

SCHOTTEL REPORT



BIG DATA AT THE QUAYSIDE

Seaports compete for ever larger cargo ships

M = MEDIUM-SIZED
Azimuth from 400 to 1,000 kW

FIT FOR THE FUTURE
Plug and play modernization

No. 18

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POWERFUL MANOEUVRES IN THE AMERICAS 33° 26' S, 70° 39' W

SAAM Towing, a multinational tugboat operator based in Chile, started with just one vessel almost 60 years ago. Today, the fleet operates in nine countries in the Americas facing a wide range of tasks for towing operations in the inland ports. **Page 16**



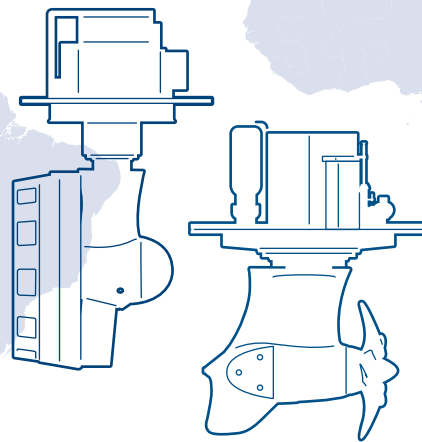
MAKING LIFE EASIER FOR CUSTOMERS 60° 23' N, 5° 17' E

Jan Helge Telseth, Managing Director at SCHOTTEL Nordic:
"We are there to provide our customers with a product that exceeds expectations". **Page 08**

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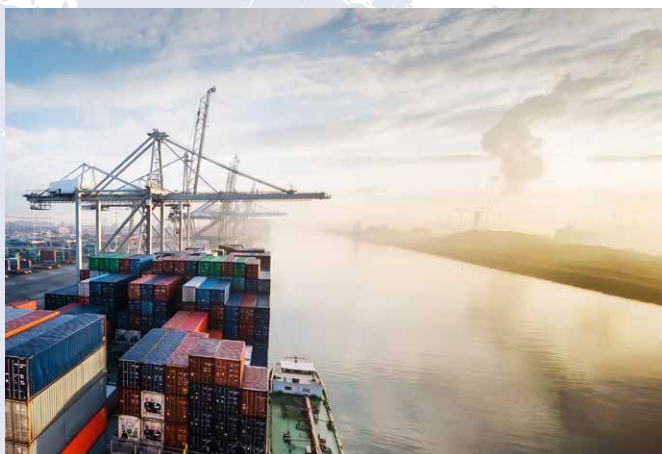
NO. 18, NOVEMBER 2020

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MORE FLEXIBILITY WITH MEDIUM-SIZED AZIMUTH THRUSTERS 50° 8' N, 7° 35' E

With the new M-Series, SCHOTTEL introduces medium-sized rudder propellers combining latest technologies in mechanical engineering, hydrodynamics and digitalization. **Page 04**



BIG DATA AT THE QUAYSIDE 31° 13' N, 121° 28' E

Larger cargo ships, automated systems, global companies: ports and shipping companies, like those in China, are preparing for the challenges of tomorrow. **Page 10**

DEAR READERS,

Welcome to Russia, our part of the SCHOTTEL world.

In 2011, SCHOTTEL Russia was founded as part of the targeted expansion of the international network of SCHOTTEL subsidiaries. Our office in St. Petersburg is responsible for all newbuilding activities, as well as lifecycle support for existing vessels in the Commonwealth of Independent States (CIS) and the Baltic states. More than 400 vessels navigate these countries' waterways using SCHOTTEL propulsion systems.

A large number of our projects deals with the transport of cargo for Russian waterways. There are 35,000 kilometres of navigable rivers in the Russian Federation. Over the past 10 years, more than 150 Russian river and sea-river vessels have been equipped with SCHOTTEL azimuth thrusters.

In order to offer our Russian customers even more comfort and proximity, a new service center is planned for St. Petersburg. An administration building with repair workshop and warehouse site is to be constructed on a recently purchased 3,000 m² plot of land within the next two years.

Our future facilities will provide our valued customers with the significant advantage of reduced transport time. Especially in the event of larger repair works, we will be able to offer on-site assistance, for example with a local stock of assembled big parts for module replacement.

Even beyond Russia, these benefits – comfort and proximity – are increasingly key factors for customers when it comes to choosing a SCHOTTEL propulsion system and its lifelong support. Customers from all over the world appreciate that SCHOTTEL is responsive, reliable and close at hand. We all are very grateful to them for this.

Some of the most interesting insights in various other parts of the SCHOTTEL world are presented in this new issue of the SCHOTTEL Report. They contain not only news from the different regions, but also in-depth technical information.

Happy reading.

Sergey Chestny
General Manager
000 SCHOTTEL



MORE FLEXIBILITY WITH MEDIUM-SIZED AZIMUTH THRUSTERS

SCHOTTEL introduces new medium-sized azimuth thrusters: the M-Series consists of several rudder propeller sizes covering the power range from 400 to 1,000 kW. Roland Schwandt, Vice President Sales at SCHOTTEL, describes latest features and advantages

Shifted engine power classes, updated ice class rules and an increasing number of electrically or hybrid-driven vessels – in order to meet new challenges on the international maritime market, vessels require propulsion systems that are optimally adapted to the changing conditions. SCHOTTEL offers suitable solutions with the M-Series azimuth thrusters, combining latest technologies in mechanical engineering, hydrodynamics and digitalization.

These propulsion systems are available in three sizes: 210 (640 kW), 240 (850 kW) and 270 (1,000 kW), corresponding to common engine power classes. All sizes are equipped with a strong planetary steering gear.

MORE VERSATILITY

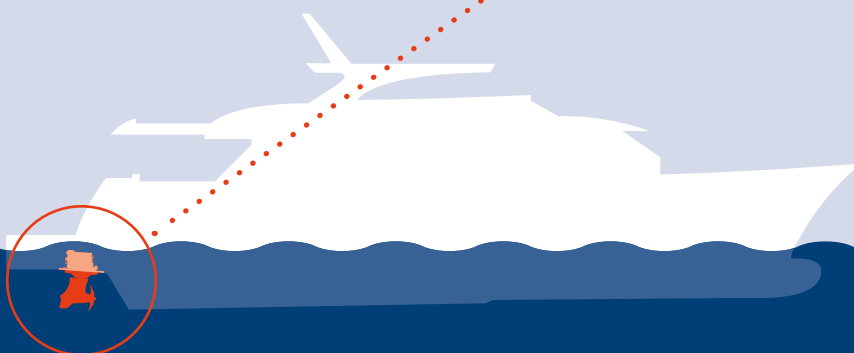
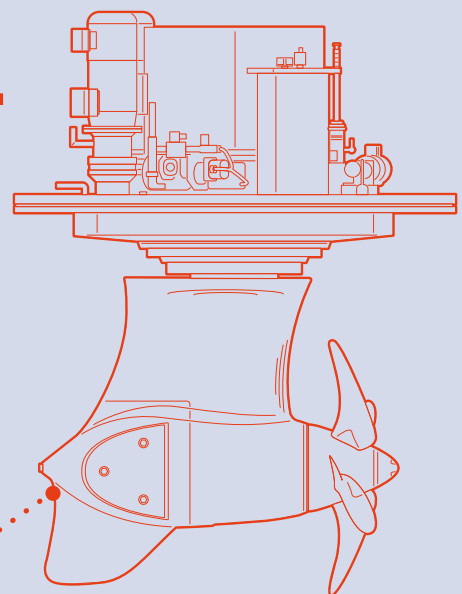
“The M-Series offers versatile solutions for all vessels with azimuth thrusters in the medium power range,” says Roland Schwandt, Vice President Sales. “Accordingly, it is designed for various power source options. It comes either with a horizontal or vertical power input and can be engine or e-motor driven. Furthermore, a version with an additional PTI is available, thereby making it compatible with hybrid options such as SCHOTTEL SYDRIVE.”

MORE DESIGN FREEDOM

Thanks to two installation variants, the M-Series can be incorporated into many different vessel designs. “Besides the standard option with variable propeller arm length, a compact version with shorter propeller arm length is available too. These compact installation variants (LC for

M-SERIES: SCHOTTEL ECOPELLER

Compact installation variants of the SCHOTTEL EcoPeller open up greater design freedom for ship designers while offering outstanding overall propulsion efficiency and excellent course-keeping stability.

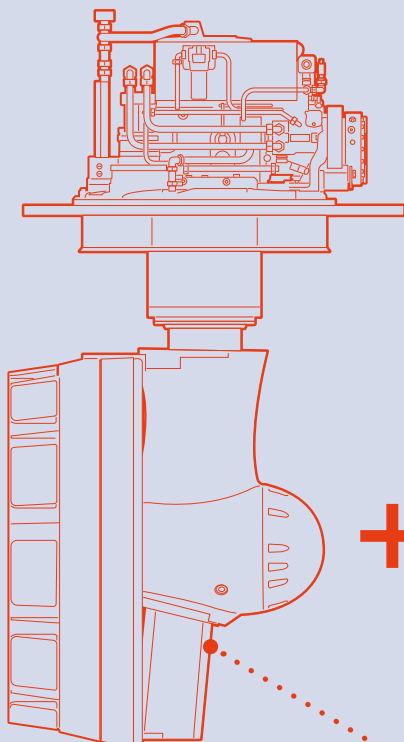


L-drives, ZC for Z-drives) increase design freedom and open up new possibilities to use azimuth thrusters in various applications – especially when machinery space is limited,” adds Roland Schwandt. Both the standard variant and the compact one can be bolted, welded or elastically mounted.

MORE PROPULSION EFFICIENCY

Two different propulsion modules ensure that the M-Series can be used in multiple operation profiles. The proven SCHOTTEL Rudderpropeller (SRP) is universally suitable for all standard applications and vessel designs, achieving high bollard pull values and maximum propulsion efficiency for vessels with medium speeds.

The SCHOTTEL EcoPeller (SRE) ensures high propeller performance in overall efficiency and course stability in more demanding applications and running at higher service speeds – such as ferries. The SRE reduces fuel consumption and emissions and thereby leads to lower operating costs.



M-SERIES: SCHOTTEL RUDDERPROPELLER

As universal multi-talent, the SCHOTTEL Rudderpropeller achieves top performance in terms of manoeuvrability, bollard pull and dynamic positioning.

“Whether it is a ferry or a tugboat, a diesel-driven, full-electric or hybrid vessel, whether bollard pull or free-running efficiency – the M-Series offers the right solution.”

Roland Schwandt, Vice President Sales at SCHOTTEL

MORE CONFIGURATION OPTIONS

“The modular setup of the M-Series is the cornerstone of the design and makes it easy to adapt to the needs of different applications. Whether it is a ferry or a tugboat, a diesel-driven, full-electric or hybrid vessel, whether bollard pull or free-running efficiency – the M-Series offers the right solution. This extreme versatility is achieved by a high quantity of similar features throughout the different versions. This greatly reduces the maintenance and service efforts, even when different versions of the M-Series are in use throughout the fleet,” summarizes the Vice President Sales.



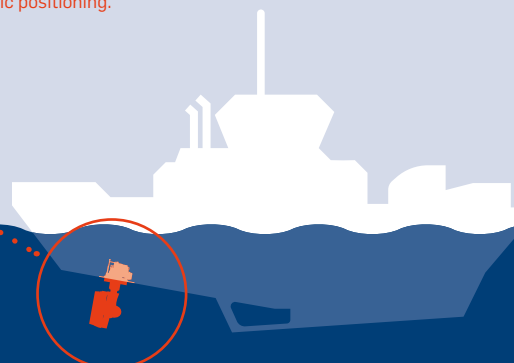
ROLAND SCHWANDT

Vice President Sales at SCHOTTEL

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FIRST UNITS DELIVERED

The first propulsion units of the new M-Series have recently been put into operation: among others, two new tugs for the US Navy are equipped with M-Series rudder propellers from SCHOTTEL. Furthermore, two vessels of the Norwegian ferry operator Norled feature highly efficient medium-sized EcoPellers.



RETRO-FIT FOR THE FUTURE

Today's tugboats need to be equipped with particularly effective propulsion systems in order to offer reliable towing services. The long-term availability of all propulsion components plays an important and vital role in successful operation of the vessel

Moran Towing Corporation is a leading provider of marine towing and transportation services. The company operates one of the largest fleet of tugs in the United States. One of which, the Marci Moran, required an upgrade to her propulsion system. Moran chose a tailored retrofit concept from SCHOTTEL. After all, Moran and the propulsion experts at SCHOTTEL have been working together since 2005.

RETROFIT SOLUTIONS OFFER NUMEROUS ADVANTAGES

The benefits are clear: "By incorporating the existing machinery, the overall costs could be reduced and the modernization realized cost-effi-



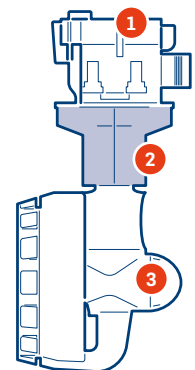
Moran currently owns and operates 95 tugs and 30 barges.

ciently for the customer," explains Jörg Majewski, Sales Director Modernization & Conversion at SCHOTTEL. "Work at the shipyard is also minimized," adds the modernization expert, "because the azimuth thrusters are installed using a plug and play principle." The standardization of the upper and the lower gearboxes also ensures high long-term availability of replacement parts. The two components of the SRP 360 are connected by a customized cone support tube (see illustration 2).

FURTHER ORDER PLACED

However, the project manager knows that other criteria also play an important role: "Along with cost and risk reduction, quality is always paramount for our customers." Among other things, it is ensured by the Factory Acceptance Test (FAT), which involves testing of the brand new thrusters on all contractual performance parameters in the presence of the responsible classification society. As in Moran's case, the customers can also attend to convince themselves of the high quality standards of the systems and at the plants.

The modernization of the propulsion system was carried out in close cooperation between Lyon Shipyard in Norfolk, Virginia, and SCHOTTEL USA. It was successfully modernized in just a few weeks. A further order for the conversion of a second tugboat has already been placed.



SPECIAL INSTALLATION CONCEPT

The upper 1 and lower 3 gearboxes of the SRP are connected by a customized cone support tube 2. It is adapted to the ship's existing foundations, avoiding the need for major steelwork.

WHAT CUSTOMERS ARE SAYING ABOUT SCHOTTEL

Jan De Nul Group is one of the leading companies for dredging and marine works as well as a specialized provider of services for the offshore market of oil, gas and renewables. In order to perform these tasks reliably, Jan De Nul Group owns a most modern dredging fleet.



Filip Vivile, Fleet Unit Manager at Jan De Nul Group

WHAT IS THE REACH OF YOUR BUSINESS? ARE THERE ANY NEW CHALLENGES FOR YOUR COMPANY TO MEET?

Over the next few decades, it is expected that the world population will continue to grow, especially in coastal areas. And prosperity will continue to rise. This will result in an increasing demand for appropriate infrastructure and energy supplies. These are some of the challenges we see for tomorrow's world.

Jan De Nul Group meets these demands by offering services in land reclamation, civil and maritime construction, and also for the fossil fuel sector and the renewable energy sector. Within its activities, Jan De Nul faces the great challenge of reducing its ecological footprint to an absolute minimum.

WHICH TYPES OF VESSEL DOES YOUR FLEET CONSIST OF?

Our fleet consists of a total of 87 state-of-the-art vessels – mostly dredgers, installation vessels and heavy lift vessels. Nearly 40 of them are propelled by SCHOTTEL, which corresponds to 84 SCHOTTEL units installed in our fleet.

WHAT ARE THE DEMANDS PLACED ON THE PROPULSION SYSTEMS? HAVE THEY CHANGED OVER THE LAST FEW YEARS?

The main requirement is reliability. However, in view of reducing emissions, efficiency is becoming an increasingly important parameter.

WHAT ARE THE REASONS FOR YOUR PARTNERSHIP WITH SCHOTTEL?

The first SCHOTTEL units were installed on our vessels in the late 1970s. Since then, we have gained a great deal of experience together with regard to the operation of the propulsion systems under the very demanding conditions of our vessels. If necessary, we can contact the experts directly. We highly appreciate such close and direct communication channels.

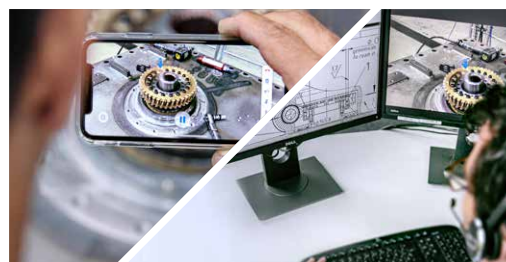
WHAT SETS SCHOTTEL APART FROM THE COMPETITION?

SCHOTTEL differs from other market players through its decades of experience and the fact that its systems are developed and produced in Germany.

IMMEDIATE TECHNICAL SUPPORT ON SITE

When time is of the essence, SCHOTTEL Remote Assistance Services with augmented reality offer immediate technical support on site. Customers are provided with interactive, personal and live expert assistance and visual guidance throughout the service job. Detailed support is provided by local specialists or from SCHOTTEL headquarters in special cases. Only simple requirements at the customer site are necessary, such as the appropriate tools and devices for the service job, internet access on a mobile device and the TeamViewer Pilot app.

More information at: [✉ service.germany@schottel.de](mailto:service.germany@schottel.de)



NEW SUBSIDIARY: SCHOTTEL ITALIA

The new subsidiary SCHOTTEL Italia opened for business on 1 October 2020. Managing Director Giorgio Alemanno brings with him extensive market expertise and many years of sales experience in the shipping industry.

Customers from the prospering segments passenger shipping/mega yachts and tugboats will benefit from the more intensive focus on serving the market in the newbuild business. Customer Service will continue to be managed by the SCHOTTEL service partner Jobson Italia in La Spezia.



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MAKING LIFE EASIER FOR CUSTOMERS

Jan Helge Telseth, Managing Director at SCHOTTEL Nordic, joined the company three years ago after having held various positions at both large international companies and mid-size specialty businesses. The most important thing, he says, is making life easier for customers

The Managing Director has been with the propulsion expert since 2017. He is in charge of the Nordic countries – Norway, Sweden, Finland, Iceland, and the Faroe Islands – from his office in Bergen, a city of about 270,000 inhabitants on the west coast of Norway, about 500 kilometres from Oslo. He manages a team of 14 people across the region. The service centre and head office are in Skedsmokorset, close to Oslo Airport, making it easy to serve the customers. In addition, there is an office in Ulsteinvik, close to Ålesund. Before that, Jan Helge Telseth, who has a degree in engineering, spent more than ten years at a large naval propulsion technology company, some of them as a general manager in Singapore, and worked for mid-size businesses as well.

When he joined the German company, one of the things he was most pleased with was the fact that it is, for him, just the right size. "We are a mid-size company," Jan Helge Telseth explains. He greatly values the short lines of communication, especially when making decisions. "What makes us unique is in-depth expert knowledge which enables us to adapt our thrusters and service products exactly to our customer's requirements, and to find solutions on the short track," he says.

INDEPENDENCE AS A SCHOTTEL PLUS

His day-to-day work is divided between his office and travelling to meet customers in Scandinavia. "What I like most is actually to be out in a meeting with a customer discussing a new opportunity," the head of SCHOTTEL Nordic explains.

His visits are not only very enjoyable to him, they are also an important unique selling point for SCHOTTEL. "The Nordic region is home to more than 50 ship designers. They very much appreciate support from us to find the perfect propulsion solution. This is an area where SCHOTTEL

can add value," he concludes, "because we are an independent propulsion expert." In addition, the engineer's focus is on supporting these designers by providing them with calculations they can use in their blueprints. "If these projects do end up in the shipyard," Jan Helge Telseth says, "we are in a good position."

OVERVIEW OF THE MARITIME ENVIRONMENT

Furthermore, there are also many shipowners in the Nordic region. Due to the geographical fact that the area is home to thousands of fjords and due to the surrounding sea, there are almost 350 different companies that own and operate vessels. "So, an important part of our job is to keep an overview of the maritime environment, and to steer SCHOTTEL in the direction of shipowners, designers, and also the shipyards in the region," Jan Helge Telseth says.

SCHOTTEL is partner to some of the most important industries in the Nordic region. The company has outfitted uncountable ferries in Norway as well as in Finland and Sweden, and serves the gas and oil industry. The fishing industry is another branch with even more growth potential for the propulsion expert. "It is a very promising segment," he points out, for both the traditional fishing industry and the fish farming industry with its live fish carriers.

THE FUTURE: REDUCING EMISSIONS

Working at SCHOTTEL means having access to the latest technical developments, and educating and informing customers about them. Still, even though the basics have stayed the same, there is one change he has witnessed since the Norwegian government stipulated a programme to reduce shipping emissions in 2015: "There is now a major focus precisely on that: avoiding emissions." And, SCHOTTEL has the right solutions. The EcoPeller is a highly



efficient and ecologically clean propulsion system that is used in a number of Norwegian fjord ferries. Likewise, digitalization is an important topic. "That means using a digital platform to operate the vessels efficiently and also to monitor the equipment, thus making important data available for maintenance." For this, the propulsion systems are equipped with sensors for monitoring.

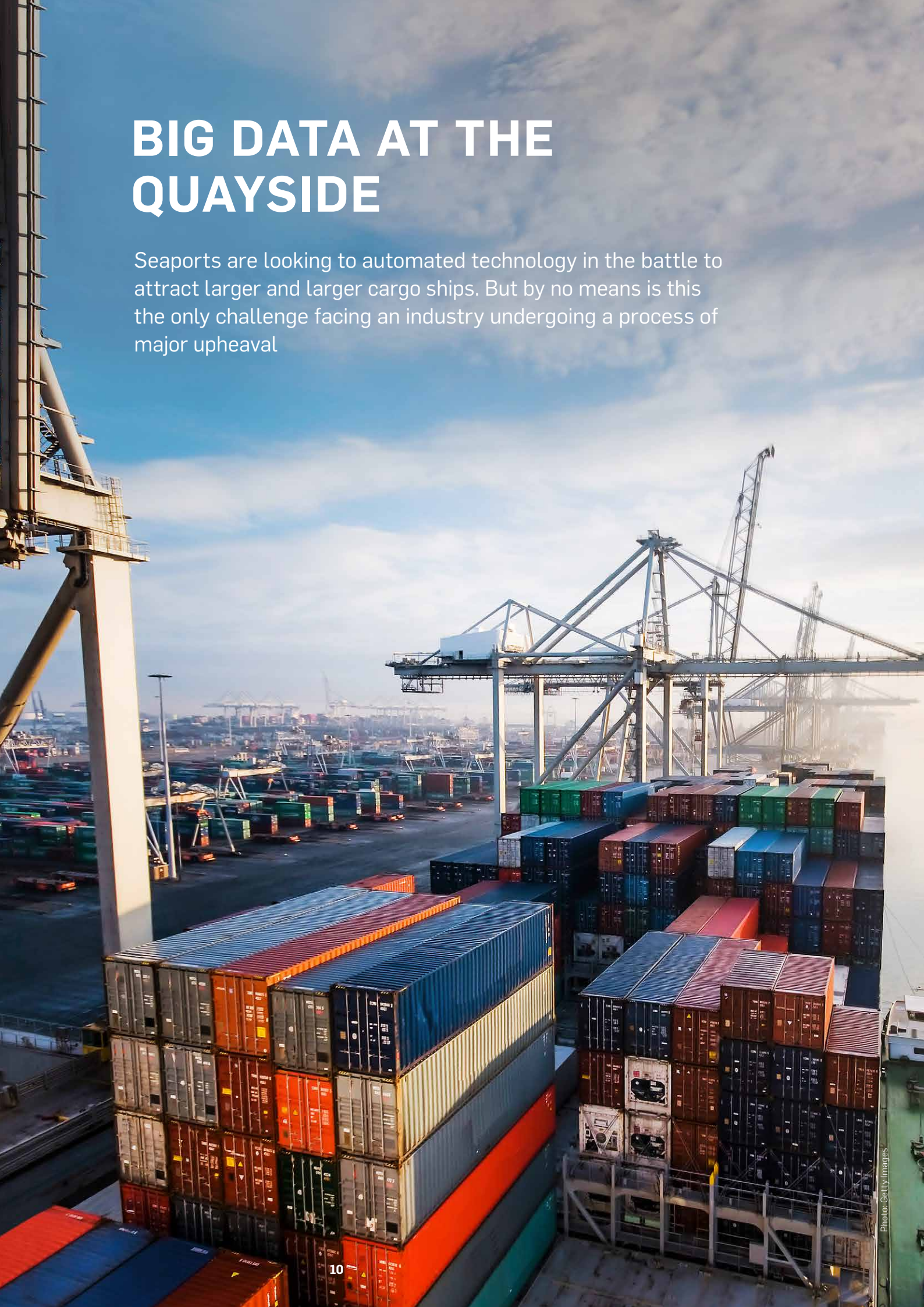
Jan Helge Telseth, who is 53 and has two sons aged 11 and 14, enjoys staying active by running and cycling in his free time. He jokes he is a "taxi driver to different football camps" for his children. The time he spends with his family recharges his batteries for his most important challenge: to focus on his customers. "We are there to provide our customers with solid products engineered for a long life with a performance that exceeds

expectations," the Managing Director emphasizes. "This, combined with a responsive and service-minded organization, is what SCHOTTEL customers value the most: it is the reason why they may choose you again for their next project. Because you make life easier for them."



BIG DATA AT THE QUAYSIDE

Seaports are looking to automated technology in the battle to attract larger and larger cargo ships. But by no means is this the only challenge facing an industry undergoing a process of major upheaval



Until midway through the 20th century, workers would unload sacks, crates and barrels from cargo ships with their bare hands. Millions of dockworkers completed this backbreaking work across the world's ports. In modern terminals, this profession has completely died out. Once a ship docks, enormous overhead cranes manoeuvre across its cargo and unload the containers. They are loaded onto self-driving vehicles, which transport them to the next station following the radio signals emitted by transponders installed on the ground. This way, the cargo reaches its first destination at the dockyard without any human intervention whatsoever.

In modern ports, scenes such as these are commonplace. Around 90 per cent of global trade is transported by sea; the vast majority in containers, which can be loaded quickly and systematically. "An increasing number of processes are being automated," says Carsten Eckert, terminal planner at consulting firm Hamburg Port Consulting (HPC), Germany. The same applies throughout port logistics. According to a study by McKinsey in 2017, the number of ports around the world with at least some degree of automation is around 40. Investments may be expensive, but experts believe that successfully implemented automation can reduce ports' operating costs by up to 55 per cent, while boosting productivity by up to 35 per cent. New high-capacity mobile network technology such as 5G also has a role to play here. In the port of Xiamen, a Chinese industrial consortium demonstrated this spring how autonomous vehicles can be fed with data and controlled using the latest mobile network standards. A letter of intent from the companies describes how the future of our ports will be dominated by 5G operating in conjunction with machine vision, decentralized data processing (edge computing) and artificial intelligence.

ARRANGED ARTISTICALLY

The benefits of automation are not only on display at the quay, they also provide assistance in container warehouses. Here, IT systems ensure that containers ready for pick-up are positioned as far up in the stack as possible. Overhead cranes are in non-stop operation, picking out containers and re-sorting them. Only the systems' electronic control units can see a method to the madness.

Keeping track of things is also one of the greatest challenges in modern ports. Large cargo ships carrying 20,000 standard containers come into dock; in a few years' time, ships carrying 30,000 containers could be the norm. The more containers loaded onto the ship, the more time required at the port terminal – a major cost factor for shipping companies. Ports are investing in new

technology to streamline their processes and attract ships moving forward. "Some terminal operators invested in automation early on," says Dr. Jean-Paul Rodrigue, Professor of Transport Geography at Hofstra University in New York.

One example is the high-tech container terminal in the Altenwerder district of Hamburg, Germany, which was opened already in 2002. However, ports like this did not only intend to keep pace with the competition. "They also used their high-tech systems as a showpiece for their ports," comments Rodrigue, who has been monitoring port digitalization for many years.

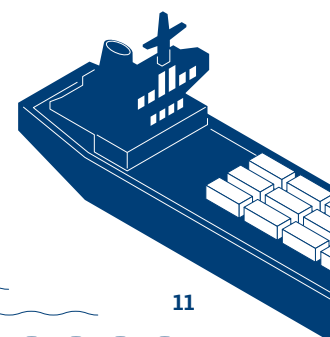
AUTOMATION OVER EXPANSION

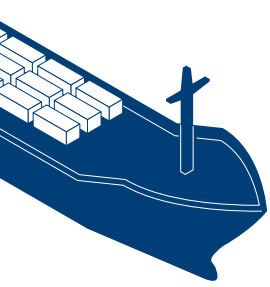
The professor has noted that more and more port operators have been playing catch-up recently. "One of the reasons for this is that the technology is more reliable and costs less." For some ports, digital solutions are the only opportunity to expand their business. Case in point: Los Angeles. It is the largest port in the US, handling 9.5 million standard containers per year. However, its location – penned in by the city on one side and the hills on the other – makes physical expansion impossible. This means that increasingly larger cargo ships have to be processed and handled more and more quickly. Last year, Los Angeles adopted autonomous transporter vehicles to solve this issue.

The port of Singapore, on the other hand, is pursuing a conventional growth strategy. It handles 37 million containers per year making it the second-largest port in the world after Shanghai. The port operator intends to build a global trading hub handling 65 million containers per year by 2040 using land reclaimed from the sea. Everything will be automated – from transporter vehicles and cranes to warehouses and administration.

DIGITAL NAVIGATION

Modern data technology is not just used to control systems on quays, in warehouses and in administrative centres; it can also be deployed to simplify harbour tug maintenance. Sensors monitor the vibrations of key drive components. Certified maintenance specialists work in harmony with the software, which compares current and past data and spots any patterns that may point to a potential issue. The component in





THE LARGEST CONTAINER PORTS IN THE WORLD IN 2019

Number	Port	Country	Handling volume
1	Shanghai	China	42.01 million TEU
2	Singapore	Singapore	36.60 million TEU
3	Ningbo-Zhoushan	China	26.35 million TEU
4	Shenzhen	China	25.74 million TEU
5	Guangzhou	China	21.91 million TEU
6	Busan	South Korea	21.59 million TEU
7	Hong Kong	Chinese special administrative region	19.60 million TEU
8	Qingdao	China	19.32 million TEU
9	Tianjin	China	16.01 million TEU
10	Dubai	United Arab Emirates	14.95 million TEU

Seven of the ten largest ports in the world are located in China. They are listed according to the number of standard containers handled in a single year. This is measured using the standard international unit TEU, an acronym for twenty-foot equivalent unit.

Source: Handelsblatt/Statista

question can be replaced before it fails, without risking the tug being out of action and significant costs being incurred as a result.

The ability to systematically evaluate large volumes of data allows ship arrival times to be predicted with an even greater degree of precision. This ensures more efficient operations and optimizes the steps involved from unloading to onward transport. Algorithms are used to assess data on ship size, load, currents and weather. This capability will only get better over the coming years.

NO SHIPPING WITHOUT DREDGING

Smart technology is not enough to make ports futureproof. The more containers loaded onto a

cargo ship, the deeper its draught. But dredging out new access routes is expensive. The ongoing project to deepen and widen the river Elbe in Germany is set to cost some €780 million. In other cases, structures are what hinder large ships' progress – such as at the Köhlbrand Bridge in Hamburg. This bridge spans a key access point to the port, and some ships can only pass underneath it when the tide is out. Larger ships cannot pass at all and are forced to resort to other port terminals.

The trend towards ships of increasing size is also being met by protests. The port of Houston, Texas, for instance, has imposed a limit on the size of ships docking there. But with competition only becoming fiercer, not all port operators can afford to put up such resistance – especially in Europe. "Around a dozen modern ports along the Northern Range, a group of ports spread across 500 kilometres of coastline in northern Germany and northern France, are fighting to attract customers," says Carsten Eckert. Rotterdam is aiming to cement its position as Europe's largest container port. For newcomers such as JadeWeserPort in Wilhelmshaven, which opened in 2012, it is difficult to gain a foothold. JadeWeserPort is Germany's only deepwater port and offers capacity for 2.7 million standard containers per year. According to industry figures, 640,000 containers were handled in 2019, not enough for a profitable port.

A QUESTION OF SIZE

Over the years the industry has also seen the emergence of global corporations that operate both ports and shipping companies in unison. It goes without saying that these ships prefer to dock at the company's own terminals. Chinese com-

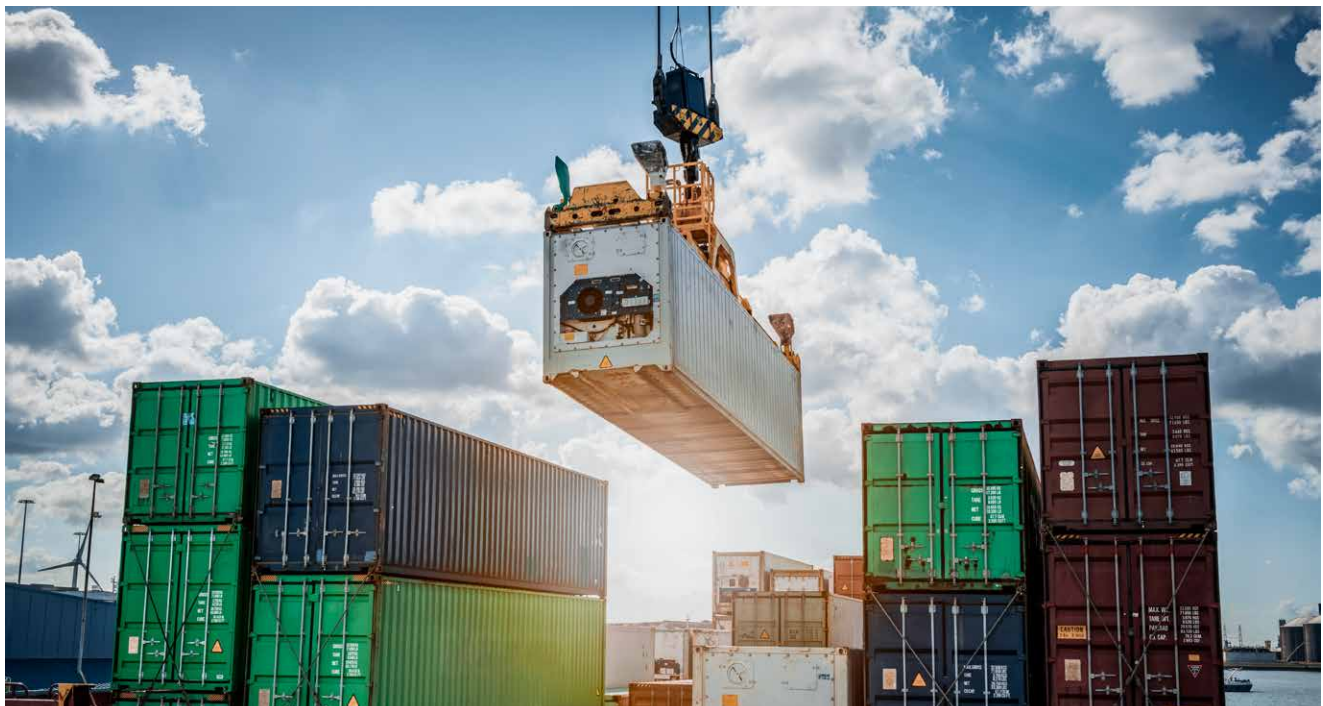
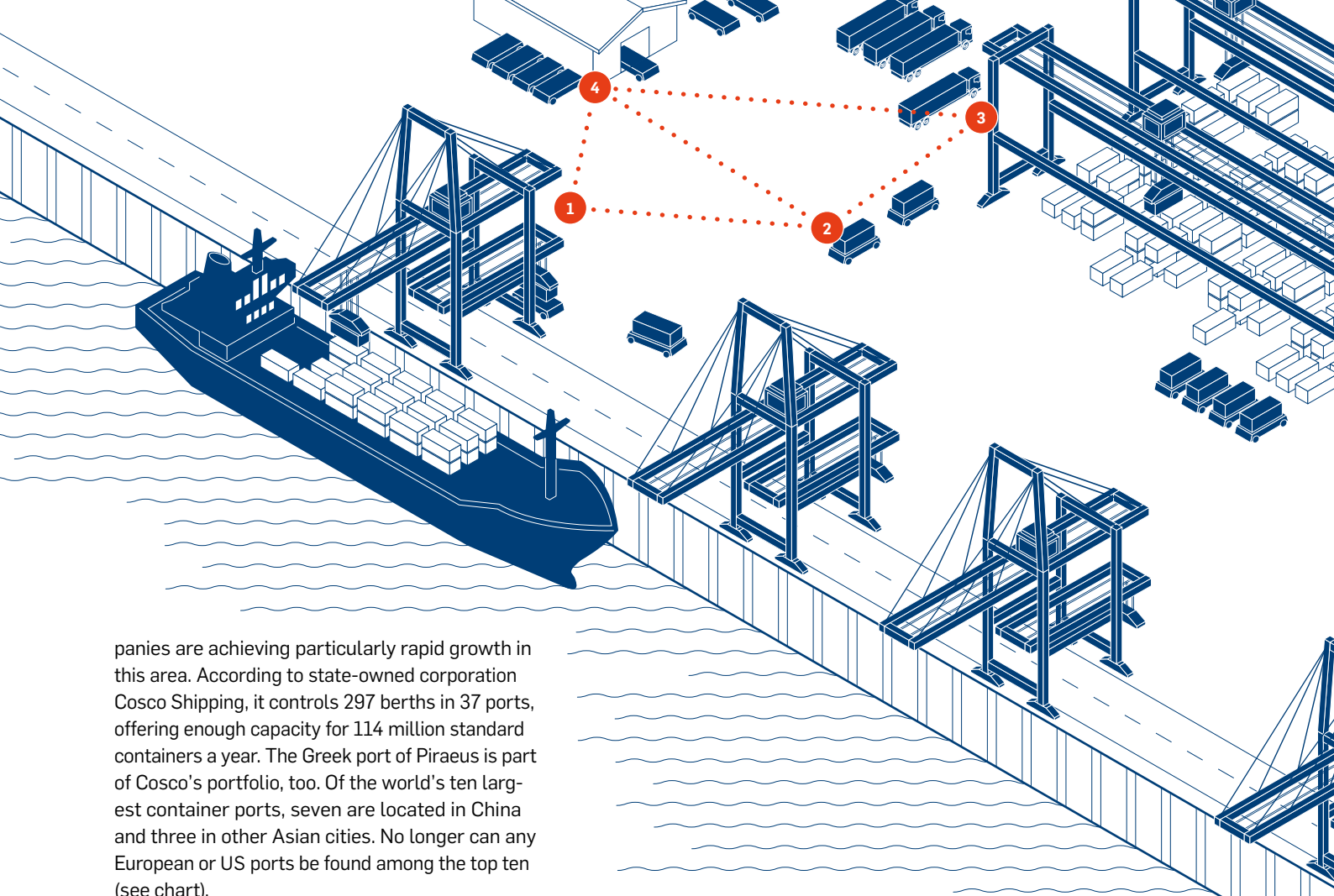


Photo: Getty Images



panies are achieving particularly rapid growth in this area. According to state-owned corporation Cosco Shipping, it controls 297 berths in 37 ports, offering enough capacity for 114 million standard containers a year. The Greek port of Piraeus is part of Cosco's portfolio, too. Of the world's ten largest container ports, seven are located in China and three in other Asian cities. No longer can any European or US ports be found among the top ten (see chart).

The race for size and market position has also spread to ports in South America. The Argentinian government is concerned that the port of Buenos Aires is falling behind its competitors in Brazil and Uruguay, and so it announced a major development programme at the end of 2018. The plans included the construction of an external terminal, improved access routes and an increase in freight handling. Annual capacity is set to increase from the current level of 1.8 million standard containers to 2.7 million by 2030.

Container and mass-produced goods make up the majority of global trade, alongside commodities such as iron ore, liquid natural gas, coal and rock. The largest ore freighters are over 300 metres long and can carry loads weighing 400,000 tonnes. Port Hedland in Western Australia is home to the hugest bulk cargo port in the world. Large amounts of iron ore are mined in the surrounding region and shipped all over the world from numerous ports nearby.

Rotterdam is Europe's most modern bulk cargo port, and also features fully automated loading and unloading. The port is operated by coal and iron ore company EMO, with one single person responsible for monitoring the 20 cranes. The benefit of automation does not lie in the increasing loading speed, the company says. It means that operators can respond to market fluctuations and a lack of qualified personnel with greater flexibility.

ALTERNATIVE PROPULSION SYSTEMS ARE FORCING PORTS TO MAKE INVESTMENTS

However, size and technical standards are not the only factors when it comes to competition – sustainability is also starting to play a vital role. Alternative propulsion is gaining in significance in the shipping industry. Electric cargo ships have already started docking in Rotterdam's inland port. But ship batteries cannot be charged up simply by plugging them into the local power grid. They are the same size as a standard container and, instead of being recharged, overhead cranes replace the empty batteries with a new set. Modern ports are working hard to offer power supply infrastructure, something that will also benefit cruise ships requiring significant amounts of energy at the quayside.

Battery-powered motors are not practical for powering large commercial ships, as the necessary power storage systems would simply be too heavy. Deepwater vessels are therefore equipped with LNG-powered (liquid natural gas) generators in addition to the onboard batteries. LNG generates around 25 per cent fewer carbon emissions compared to the fuels used in combustion engines, but it can only be stored in its fluid form in a pressurized state. This means that LNG fuel stations have to fulfil high safety standards, which translates into increased costs. It is clear that the future continues to hold some challenges for deepwater terminal operators.

CONTROLLING VEHICLES AS IF BY MAGIC

Cargo ships dock at terminals carrying thousands of containers. Unloading takes time and has to be completed quickly. That is why modern seaports choose to use automation. **Overhead cranes 1** controlled by port personnel grab the containers and lift them onto land, where **self-driving vehicles 2** are waiting to transport them. Transponders fitted into the ground show the vehicles the route to one of the block warehouses, where **gantry cranes 3** take over and place the containers where they need to go. The software ensures that each container is near the top of a stack when it needs to be picked up. Recently, electric self-driving vehicles have been introduced at some ports. When the batteries are empty, they automatically seek out the nearest **charging station 4**.

“The potential is considerable”

The sales department at SCHOTTEL is dividing its market development into five segments. One segment focusses on merchant vessels, which Tobias Oser has just recently started to manage. In an interview, he outlines the setup

TOBIAS OSER
Sales Director Merchant
Vessels at SCHOTTEL

✉ sales@schottel.com

Tobias Oser (33) studied mechanical engineering and business administration at the Technical University of Munich, Germany, before joining SCHOTTEL in 2015. In technical sales and distribution, he gained experience in different roles, first in a graduate program, then as a Sales Manager in the Tug & Offshore segment. Tobias Oser took over the management of the Merchant Vessels segment from long-standing SCHOTTEL employee Hans-Herbert Dünow, who has now retired.

MR OSER, WHAT GOES ON BEHIND THE SCENES IN THE MERCHANT SEGMENT AT SCHOTTEL?

We serve the global market of tanker, cargo, dredger and fishing vessels, which usually have specific requirements for main and auxiliary propulsion systems and CP shafting. On the one hand, our setup is intentionally broad, but on the other hand, we also have in-depth specialist knowledge, so that we can consistently focus on specific needs and respond early to developments that are important for our customers.

PLEASE TELL US MORE ABOUT THAT.

For example, there is a cross-segment trend towards equipping ships with liquefied gas propulsion systems, because this is much more environmentally friendly than the classic combustion with crude oil. Refuelling with gas in a port requires a high level of safety, and the costs are therefore high. Bunker ships are then needed to refuel other ships away from the ports, where currents and waves can cause significant problems. This is where our propulsion systems can reliably secure the tankers in a stable position to ensure a safe and efficient refuelling process. We benefit greatly from the experience that our colleagues in the offshore segment have gained over the years.

IS THIS A TYPICAL EXAMPLE?

This example can be used to generalize the need of many owners to operate their ships with the utmost reliability and efficiency in a dynamic environment. Dredgers are used in many situations, such as when building artificial islands in the Persian Gulf or dredging a deepwater port in Asia. Rotary drives are then often required in order to keep the ships in position or manoeuvre them precisely even in adverse conditions.





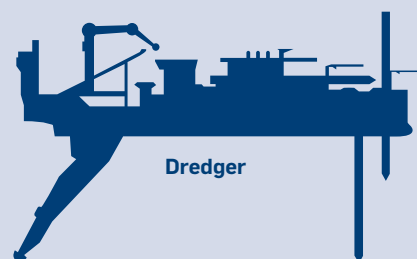
Longliner, Live Fish Carrier



Inland Cargo Vessel (Azimuth)



Merchant Cargo Vessel



Dredger

WOULD YOU SAY THAT COASTAL PROJECTS ARE BECOMING MORE DIVERSE AND IMPORTANT FOR YOUR SEGMENT?

Absolutely. Salmon farming, for example, is booming in Scandinavia. Sometimes huge fish farms operate in the open sea, because the circulation of fresh water is particularly good there and the faeces of the animals does not become a problem due to the permanent change of location. Live fish carriers take over the task of either supplying the farms with young fish or transporting adult fish from the farms to the mainland. The dynamic positioning of the carriers is essential, even with stronger waves or winds. Our finely adjustable, controllable propellers are ideally suited to this task.

SOUNDS LIKE PRECISION WORK.

Very often it is. SCHOTTEL has got a modular system that includes a variety of propulsion types and modules as well as wheelsets and seals. For each project, we use exactly the equipment that the customer needs. We configure the propulsion individually, depending on the purpose and duration of use, the conditions and the loads occurring on site ...

... WHICH CAN SOMETIMES BE EXTREME. HOW IMPORTANT ARE AFTERSALES AND SERVICE TO YOU AND YOUR CUSTOMERS?

Our contact with the customer does not end with the sale of a propulsion unit; quite the opposite in fact. Our service is extremely important, because in the event of damage no customer can or wants to wait long – every breakdown costs money. Of course we are well aware of this and have a sufficient number of competent employees in place accordingly. SCHOTTEL has over 150 service mechanics worldwide, so we can guarantee a fast and

comprehensive response. I think it is fair to say that SCHOTTEL is setting standards for speed and quality in the industry.

DIGITALIZATION PLAYS A MAJOR ROLE IN ALMOST ALL INDUSTRIES AND SEGMENTS. DOES IT KEEP YOU BUSY?

We were just talking about service and after-sales. Online remote maintenance and predictive maintenance are becoming increasingly important, and digital technologies play a key role in this. In the future, it will be normal for our technicians and engineers to connect to customers' systems online in order to analyze and rectify machine defects, directly order the spare parts needed or carry out software updates.

TO WHAT EXTENT DOES FLEET MANAGEMENT BENEFIT FROM THE DIGITAL TRANSFORMATION?

We already provide owners with software tools that they can use to comprehensively manage their fleet virtually on the basis of a wealth of ship data. This offers tangible advantages during operation. A condition monitoring system helps to detect irregularities or increasing wear as soon as possible to ensure repairs are made before damage occurs. This predictive maintenance therefore makes it easier to plan spare parts stocks, whether for scheduled replacement or during regular docking. And ultimately the Merchant segment also benefits from this: our customers are seeing time and again that their investment has paid off and that SCHOTTEL is a strong partner for the long term. The potential offered by SCHOTTEL is considerable.



THE SEGMENTS AT SCHOTTEL

- Tug & Offshore Energy
- Cruise, Ferry & Yachts
- Merchant Vessels
- Navy & Governmental
- Modernization & Conversion

POWERFUL MANOEUVRES IN THE AMERICAS

SAAM Towage, a multinational tugboat operator based in Chile, offers maritime services to support a broad foreign trade network spreading over nine countries. This is how the company, which started with just one vessel almost 60 years ago, is growing its business in the Americas



In an enormous region such as the Americas with trade centres located far apart and long transport routes, cargo must be handled efficiently to ensure robust economic growth and a stable network for foreign trade. SAAM's fleet of 151 tugboats is the largest in the Americas, making the company the ideal partner for cargo operations reaching into Brazil, Canada, Costa Rica, Ecuador, Guatemala, Mexico, Panama, Chile and Uruguay. A currently planned acquisition will extend the area of operation to Colombia and Honduras.

PARTNERS FROM THE BEGINNING

This is a far cry from when SAAM began operating in 1961. Over six decades ago, it was a business with one tugboat based in Valparaíso, the first port city of Chile, just 150 km from its capital, Santiago, which has seven million inhabitants nestled between the snow-capped Andes in the east and the Chilean Coastal Range to the west. Today, the company has grown into an international provider of trade network services. Its three main businesses under the umbrella organiza-

tion of Sociedad Matriz SAAM S.A. are the operation of ports, logistics and towing services. The latter unit is handled by SAAM Towage. In 2018, the towing unit alone had more than 1,400 employees. "SCHOTTEL has been part of SAAM's growth story from the outset. First with thrusters in second-hand vessels, and later on as part of our renewal and new building plans," is how Pablo Cáceres, Technical Director of SAAM Towage, explains the long business relationship with the German propulsion expert.

EXPERIENCED PROVIDER OF MARITIME SERVICES

Today, the fleet operates in nine countries in the Americas facing a wide range of tasks for towing operations in the inland ports. SAAM Towage is an experienced provider of maritime services in oil terminals and in buoy mooring operations. Also their tugs are prepared to support rescue operations, acting as a great partner for salvage companies. The tugs are suitable for carrying out almost any request for support from coastal applications of any kind. Furthermore, SAAM Towage is proficient in the operation of LNG terminals. Among the most important are Petrobras in Salvador de Bahia in Brazil, Bahía de Quintero in Chile and Altagas in British Columbia, Canada.

SCHOTTEL'S PRESENCE

"The tugboat industry is very competitive. It is still highly fragmented and presents significant growth opportunities," says Pablo Cáceres. "SCHOTTEL is always present in our long-term growth, as well as in our day-to-day operation." One of the latest examples is the acquisition of two 83-ton bollard pull tugboats for operations in Canada in 2018. The SAAM Grizzly and SAAM Orca are equipped with powerful type SRP 460 CP rudderpropellers, giving the escort capabilities that the carriers need in important ports, such as Vancouver in Canada.

"However, the introduction of new assets to our fleet is not the sole relevant cooperation milestone with SCHOTTEL," SAAM Towage's Technical Director explains. "We also partner with them when it comes to important trends. One trend is the move towards hybrid propulsion, something every operator must take into account when evidencing the necessary involvement with environment protection. In addition to that, we feel safe with them when it comes to the digitalization of data acquisition, as well as remote control operations."

With two subsidiaries in South America – in Colombia and in Brazil – and several sales and service locations, SCHOTTEL is a key player for tasks beyond delivering propulsion and steering systems, Pablo Cáceres adds. "SAAM

Towage is always obtaining support and ideas for new projects on the maintenance side and life-time improvement on the vessels in operation."

FUTURE GROWTH

The company has been making strides in the past few years to continue its growth in the future. In 2018, for example, the parent company signed a US\$ 194 million deal to acquire a full stake in the two joint operations it formed in 2014 in Brazil, Mexico, Panama and Canada with Royal Boskalis Westminster for their towage business. The operation was closed in October 2019, positioning SAAM Towage as one of the key players in the industry. Also in 2018, SAAM Towage won the first regional contract in six countries in the Americas and signed a long-term agreement with Energía del Pacífico to provide services in a new market, El Salvador. Most recently, the company expanded into Central America. The acquisition of 70 per cent of Intertug is in its final stage of closure. Intertug is a towage operator in Colombia, Mexico and Central America. Its 25-vessel fleet allows SAAM Towage to establish a presence in Colombia, one of the fastest growing economies in Latin America, and at the same time reinforce its position in Mexico and Central America.

There is no question that SAAM Towage has all the building blocks it needs to achieve its long-term goal: to consolidate its leadership in the Americas in providing the best services for the maritime industry.



AT A GLANCE

SAAM Towage, founded in 1961, is based in Santiago de Chile. The multinational company under the parent company Sociedad Matriz SAAM S.A., which is focused on the operation of ports, logistics and towing, operates 151 tugboats, 83 per cent of them azimuth, in nine countries.

70

ports of the Americas count on SAAM Towage's services

104,000

towing manoeuvres in 2019 by SAAM towboats



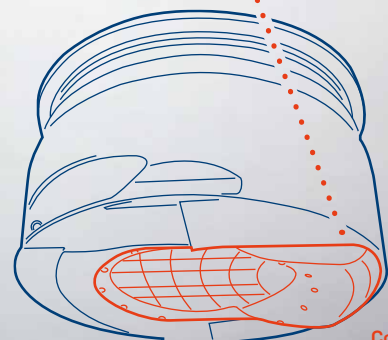


Higher efficiency, less noise

SCHOTTEL CoaGrid

The proven SCHOTTEL Pump Jet, which is particularly suitable for shallow water operations, is now optionally available with a new feature: the SCHOTTEL CoaGrid. This exploits the Coandă effect, which describes the tendency of a fluid to stick to a curved surface. In combination with in-house CFD optimizations a new streamlined geometry below the pump jet housing has been developed. This allows the water flow to be better directed into the inlet of the pump jet, leading to higher efficiency and lower noise emissions.

First propulsion units with the new CoaGrid are already reliably in service in passenger vessels.

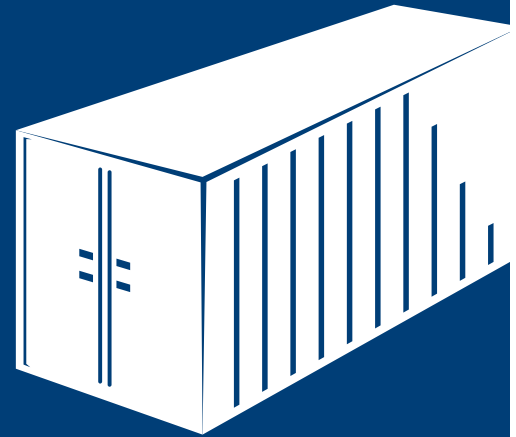
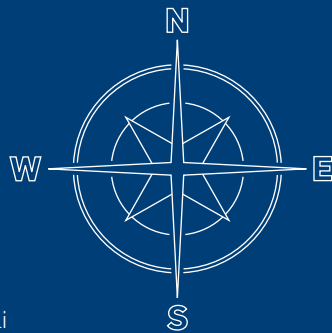


CoaGrid

LOOKOUT

Navigation in the ancient world:

The first rudimentary navigation aids come from the ancient world. The periplus (as they were known) contained information about the course of coastlines, distances, depths, currents and landmarks, and served sailors as a rough orientation aid. Scientifically sound nautical charts were created in the 15th century with the help of Greek astronomy, geography and cartography. ^{1*}



1,582 containers

out of a total of more than 130 million are lost at sea each year around the world, according to the World Shipping Council. Alongside factors relating to severe weather and rough seas, the main reasons for containers being lost at sea are improper stowage and securing aboard ship, ship groundings and collisions. ^{2*}

2–6 mm is the size of the largest terrestrial animal in the Antarctic. *Belgica antarctica* (or the Antarctic midge), the only animal living exclusively on land in the Antarctic, is a short-lived, flightless type of midge. ^{3*}



Seagrass as carbon storage:

Seagrass is efficient at absorbing CO₂. It captures carbon up to 35 times faster than tropical rainforests, making it a key weapon in the battle against climate change. This is why Sky Ocean Rescue, WWF and Swansea University (UK) are planting seagrass across an area measuring 20,000 m² in 2020. ^{4*}



Some 3 million shipwrecks are estimated to be spread across ocean floors around the planet, according to UNESCO. ^{5*}



Sources:

1* www.planet-wissen.de; 2* www.worldshipping.org; 3* www.nationalgeographic.com;
4* www.swansea.ac.uk; 5* www.unesco.org

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