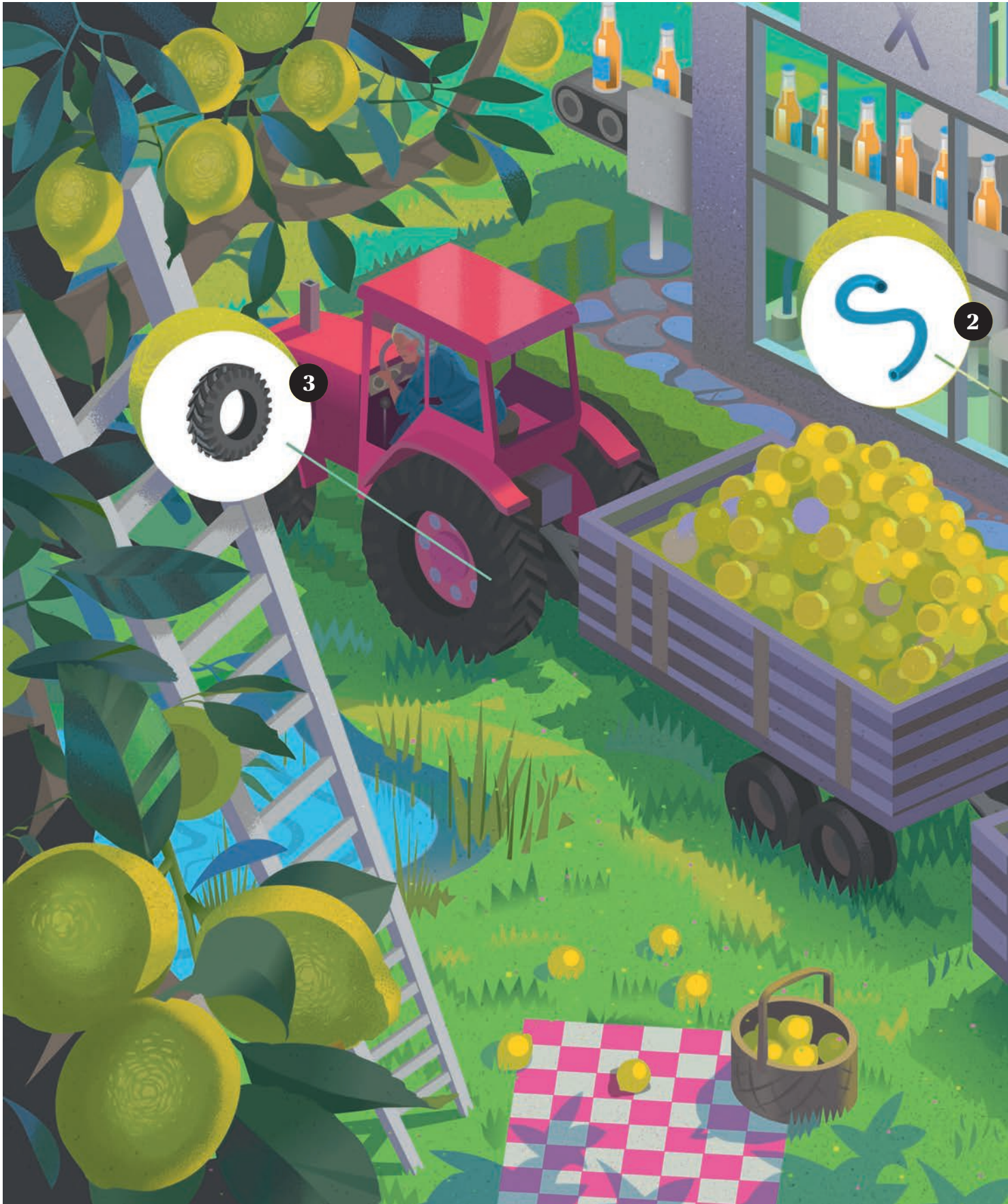
Above:
Corn is an important crop in the American Midwest.

Below:
Tara Schrock’s father together with her uncle; 85 years young, he is still helping out on the farm.

“When we understand the growers and their needs it keeps us innovating.”

Tara Schrock, Trelleborg







TEXT DONNA GUINIVAN

ILLUSTRATION NILS-PETTER EKWALL

EAT AND DRINK WELL

What is essential? Fundamental to life is the food that we eat and the beverages that we drink. Keeping these vital resources on our tables and safe to consume is critical. Trelleborg focuses on ways to do this, from developing materials that improve the sustainability of its customers' food processing to supporting farmers in maximising the production from their land; from providing food-safe seals, to hoses that improve manufacturing efficiency.

1. Food-safe seals

Food ingredients, such as citric acid, can be destructive to sealing materials. To avoid potential contamination, it is vital that compounds are compatible with process media.

2. Performance hoses

Constructed to provide extended life in challenging beverage applications, hoses twist and turn effectively to increase production efficiency.

3. Tractor tires

The design of the tread on Trelleborg's tires protects the soil. That means plants can grow more effectively and maximize the crop yields produced from each hectare.

A focus for all Trelleborg facilities globally is to continue to lower their environmental impact. The team that runs the prize-winning canteen at the Trelleborg facility in Denmark have a strong focus on the UN Sustainable Development Goals, sourcing its food locally.

It's the real thing

More than 1.9 billion servings of Coca-Cola are enjoyed in more than 200 countries each day.

Pharmacist John Pemberton invented Coca-Cola in 1886. Two years later the businessman Asa Candler bought the recipe for 550 USD. The rest is history.



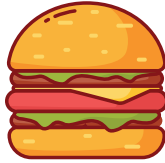
PHOTO: SHUTTERSTOCK

Daily bread

In medieval times, trenchers were absorbent plates of bread. After a meal, the trencher was eaten, given to the poor or fed to the dogs. There is a theory that the trencher is the origin of pizza.



PHOTO: WIKIPEDIA



Biggest burger

The largest hamburger ever weighed 1,164.2 kilograms and was made by a team of chefs on 9 July 2017. It consisted of three meat patties, tomatoes, lettuce, cucumbers, onions, hamburger sauce and a bun.



PHOTO: ISABELLA'S ISLAY

Millionaire's choice

The most expensive drink in the world is the Isabella's Islay Whisky Original version, which retails for 6.2 million USD. It is encrusted with 8,500 diamonds, almost 300 rubies and fashioned with the equivalent of two bars of white gold, all covering a fine English crystal decanter.

Weirdly wonderful

Tastes vary around the world, and what may seem delicious to some, is weird to others. Here's our top ten of the strangest delicacies globally, and we love them all!

1. 100-year-old eggs, China

Not quite that old but pretty rotten.

2. Haggis, Scotland

Reputed to be a wild creature, it's actually made of the innards of sheep.

3. Wasp cracker, Japan

Think choc chip cookies, with wasps instead of chocolate.

4. Escargot, France

A delicacy if you try and forget the snails crawling around the garden.

5. Vegemite, Australia

Made from yeast extract, a by-product of brewing beer; you either love it or hate it.

6. Rattlesnake, United States

Southern fried in the South West of the U.S.

7. Guinea Pig, South America

Typically roasted and served whole.

8. Casu Marzu, Italy

Also known as maggot cheese, it contains live insect larvae.

9. Stinkbugs, Africa

Used to flavour stews or eaten on their own, they are said to taste like apple.

10. Tripe, all over the world

The stomach lining of various animals, with a sponge-like texture.



A yummy rattle snake for dinner.

PHOTO: SHUTTERSTOCK

The road to the future

Electric roads are key to Sweden's target of slashing greenhouse gas emissions from domestic road transport by 70 percent. Trelleborg is contributing custom sealing solutions to the country's electric road tests.

TEXT ANDREW MONTGOMERY ▶

PHOTO: ELECTREON

PROTECTING THE ESSENTIAL ELECTRIC ROADS

An electric bus and truck wirelessly charging from Electreon's electric road outside the medieval town Visby on the Swedish island of Gotland.



PHOTO: ELECTREON

Sweden is a pioneer of electric road systems and aims to reduce greenhouse gas emissions from domestic road transport by 70 percent from 2010 to 2030. However, to achieve just a 20 percent cut by 2020, the country needs to lower emissions by one million tons a year between now and 2030.

By 2035, the government wants to find 3,000 kilometers of roads with heavy traffic that can be adapted for electrification. The Swedish Transport Administration, Trafikverket, has been identifying suitable roads and so far, four solutions have been tested.

At the first site, an overhead power line charged trucks via pantographs mounted on their roofs. The four-year test period – along two kilometers of the E16 highway close to Sandviken in central Sweden – ended in 2020.

The second option is the eRoad Arlanda

Smartroad Gotland's charging system is installed under the asphalt. This reduces the need to charge the battery when stationary.



PHOTO: ELECTREON

“Electric roads are a solution with big potential that also utilizes existing road infrastructure.”

Jan Pettersson, Trafikverket

project, a two-kilometer section of the road between Stockholm's Arlanda Airport and the Rosersberg logistics center. Vehicles use a movable arm to pick up electricity from an electric rail embedded in the road. The test began in 2018.

A third alternative is a conductive connection between the electric road and the vehicle through a pick-up under the vehicle. The pick-up connects to the road by sliding along electric rails laid on top of the road, efficiently transmitting power and charging the vehicle's batteries. This solution is being trialed between 2020 and 2022 in the Evolution Road project in Lund, southern Sweden, using a city bus as the main test vehicle.

Fourthly, the Smartroad Gotland focuses on a 1.6-kilometer-long electric road between the airport and town center of Visby on the Baltic Sea Island of Gotland. It is an inductive system where

E-mobility on the rise

The e-mobility market is fast paced with new technologies and companies constantly emerging. Original equipment manufacturers and system suppliers face distinctive challenges and ever-changing requirements because customers do not have clearly defined standards or established solutions. The innovation rate is intense, with pressure to quickly bring the right products to market.

A hybrid truck with a pantograph on the roof drives on an electric road alongside highway E16.

receivers pick up electricity under the vehicle's chassis from a copper cord sunk into the road. The three-year test ends in 2022.

"It takes a multitude of solutions to make it possible for all kinds of traffic to switch to a fossil-free system," says Jan Pettersson, head of Trafikverket's program for electrification of heavy transport.

"Electric roads are a solution with big potential that also utilizes existing road infrastructure. It may also need to use other technologies than those in these demonstrations."

In its latest report on electric road development, Trafikverket says that the electric road concept will be most suitable for long-distance transport on the roads with most traffic; the priorities being between the cities of Stockholm, Gothenburg and Malmö.

The incentive to invest in vehicles for electric roads will depend on the share

of goods transported on these roads, and Trafikverket calculates that the volume should be 40 percent or more to make this solution profitable.

Pettersson is hopeful. "Based on the demonstrations and other considerations, we've identified at least 2,400 kilometers of roads that are suitable for electrification," he says.

E-mobility is booming. To keep the momentum going, customers need reliable and competent component suppliers who can react quickly to meet their needs: from design, product development and prototyping through to serial production.

Trelleborg is ready. Its dedicated customer focus and combination of innovation, technology, and an efficient R&D organization leads to a reduction in the time needed to develop products and manufacture the first functional prototypes.



PHOTO: TOBIAS OHLS

"We've identified at least 2,400 kilometers of roads that are suitable for electrification."

Jan Pettersson, Trafikverket



In the first phase of the test of Evolution Road, the charging rail is on top of the road.

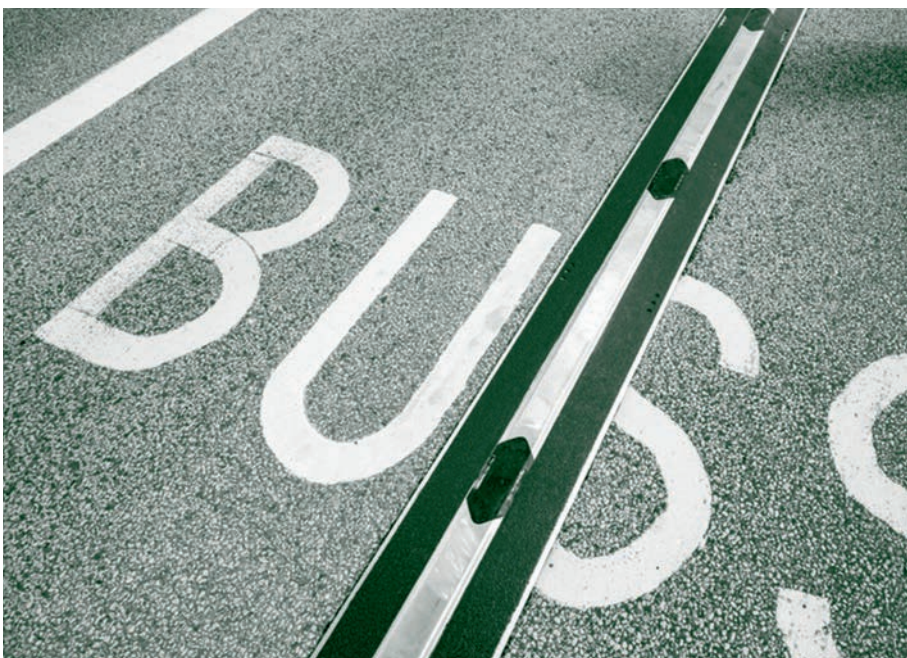


PHOTO: JOHAN NILSSON/TT

“We’re proud to be a key player in this booming and important market.”

Anna Scheuren, Trelleborg



To these electric road projects, Trelleborg supplied tailor-made sealing solutions, including a special EPDM material with very low conductivity.

“We’ve developed customized rubber sealing for the electric rails,” says Anna Scheuren, Business Development Manager for seals and profiles within Trelleborg Industrial Solutions.

“The seals have to provide a reliable sealing function against water ingress into the rail system and maintain electric conduction to the pick-up connection area.

“It’s a very demanding application not only due to the wear caused by the pick-up device under the test vehicles, but also from the usual non-electric traffic on the road. The sealing has to withstand very harsh weather conditions, with road temperatures ranging from minus 40 degrees Celsius during the coldest part of the winter to more than 60 degrees Celsius on the hottest summer days.”

In addition to electric road projects, Trelleborg is constantly developing leading solutions for all parts of the e-mobility industry.

“We’re proud to be a key player in this booming and important market and will continue to push for the next innovation that will allow electric vehicles to go farther and faster more effectively,” says Scheuren. ■

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PHOTO: NCC JOAKIM KRÖGER

eRoad Arlanda is a project with a two-kilometer electric road from the airport Arlanda, Stockholm, to a logistics center.



Rubber sheets

Ethylene Diene Propylene Monomer (EPDM) sheeting is one of the most versatile types of rubber sheeting and best suited for outdoor applications. It is highly resistant to wear and tear, even in the most aggressive external conditions such as steam, UV rays, ozone, saltpeter or extreme weather. EPDM sheeting also maintains its properties under a wide range of temperatures, making it ideal for general industry and construction, automotive, marine and outdoor applications. The EPDM sheeting used in the electric road projects was tailor-made for the application.



Vehicles use a movable arm to pick up electricity from an electric rail embedded in the road.

NEWS



PHOTO: SHUTTERSTOCK

Dominican bridge joints replaced

Reconditioned in the summer of 2021, the Juan Bosch suspension bridge over the Ozama River in Santo Domingo, Dominican Republic, has six new Trelleborg Transflex 900 gaskets, or expansion joints, in each of its six lanes.

Local company Proyectos Industriales, S.A. (Pinsa) worked 24/7 for 45 days to replace the polymer joints and pave the structure. The Juan Bosch Bridge is 648 meters long and 30 meters wide and joins the Santo Domingo Este municipality with the National District.

300

million SEK will be invested in Trelleborg Group's new production facilities in Russia, Vietnam, Morocco and Japan by 2026.

In 2021, the company opened its first African production facility in Kenitra, Morocco to manufacture automotive boots.

"These investments to increase the Group's geographic presence will allow more business decisions to be made close to customers, which creates competitive flexibility and an even greater market and customer awareness," says Peter Nilsson, President and CEO of Trelleborg Group.



PHOTO: FEMERN

Tunnel deal sealed

Trelleborg won a contract to supply its tunnel seals to Femern Link Contractors (FLC) for the construction of the 18-kilometer-long Fehmarnbelt tunnel between Denmark and Germany. When completed, the structure will have a four-lane motorway running through it along with two electric rail tracks and it will be the world's longest immersed tunnel.

Japanese mooring partnership

Trelleborg announced a new strategic partnership with Japanese shipping and logistics company Nippon Yusen Kabushiki Kaisha (NYK Line,) which will be Trelleborg's agent in Japan. Its subsidiary, Japan Marine Sciences, will help the country's ports realize the safety and efficiency benefits of Trelleborg's DynaMoor mooring solution.

The partnership between Trelleborg and NYK Line also aims to contribute to the decarbonization of the maritime sector globally through more sustainable, cleantech mooring operations; a strategic focus for Trelleborg as part of its commitment to supporting the United Nations' 17 Sustainable Development Goals.



PHOTO: TRELLEBORG

GOING TO MARKET FASTER

Trelleborg's Rapid Development Center accelerates the time to market for new products and provides Healthcare & Medical customers with a team of dedicated experts to support their journey from prototyping to production.

TEXT CARI SIMMONS PHOTOS TRELLEBORG

Trelleborg's Rapid Development Center (RDC)

The new Rapid Development Center offers Healthcare & Medical customers silicone molding (both Heat Cured Rubber, HCR, and Liquid Silicone Rubber, LSR), silicone extrusion, an in-house tool shop, assembly, pad printing, slitting, laser marking, bonding, thermo-plastic injection molding, micromolding, multi-component molding, and an in-house automation team to develop and support high volume manufacturing. The RDC officially opened in August 2021, is in Delano, Minnesota, USA, and is open to customers worldwide.

Trelleborg has been working with Healthcare & Medical customers for more than 25 years, initially providing silicone molding for their medical devices. Today, Trelleborg can offer additional capabilities including silicone extrusion, thermo-plastic injection molding, silicone sheeting, micro-molding, slitting, bonding and laser marking on devices such as diagnostic instruments, stents and pacemakers.

During 2021, Trelleborg went a step further in supporting its Healthcare & Medical customers by opening a Rapid Development Center (RDC) to help bring these products to market faster. Having a development center with a controlled manufacturing environment, full material traceability and the ability to hold tight tolerances, is crucial when considering the sensitive nature of health and medical products.

Additionally,

healthcare and medical customers are increasingly consolidating their suppliers, looking more and more for a one-stop shop. "The RDC is Trelleborg's response to that," says Andrew Gaillard, Senior Global Commercial Director at Trelleborg Sealing Solutions, who brings his experience from working at a top medical device manufacturer to the table. "Trelleborg has expanded its material offering as well as the number of solutions we provide, such as multicomponent molding, micro-molding or component assemblies."

The RDC supports customers in three critical areas: lower costs, speed to market and access to experts.

Through the RDC, Trelleborg is able to help customers lower their manufacturing costs by getting involved in a project early on and incorporating design for manufacturability. "Customers frequently request that we help take costs out of the manufacturing process," says Chris Tellers, Director, Rapid Development Center H&M, Trelleborg Sealing Solutions. "The challenge is that 80 to 90 percent of a component's manufacturing cost is designed into the product during the design phase of product development. Simple changes can have huge impacts on part cost, while having no impact on product performance."

For example, simply adding a radius can greatly reduce tooling lead times and costs, how a part fills and how easily it is removed from the tool. "This in turn allows us to have faster cycle times and lower costs," Tellers explains.

The RDC also helps customers accelerate time-to-market. "Sometimes our customer simply

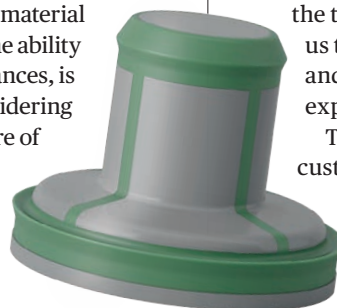


PHOTO: ISTOCKPHOTO/TRELLEBORG

Left: The Rapid Development Center creates prototypes for the medical industry.



“We can adapt to our customers’ needs and requirements based on their project goals.”

Chris Tellers, Trelleborg

obtaining feedback, our customers then make tweaks and quickly get a product back into the clinical test environment.”

Finally customers have access to Trelleborg’s experts – and in many cases, access to external material experts as well, who help customers choose the right material for their product and requirements. This too can have a positive impact on costs and speed to market.

Judging by the demand – six projects in the RDC’s first two months of existence – customers are eager to be partners with Trelleborg.

Recently, a global medical customer approached the RDC for support on a seal prototype. “They reached out to us for our sealing expertise, design help and our ability to quickly turn around prototype samples in multiple configurations and materials. This included Liquid Silicone Rubber molded and machined parts,” Tellers explains.

The center reviewed a number of material options and made design iterations in just 10 business days. “We were able to help them come up with an effective design to properly fix their sealing issue for a fully functional, long-lasting seal prototype,” says Tellers. ■

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needs to ‘fail fast’ with multiple design ideas they need to try out as quickly as possible to meet a tight timeline. Our Rapid Development team and processes are specifically set up to do just that,” says Tellers. “We can adapt to our customers’ needs and requirements based on their project goals.”


While the design work is underway, the Trelleborg team can simultaneously plan the manufacturing of the product. “This allows us to move extremely quickly,” says Tellers. “When we get started on the tooling, all the tough questions have already been answered and the

team can jump right into manufacturing the tool. There is no need for another group or company to get involved, having to start over and answer all those same questions.”

And although speed to market is critical for all industries in order to increase their revenues, Gaillard says it is even more vital for this particular industry. “In Healthcare & Medical, launching a product early on means patients have potentially life-saving devices and therapies earlier,” he says. “Another reason rapid development is critical in healthcare is the need to test functionality in a clinical setting. After testing and

“We have expanded our material offering as well as the number of solutions”, says Andrew Gaillard, Trelleborg.



A full-page photograph of Frauke Urban, a woman with dark hair and bangs, wearing glasses and a dark checkered suit over a red shirt. She is standing outdoors with a blue sky and clouds in the background. A propeller airplane is visible in the upper right corner. The text is positioned on the left side of the image.

Frauke Urban's
multi-disciplinary
research group
explores the
opportunities and
barriers relating to
fossil-free flights.



Toward flight net zero

Frauke Urban has no plans to stop flying. And neither do many of us. Not completely, anyway. That's why Urban focuses on increasing her knowledge of sustainable energy systems to help decision-makers and those in the aviation industry make flying more sustainable.

TEXT SUSANNA LINDGREN PHOTOS JOHAN KNOBE

Heading a research team that has been commissioned to help accelerate the transformation toward bio-based jet fuels, electric aircraft and hydrogen-powered planes, Frauke Urban is working with a multi-disciplinary group of researchers to map out a route for green aviation. They're identifying which conditions will enable Sweden to reach its ambitious target of making all domestic flights fossil-free by 2030 and having a completely fossil-free transport sector by 2045. Then all flights, both domestic and international that begin in Sweden, will be fossil-free.

"We could of course try to imagine a world without flying, but that

would be unrealistic," says Urban.

"The world is interconnected today in terms of people's movements and trade; hence people will continue to fly in the future. Covid-19 may have made many fly less than before, but aviation is here to stay."

Therefore, the major question for Urban is how to make flying more sustainable. According to the International Energy Agency, the aviation sector accounts for two percent of global CO₂ emissions. Over the past decade the industry has tried to reduce emissions by researching new materials to make planes lighter and more aerodynamic, and to make the engines more efficient.

However, “That’s not enough,” says Frauke Urban. “To make a real difference the fuel has to be decarbonized.”

One transformation that is in progress is the mixing of traditional fossil-derived jet fuels with fuels made from renewable sources. Biofuels are frequently used in Sweden, but generally in very small quantities of two to three percent of the total amount of fuel used. That’s far from the possible 50/50 ratio of biofuels and petroleum-based aviation fuel. The main reasons for this modest progress are the price and supply of biofuels.

“Producers are few and biofuels are still relatively expensive. At the same time, end-customer direct support has been low, due to price and maybe also a lack of awareness of the possibility of making a personal impact,” says Urban.

Today air travelers on major Swedish airlines can pay extra for the use of biofuels when purchasing a ticket. The present cost is SEK 300, or about EUR 30, per fossil-free hour in the air. That equals about EUR 70 extra for a flight between

Stockholm and London, but so far there are not enough travelers paying this additional cost to make a real difference.

In Frauke Urban’s opinion, an increased use of biofuel and other drop-in fuels working in existing jet engines is a necessary transition to reach the goal of fossil-free air travel while awaiting new sustainable technologies. The outlook is promising and there are several initiatives for electrification of flights.

One example Urban mentions is aviation giant United Airlines’ recent order of 100 ES-19 electric aircraft from the Swedish electric aviation start-up Heart Aerospace. The ES 19 is a small electric plane seating 19 passengers, which utilizes lithium-ion batteries. These are similar to those used in automobiles, but with a 400 km range. Initiatives such as this make Urban confident that Swedish airports can reach their goal of fossil-free domestic flights despite there being only nine years left until the target date.

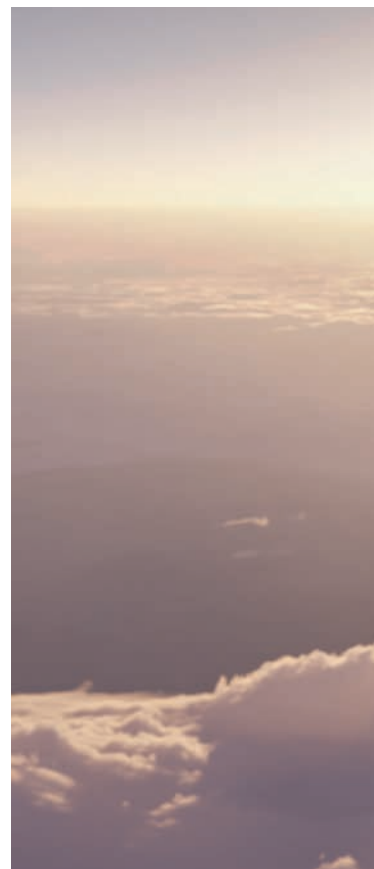
“Hydrogen-based aviation is currently in the R&D stage, driven

Right:

United Airlines has ordered 100 electric 19-seaters from start-up Heart Aerospace.

Below:

Heart Aerospace, Anders Forslund, CEO.



Research project about the transformation toward fossil-free aviation

The SETA project, involves a multi-disciplinary group of researchers from the Royal Institute of Technology, KTH, and Linköping University in Sweden. The aim is to provide new insights that can help airlines, airports, regulators, aircraft producers and other players in the aviation industry fill in some

of the existing knowledge gaps for a successful transformation toward fossil-free aviation.

Most of the research in this field is into the technical dimensions, as electric aircraft, hydrogen technologies and bio-fuel refinery processes need development. However, the transformation also

requires new socio-economic, socio-technical, political, and sustainability-related solutions. The SETA project also focus on these issues, for example by exploring options for new business models and how they can support sustainable aviation technologies.



PHOTO: PATRIK OLSSON

“We could of course try to imagine a world without flying, but that would be unrealistic.”

Frauke Urban,
KTH, Royal Institute of Technology, Sweden



forward, for example by an investment by Airbus to design planes fueled with hydrogen. The EU has a hydrogen strategy in place and the fuel is projected to be used in commercial aircraft from around 2035,” she says.

So, what do Frauke Urban and her research colleagues contribute to the ongoing transformation? It’s her 18th year of working on industrial transformations toward decarbonization and climate mitigation.

This made her initiate Sustainable Energy Transformations in Aviation (SETA), a four-year research project that is funded by the Swedish Energy Agency.

“Sweden is a leader in decarbonization and has the potential to be one of the first countries to decarbonize its aviation sector, but there are risks and challenges ahead,” says Urban.

Electric aviation will need a new infrastructure for charging planes. The shortage of biofuels is another challenge. Hydrogen may lie further ahead but visions and investment still need to correlate for a fossil-free aviation industry to be possible.

“It’s a bit like the ‘chicken and egg’ discussion. Investment is required, which will only happen

PHOTO: HEART AEROSPACE



Left:
The ES-19 airplane
will be certified
in Q3 2026, and
the first flights
launched the
same year.

PHOTO: PATRIK OLSSON

if there is a predicted market, and the market will only be created if there is large-scale investment happening,” says Urban.

SETA’s contribution is to explore the socio-technical opportunities and barriers relating to the transformation to fossil-free flights. The multi-disciplinary group of researchers from KTH and the University of Linköping has knowledge beyond technical development – it also focuses on management and economics, life-cycle assessment and political science.

The group’s work includes everything from identifying the necessary changes in governmental policies and industry investment strategies down to individual customer behavior, as well as investigating the sustainability of different fossil-free technologies for aviation. And Urban is confident that things are going in the right direction.

“Obviously, we are a small part of a much larger community who all have the vision of fossil-free aviation. Through the SETA project, the team and I can contribute to solving complex questions that relate to how the aviation industry can decarbonize and become more sustainable, with the aim of mitigating the dangers of climate change. Will I fly on a battery-powered plane in 2030? Absolutely!” ■

**“Will I fly on
a battery-powered
plane in 2030?
Absolutely!”**

Frauke Urban,
KTH, Royal Institute of Technology,
Sweden

Frauke Urban

Lives: Stockholm, Sweden, with husband and two children.

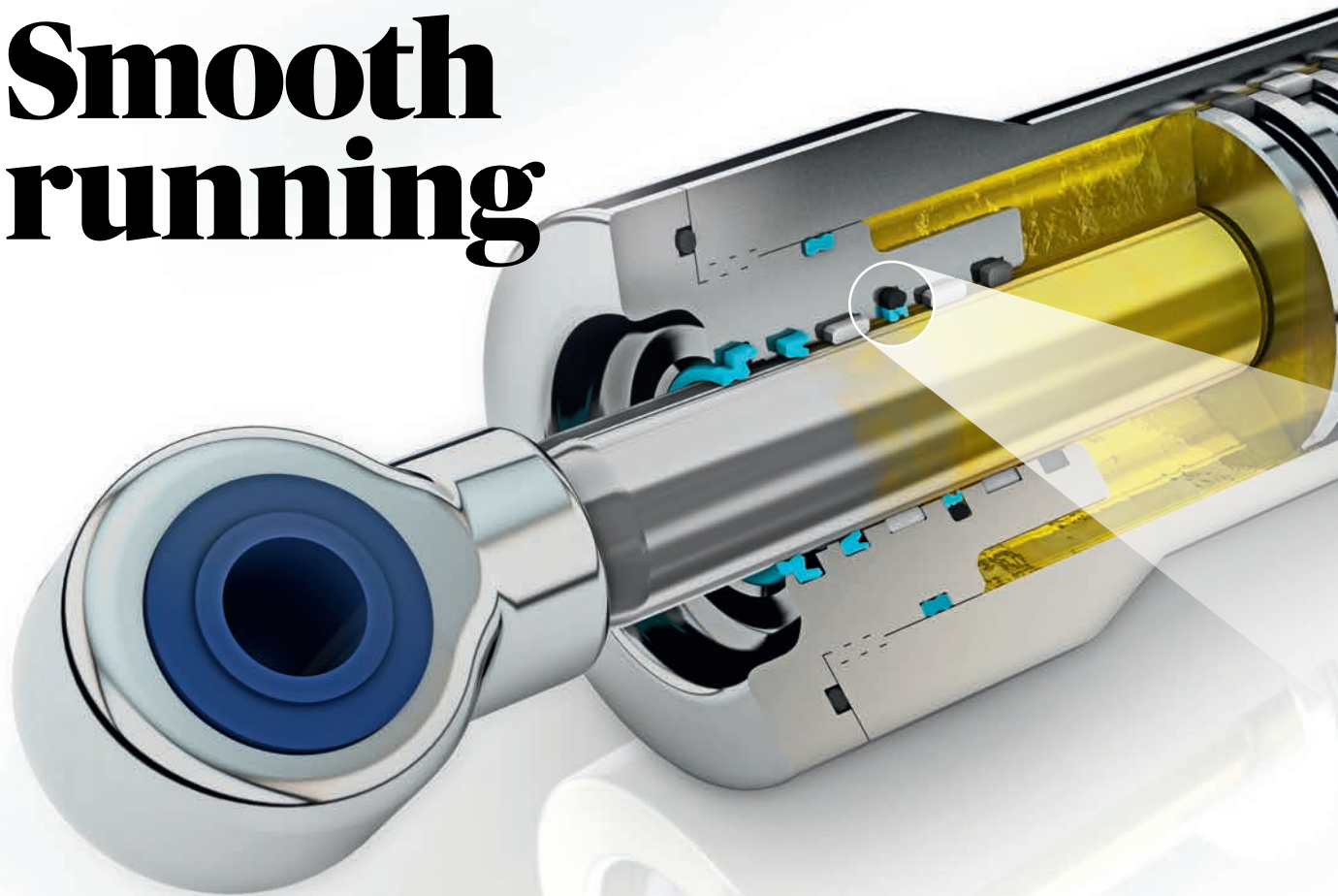
Job: Associate Professor in the Management of Sustainable Energy Systems at KTH Royal Institute of Technology, Stockholm, Sweden.

Travel by: “I travel by bike, wherever I can. When necessary I use an e-car sharing service. I travel by plane when I visit my family in Germany.”

What drives you: “I hope that my research can be one of the small puzzle pieces that solves the big puzzle of how to live more sustainably, and how to restructure economies, industries and societies in a way that mitigates climate change.”



Smooth running



Trelleborg's advanced sealing solutions and expertise in managing lubrication are helping customers to improve the performance of their equipment.

TEXT ELAINE MCCLARENCE
ILLUSTRATION TRELLEBORG

There are many things that can reduce the performance of a piece of hydraulic equipment. Friction, wear, pressure, speed, surface characteristics and roughness can all take their toll, causing costly and time-consuming stops in production.

Trelleborg seeks to address this with a lubrication management strategy. This takes a holistic view of how fluid power equipment operates, improving a machine's performance and extending its lifespan.

"Today, lubrication and sealing are critical to the performance

"Today, lubrication and sealing are critical to the performance of the total machine."

Mandy Wilke, Trelleborg





“This technology has already proven to provide increased mean time between maintenance in off-highway equipment.”

Francesco Marano, Trelleborg

Below:
Rounded sealing lips and low friction increases application lifetime.



of the total machine,” explains Mandy Wilke, Senior Manager Global Technical and Intellectual Property Management, at Trelleborg Sealing Solutions.

“Lubrication management is more than simply choosing and applying a lubricant. It’s managing and adjusting the lubrication conditions of all elements within a sealing system. This reduces the load on each element and optimizes performance in terms of friction-wear lifetime.”

Trelleborg’s response to the challenges of optimized lubrication and sealing is the result of

Sustainable lubrication

A more efficient lubrication process means less lubricant, which is better for the environment. A machine that’s lubricated the right way is more energy efficient, with reduced leakage, friction, and noise levels.

How it works

In sealing configurations, conventional seals have high contact pressure with the rod, which means an inadequate amount of oil reaches the contact zone of the primary element and through to secondary seals. That results in greater friction and wear on a machine. Trelleborg’s solution has been to design rounded sealing edges, which lower the contact pressure and consequently reduce friction and wear.

The seal design allows a thicker

and higher quality film of oil to flow under the pressure-loaded primary sealing element. That reduces the load on that seal.

Controlled by an integrated check valve, the film volume moves past the primary seal to the contact area of the second seal and the counter surface. This lowers the contact pressure against the rod, which allows just enough lubricant to enter the hydraulic system to lubricate the rod, ultimately reducing both friction and wear on the seal.

an extensive testing process of its new lubrication management technology.

“At its heart, Trelleborg’s lubrication management is a unique sealing solution that is designed to work more effectively and efficiently in each individual application,” says Francesco Marano, Global Segment Director, Fluid Power & Material Processing, Drives & Motion Control at Trelleborg Sealing Solutions.

As well as maximizing the performance of the hydraulic system, the Lubrication Management technology offers other benefits, such as prolonging machine life, reducing maintenance and lowering the total cost of ownership, due to the machine being in service more often and for longer.

“This technology has already proven to provide increased mean time between maintenance in off-highway equipment,” says Marano.

Trelleborg sees that companies across many industries are now realizing that lubrication management is of growing importance in improving the performance of all types of modern machines.

As Wilke says, “The demands of the modern world are placing increased pressure on machinery to work reliably for longer periods of time, while ongoing economic pressures are fueling a never-ending quest for cost-effectiveness.

“To meet these demands, it’s essential to keep things running smoothly, and a focus on lubrication management for sealing systems can help do this. To develop effective sealing systems, it is important to work with an experienced sealing solutions partner.” ■

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At the helm

Marine entrepreneur, Yvonne Mason, grew up in a fishing community. Nowadays, she is a specialist in ship-to-ship transfer, a business in which solid fenders prevent damage to moving ships.

TEXT ALEXANDER FARNSWORTH

PHOTOS SIMON BUCK

Yvonne Mason has never been far from the maritime world. She had a 'salty' sea background growing up on England's Norfolk coast. Her father was a tugboat captain, and now she is married to a ship's captain. Today, Mason is CEO of Safests Ltd, a company that rents and sells pneumatic fenders around the globe.

Mason's pedigree as a business leader in the maritime sector was sealed in 2020, with the award of an OBE (Officer of the Order of the British Empire); an honor given by the Queen of England to people who have a major local role in any activity, including people whose work has made them known nationally in their chosen area.

Anyone with a love of boats may be able to identify pneumatic fenders, but Mason's products are not the typical ones found on small motorboats.

"These aren't cheap assets," she states, referring to one of her company's enormous 4.5 by 9.0-meter pneumatic fenders hanging off a supertanker.

In recent times, Safests Ltd has expanded its fender business and

worked to standardize its global offering that focuses on quality, safety and the environment. In May 2021, Safests TTL was appointed as a U.K. distributor of Trelleborg-produced fenders.

Safests is also often a first responder to assist with emergency lightering operations, the transferring of cargo between vessels of different sizes, when there is a need to remove cargo from a damaged vessel.

Preventing damage to a ship's superstructure is a relatively simple job during a transfer of cargo, but this belies the fact that the pneumatic fender is a highly engineered product that forms a vital link in the ship-to-ship (STS) transfer industry. It's supplied with a net of chains and tires for added protection, and it also requires safety permits and various licenses, as well as compliance with numerous ISO standards.

Mason puts her pneumatic fenders into the current geoeconomic perspective: "The development of port infrastructure is a major driving factor for global logistics, connectivity and global growth," she explains.

Trelleborg's fenders

A pneumatic fender is basically a large bladder filled with air, where the bladder walls are often as thick as a loaf of bread. But it is not the thickness that counts, as much as the design and manufacturing process that separates the best pneumatic fenders from the rest.

Trelleborg's manufacturing process designs

pneumatic fenders to be as efficient and as safe as possible. Production of the entire Trelleborg fender is inside a purpose-built mold without using any pre-vulcanized components.

This molding process gives Trelleborg's pneumatic fenders an ISO compliance with specific absorption and reaction forces.

"If a fender fails, it can lead to a major incident!"

Yvonne Mason,
CEO of SafeSTS Ltd



Above:

Yvonne Mason, CEO of SafeSTS Ltd, and Trelleborg pneumatic fenders, that have a lifespan of 15 years.

“For world ports, STS transfers can provide an early-stage solution while market growth develops or can indeed provide a longer-term alternative solution. Either way, STS forms a crucial part of any trader’s planning and options in port operations. In this context, it is vital that the STS industry adheres to the strictest safety and environmental standards for optimum operations and compliance. It is critical that the equipment we use is of premium quality because if a fender fails, it can lead to a major incident!”

When she’s not crisscrossing the world to visit port facilities and

taking note of where her company can improve the process of cargo handling, Mason trains horses. With all the equipment issues and psychology involved, she says it isn’t that much different from the demands of her business. And in her job, the psychological side is especially important.

“Listening to people, good manners, and a big smile will help to form global relationships and build the trust that is needed when managing clients’ risks,” she says. ■

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SafeSTS

SafeSTS TTL Ltd was founded in 2009 by Yvonne Mason and her husband, Captain Bob Gilchrist.

Headquartered in Norfolk, England, with divisions in Mozambique, Dubai, Brazil, Japan and Singapore, this 50-strong company has become the go-to supplier of pneumatic fenders to the shipping and marine industries. Alongside fenders, the company also specializes in transfer hoses for liquefied petroleum gas and oil transfer operations.

The PTX is an on-demand release hook for marine hose transfer systems. This was co-designed with Trelleborg.

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.