

TIMES



WAGENBORG FOCUSES ON

SUSTAINABILITY AND INNOVATION

**Second EasyMax taken into service under her
official name: *Máxima***

*"Sustainability is part of our family business
that has been passing the company on to
future generations for decades."*

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| The opinions expressed in this publication are not necessarily those of Wagenborg. In this publication maximum attention has been paid to safety. Photos at work sites where personal protective equipment is not visible were taken at a time when no work was being done or taken for COVID-19.



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The "maiden voyage" of the MV Máxima was a shipment of wood chips from Antwerp to a power plant in Scandinavia.

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Covid-19 has been gripping the world for over a year now. But the seriousness and approach can differ considerably per country. How do Wagenborg colleagues across the border experience this period?

HOW IS THE SITUATION IN...?



On the cover
"Windpark Fryslân" has started the construction of the wind turbines in the IJsselmeer. From March to June 2021, the 89 wind turbines will be shipped, installed and commissioned. This is the final phase of the construction project and an important milestone for the wind farm. During this phase Wagenborg provides the transport of the blades and tower parts with various tugs and pontoons.

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You want to be able to ship your products in a responsible manner. Wagenborg is working hard on the use of alternative fuels, such as possible **DIMETHYL ETHER** as an alternative fuel

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We talk to Martin Pei, SSAB Executive Vice President and Chief Technical Officer about "his" prestigious Hybrit project

Egbert Vuursteen
CEO Royal Wagenborg



DEAR READER,

"The climate is 'hot'. Not only is the earth literally warming up; minimizing the impact on the climate is also high on the agenda of many companies. This is evident from the interviews with SSAB, SCA, Hyzon and ABN Amro for this edition of Times. While shipping is the most environmental-friendly mode of transport, it is no reason not to act. Shipping also has a challenging path to take to make an important contribution to the goals of the Paris climate agreement, says Jurrit Bergsma of TNO.

Our sustainable journey has already begun to keep Wagenborg viable and profitable in the longer term. With our focus on maximizing cargo capacity and minimizing engine power, Wagenborg emphasizes its focus on energy efficiency. At the beginning of this year, we put a second EasyMax into service. This is the greenest and most environmentally friendly dry cargo vessel in its segment, with over 60% less CO₂ emissions than the market. This reduction exceeds the 50% reduction target set by IMO for the year 2050!

One of the easiest ways to reduce our impact is to reduce fuel consumption. We are also making progress through new techniques - such as fuel monitoring - and software such as our ERP software "BRIDGE". At the same time, we are investigating alternative fuels. Wieger Duursema explains exactly how it works with "dimethyl ether" as an alternative fuel on ships. Other business units within Wagenborg are in full development when it comes to electrification.

The energy transition means change. How to respond to this varies per division and activity. That is why we talk to Bert Veenstra, Fokke Botke, Jaap Bos, Jan-Ebe Boerema and Zmarai Nisar about what sustainability means to them in their work.

In short, a lot is happening within Wagenborg, but together we still have a long way to go. The environment therefore remains a high priority for us, not only today, but also for tomorrow and the day after tomorrow."

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While TNO Business Developer and researcher Jurrit Bergsma still wondered two years ago whether ocean shipping would switch to sustainable energy carriers, he believes that the question now is when the sector will switch.

CHALLENGES FOR THE SHIPPING INDUSTRY



SCR SYSTEM ON 'WATERPOORT' REDUCES NITROGEN UP TO 85%

Recently, a so-called "Selective Catalyst Reduction" system (SCR) was installed on the oldest Wagenborg tugboat "Waterpoort" - built in 1962 at Amels in Makkum and equipped with an old Stork Werkspoor engine. With this catalytic converter behind the engine, exhaust gases are after-treated, so that nitrogen (NOx) is captured. "With this SCR system, we reduce nitrogen emissions up to 85% at stage V level and an older ship such as the 'Waterpoort' can still be used for inland waterways," says Marc Mazereeuw, director Wagenborg Towing Service.

In the Green Deal for Sea Shipping, Inland Shipping and Ports, agreements have been made on, among other things, harmful environmental emissions in the air. One of the objectives is that nitrogen emissions must be further reduced by 2024. But it is not only because of this deal and legislation and regulations that it becomes important to look for solutions to reduce NOx emissions. "We see that more and more ports, clients and contractors are starting to demand cleaner ships to be able to do the work. For example, in consultation with our client Van Oord, we have opted to invest in greening the Waterpoort," says Mazereeuw.

Deployment Waterpoort at 'Wind farm Fryslân'

After the installation of the SCR system, the "Waterpoort" will be deployed on the IJsselmeer together with the "Waterlelie" and various pontoons. "For the construction of the 89 turbines at Windpark Fryslân, we provide the transport of the blades and tower sections for Van Oord. A great project that fits perfectly with Wagenborg's "greenest" tugboat," says Marc Mazereeuw.

Wagenborg introduces SCR in 1999

Incidentally, it is not the first time that Wagenborg, in collaboration with its clients, has invested in the greening of ships through an SCR system in anticipation of legislation. In 1999, for example, an SCR system was already introduced on the ro-ro carrier Spaarneborg. In the following years, several ro-ro ships and one of the offshore ships followed.



ELECTRIFICATION ON THE RISE AT WAGENBORG STEVEDORING

Wagenborg Stevedoring focuses on the electrification of the machinery. All diesel-powered lift trucks are replaced at the end of their service life by variants with a battery. This makes diesel unnecessary, which is not only better for the environment; the working environment has also become a lot healthier and quieter. One third of diesel forklifts have now been replaced.

Diesel generators are a thing of the past with these conveyor belts. ↑

Wagenborg Stevedoring is also working on the realization of shore power facilities in the port of Delfzijl, so that ships do not have to run their auxiliary engines. The overcapacity of the electric port cranes is used for this. To further reduce the footprint in the port, this overcapacity is also used to supply electricity to the mobile conveyor belts. This also makes it possible to say goodbye to diesel generators.

MILESTONE FOR WAGENBORG NEDLIFT: THE NEW COMPUTER-CONTROLLED JACKING SYSTEM



← *The power packs can also control a sled system.*

Wagenborg Nedlift has put a new computer-controlled jacking system into use for objects up to 2,400 tons. The system developed in-house is full of technical gadgets with which a jacking operation can be performed very accurately and safely. The jacking system is designed using sustainable bamboo jack beams and makes optimal use of the strength of these beams. The new jacking system is controlled emission-free with electrically driven hydraulic power packs. This way, you work quietly and cleanly!

INSTALLATION BALLAST WATER SYSTEMS ACCORDING TO PLAN

The way in which ships handle ballast water affects the health of oceans and biodiversity. Ballast water is used to keep the ship stable and safe and is discharged in a different environment due to changes in cargo. This can lead to invasive micro-organisms disrupting local ecosystems. The Ballast Water Management Convention (BWMC) obliges shipowners such as Wagenborg to have ballast water systems installed on all ships by 2024. Wagenborg has planned to equip a total of 30 ships with such a system by 2020. In 2021, 26 ships are planned.

WAGENBORG SCORES HIGHLY AT ECOVADIS

Various divisions within the Wagenborg Group have recently assessed their sustainability performance with EcoVadis.

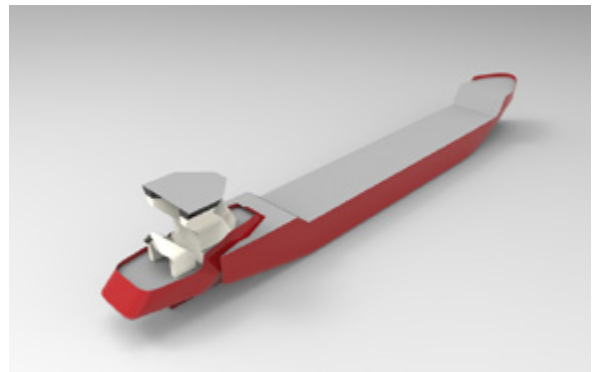
The EcoVadis sustainability assessment is an evaluation of the extent to which a company has integrated the principles of Corporate Social Responsibility into its business and management system. The EcoVadis Sustainability Scorecard illustrates the performance on 21 indicators in the four themes Environment, Labor and Human Rights, Ethics and Sustainable Procurement.

In the EcoVadis sustainability assessment Wagenborg Shipping achieved a score of 48 and Wagenborg Nedliff even a score of 49. This makes Wagenborg Shipping and Nedliff among the top in their industry. And we are proud of that!

EFFICIENCY BOOSTED BY DEEPENING SHIPS

The amount of cargo that a cargo ship can carry affects its efficiency. In principle, you want to ship as much cargo as possible with the lowest possible energy requirement. Based on this philosophy, a total of 24 ships of the Wagenborg fleet were deepened in 2020.

This way, these ships can transport up to 10% more cargo with the same installed power and fuel consumption. In this way, energy efficiency improves.



CO₂ BARGE-PUSHER COMBINATION READY FOR REALIZATION AFTER 'APPROVAL IN PRINCIPLE'

MILESTONE CO₂ TRANSPORT AND STORAGE CONCEPT

Carbon Collectors has received an "Approval in principle" from Bureau Veritas for the CO₂ barge-pusher combination including the offshore single point mooring system. This important milestone indicates that the concept complies with all international rules and regulations and is ready to be put into practice as a solution to reduce CO₂ emissions.

The Carbon Collectors CO₂ transport and storage concept has been developed in close collaboration with, among others, Royal Niestern Sander and Royal Wagenborg.

NEW CO₂ EMISSION REGULATIONS (EU ETS) HAS AN IMPACT ON THE SHIPPING INDUSTRY

Pay for every ton of emitted CO₂ above a maximum emission that decreases every year. That is what the EU Emission Trading System (EU ETS) stands for. With this system, the European Union wants to stimulate sectors to reduce CO₂ emissions. From 1 January 2023, these regulations will also apply to European shipping. A decision with potentially major consequences for Wagenborg, your work and our customers.

WHAT IS EU ETS ?

EU ETS is a system that works with a limit of total emissions within a sector, which will gradually be reduced over the years. Within this limit, any company can buy and sell allowances as needed. You may emit 1 ton of CO₂ for every emission allowance you own. If you have too few or too many allowances in relation to the CO₂ emissions, you can buy or sell additional allowances. Companies that emit a lot of CO₂ therefore pay more than companies that emit less. This way, companies are stimulated and rewarded to invest in reducing CO₂ emissions. A system that matches with the sustainability ambitions of Wagenborg.

HOW DOES EU ETS EFFECT WAGENBORG?

All vessels trading in European ports, are obliged to participate in the EU Emission Trading System. This involves a number of basic obligations, such as monitoring, reporting and verifying the CO₂ emissions per ship. In addition, they must, of course, also 'pay' for the required CO₂ rights. This also applies to the vessels of Wagenborg and affiliated captain owners.

70%

By 2050, the shipping industry must have reduced its CO₂ emissions by 70% according to the EU

WHAT ARE THE CONSEQUENCES OF EU ETS?

That is not yet entirely clear, because the regulations are still under development. It is still unknown what kind of voyages will be covered by the regulation: only voyages between European ports, all miles on European waters or a total voyage, if this crosses European waters.

Furthermore, a threshold may be introduced. For example, all ships under 5,000 GT or that emit less than 5.000 tons of CO₂ per year may be excluded from the regulation.

In addition, it is most likely that a large part of the required emission allowances will be donated in the form of so-called 'free allowances'. The number of free allowances would then be reduced in the following years. If you have too few emission allowances, you have to buy extra emission allowances.



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CEO EGBERT VUURSTEEN AND CFO JEROEN SEYGER

ABOUT SUSTAINABILITY AT WAGENBORG

ON A SUSTAIN for and to future

“Making our company a more sustainable every day for current and future generations.” With this ambition, Wagenborg presented its sustainability policy at the end of 2020. We will talk to CEO Egbert Vuursteen and CFO Jeroen Seyger about good entrepreneurship, taking responsibility and greening at Wagenborg.

Continuity has played a major role at Royal Wagenborg since its founding in 1898 and is therefore closely intertwined with today’s concept of ‘sustainability’. **Vuursteen:** “We are all passing through and want to leave everything tidy for the next generations. This applies not only to our company, but also to the world around us.”

Seyger: “In the days when sustainable was still a more general word, this meant ‘little transient’, according to Van Dale. Reasoning the other way around: unsustainable is therefore transient. And this does not suit Wagenborg, which as a family business has been “passing the company” to future generations for decades.”

LICENCE TO OPERATE

Although a sustainable way of doing business is in Wagenborg’s DNA, the course Wagenborg wants to take towards the future has recently been made explicit. **Vuursteen:** “From a business perspective, transparency in the field of sustainability is our ‘license to operate’. If you continue on the beaten track for too long and do not follow

ABLE TRANSIT generations

new developments, you will fall behind as a company.”

Seyger: “Good entrepreneurship is a core value of Wagenborg. Also consider issues such as good working relationships or a safe working environment. That too is part of sustainability, just like the environment. Actually, it is just a natural part of corporate social responsibility, to which we as Wagenborg are of course happy to contribute.”

INCREASE CARGO CAPACITY AND REDUCE INSTALLED POWER

The fact that Wagenborg is already doing a lot to promote good entrepreneurship and minimizing the impact on the environment appears to be correct when we take a closer look at Wagenborg’s fleet development. **Vuursteen:** “Wagenborg was one of the first Western European shipowners to take a critical look at the required engine power per ship around 2006. While we had equipped our 9,000 tonners with a 5,280 kW engine, we decided to increase the cargo capacity and reduce the engine power. When we saw the m.v. Beatrix was the first in a series of 14,600 tonners with a 4,500 kW engine, we were told it was crazy.”

Seyger: “We were at a time when the discussion about climate was starting to emerge. Consider, for example, “An inconvenient truth” by Al Gore. Unconsciously, this must have played a role.” **Vuursteen:** “We have further developed the philosophy of the Beatrix into our R-series built in 2013 at Ferus Smit. These ships have the

same 4,500 kW engine, only the payload of 23,000 tons is a further 57% higher, without the ice class 1A ever being endangered. Also new to the R-series is the hull shape where we have replaced the bulb with an axe-shaped bow. You can still see this adaptation today in our EasyMax ships built at Niestern Sander, where we have also integrated the accommodation in the fore ship to improve aerodynamics. With the Easymax ship type, we are working on an optimal ship design when it comes to sustainability. It is not without reason that this ship has the undisputed leading position in the Energy Efficiency

Sustainability is part of our family business that has been passing the company on to future generations for decades.



Wagenborg's fleet development is characterized by increasing the cargo capacity and reducing the engine power. The 14,000 ton Easymax with a 2,999 kW main engine is the most recent example.

Design Index ranking. The next step is sailing with other propulsion systems. "

A DOUBLE BUSINESS CASE

Wagenborg is now pursuing two parallel tracks: on the one hand, it focuses on the more efficient use of the existing fleet. On the other hand, plenty of research is being conducted into new technologies and fuels.

Seyger: "As Wagenborg, we are not able to independently develop a completely new propulsion system. We depend on suppliers and what the market offers us. We can, however, participate in various consortia and contribute to pilots, whatever we do. In addition, we strive to use our current fleet as efficiently as possible. Whether it concerns fuel savings, operations, digitization or maintenance: every gram of CO₂ reduction is important to us. This is actually a double business case: both environmental and financial savings; especially when both things come together in an "emission trading system". Let me be clear: we are in favor of CO₂ pricing on the condition that the proceeds make it possible to invest in making the fleet more sustainable. This is the fastest way to progress as a sector. "

Greening and remaining profitable

Vuursteen: "Our fleet and the growing focus on sustainability is an opportunity for Wagenborg. If I compare our CO₂ footprint per ton of cargo transported per mile against the bar of the market, I can conclude that we are definitely not behind, and then I am expressing myself carefully." But the key to success does not lie solely with the shipowners. It is necessary for every link in a supply chain to take responsibility. **Seyger:** "We have to work together to become more sustainable. And yes, more sustainable transport costs money - especially in the beginning. Although financing is a challenge for the entire market, we expect our financiers to remain willing to participate in sustainable investments. Fortunately, we notice that our customers are enthusiastic about working together on sustainable initiatives. I would therefore like to call on them to work with us to see to what extent short sea shipping can be an attractive alternative for them to transport by road or rail. Shipping is the cleanest way of transport. In any case, the biggest challenge remains to make a company greener while remaining profitable." **Vuursteen:** "If we have all shaped the energy transition together, I want to be able to say that we have made an active contribution to the challenges we now face. Who knows, we might be sailing with ships that we don't even know about yet. Or maybe one day we will go back to the beginnings of my great-grandfather, who sailed with the "Broedertrouw" on sails, had 0% emissions and had a thriving business. "

Maybe one day we will go back to the beginnings of my great-grandfather, who sailed with the 'Broethertrouw', had 0% emissions and had a thriving business.



LETTER OF INTENT

WAGENBORG AND HYZON

FOR EUROPE'S FIRST

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ZERO EMISSION hydrogen truck

Gerard Bastiaansen (director Wagenborg Nedliff) and Carl Holthausen (Managing Director Hyzon Europe) have signed a letter of intent for the delivery of an emission-free hydrogen heavy duty truck. Wagenborg is expected to put the truck into operation by the end of 2021 as Europe's first hydrogen truck. "It is unique that two Groningen family businesses join forces and together strengthen the position of Groningen as Hydrogen Valley," says Bastiaansen.

Wagenborg as a "strong name" in the region

Holthausen Clean Technology - like Wagenborg also a Groningen family business - enjoys fame with the construction of vehicles that run on hydrogen. The American newcomer Hyzon Motors approached the company last year for a close cooperation and to build a factory in the province of Groningen. Holthausen: "We are currently scaling up our production in Winschoten. With this we are working towards an annual capacity of approximately 2,000 trucks."

A first order came in February 2021. Over the next five years, both partners will deliver a total of 1,500 hydrogen trucks to a New Zealand company. "We will of course never see these trucks again. That is why we are looking for "strong names" - preferably from the region to strengthen the local economy - who want to commit to our product and with whom we can further develop the hydrogen truck together. I am

proud that, together with Wagenborg, we are now going to test shoulder to shoulder our Hyzon heavy transport truck together," says Holthausen.

Sustainable transport solutions

Wagenborg Nedliff has been making her fleet more sustainable for years. Existing equipment have been replaced by (partly) electrically deployable cranes with Euro 6 engines. Bastiaansen: "In addition, we are also investigating options for replacing our current conventional diesel fleet in the future. Until now this seemed a long way off; as long as 100 tonnes of terrain weight cannot be transported electrically, the market will not move in this direction. With this hydrogen truck, Hyzon is actually presenting a truck that which will work out for Wagenborg. Thanks to a generous operating radius and the capacity of 450 kW, this truck allows us to respond to increasing customer demands for sustainable transport solutions."



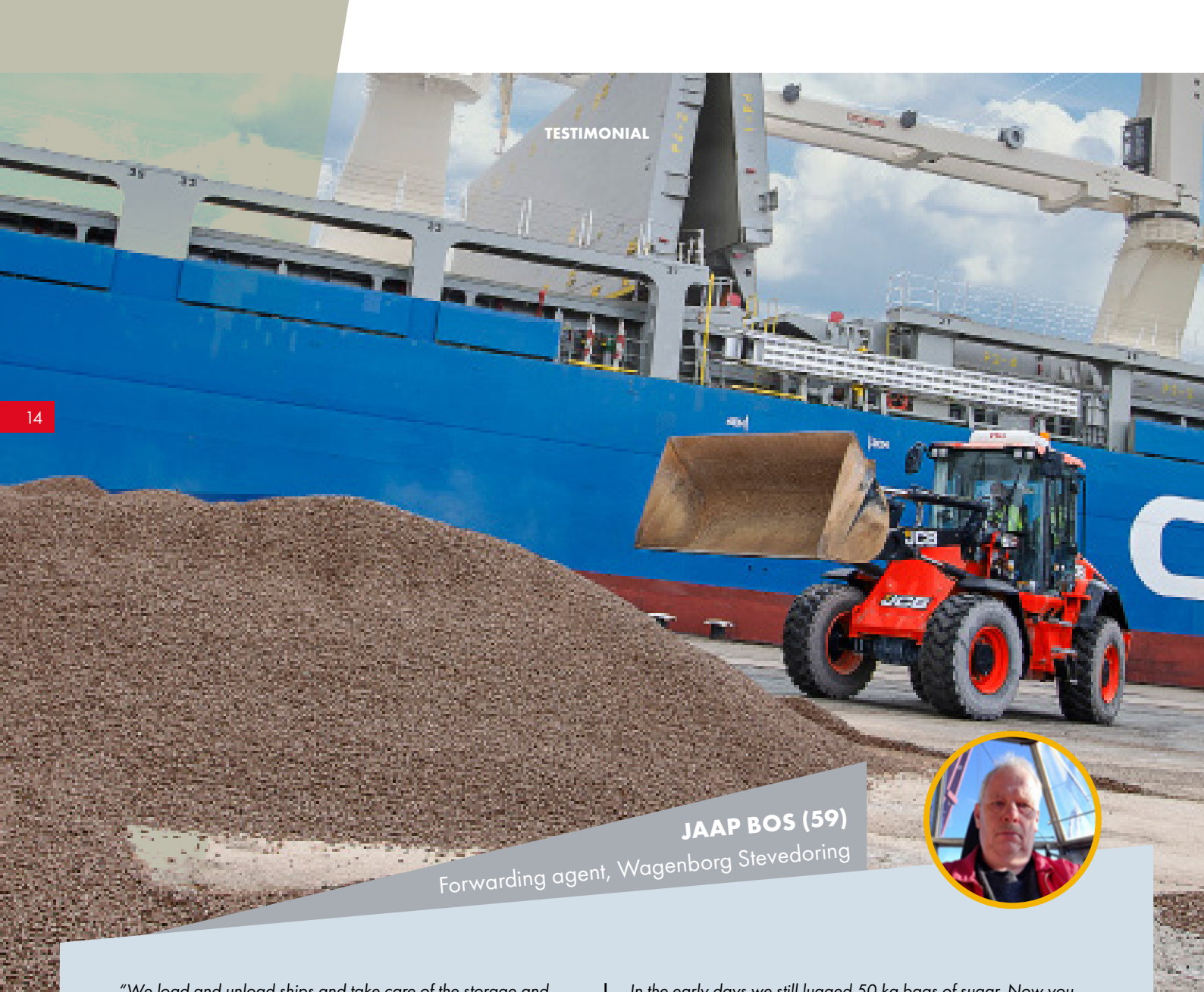


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HYZON



As long as 100 tons
terrain weight is not
electrically transported
the market is not
moving in this direction.
With this hydrogen
truck, Hyzon is actually
presenting a truck that
will work out well for
Wagenborg.



JAAP BOS (59)
Forwarding agent, Wagenborg Stevedoring



"We load and unload ships and take care of the storage and transshipment of products. Salt, china clay, animal feed; you name it. Nowadays hardly any lifting work is involved. We have forklifts, cranes and aerial work platforms that we can deploy. And if you have to lift something yourself and it is on the heavy side, you consciously lift it with more men. I am sometimes a bit stiff after a long, busy day, but I still managed to prevent real physical complaints in this way.

I have been at home once. As a young boy I worked at Lommerts. There I got a tree on my back because of my work. I lay flat for four weeks. The doctor told me that if the tree had hit me an inch higher, I would have ended up in a wheelchair. That does make you alert, but luckily times and working conditions have changed. It has become much less heavy and safer.

In the early days we still lugged 50 kg bags of sugar. Now you can lift a maximum of 23 kilos. They really pay attention to that here. Then in the morning we have a toolbox that explains how we can do the work as well and safely as possible. And there are plenty of personal protective equipment, such as dust masks and fall protection, to carry out the work accordingly. In addition, the machines have become much better. Take the forklift trucks, they are now electric with air suspension seats. No more noise and stench, and the seats are wonderfully springy.

I've been doing this job for 42 years. I have seven more years to retire. I make it as easy as possible for myself physically. For example, if I continue to stay healthy, I must be able to reach my pension with a healthy body. The best advice I can give here: use your common sense."

**"USE YOU COMMON
SENSE. I MUST BE ABLE
TO REACH MY PENSION
WITH A HEALTHY BODY"**

IN CONVERSATION WITH MIKAEL TOFT, COMMERCIAL MANAGER SCA SOURCING & LOGISTICS

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SCA'S NEED FOR GLOBAL SHIPPING

- COST-EFFICIENT AND ENVIRONMENTAL FRIENDLY



The wood, pulp and paper producer SCA is Europe's largest private forest owner with 2.6 million hectares of forest in Northern Sweden. The forest company has been working with Wagenborg for decades to ship these products to ports worldwide.

“We believe sea transport is important for SCA towards the future. For the last decades Wagenborg has been able to ship our products with a high quality and flexible fleet and had the chance to grow together,” says Mikael Toft, Commercial Manager SCA Sourcing & Logistics.

SCA consists of five business units: Forest, Wood, Pulp, Paper, Renewable Energy, and our supporting unit Sourcing & Logistics, primarily serving customers around Europe, the Mediterranean, Americas and Far East. The group’s head office and production mills are located in Sweden, with terminal and distribution centers in North West Europe.

SCA Sourcing & Logistics, which is based in Sundsvall, is responsible for the entire supply chain of all SCA forest products. From the forest up to the client. Over land and sea. The forest company mainly ships containerized products and break bulk on a global scale.

“We have large volumes, which we cover in a yearly logistic setup. On a contract basis we work with about 6-10 ship owners during a year. We are looking for those supplier who are able to deliver our products in the same way as they were loaded,” explains Mikael Toft, who is based in Sundsvall.

Focus on sustainability

Early 2020, SCA has established the Group’s sustainability targets. As the official announcement states: sustainability is integrated in every part of SCA’s operations. This includes striving for a positive climate effect in all parts of the value chain. This ambition also results in various requirements to logistic suppliers.

“Besides our own targets, sustainability is also important for our European and American customers. That is why we evaluate our logistic suppliers by using Ecovadis questionnaires and audits. And although Wagenborg has a performance above industry score, there is work to do. All logistic players on the market now need to have a sustainability plan. If you don’t have it, it will be

tough to act on our market. The ship owners we work with, such as Wagenborg, have the latest cutting edge technologies to comply with rules and regulations. But regulations will adapt over time,” says Toft.

With the introduction of Sulphur Emission Controlled Areas (SECA) and the recent IMO 2020 sulphur cap first steps were being made to reduce the environmental impact of marine logistics.

“The introduction of the SECA was big. The shipping industry was simply pushed to switch fuels within certain areas. However, we believe - when selling products on a global scale - different regulations in different areas is not good for both our market as the shipping industry. Now it is time for shipowners to make a next step and figure out how to adapt their vessels,” says Toft.

Success through fleet development

SCA is using Wagenborg’s shipping services to ship their products to Europe, the Mediterranean and the US East Coast. This assignment has been ongoing for 25 years, something that implies a variety of vessels to pass by over time.

“I am working about 20 years for SCA and looking to the early years, the overall quality of vessels was not that good. Nowadays, the old and bad ship are not in the market anymore. This is important to us, since we looking for clean and quality vessels to ship our products free of damage. Looking at Wagenborg this quality is really there. Also we noticed a new building development at Wagenborg of smaller to bigger vessels, which fits perfectly to the growing parcel sizes from our side. This spread in various vessels gives us the flexibility we are looking for,” says Toft.

Where previously the 15,750
dwcc A-type ships were
regularly deployed for SCA, the
19,500 DWCC T-type is now
a familiar sight in the port of
Tunadal ↓

The booming trade from Sundsvall to the United States is a good example. SCA is investing heavily in the US market with growing volumes of wood pulp. Where beofre the 15.750 DWCC A-type vessels were deployed on this trade on a regular basis, now the 19.500 dwt T-type becomes a well-known vessel in the port of Tunadal. Recently the m.v. Trinityborg set a new record by loading 18.500 mton of wood pulp and the next planned voyage will be even bigger.

"The Wagenborg service as a product mix matches perfectly with the changing needs we have. No matter where we are selling our products, Wagenborg is present in the geographical markets we cover. Since we see a transformation from publication paper to pulp and kraftliner, a grow in the breakbulk segment can be expected. This can be a good development for both our companies," says Toft.

Looking to the future

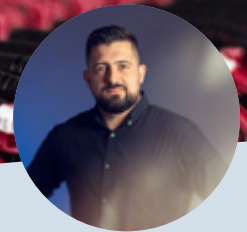
The challenge of transporting SCA Logistics' forestry-based cargoes is largely in the massive volumes and the amount of space required. *"Wagenborg's extensive fleet is an excellent match and suitable to continue our collaboration for a long time to come. We follow the fleet development within Wagenborg with great interest and are waiting to welcome new cost-efficient ships, environmental friendly as possible,"* concludes Toft.



We evaluate our logistics suppliers with EcoVadis questionnaires and audits.

TESTIMONIAL

ZMARAI NISAR
IT Security Officer, Royal Wagenborg



"The world around us changes because we change. More and more is possible in the field of information, digitization and IT. Technologies enable new forms of communication and make our work easier. We also respond to this at Wagenborg. What about our new self-built ERP system 'Bridge', which supports our processes better and makes work easier or how about the use of real-time data from the ships to determine the most economical speed and route for a ship, so that we do not need to consume unnecessary fuel.

These technologies offer us many opportunities, but also entail risks. One malfunction is enough to affect systems, (a chain of) processes or entire divisions. By using applications such as the Cloud and "Internet of Things", the possibilities are endless and connectivity increases. Everyone and everything is online. However, such applications, often in combination with existing (legacy) environments, also offer attackers more extensive and new steps to attack organizations.

I map out the (cyber) security risks within Wagenborg and implement risk-mitigating measures where necessary. The mitigating measures are the result of periodic risk analyzes and are determined by policy. We do not only focus on the technical

infrastructure, applications and information systems; human behavior is just as important. With a Security Awareness Program I alert my colleagues to (cyber) security risks and the possible impact of the risks on business continuity. This applies not only to our office organization, but also to our advanced ships. From this year on, cybersecurity is a mandatory part of the internationally prescribed ISPS code. That makes working at Wagenborg as a Corporate IT Security Officer extra special.

You have to look at the risks on board ships from a different perspective. Compared with the office organization, but also with the ships themselves, not only the risks themselves, but also the impact of the same risks can vary. Imagine, if the bridge equipment fails hundreds of kilometers from the coast or if the control of the ship is taken over remotely by malicious parties, the entire operation and the crew will be endangered. That is why the disaster recovery plan - in which we have described dozens of scenarios of what can go wrong and how we should respond to this - is also very important here. And finally: "Big Business needs Big Security. No one can provide a safe and reliable work environment on their own. Together we can. Because together we are stronger."

**"IF BRIDGE EQUIPMENT
FAILS OR THE
CONTROL IS TAKEN
OVER REMOTELY, THE
ENTIRE OPERATION IS
ENDANGERED."**

SUSTAINABILITY FROM A BANKERS PERSPECTIVE

The shipping industry is and will remain cyclical. Good and bad years alternate. As a shipping company, it is therefore not that easy to remain profitable in the longer term. Especially considering all the environmental requirements and expectations that are set today. In addition, shipping is capital intensive, whereby appropriate financing is inextricably linked to the future of shipping. We talk to Bert Kuiken (Commercial Director) and Joep Gorgels (Global Head of Coverage Transportation & Logistics) of ABN Amro about mutual expectations, challenges for the future and the “Poseidon Principles”.

Wagenborg has long been an important customer of ABN Amro.

Gorgels: “ABN Amro’s shipping portfolio is considerable. We are one of the most important ship financiers in the Netherlands, but also worldwide. Our books contain some 2,000 merchant ships that we finance, including those of Wagenborg. Because we are one of the most important financiers and we consider sustainability to be of paramount importance, we really try to play a role in this for the industry. We are one of the first banks to adhere to the Poseidon Principles. This means that we measure the footprint of the portfolios that we finance in order to assess whether our portfolios are in line with the set climate goals.”

Green portfolio

The first Poseidon Principles Annual Disclosure Report has recently been published. This includes the extent to which the participating financial institutions follow the IMO CO₂ reduction with their financed portfolio.

Gorgels: “The report gives us insight and reason to talk to shipping companies about how they can make them greener. On the one hand, this is about how you can make ships that are already on the water more efficient. In order to properly assess this, we work with RightShip, an independent expert in the field of shipping and sustainability. Furthermore, we have set ourselves as a KPI to no longer finance F and G labeled ships, but to focus more on A, B and C labeled ships. This not only gives

you a greener portfolio; Financing and money also go to green projects and ships: that is the goal.”

There is a lot of debate in the sector about how best to build new ones. Since much is still unclear about the fuel for the future, it seems obvious to focus on other aspects of sustainability in the coming years. **Kuiken:** “In terms of technology, we are going to experience a lot in the next five years. From applying new methods to alternative fuels, new engines or propulsion mechanisms. I also expect more “smaller” things that help reduce emissions, such as more efficient sailing, remote control, wind assistance, nozzles, bulb adjustments, etc.”

Gorgels: "I myself see a clear split. On the one hand, it is possible to invest a few more million in the greening of ships younger than 10 years old, for example through wind propulsion; that can still be used during the term of the ship. On the other hand, you have to look carefully at the business case for a new ship. A new, much greener ship would also be a lot more expensive at the moment. How does the business case work? What does not work is to build a greener ship, which costs 30% more and for which the fuel is also 50% more expensive. Governments could help with subsidies. I also believe that shipowners can demand a long-term contract with a slightly higher charter rate from cargo owners to cover the initial additional costs; they also want greener ships, don't they?"

I think there is always financing available for good projects and good shipowners.

In tramp shipping, however, ships do not sail dedicated to 1 customer, so the balance between greening and return remains. **Kuiken:** "I also see this enormous challenge. Shipowners must be careful in managing their fleet and in slowly renewing and greening the fleet. This certainly places demands on their replacement planning. What you can do at large docking projects, you should definitely take along. We know that shipowners are forced by legislation to use other fuels or install a 'ballast water treatment' system. That already makes a considerable claim on the available financing space, especially in the short sea sector. Nevertheless, the good parties such as Wagenborg can manage that very well. I also see this reflected in Wagenborg's objectives and sustainability report. Major steps have been taken, also in the awareness of sustainability. Looking at the peers, Wagenborg has an average young fleet and the replacement of ships is well planned. It is a nice signal how Wagenborg is thinking about this and is working on it; that is the gain of recent years. This meets our goals in our commitment to the Poseidon Principles."

Reward for greening

Sectors in which the assets require large investments, such as shipping and aviation, are very difficult to green up quickly. It is a transition in which changes are gradual. **Kuiken:** "This entire transition is of course also an opportunity, it is just business. For Wagenborg, but also for us. Of course we have to do something to make the world a better place. And that realization is getting a lot stronger. I see it as our role to take steps in this and provide incentives where necessary. We

What are the 'Poseidon Principles'?

The Poseidon Principles provide a framework for financial institutions to integrate climate considerations into lending decisions to promote the CO₂ reduction of international shipping. This aligns ship finance portfolios with responsible environmental behavior to shape a better future for the shipping industry and society.

The Poseidon Principles are consistent with the policy and ambitions of the IMO, including a CO₂ reduction of at least 50% by 2050.



→
ABN Amro's pursuit of a green portfolio is reflected in the financing of green ships, such as the m.v. Máxima, the latest addition to the Wagborg fleet.

try to steer to achieve the 2050 targets and preferably a little earlier and a little better. As ABN Amro, we have already rolled out the first rewards for greening by setting KPIs in this area to our customers: achieving targets results in interest discounts. This allows you to link the price of financing to the sustainability objectives. That is a new trend."

A good business case

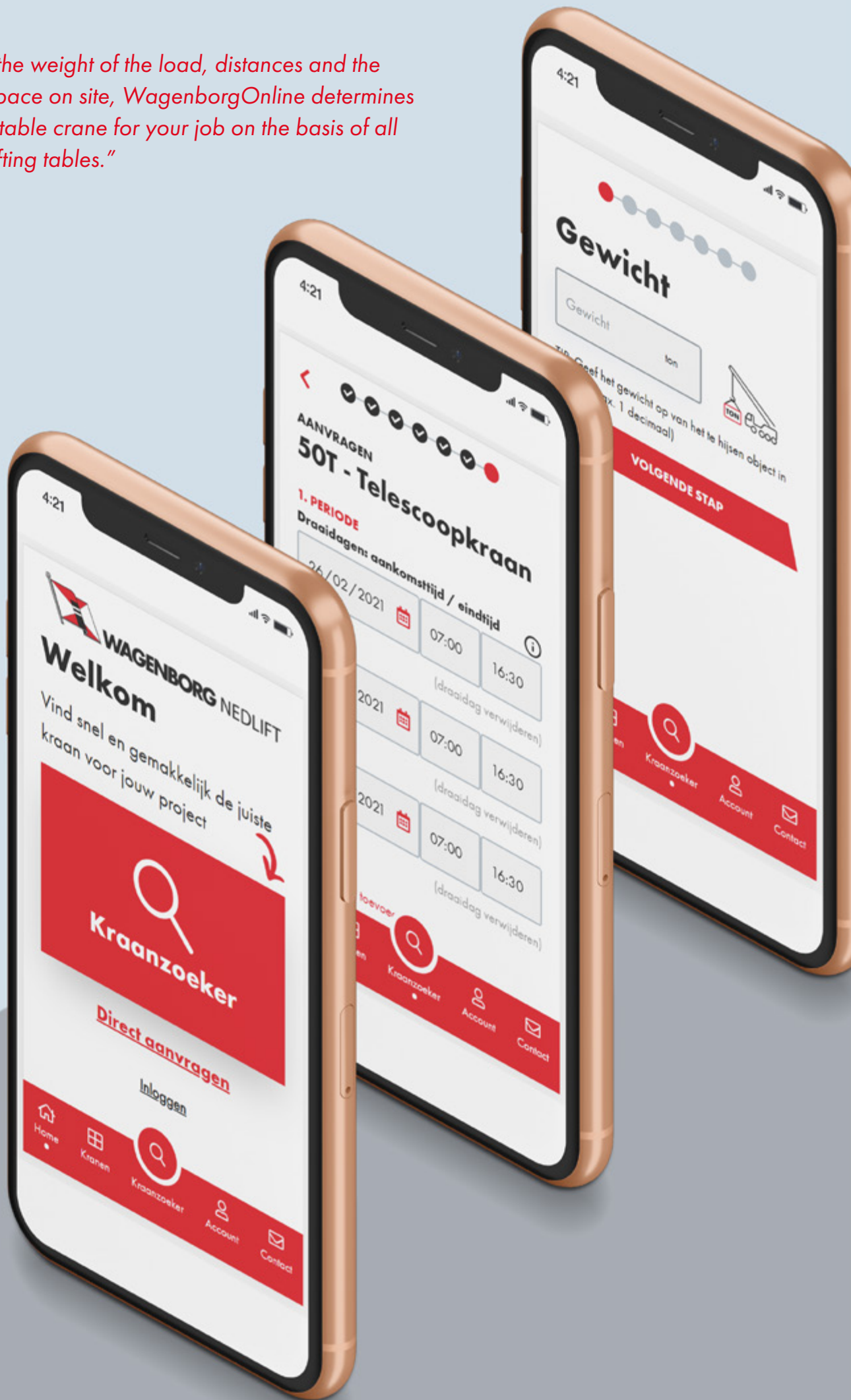
Due to poor past performance and increasing regulations, a retreating movement of the traditional financiers can be seen. **Gorgels:** "We see hesitation in the market. However, we

do not want to be closed to the shipping industry, but look together critically at options for the future. I think there is always financing and funding available for good projects and good shipping companies."

Kuiken: "One of our most important slogans is 'banking for better, for generations to come', and that is what we give substance to. By looking to the future and setting an example yourself. We ask our customers to go along with this. You can expect us to take up our role and develop initiatives to initiate the process. Giving incentives for

greening is something we will continue to do and may even do more in the future. We expect that Wagborg will be able to follow the Poseidon Principles with the mix of their fleet. Wagborg can distinguish itself in this through innovation, by being proactive, through transparency, good reporting and, above all, a good business case. Ultimately, it is a good business case for both of us. There are plenty of initiatives going on and now and then you just have to grab your chance."

“Based on the weight of the load, distances and the available space on site, WagenborgOnline determines the most suitable crane for your job on the basis of all available lifting tables.”



A FIRST IN CRANE LAND

Renting a crane faster, easier and smarter is now possible with the new online ordering tool from Wagenborg: WagenborgOnline.

As a contractor you know it: those days when you have to arrange 1,001 things, everyone wants something from you and you eventually forget to order that mobile crane that you really need at the end of the week. With the new online ordering tool from Wagenborg you can order the right mobile crane yourself at a time that suits you. Also in the evening or at home while sitting on the couch.

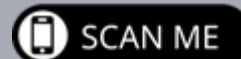
STEP BY STEP THE SUITABLE TAP

With WagenborgOnline you have access to the entire crane fleet of Wagenborg and you can easily rent any desired crane with any accessories. From 40 tons to 700 tons, telescopic cranes and tower cranes. But how do you know exactly which crane to choose? Simple: based on the weight of the load, distances and the available space on site, the tool determines the most suitable crane for your job on the basis of all available lifting tables. After a simple reservation, you then put our planning and work planners to work.

INSIGHT WITH YOUR OWN DIGITAL PORTAL

Such an online crane ordering app is new in the market and characteristic of what Wagenborg wants to show. "We want to be at the forefront of developments in a traditional market" says account manager Danny Ritsema. "We are all familiar with the concept of a personal portal; think of Amazon. But insight for our customers into his / her recent orders, invoices or other personal data is really a first. We started using WagenborgOnline in April and will develop it further in the coming months in close collaboration with our customers", says Ritsema.

Experience the ease and speed of WagenborgOnline yourself at:
kraanhuren.wagenborg.com



FUTURE-PROOF ERP-SYSTEEM BRIDGE SUPPORTS PROCESSES AND CUSTOMER DESIRES

In recent months, a lot of work has been done on the go-live of the first modules of "BRIDGE". The new ERP system that offers many advantages for Wagenborg and its customers. "When you think of Bridge, you think of...."



"A FUTURE-PROOF IT-PLATFORM"

Berend Hut
(IT Manager)

Hut: "Bridge is a so-called low-code system known for its high development speed and flexibility. This allows us to continuously improve the platform and supplement it with new functionality and technology. In consultation with the business, we are able to realize business software that seamlessly matches the wishes of our organization. We are now building exactly the software that is needed much faster and more precisely. And because we do everything in one platform, we can now automate many processes and manual actions. It is now also much easier to use new technology such as "Internet of Things" and "Artificial Intelligence". By automating

certain things, data-driven decisions become even more the norm. This gives our colleagues more room to develop new, better business development ideas. All of this provides an enormous advantage."



"PERFECT SUPPORT OF VAN BUSINESS PROCESSES"

Arie Versluis
(ERP Programma Manager)

Versluis: "We did not start the ERP program from necessity, but from the vision that we want to be a leader in the digital transformation of Shipping. We are convinced that our way of working is making the difference and our processes are a unique selling point. That is why we want to make it even tighter and support it intelligently by means of automation. We started redesigning

and automating commercial processes, such as planning, fixing and contract management. Thanks to Bridge, our colleagues have 'time left' to do what they are good at, and that is to help the customer."



"BEING ABLE TO SERVE THE CUSTOMER ADEQUATELY"

Koos Zumkehr
(Directeur Bevrachting)

Zumkehr: "Although we are currently still busy recording our contracts in Bridge, the benefits are already visible. For example, we can see at a glance how many cargoes and ships have been booked in a specific period and where and when ships are available for new cargoes or specific requests. The system will also be able to indicate



The name "BRIDGE" of Wagenborg's new ERP system symbolizes the bridge of a ship: the control center from which control takes place. By the way, the Wagenborg ships are all equipped with live data connections that communicate closely with BRIDGE, which our operators use independently of time and place to optimize the daily planning.

We started the ERP program from the vision that we want to be a leader in the digital transformation of Shipping.

the best planning in terms of results and sustainability. In consultation with the customer, we can plan further ahead in order to link things up even better and thus further limit CO₂ emissions, for example. This also saves a lot of time, so that a customer has a faster insight into the planned voyage or the nomination of a ship. During this time, we can start introducing KPIs that customers set for us. Think of laycan, deployability and damage. We also want to make our set KPIs visible to customers: nomination on time, timely payment, nominations versus realization, etc. With this information we can jointly optimize the supply chain as possible. "



Second EasyMax taken into service by
Wagenborg under her official name:

MÁXIMA

The 'maiden voyage' of the MV Máxima was a shipment of wood chips from Antwerp to a power plant in Scandinavia.

Remote support

The MV Máxima has a network on which systems can be accessed from various places on board and can be reached from shore for diagnostics or malfunction assistance. This results in lower maintenance costs, minimal down-time and more reliable services.

Aerodynamic hull shape

The hull of the EasyMax is designed above and below water in such a way that less resistance from water and wind takes place.

Comfort on board

The comfort on board and the physical strain of the crew have also been central to the ship's design with, for example, an ergonomically optimized, integrated bridge.

Minimal outfitting

The art of omission has been applied in this ship design. With only essential ship equipment, looking at loading options and processing the accommodation in the bow, a cheap and lightweight ship has been created.

Energy efficient propulsion

An economical 2,999 kW engine provides a fuel saving of 60% compared to existing ships. The Energy Efficiency Design Index (EEDI) scores more than 30% better than the standard that will apply from 2025.

Shore power connection

In ports, the Maxima can use the fixed shore power connection in order to keep fuel consumption and emissions to a minimum in those circumstances.

Water treatment

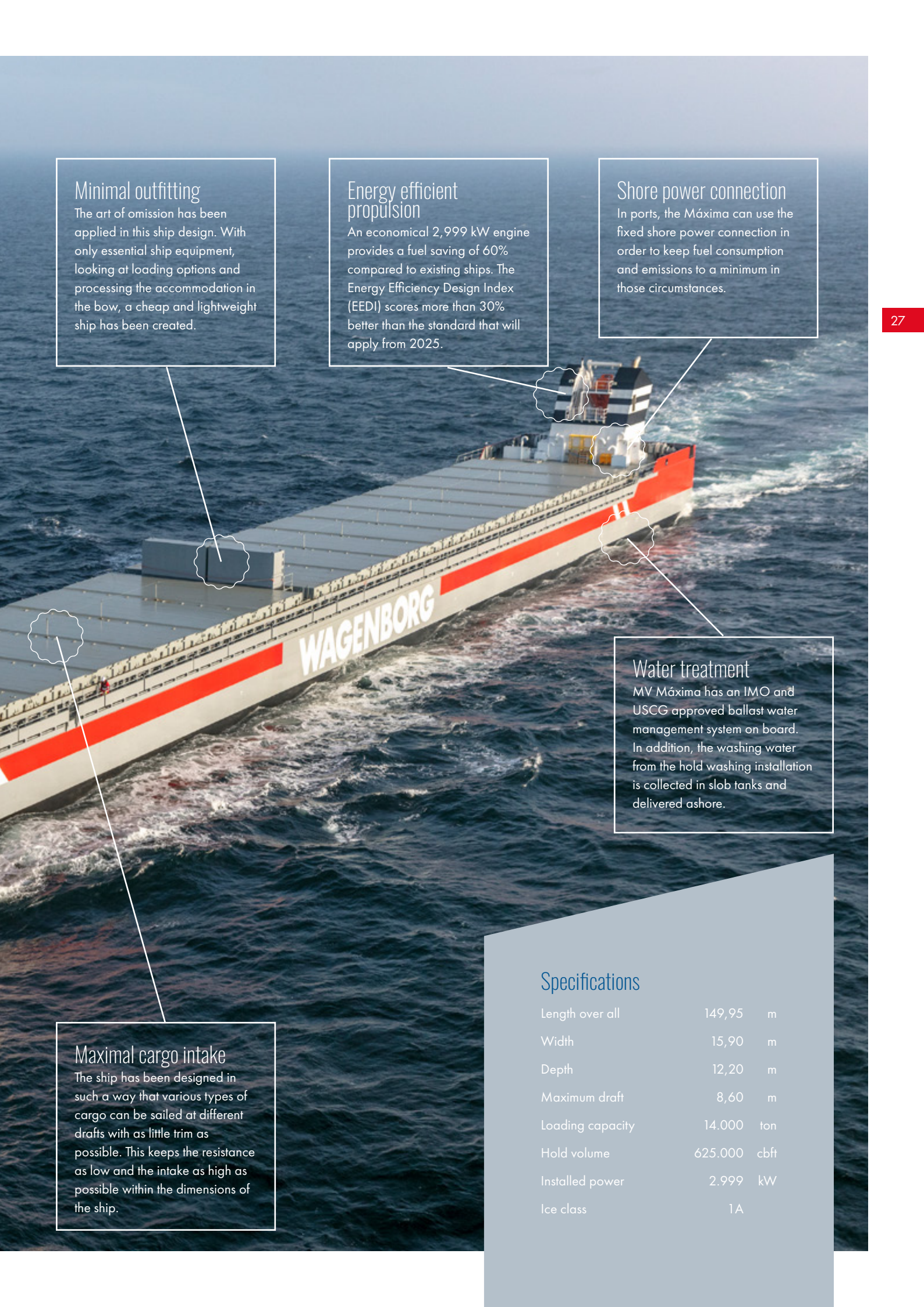
MV Maxima has an IMO and USCG approved ballast water management system on board. In addition, the washing water from the hold washing installation is collected in slob tanks and delivered ashore.

Maximal cargo intake

The ship has been designed in such a way that various types of cargo can be sailed at different drafts with as little trim as possible. This keeps the resistance as low and the intake as high as possible within the dimensions of the ship.

Specifications

Length over all	149,95	m
Width	15,90	m
Depth	12,20	m
Maximum draft	8,60	m
Loading capacity	14.000	ton
Hold volume	625.000	cbft
Installed power	2.999	kW
Ice class	1A	



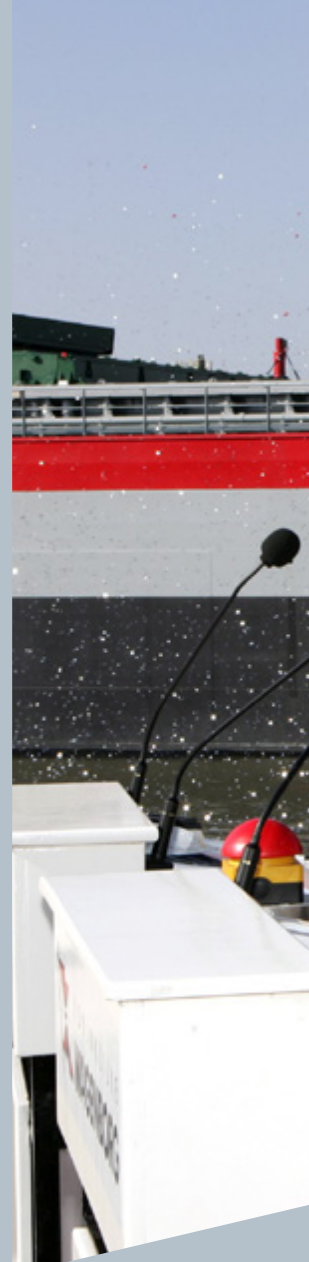
Wagenborg, for almost 25 years proud owner of the designation

ROYAL

Wagenborg has been awarded the “Royal” designation since 1998. This award can be awarded to companies, among others, and symbolizes the respect, appreciation and trust of the King towards the recipient. As a Royal company, we are therefore particularly honored that Her Majesty Queen Máxima of the Netherlands has been pleased to associate her name with our sustainable new-build vessel.

The intended christening by Queen Máxima will not be the first time that a Dutch queen has given her name to a Wagenborg ship. In 2009, Wagenborg welcomed Queen Beatrix for the christening of the dry cargo ship “Beatrix” named after her.

Even then, it was the second time that a member of the Royal Family christened a Wagenborg ship.





When does a company earn the designation “Royal”?

The company must have prestige in terms of nature, size and reliability and in its field occupy a first or a very prominent place in the Kingdom of the Netherlands, preferably with an international image. This also takes into account the size of the company, the number of employees and the turnover. Business operations must be impeccable. The company, as well as the board members and supervisory directors, must be known in good name and fame and be of good conduct. A company must exist for a hundred years and the Designation is only awarded on the occasion of a special anniversary.

← In 2009, during Delfsail, Queen Beatrix christened the MPP carrier “Beatrix”, named after her.

As a Royal Company, we are particularly honored that Her Majesty the Queen Máxima is pleased to associate her name with our sustainable new-build vessel.

In 1995, the daughters of the mayors of Hoogezand-Sappemeer and Delfzijl christened m.v. Kroonborg assisted by - then - crown prince Willem Alexander. Since both ladies failed to break the bottle, the prince offered a helping hand and the ship slid into the water without any problems.

In 1999, Princess Margriet, godchild of the Dutch merchant shipping, also visited Wagenborg and the then brand new ship ‘Vlistborg’.

Over the years, Wagenborg has used “Orange related” ships. In addition to the Beatrix, the ‘Oranjeborg’ and ‘Nassauborg’ - and until a few years ago the ‘Prinsborg’ - are part of the fleet. There is also a portrait of the royal couple on each ship.



← In 1995 - then - Crown Prince Willem Alexander christened the m.v. Kroonborg.



What does a
Royal
christening look like?

The intention is to have the christening of our new built vessel *Máxima* performed by Queen *Máxima* during the Wagenborg event during DelfSail. Covid-19 has moved this event to a date to be determined.

The timing of this festive event will be chosen in such a way that our domestic and foreign guests may witness it. Queen *Máxima*, namegiver of the ship, will not be the first queen to be invited to a christening.

During DelfSail in 2009, Queen Beatrix christened the ice-classed multipurpose carrier named "Beatrix" after her.



↑
 A permanent part of the program is also talking to Wagenborg relations under the direction of the director of the relevant division.

ROYAL NIESTERN SANDER DELIVERS THIRD 'WALK-TO-WORK' -VESSEL

KEIZERSBORG taken into service

Wagenborg Offshore has taken its third walk-to-work vessel (W2W) into service as Keizersborg.

Keizersborg is used as a standby and support vessel for inspection and maintenance of unmanned platforms in both Dutch and British waters in the southern North Sea.

CONVERSION PSV TO W2W

After the positive experiences with the W2W vessel Kasteelborg, Wagenborg has once again opted to convert a standard Platform Supply Vessel into this specialist offshore vessel. The DP2 vessel was designed by Wärtsilä and built by Wuhu Shipyard in China. Keizersborg was converted in 16 weeks by the Royal Niestern Sander shipyard and provided with an extra accommodation module and a motion compensated gangway.

PRODUCING NATURAL GAS OFFSHORE

Oil and gas companies face major challenges to carry out their work as safe and cost-efficient as possible and to increase the effectiveness of maintenance. Offshore platforms are smaller and normally unmanned without a "helicopter deck", resulting in a need

for W2W ships. With W2W ships, offshore activities can be supported safer, more efficiently, more effectively and more productively, as the W2W ships Kroonborg and Kasteelborg have proven. Keizersborg is used in a similar way and is ERRV certified.

WHAT IS ERRV?

As an Emergency Response and Rescue Vessel (ERRV), Keizersborg can be deployed in emergency situations at platforms for rescue work, standby activities, emergency towing or patrol tasks. The ship is equipped with extra facilities for those on board, such as an infirmary, reception rooms, a decontamination room, a recovery room and extra sanitary facilities. Keizersborg is also equipped with a daughter craft and a fast rescue boat, so that rescue activities can also be carried out in bad weather.

MARKET LEADER

With three operational W2W vessels, Wagenborg is one of the market leaders in this offshore niche.





Specifications

Length over all	79,20	m
Width	18,30	m
Draught	8,00	m
Deck space	502	m ²
Accommodation	60	PAX
Dynamic positioning	DP2	
Gangway	Ampelmann E-type	
Crane	Lintec Crane 5t @ 19,5m	

←
As Emergency Response and Rescue Vessel is Keizersborg equipped with extra facilities for people on board in emergency situations.

WAGENBORG OFFERS
EFFICIENT AND SAFE
TOTAL SOLUTION FOR

LOGISTIC PUZZLE



Drilling company KCA-Deutag issued a tender last October for the transport of the T-700 drilling rig from Turkey to Germany. Wagenborg managed to win the tender for this door-to-door transport with an efficient and safe total solution. "A challenging project, which we completed on schedule and without incident," says Jan Willem Klaas, Managing Director Wagenborg Foxdrill.

The entire logistics chain - from loading and unloading and transport by land and sea to customs matters for clearing the drilling rig - was in the hands of Wagenborg. To this end, Wagenborg Foxdrill as a drilling specialist and Wagenborg Projects & Logistics as a specialist in special transports joined forces.

EXPERTS TO TURKEY

The derrick was first transported from the storage site to the port of Tekirdağ. At the end of January the MV Unistorm was moored and a start could be made with placing and securing the 234 parts on board. Corrie Brillman (Conductor Installation Technician) and Roger Damhuis (Rigger) were on site on behalf of Wagenborg to ensure that everything runs smoothly. That still took some doing, with a PCR test prior to the trip to Turkey, another PCR test before departure and back in the Netherlands in quarantine for five days, with another PCR test.

"Unfortunately, it is part of the deal at the moment," says Klaas. "At the same time, it is of course nice that the tests are there, because it gives us the opportunity to travel when necessary, as in this case. We had already brought T-700 to Turkey for KCA-Deutag in 2018 and on site we assembled and dismantled the 43.5 meter high drilling rig at a few different locations. This expertise is of great value if you want to carry out such a project efficiently and safely. For example, we know exactly where the center of gravity is when lifting pieces."

LOGISTIC PUZZLE

After a journey of 1,5 weeks by sea, the port of Emden was reached without any problems. After all items had been unloaded in Emden and customs had released the material, the transport started. A complete logistical puzzle. The drill pipes had to go to Georgsdorf, the substructure partly to Georgsdorf and partly to Bad Bentheim, and the sleepers and office containers had to go to Niederlangen. To the satisfaction of the customer, all equipment - a total of just under 130 truckloads - was in the right place within a week. Ready for an overhaul or for a new deployment.

THE WORLDWIDE IMPACT OF COVID-19

The corona pandemic has been gripping the world for over a year now. But the seriousness and approach can differ considerably from country to country. How do Wagenborg colleagues across the border experience this period? How is the situation in...?



**ANTOINETTE
TAMBURELLO**
Montréal -
Canada

"We started working from home on March 17, 2020. We began our first two-week lockdown to help flatten the Covid-19 curve. At the time, there was upwards of 70 Covid-19 cases per day in Quebec and we had no idea that one year later we would still be working from home and the number of infected persons would rise to the hundreds of thousands. The year 2020 and all the events surrounding the pandemic still feel surreal. We've been through two total lockdowns in Montreal, and the latest restrictions include an 8:00pm curfew. I never imagined I would experience living through a province-wide curfew in my lifetime – this is something I associated with wartimes.

Working from home has had its

challenges for sure, especially in the beginning while we transitioned from office to home. However, I quickly realized how privileged I am to be able to keep working while staying safe in my home unlike so many others risking their lives. You can say it is now business as usual – except instead of face-to-face contact, we rely on phone calls and Teams meetings. While my experience has been mostly positive, I do miss our office environment, my colleagues and our beautiful view of Old Montreal!

The biggest challenge I have faced throughout this pandemic has been the overwhelming feeling of worry for my loved ones, especially my elderly parents. I constantly think about how little time they might have left with us, and how we have not been able to celebrate any holidays or birthdays together this year. I miss the simple pleasures like sharing a meal with family and friends,

and travelling. On a positive note, this added time alone has been a good opportunity for me to work on myself and has allowed me to stay active, practice meditation and gratefulness. I am extremely grateful that my family and friends are all healthy and that I love my work and the wonderful company I've worked for the past 18 years. Stay safe everyone."



ANNA LEON
Saint Petersburg -
Russia

"The pandemic has seriously impacted most of the crewing operations. For instance, each and every crew change had to be thoroughly investigated.

Coming up with new solutions turned out to be inevitable in order to make things work in this new challenging reality full of uncertainty, constantly changing



ANTOINETTE TAMBURELLO

Montréal, Canada

restrictions all over the world and increasing number of medical cases.

In April it became clear that the pandemic wasn't going to be over soon and that keeping seafarers on board and ashore wasn't an option anymore, so it was decided to resume crew changes. However, Russian borders had already been shut down by then and all the international flights to/from Russia had been banned. Somewhat jokingly I suggested transporting seafarers from Russia to the airport of Minsk by taxi. As I remember, though back then it sounded almost absurd: the distance between St. Petersburg and Minsk is about 800 kilometers. Who'd think that within a week our trailblazers would actually have to go all the way to Minsk by 2 taxis and cross the border on foot. Later our seafarers started traveling via Tallinn as well, and after a while a very limited number of international flights started operating again.

Thanks to teamwork and joint search for solutions, crew managers constantly keeping in touch with local agents all over the world and embassy representatives in some cases, this pandemic chaos has mostly been tamed in terms of crewing operations.

I'd like to thank our seafarers for understanding and cooperation in these abnormal times.

Personally, the pandemic hasn't affected me negatively that much. Surprisingly, everyday life seems quite normal here in St. Petersburg right now. The present situation is strikingly



ANNA LEON

Saint Petersburg, Russia

different from what I've experienced in the spring of 2020 during my 3 months' "confinement", with almost zero human contact limited to deliverymen.

We can only wait and see what the future brings. In any case, I'd prefer to stay optimistic and to keep exploring ways of adapting to our new reality, whatever the future may bring."



VALENTIN LEFEVRE
Madrid - Spain

"In March 2020, upon the Covid-19 outbreak, we got quite a tough lockdown here in Spain. Indeed, during six weeks we were allowed to step out only to go to supermarket where you had to queue during minimum one hour to enter, to pharmacy and to doctor. Otherwise, we were merely not authorized to go out, even for a short walk. Of course, in a flat you don't have garden and not always a terrace or a balcony either. Afterwards, the confinement eased and we were allowed to step outside during specific timeframes (early mornings and evenings). I've never seen so many people running at 07:00 am! Then, when the summer came all the restrictions were lifted unless to wear a facemask which still remains. Now and already for several months, in Madrid, I would say we have some relatively light restrictions, only a curfew at either 10:00 pm or 11:00 pm till 06:00 am, pubs and restaurants remain open. Nevertheless, our mobility through the



VALENTIN LEFEVRE

Madrid, Spain

country remains very limited and only into the province.

When thinking about the spring 2020, I really don't want to live it again. The outdoor life, the sociability and seeing my relatives were missing a lot. Upon the lockdown, we obviously had to start working from home and I've been almost 3 months without stepping in at the office. It was something totally new for such a long period but we had to adapt ourselves, actually as many people. I think together with the colleagues and the company we have shown a swift reactivity and a good adaptability. Personally, I rather be at the office due to the social contact as well as the commute from home to work giving me a useful break. Now, we have a rotation system allowing us to be one day at the office and the next one teleworking which definitely pleases me better.

As everyone I do naturally hope that the current restrictions whether it be social or professional will end soon. However, without being too pessimistic, I think we will keep living with them for a while. Furthermore, I unfortunately believe this dramatic event will have consequences on each other and on our way of life for a long time.

To conclude, I would like to send my full support to our fellow worker on board as well as our colleagues and their relatives who have been directly affected by the virus. Even though the context has not always been easy, I still believe our current and ashore conditions remain privileged."

**JOHAN KRIJNSEN**

Delfzijl, the Netherlands

**LENNART MEYER**

Helsinki, Finland

**JOHAN KRIJNSEN**
Delfzijl -
Nederland

"Internal audits on board ships are an important part of my job. This came to a standstill at the beginning of 2020. I worked from home a few days a week to handle current affairs and answer questions, and I also took the opportunity to take time off to cut down on my vacation days.

Fortunately, we were able to resume the internal audits after 2 months, albeit without flying. I drove the car through half of Europe. I loved to visit ships in this way with more peace of mind. All entry and exit restrictions from countries make my job more difficult. Borders can open or close inappropriately. This creates quite a bit of uncertainty, even the Belgian-Dutch border is exciting.

I have myself tested before every ship visit. That gives me a safe feeling and I step on board more confidently. I also wear a mouth mask on board. If I can't wear it for example with dinner, I make sure that I sit at the end of the table, so that everyone can keep a distance.

Unfortunately, we cannot visit the ships that sail between Canada and China. The officers' meetings have also been canceled and a drink with a few officers on shore after an audit is no longer possible. This is a great loss,

for myself, but also for the company, because I often heard much more there than during the audit itself.

In my personal life, Corona does not play a very big role. Of course there are fewer parties, but if I want to visit my parents or friends, it is nice that I can be sure I am healthy once or twice a week. I find working from home less, because I can concentrate less well. On the other hand, working from home also has advantages, especially for colleagues who live further away, it saves a lot of travel time. I think that as a company we can also make a lot of profit after Covid-19 by continuing to work more flexibly."

**LENNART MEYER**
Helsinki -
Finland

"Covid-19 has certainly affected our daily life here in Finland, but luckily we are a small population in a fairly large country, which makes it easier for us to keep the required social distance. We have overall had a fairly stable infection situation and so far most of the restrictions and measurements taken, have given desired results.

Our team in Helsinki consisting of 9 people quickly managed to adapt to the situation in March 2020 when the Government strongly recommended to work from home. We already had mobile access to our emails

and IT systems. All of us were using mobile phones, but we also still had traditional desk phones. Our plan was to shift over to 100% mobile phones in any case, so the pandemic actually made us act even quicker. By the Summer we had a fully operational virtual telephone switch board.

In the midst of the pandemic we have managed to open up a new department for agency activities and even employ 2 new staff members. It was a very interesting task to lead such a project, whilst having very limited possibilities of travelling and meeting people.

During the last year, I have visited the office on very few occasions. Not being present in the office does not affect my actual daily work, but I do miss the interaction with my colleagues. Both on a social level, but also discussing business matters and brainstorming around new ideas.

Working from home and not having to commute has given me the possibility to spend a lot more time with my family. I have 2 boys of age 4 and 2, so I highly value being able to be present during this important age.

I think everybody has seen pros and cons with working from home during the last year. Personally I would not mind having a mix of both in the future, but time will show. I think it all depends on how soon we can go back to some sort of a "normal life"."



FOKKE BOTKE
Director Shipbuilding, Royal Niestern Sander

“Challenges in my work are important to me. Niestern Sander and Wagenborg responded very well to this by giving me the opportunity to take the next step at the right moments. I started 2011 at Royal Niestern Sander as Head of Technical Operations. Four years later I made the switch to Wagenborg Offshore as Manager Operations, and now return to Niestern Sander as Director of Shipbuilding.

I started my career as a seafarer. After studying Maritime Technology, I was able to work at Smit. I then wanted to move to the north and saw the vacancy at Niestern Sander. I thought it would be interesting to experience the construction process after sailing and the engineering. During that time we built, among other things, the Exeborg and the Walk-to-Work ship Kroonborg for Wagenborg. With this last ship I was also closely involved in the design and the winning of the contract.

When the Kroonborg was almost ready, I indicated that I was ready for a new challenge. Via, via, that news reached Wagenborg, after which the Corporate HR Manager asked me to start working at Wagenborg Offshore. It felt like a logical step to follow the Kroonborg. I had been very closely involved in the

design and construction of the ship and knew the operational side of shipping. Moreover, this was a great opportunity to learn more about the other Offshore ships.

In the years at Wagenborg, the collaboration with Niestern Sander continued, for example in the conversion of the Statiaborg, the conversion of the Kasteelborg and the conversion of the recently completed Keizersborg. When Wietse Holman retired, I received the offer to join the board of Niestern Sander. A very nice step, which I have thought very carefully about.

Until now I have always been close to the operation, as a board member you are further away from that. That also requires other competencies, but the confidence is there and I am given the space to develop further in this position. In short, a nice challenge and a nice reunion of old acquaintances.

One thing is certain: I will certainly focus on the development of our employees. If you help good people to develop, they will certainly help the company move forward.”

**“IF YOU HELP GOOD
PEOPLE TO DEVELOP,
THEY WILL CERTAINLY
HELP THE COMPANY
MOVE FORWARD”**

CONVERSION AG EMS PASSENGER SHIP TO LNG BY NIESTERN SANDER A LOGICAL CHOICE

This summer, the Royal Niestern Sander shipyard will complete the LNG conversion project of the passenger ship “Münsterland”. With this, the owner AG Ems will put its third LNG ship into service. We talk to AG EMS CEO Dr. Bernhard Brons about Niestern Sander, his vision on sustainability and the choice for LNG.

CAN YOU TELL US A BIT ABOUT WHAT SUSTAINABILITY MEANS FOR AG EMS IN PRACTICE?

“At the moment our focus is on an environmentally friendly travel chain. From the train journey to Eemshaven to an environmentally friendly ferry crossing through the Wadden Sea World Heritage with LNG on the MV Münsterland to Borkum. A railway is used on the island - here we were one of the first to put rapeseed oil methylester (biodiesel) into use - which could possibly also work electrically in the future. In addition, as the operator of public transport buses on the island of Borkum, we have already switched to fully electric mobility, so that about 80% of the island’s traffic is already sustainable through electricity from wind energy.

For us, sustainability also means using resources in an environmentally friendly way. This is ultimately the reason for the conversion of the MV “Münsterland”. The ferry itself was still in pristine condition and very suitable for continuing to transport cargo and people to Borkum. We also maintain our equipment in other areas to enable longevity and deployment - this is also a kind of ecological management.

And last but not least, sustainability mainly means economic and ecological action. With liquefied natural gas (LNG) we reduce 90% nitrogen, 95% sulfur, 20% CO₂ and 100% particulate matter compared to conventional fuels. We also use energy recovery in our air conditioning in the passenger lounge. This is energy efficient and conserves resources, with the cold released from the evaporation process or the waste heat from the engines providing for the need for hot water in the washrooms.

In Germany we have received the “Blue Angel” environmental label for our ship projects.”

WHAT WERE YOUR REASONS FOR CHOOSING LNG OVER OTHER ALTERNATIVES SUCH AS METHANOL, HYDROGEN OR ELECTRICITY?

“We needed a fuel that met our requirements: the size of the ship, the distance to be covered and of course the local infrastructure. That would have been impossible with electricity, batteries would have blown our ship’s capabilities. The use of hydrogen and methanol is not yet ripe for development. In addition, LNG can be further developed into bio-LNG from biomass, so that we can become CO₂ neutral.”

THE MV MÜNSTERLAND WILL BE THE THIRD LNG VESSEL IN THE AG EMS FLEET. WHAT DOES THIS PROJECT LOOK LIKE FOR YOU?

“Every LNG ship project was and is something special, as we are pioneers in this segment. For all ships, the built-in technology was applied in practice for the first time, so that we are actually pioneers. These techniques are not available from stock, but must be individually developed for our requirements. Because of this we were called “first movers”. Not only because there was nothing comparable to fall back on, but also because our ports do not yet have an infrastructure for the supply of LNG. The technology has of course been further developed, so that an improved tank with more volume on the m.v. Münsterland is used.”

HOW DID THE MÜNSTERLAND PROJECT COME ABOUT AND HOW DID ROYAL NIESTERN SANDER CHOOSE?

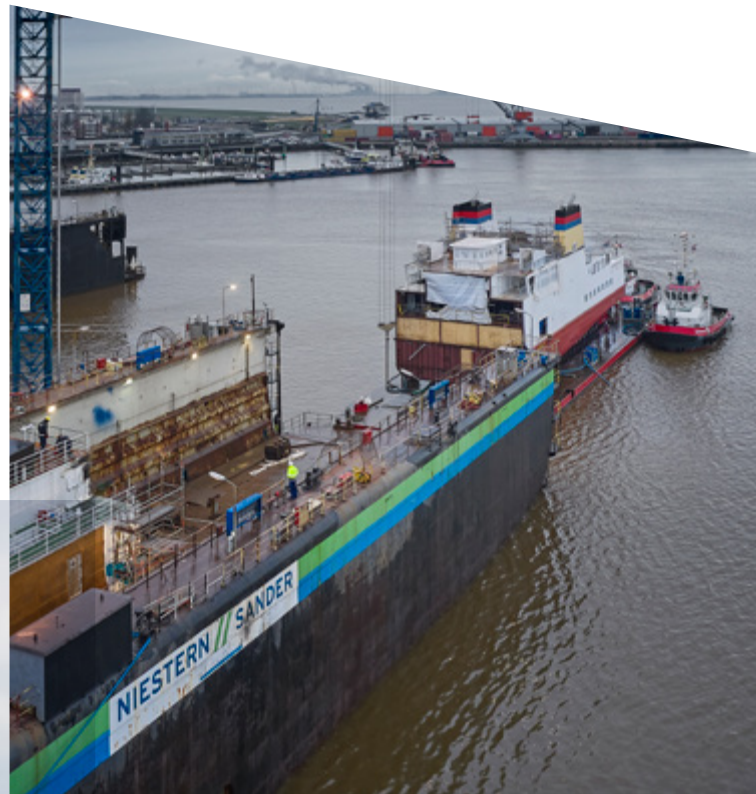
“Due to the positive experiences with the m.v. Ostfriesland, which was converted in 2015, it was no question for us whether we would convert the previously identical “Münsterland” to LNG. As usual with these types of projects, the renovation was put out to tender throughout the EU.

We were very happy that Royal Niestern Sander signed up for this. For decades we have been a regular customer for annual maintenance on board our ships or for extensive renovations, such as recently on the m.s. Westfalen. Royal Niestern Sander is always flexible and helpful with unplanned repairs. The m.v. Münsterland has already spent time on the shipyard in the past. So we are good friends and appreciate each other."

FINALLY, WHAT ARE YOUR EXPECTATIONS FOR THE FUTURE WHEN IT COMES TO SUSTAINABILITY?

"We assume that ecologically and economically sustainable action will become more important for us as a shipping company in the long term. Issues like climate change shape our society, so we need to make it clear to our guests that we are committed to them. Due to the pandemic, "feeling good" plays an important role in our lives and so does starting a vacation trip with a green footprint. As AG EMS we are committed to sustainability and open to further developments - perhaps one day bio-LNG or synthetic LNG from biomass or wind or solar energy."

With LNG we reduce 90% NOx, 95% SOx, 20% CO₂ and 100% particulate matter compared to conventional fuels.



After removing the existing aft ship, the Royal Niestern Sander shipyard will install a completely new section to the passenger ship Münsterland. This completely newly designed and built aft ship contains dual fuel engines, an LNG storage tank, propulsion, all LNG installations, pipes and other systems.



'MAIDEN VOYAGE' M.V. MÁXIMA: A SPECIAL EXPERIENCE

Under the authority of Captain Erik Magel, our latest EasyMax vessel Máxima started on Friday 5 February her maiden voyage from Delfzijl to the port of Antwerp. Even for an experienced captain like Magel, it remains a special experience.

"You are going on a journey with a new ship and a new crew. That is always exciting, but now an extra dimension was added. Due to Covid-19, the crew had not been on the sea trials, they only came on board just before departure. Fortunately I already knew the operator and the chief mate and they also had experience on our other EasyMax vessel. The ballast water treatment system was new to us, but it worked fine."

The trip to Antwerp went well. "At Walcheren the ship spotters were already waiting for us on the beach and several drones were hanging above the ship. When we arrived in Antwerp, we received the shield from the Port of Antwerp for our maiden voyage, which we gave it a nice spot on the bridge," says Magel. After loading the woodchips, the course was

set for Copenhagen.

After a second shipment consisting of wood chips, the m.v. Máxima to Saint Petersburg. There, her first serious ice cream awaited her. "We sailed to the port in convoy. When we were ready to set course for Lübeck, the ice conditions were a bit better and we were allowed to go outside ourselves. That went fine, until suddenly some engine problems arose. It turned out that a PLC card had been vibrated loose through the ice. Fortunately we solved the problem in time, in Lübeck the supplier has further improved the engine control box. That is also part of it."

Arriving in Lübeck, the first period for Magel was also over and Captain Hendrik van der Laan was allowed to take over the helm. "It will be my turn again at the end of April."

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JAN-EBE BOEREMA

Head of Technical Service, Wagenborg Nedlift

"The use of our equipment has a major impact on the footprint of a project. We are well aware of this and we take our responsibility in this. In our industry we are really at the forefront when it comes to sustainability. For example, all our new machines must comply with the most recent EU emissions standard when they are purchased. This makes us the only party in the Northern Netherlands that sets such strict requirements.

In practice, this is reflected, for example, in the electrical share of our fleet. Last year we purchased three truck-mounted cranes with fully electric power packs, now 10 percent of our cranes can run electrically. We also have an eye for the entire chain: new machines do not always have to be the most sustainable solution, since the production of a machine is also very harmful to the environment. That is why we have chosen to replace the engines with new EU Stage V engines for two crawler cranes of ten years old. That is a significant investment, but the machines can technically last for years and this is how we immediately reduce emissions by 80 to 90 percent.

Behind the scenes, we are also in full discussion with parties such as Volker Wessels, VDL, TNO, Hyzon and the machine manufacturers about the use of alternative fuels and drives. We are very interested in the possibilities that exist in this area, even if it is a complex issue. The load on the machines is high, as is the investment and the duration. That is why it is very important that we make well-considered choices. In the meantime, we are looking at how we can use our machines as effectively as possible. For example, we are currently investigating the possibilities of a smart tracking system that can help us to better use the machines in our own region to avoid unnecessary travel kilometers.

In short, we are working on limiting our footprint in many areas. These are often difficult issues, in which an apparently sustainable solution does not always have to be sustainable in practice. By continuing to look critically at the entire chain and by working together, I am convinced that we at Wagenborg Nedlift will be able to make the right choices to stay ahead."

**"THESE ARE OFTEN
DIFFICULT ISSUES, IN
WHICH AN APPARENTLY
SUSTAINABLE SOLUTION
DOES NOT ALWAYS HAVE
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PRACTICE."**

SUSTAINABILITY AS A BUSINESS OPPORTUNITY

Sustainability and decarbonizing is high on the agenda of many companies. SSAB and her intentions to produce fossil free steel in close cooperation with LKAB and Vattenfall is an inspiring example how partnerships and cooperation in a supply chain may lead to new opportunities and success. We talk to mr. Martin Pei, Executive Vice President and Chief Technical Officer of SSAB about 'his' prestigious Hybrit-project.

Q: WHAT MEANS SUSTAINABILITY TO SSAB?

SSAB is a highly-specialized global steel company and has been at the forefront of sustainability. SSAB is planning to offer fossil-free steel to the market in 2026 and eliminate all CO2 emissions. By transforming from blast furnace based technology to hydrogen based HYBRIT technology before 2045, SSAB will put itself in a global leading position. This mindset grew over time. Back in the 70s, we had to restructure our company due to the oil crisis and had to find a niche and specialize for a long term competitiveness. We developed a business focusing on high-strength steel products. That gave us the advantage that we very early focused on creating value for our customers. For example: with our high-strength steel products our customers can make products with lower weight of steel in their machines or vehicles resulting in less material costs and fuel consumption. This focus on fuel economy gave us a starting point for our focus on climate change.

Q: HOW DID THE HYBRIT PROJECT EXACTLY START WITHIN SSAB?

Steel production is resource intensive

and generates CO2 emissions. Around 90% of our direct CO2 emissions are generated by our blast furnaces in the iron ore-based steel production at our sites in Luleå, Oxelösund and Raabe. However, SSAB's blast furnace-based production is among the most CO2 efficient blast furnace operations in the world by using high-grade iron-ore pellet supplied by LKAB and continuous improvements. SSAB's production results in an emission of 1,6 ton CO2 per ton produced steel, compared with a global average of 2,0 ton. Despite the most efficient blast furnace, SSAB is still the largest CO2-emitting company in Sweden and Finland, accounting for 10% and 7% of total emissions in these countries. Since both Sweden and Finland have very high ambitions to become carbon neutral soon, SSAB teamed up with LKAB and Vattenvall and launched the Hybrit initiative early 2016.

Q: HOW WAS THE HYBRIT PROJECT RECEIVED INITIALLY AND HOW CHANGED THIS PERCEPTION OVER TIME?

After the launch of Hybrit, our peers in Europe were very skeptical. But we were convinced this was the right way to go.

Sweden is a good starting point with a full decarbonized electricity system. In addition, Sweden has extensive competences within the mining and steel industry as well as in universities and research institutes. We were also convinced that the cost for CO2-emission will increase, even though the emission trading system (ETS) of the EU was not creating a significant push for change at that time. As the years pass, political pressure on climate changed increased and there is an rising demand from the society to decarbonize. From technology perspective more people realize that continue to invest in blast furnace system will create a lock-in effect. Hybrit gained more recognition as the most attractive technology path, especially after the pilot plant started up in August 2020. There is still years of development ahead, but we see already an increasing interest from the industry. More people start to believe this is the start of a revolution of the steel industry.

Q: HOW DO THE UPCOMING YEARS LOOK LIKE?

The steel industry is heavily invested and investment cycles are long. To reach the goals as set in the Paris agreement, we don't have so many investment cycles

About the Hybrid-project

In 2016, SSAB, LKAB (Europe's largest iron ore producer) and Vattenfall (one of Europe's largest energy companies) joined forces to create HYBRIT – an initiative that endeavors to revolutionize steelmaking. Using HYBRIT technology, SSAB aims to replace coking coal, traditionally needed for ore-based steelmaking, with fossil-free electricity and hydrogen. The result will be the world's first fossil-free steelmaking technology, with virtually no carbon footprint. Our goal is to reduce Sweden's CO₂ emissions by 10% and Finland's by 7%.



left before 2050. That is one of the reasons why we want to do this as fast as possible: we have an ambitious plan.

Since we started Hybrit, we launched a 4 year research program focusing on topics such as policy, public opinion and technical R&D projects such as production, storage of hydrogen, alternative heating technology of pellet sintering and direct reduction of iron pellets by hydrogen and the following steel making process. In 2017 we created a joint venture company to run all research: Hybrit Development AB. In 2018 we decided to invest in a pilot study phase. The Swedish Energy Agency, SSAB, LKAB and Vattenfall invested around 200 million euro in research and pilot facilities. The Hybrit pilot plant was started up in 2020 and soon we will start the construction of the hydrogen storage pilot testing facility in Luleå.

Currently we are planning a Hybrit demonstration plant in northern part of Sweden. Also we will replace two blast furnaces and the BOF-meltshop by electric arc furnaces at our steel plant in Oxelösund. This enables us to produce fossil free steel products as off 2026. And I am sure your company will help us with shipping these premium products around the world.

Q: I GUESS INVESTING IN THE HYBRIT-PROJECT IS NOT JUST CHARITY. WHAT'S IN IT FOR SSAB?

We believe that a steel company who has the opportunity to decarbonize from mining to production has an advantage in the upcoming decades when the world is asking for low carbon footprint material. Our steel will continue to be a premium product. Although you know products will cost more now, this will shift over time. We see renewable electricity cost is trending down while emission costs go up. Hybrit is the most important business development project of SSAB and it will further strengthen our position in the market.

Q: WHAT ARE YOUR EXPECTATION OF A LOGISTIC SUPPLIER LIKE WAGENBORG IN A FOSSIL FREE SUPPLY CHAIN?

Now we are still focusing on the manufacturing steps, but our customers will ask us to focus on other emissions too. So, in the future we also need to look at scope 3 emissions and I am sure shipping will be an area to address. One thing is for sure: the environmental footprint will count more and more. However, it will take time to decarbonize the whole value chain. We have to look together in full transparency to determine what can be done in the long run. So, let's keep in touch; we need to build partnerships to make this transformation successful.

Now we are still concentrating on the production process, but in the future we will also look at other emissions and I am sure that shipping will be a point of discussion.

About Jurrit Bergsma

- *Business Developer Sustainable Shipping TNO*
Responsible for the technical and strategic applied research and development related to the maritime energy transition.
- *PHD-research Maritime Energy transition TU Delft*
Research into the adaptability of the Dutch Maritime Sector in the context of the energy transition.

A man with short brown hair, wearing a light blue button-down shirt and blue jeans with a brown belt, stands outdoors with his hands in his pockets. The background is a clear blue sky with some greenery visible at the bottom.

Challenges for the SHIPPING INDUSTRY

While TNO Business Developer and researcher Jurrit Bergsma still wondered two years ago whether ocean shipping would switch to sustainable energy carriers, now, he says, the question is mainly when the sector will switch. *“From a technical point of view we are well on the way, now it is important to gain the trust of the ship owners with proven scalable concepts, and to make it financially feasible, so that we can take the next step in practice.”*

Electricity, hydrogen, methanol, ammonia and LNG with carbon capture: these are, if it is up to Bergsma, the energy carriers that sea-going vessels will use in about ten years' time. While the first two energy carriers are mainly suitable for shorter distances due to their limited energy density, the other can also be used for a sustainable journey around the world. Although important steps still need to be taken before that happens. *“We must first produce sufficient sustainable energy, because electricity from a coal-fired power station is of course by no means sustainable. I expect that we will be a long way in 2030.”* A worldwide infrastructure will also have to be developed to be able to bunk the alternative energy carriers.

TNO is conducting a lot of research into the properties and operation of alternative energy carriers at sea. For example, how they behave at different temperatures and how they can be used safely. *“Methanol can already ignite at 60 degrees, and the vapors from ammonia are very poisonous. You have to take this into account if you want to use them, for example when choosing the material for the tank or by installing sensors. But there are also advantages. If diesel leaks, it causes environmental damage. Methanol dissolves in water without causing much damage to humans or the environment. This allows you to see, for example, whether you can place a tank in the double wall of the hull. We investigate all that and draw up frameworks for it.”*

Trust and financing

For example, according to Bergsma, it will be technically possible to use these alternative energy carriers on a large scale by 2030. Winning the trust of shipping owners and making sailing on new energy carriers financially attractive are bigger challenges, he says. *“If you know that a ship with new techniques costs significantly more than the current generation of ships, then you must ensure that ship owners have confidence in the new techniques and they must have options for financing.”* A widely supported Maritime Master Plan in which the development of the technologies and financing is described should contribute to this.

Bringing parties together

Bergsma explains: *“The ship owners ultimately have to make the investment*

“In 2030, the holy grail is that when purchasing or replacing a ship, ship owners in Europe should not ask themselves whether they are going for sustainability, but only how.”

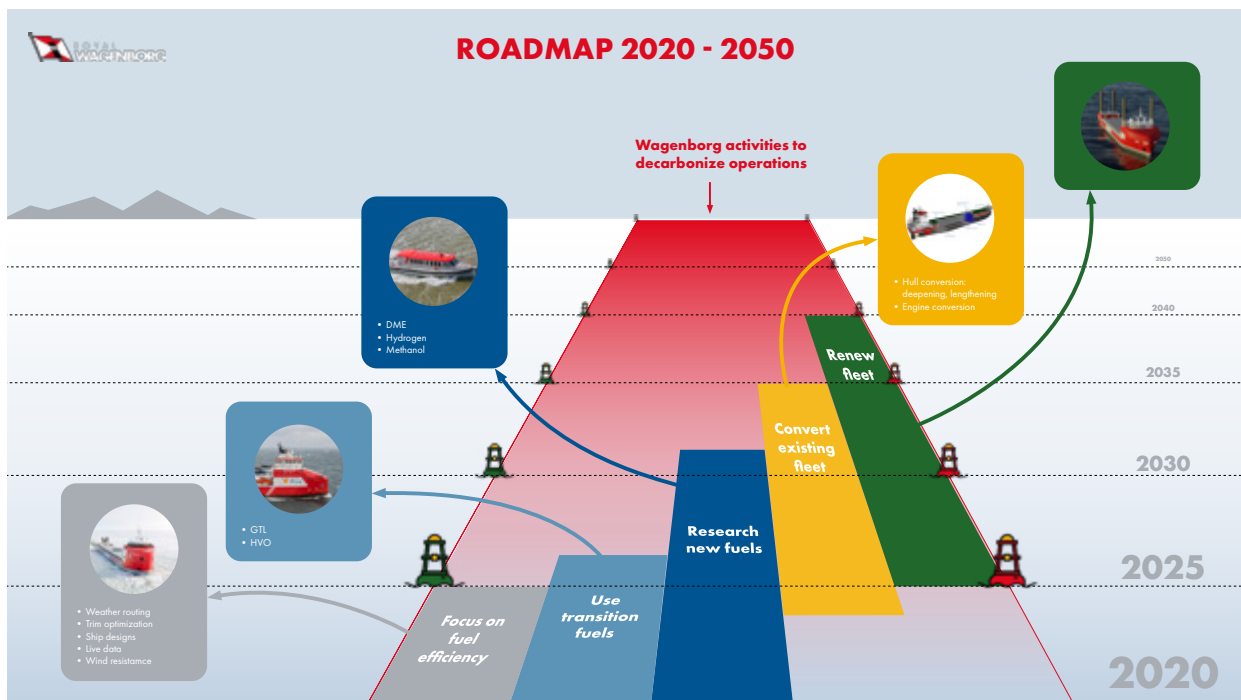
decision, but it also requires many other parties. For example, governments must ensure that investing pays off. This is now also being worked on at European level with a 'carbon levy', whereby there will be a price for CO₂ emissions from ships. Such a measure improves the business case for alternative energy carriers. In the financial field, you can think of subsidies for pilots or by issuing subordinated loans for sustainable investments, which reduces the financial risk for ship owners. And don't forget the customers. They can set sustainable requirements and commit to them by, for example, becoming a co-investor or entering into contracts for a long

period or at a higher price. Then there are shipyards that have to integrate the necessary components into the ship. Development of these technological components costs a lot of money, so there must also be a market with sufficient scale. You don't want to invest in the wrong technology. TNO is also closely involved in this as an objective research partner. The Master Plan brings all these parties together."

Sustainable business case

The holy grail as far as Bergsma is concerned? "Today we are in the midst of the development and exploration of all sustainable alternatives to seagoing

vessels. By 2025, launching customers everywhere with ships will demonstrate in practice what is possible and what is not. For example in essential test areas such as the Wadden area, where emission reduction plays a very important role. In 2030, the holy grail is that when purchasing or replacing a ship, ship owners in Europe should not ask themselves whether they are going for sustainability, but only how. By then sustainability will be the most economically attractive choice based on customer demand, carbon levies and proven safe and scalable sustainable technology."



Following on from the Maritime Master Plan, Wagenborg has drawn up its own roadmap, in which the following five tracks are used in parallel:

1. 2005 - 2025: Fuel efficiency / economical sailing.
2. 2020 - 2026: Use of transition fuels that can be applied directly to our current ships.
3. 2020 - 2032: Research into alternative fuels that require modifications and validation of whether these fuels also work in practice
4. 2024 - 2035: Conversion of existing ships to make them suitable for alternative fuels
5. 2026 - 2040: Construction of new ships in which alternative fuels can be used.



BERT VEENSTRA
Sales Manager, Royal Niestern Sander

"When I think of sustainability, I think of our climate, a theme that has increasingly become a point of attention in politics and society over the years. After the Paris climate agreement in 2015, the IMO (International Maritime Organization) made an agreement to reduce CO₂ emissions from shipping; by 2030, emissions must be reduced by 40% compared to 2008, and by 70% by 2050. Shipping is therefore facing a major challenge, the entire sector is looking for solutions for circular shipbuilding and shipping with the right choice of fuel, fuel storage, range, safety, etc.

In the field of sustainable shipping, Royal Niestern Sander has demonstrated in recent years with its solutions to be innovative, both in the field of shipbuilding, maintenance and ship conversion. Think of the environmentally friendly Walk-to-Work ships Kroonborg, Kasteelborg and Keizersborg, the hybrid diesel / electrically powered Geo Ranger, the fully electrically powered ship PW18 for Province of Groningen, the Maxima as the most energy-efficient cargo ship in her class, the Ventifoils on the Ankie and the Munsterland's current LNG conversion project.

There are plenty of great examples and our ambition for the future remains to provide our customers with innovative solutions in their desire to make a positive contribution to our climate. I notice that the climate is not only more and more often a topic of discussion with (potential) customers, but fortunately also plays an increasingly important role in decision-making.

For me personally, sustainability and making a positive contribution to the whole is very important. Our behavior determines how we leave the earth for our children. I appreciate that Niestern Sander is also actively making a positive contribution to this. Our three pillars are: actively realizing climate improvement in the world, the well-being of the employee and creating (new) solutions through innovation. Pillars that, in my view, are necessary to continue to position our company strongly in a changing market, with people as the most important capital and in particular the welfare of people and animals."

**"ROYAL NIESTERN
SANDER HAS
DEMONSTRATED IN
RECENT YEARS TO BE
PROGRESSIVE IN THE
FIELD OF SUSTAINABLE
SHIPPING WITH ITS
SOLUTIONS"**



SIX QUESTIONS ABOUT...

Dimethylether

AS AN ALTERNATIVE FUEL

You want to be able to ship your products in a responsible manner. Wagenborg is working hard on the application of alternative fuels. That does not only makes your supply chain greener; it is also better for the environment.

HOW DOES DME SCORE AS AN ALTERNATIVE FUEL?

Emissions	
Conversion techniques	
Storage techniques	
Availability and price	
Safety & storage	

How is it exactly?

Dimethyl ether as an alternative fuel ... sounds complicated. We asked fleet development manager Wieger Dursema six questions about this. His answers explain a lot.



51

1

What exactly is DME?

Dimethyl ether is a gaseous ether, the molecule of which consists of carbon, hydrogen and oxygen. DME is a product that is harmless to humans and is biodegradable and is therefore used as a propellant in consumer products such as aerosol cans. DME becomes liquid at a relatively low pressure: 5 bar.

2

How do you make DME?

DME does not occur naturally. Traditionally, DME is produced by extracting water from methanol. Another name for DME is therefore dehydrated methanol. DME can also be produced from syngas in one step; a mixture of carbon monoxide from, for example, biomass fermentation and hydrogen. An advantage of DME production is that the efficiency of the production process is high on a small production scale.

3

What does DME cost?

The determining factor for the price of synthetic DME is the price of renewable hydrogen. In addition, there are the costs for the production process and the supply to the ship. These are still unknown factors, but we assume that it will eventually reach an acceptable level.

4

How can DME be used as a fuel?

A unique property of DME is that it is burned according to the diesel principle. This means that the temperature of the air compressed in the engine is high enough to ignite DME. No external ignition source is required. Small modifications to diesel engines ensure that DME can be used. DME has a relatively high energy density compared to other alternative fuels. In terms of storage and handling, it looks similar to LPG.

5

Is DME a clean fuel?

The combustion gas of DME is free of sulfur oxides and virtually free of soot and particulate matter. The nitrogen oxide content in the exhaust gases is also very low. CO₂ emissions are acceptable because no new CO₂ is released into the environment. For these "net zero carbon emissions", DME must be produced from biological waste streams and renewable hydrogen.

6

Does DME have a future for Wagenborg?

Almost all the equipment in the Wagenborg fleet has one or more diesel engines and DME could be used in any of these engines. Due to the still limited availability, the application would in the short term be limited to liner service ships, such as the passenger ships of WPD. For some time now, we have been investigating the possibility of using DME as fuel for the express service.

Fleet Development Manager

WIEGER DUURSEMA

closely follows the developments of alternative, sustainable fuels for use on ships at Wagenborg.

DO YOU ALSO HAVE A QUESTION?

Wagenborg Shipping's R&D department is researching a variety of alternative fuels. If you have any questions about this, send them to times@wagenborg.com and maybe we will deal with them in this section next time.

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