SCHOTTEL REPORT

OFFSHORE WIND

Energy for the globe

NEW SRP-D
Rudder propeller optimized for DP

WORLDWIDE SERVICE
For maximum availability

No. 20

OFFSHORE: ENERGY FOR THE GLOBE 50° 15' N, 7° 39' O

The global expansion of offshore wind energy is progressing rapidly, with ever-larger areas being opened up. With the new SRP-D, SCHOTTEL is presenting a rudder propeller that has been optimized for use in the special vessels required for this purpose. **Page 10**

READY FOR NEW TASKS 49° 17' N, 122° 57' W

For more efficiency and safety: to meet strict environmental guidelines and enhance safety measures at a Canadian terminal, tug operator KOTUG is having two vessels retrofitted with SCHOTTEL's hybrid solution SYDRIVE-M. **Page 19**

CONTENTS

NO. 20, SEPTEMBER 2022

MULTITRACK LEARNING 10° 23' N, 75° 30' W

In 2015, he was the first employee of SCHOTTEL de Colombia: under the management of Julio Carrasquilla, the South American subsidiary has developed very positively since then. Further plans are already in the pipeline. **Page 16**

A LONG HISTORY OF SUCCESS

22° 19' N, 114° 8' O

Cheoy Lee Shipyards, one of the world's leading shipyards, is now in its fourth and fifth generation of management. To date, the shipyard has delivered more than 5,200 vessels all over the world. **Page 06**

DEAR READERS,

The history of our company is as eventful as that of our location in Wismar: railway carriages around the year 1900, cars in the early 20th century or the first controllable pitch propellers in the 1960s. On the company premises not far away from the Baltic Sea, there has always been space for products that were one step ahead of their time.

Our location in Wismar still stands for fulfilling tailor-made customer requirements. The most powerful rudder propellers in our portofolio, retractable systems and, of course, controllable pitch propellers are manufactured in a production area of around 15,000 m².

Many years of experience in the development, production, sales and service of these special systems enable us company-wide to constantly adapt to the changing needs of the maritime industry. With this 360-degree vision, SCHOTTEL will continue to succeed in fulfilling the wishes of its customers and partners around the globe.

That is exactly what drives us every day: thinking ahead for the future and developing innovative products that are both sustainable and efficient. With this in mind, all signs in our SCHOTTEL world point to growth. New products, a new subsidiary and two new companies in the SCHOTTEL Group: on the next pages, you will learn more about how we are getting ready for the challenges of tomorrow.

Enjoy reading,

Dr. Michael Potts
Branch Manager and Head of Technical Department
SCHOTTEL Wismar

Photos: Cheoy Lee Shipyards, KOTUG, Getty Images, SCHOTTEL (2)

Under construction: two SCHOTTEL ControllablePropellers type SCP 1294 with 9,600 kW each for the ro-ro ferry Tennor Ocean at the Flensburger Schiffbau-Gesellschaft (FSG) shipbuilding company

PRECISION PERFORMANCE

Controllable pitch propellers are used wherever maximum thrust and manoeuvrability at changing speeds and loads are needed. The adjustability of the propeller blades makes them particularly suitable for vessels that have to fulfil a wide-ranging operational profile. The propellers are designed according to the customer's individual requirements using state-of-the-art calculation methods such as Computational Fluid Dynamics (CFD). Operators thus benefit from a high degree of efficiency with lower fuel and operating costs.

SCHOTTEL ControllablePropellers are available in 4- and 5-blade versions with optional full-feathering function.

+ reduced noise and vibration levels

+ minimal maintenance thanks to its robust design

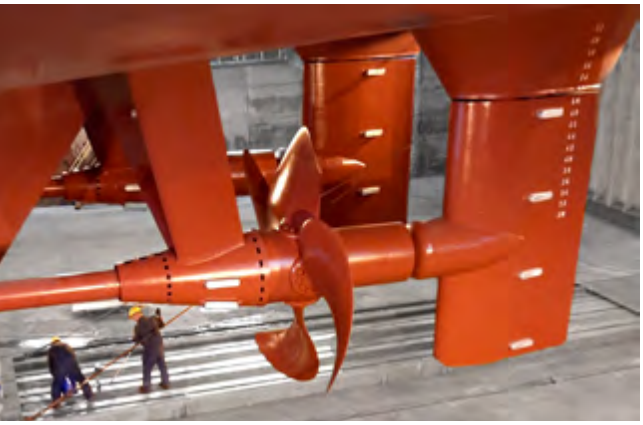
+ easy access to hub for less servicing effort

+ hydrodynamically optimized CP hubs

+ approved for use with biodegradable oils (EALs)

+ available as complete propulsion packages

Find out more:



The Tennor Ocean ready for launch: fully mounted propulsion system with a five-metre propeller diameter

Photos: Maritime Experts (2), SCHOTTEL (4)

NEWS

TRADE FAIRS 2022

29.08. – 01.09. // ONS
Stavanger, Norway

06. – 09.09. // SMM
Hamburg, Germany

06. – 09.09. // ETA ANNUAL MEETING
Tenerife, Spain

25. – 27.09. //
CFA CONFERENCE AND TRADE SHOW
Leamy Lake, Canada

26. – 28.09. // MECON
Hamburg, Germany

27. – 28.09. // SHIPPING TECHNICS LOGISTICS
Kalkar, Germany

28. – 30.09. // ITS
Istanbul, Türkiye

28.09. – 01.10. // MONACO YACHT SHOW

18. – 21.10. // EURONAVAL
Paris, France

15. – 17.11. // METSTRADE
Amsterdam, Netherlands

29. – 30.11. // OFFSHORE ENERGY
Amsterdam, Netherlands

30.11. – 02.12. // INT. WORKBOAT SHOW
New Orleans, USA

07. – 10.12. // MARINTEC CHINA
Shanghai, China

NEW BUILDING IN BRAZIL

SCHOTTEL do Brasil will soon offer additional services for existing and new customers in the shipping industry at a new Service Center in Itajaí, Santa Catarina. A spacious administration, repair and storage complex is under construction at the 10,500 m^2 site. Stephan Camp, General Manager at SCHOTTEL do Brasil: "With the new Service Center in Itajaí, in addition to the branch in Rio de Janeiro and the branch in Colombia, we will be able to provide a first-class service that will be more flexible than ever before. From early 2023, our customers can enjoy the full capabilities of the new Service Center."

SEONGKI HAN
General Manager
SCHOTTEL East Asia
SHan@schottel.com

NEW SUBSIDIARY IN SOUTH KOREA

With the founding of SCHOTTEL East Asia, SCHOTTEL is advancing the expansion of its international network. Seongki Han has been appointed General Manager of the new subsidiary based near Busan, South Korea. He has more than 20 years of experience in the maritime market. With the new subsidiary, SCHOTTEL will be even closer to customers and partners in the region. Business operations began on 1 April.

NEW MANAGEMENT IN TÜRKIYE AND AUSTRALIA

Seçkin Uz has been the new Managing Director of SCHOTTEL Turkey since the beginning of the year. He has extensive knowledge of the Turkish maritime market and propulsion technology for vessels. On 1 May 2022, Victor Zhang became Managing Director at SCHOTTEL Australia. He has vast experience in the field of marine propulsion and joined SCHOTTEL in 2018.

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SEÇKİN UZ
Managing Director
SCHOTTEL Turkey

VICTOR ZHANG
Managing Director
SCHOTTEL Australia

A LONG HISTORY OF SUCCESS

Hong Kong-based Cheoy Lee Shipyards was founded roughly 100 years ago. An impressive 5,200 ships of all types have set sail from the shipyard since. The company's long history and remarkable success are a result of its effective strategies and constant revitalization

The 100-year-old shipbuilding company was first established in Shanghai and moved to Hong Kong in 1936. Cheoy Lee Shipyards (CLS) then became a limited liability company in 1976. Owned by the Lo family, whose ancestors originate from Guangzhou, China, the fourth and fifth generations of the family currently run the company. They follow the time-honoured traditions of the first three generations of the family's shipwrights and shipbuilders, who constructed harbour and coastal vessels in wood, steel and then fiberglass and aluminium – initially with steam, then with diesel engines.

Cheoy Lee has two facilities in China: its corporate headquarters and an adjoining shipyard in Hong Kong. The latter was built by the company and is mainly designed for new vessel deliveries and local ferry repairs. The main production site is strategically located on the Pearl River in the Doumen District of Zhuhai in the Guangdong Province, just 45 miles to the west of Hong Kong. It is a 90-minute drive from the city via the recently opened Hong Kong-Zhuhai-Macao Bridge.

This modern shipyard was created in 1999 when Cheoy Lee vacated its premises in Penny's Bay to make way for the world-famous Hong Kong Disneyland. It still operates in the same location today. During the early years in Hong Kong, the shipyard constructed steel and wooden commercial vessels for local and Southeast Asian countries. By the mid-1950s, Cheoy Lee diversified to produce teak-wood sailing yachts, most of which were exported to the United States.

FIBERGLASS ALLOWS FOR NEW PATHS

When fiberglass emerged as a shipbuilding material in the 1960s, the company took advantage. It began building sailing yachts in earnest, eventually becoming a well-known brand worldwide. A Sales and Aftersales office was eventually established in Fort Lauderdale, Florida to serve the Yacht division's customers. Cheoy Lee commercial vessels continued to be built predominantly in steel and aluminium, with the 1990s seeing a strong resurgence in the shipyard's commercial vessel output.

Since relocating to Hong Kong 86 years ago, the company has constructed and delivered

Photo: Cheoy Lee Shipyards

more than 5,200 vessels, many of which are still operating for satisfied customers across all continents. Within the past five years alone, approximately 150 tugs, crew boats, wind farm service vessels, pilot boats, yachts, and other vessel types have left the shipyard.

This enormous output requires production facilities of a sufficiently large size. The 116,000 m² (30-acre) Hin Lee (Zhuhai) Shipyard facility includes a 1,000-ton railway lift, 150-ton Travelift, dedicated fabrication halls for steel, aluminium and fiberglass moulding, dust-free painting halls, trade-specific workshops along with dormitories to house up to 1,000 employees. The site is packed with advanced production machinery capable of producing vessels up to 70 metres (230 feet) in length. This includes Prop Scan equipment, five-axis CNC cutters, milling, rolling, and bending machines, lathes up to eight metres (26 feet) in length, NC water bath plasma cutters and much more.

As one of the world's only yards to routinely manufacture in steel, fiberglass, aluminium and various combinations of these materials, Cheoy Lee builds to globally recognized standards and regulations. CLS' collaboration with naval architectural firm Robert Allan Limited is of particular note, as it has helped the tug-building program to become one of the recognized global leaders in azimuth stern drive (ASD) harbour tug production. Cheoy Lee's first collaboration with the architects, a 60-ton bollard pull Z-Tech tug, was launched in 2004. Over the ensuing years, CLS has made a further 160 units of tugs designed by Robert Allan, and the relationship continues to grow to this day.

370+ SCHOTTEL THRUSTERS

SCHOTTEL is also on board with Cheoy Lee, with more than 370 thrusters installed in over 180 of their vessels. "The most remarkable ship that CLS recently built with SCHOTTEL products is probably The Jackson," CLS Director Ken Lo says. "The 63-metre dinner cruise ship for Captain Cook in Sydney is fitted with SCHOTTEL electric azimuth thrusters and a bow thruster." The cooperation with SCHOTTEL started back in the early 1990s, with many landmark projects taking off since.

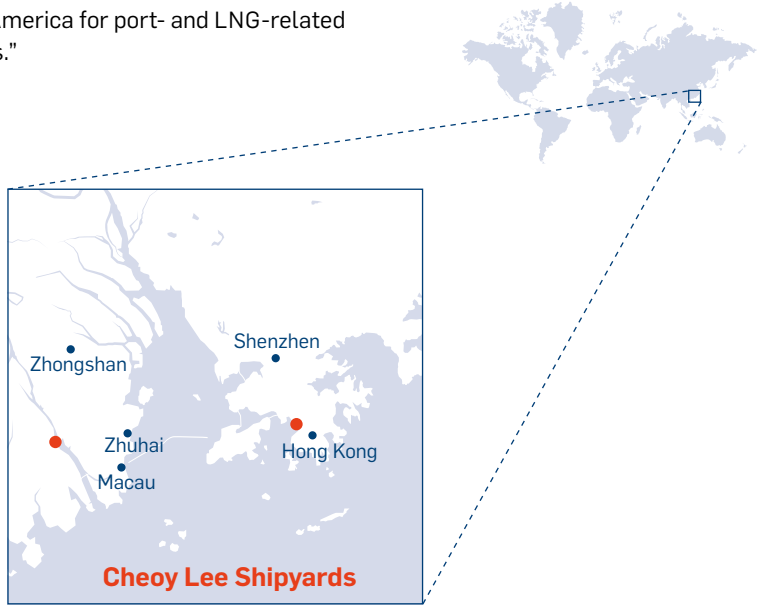
As Ken Lo recalls: "The Z-Tech tug series created by PSA Marine and Robert Allan in 2003 started the relationship between SCHOTTEL and Cheoy Lee in a big way, when our company was successfully securing the contracts from PSA," he says. "The Z-Tech was the topic of a paper at the ITS in Miami in 2004 and attracted the attention of the Panama Canal, who eventually had 21 Z-Tech tugs built by Cheoy Lee." CLS tugs are certainly well known elsewhere in the market. "They are owned and operated by most of the major tug owners: Svitzer, Boluda, Kotug, SAAM, Boskalis, CPT, to name just a few," says Ken Lo.

How would the company's Director characterize working with SCHOTTEL? "Cheoy Lee's cooperation with SCHOTTEL has been excellent throughout the years, ever since we started building ASD tugs in 2003. SCHOTTEL azimuth drives are installed in most of our tugs, way more than other brands." He adds the main arguments for cooperation are the reliability and attentive service, which result in minimal downtime.

"DEMAND IS GREATER THAN SUPPLY"

Cheoy Lee's corporate strategy is always aligned with future trends – a major factor in the company's success. There is currently a strong focus on dual fuel, hybrid solutions, and aspects relating to environmentally friendly tugs. "However, ASD is still predominant with bollard pulls in the 70- to 90-ton range," Ken Lo adds. Demand is greater than supply right now and the premium tug-builders are having a hard time trying to deliver the required tonnage.

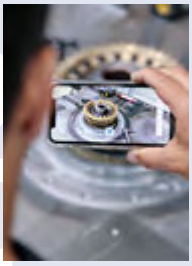
In addition to the technical focus, Ken Lo wants to expand in regional sales markets: "We are selling worldwide, but the latest trend seems to be heading towards developing regions such as Bangladesh, Sri Lanka, Africa, and Central and South America for port- and LNG-related projects."



KEEPING THE FLEET RUNNING

No one knows a ship as well as the crew on board. They are familiar with every inch, and responding to the vessel is second nature. But when it comes to the propulsion unit, SCHOTTEL is the expert. And we go all the way to ensure maximum availability of the propulsion units. We provide a range of services throughout the vessel's service life, allowing operators to increase the efficiency of their vessels and reduce expensive downtime to a minimum. The right solution at the right time in the right place, individually tailored to your needs, with SCHOTTEL's worldwide range of repair services.

REMOTE



RemoteService
SCHOTTEL RemoteService is for when time is critical to ensure processes and work orders can be carried out on schedule. RemoteService provides you with fast, interactive support from our service experts, at any time and anywhere.

+ great cost and time savings
+ interactive, personal assistance with visual support
+ early detection of potentially more serious damage
+ instantly available, reliable tool

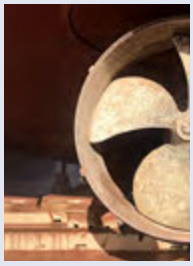
TRAINING

CrewTraining
Our training courses deliver knowledge first-hand, so that crews can carry out simpler repairs themselves. The courses range from product training sessions to specialized in-depth instruction – conducted as classroom events at one of our five worldwide training centres, but also as online courses, on-site training and simulation exercises.

+ effective learning in small groups
+ time for questions and individual solutions
+ update existing knowledge
+ targeted diagnosis on the propulsion system
+ available in more than ten languages

Photos: SCHOTTEL (8)

STATION



ServiceStation
A dense network of service partners at key shipping centres means we can provide rapid assistance, because repairs and overhauls can be carried out to our standard of quality in one of many workshops. Thanks to efficient decentralized logistics, OEM-quality spare parts with long-term availability get to our regional service partners as quickly as possible.

+ short transport routes
+ OEM-quality parts
+ repair by trained personnel
+ exploit advantages of location and local market knowledge

FIELD

FieldService
To keep downtimes as short as possible, we have more than 170 experienced service engineers available worldwide. They have extensive product knowledge so they can quickly repair propulsion units on board your vessel. With the right tools and SCHOTTEL know-how, they work hands-on to get the propulsion system ready for its next operation.

+ highly qualified service engineers
+ worldwide availability
+ expertise in SCHOTTEL products
+ full warranty

INHOUSE

InhouseRepair
Your propulsion system is in the very best of hands at our eight fully equipped workshops. With qualified repair teams who get your propulsion units up and running again quickly. By leaving the maintenance, care and repair of their propulsion units entirely down to SCHOTTEL, operators can increase operational reliability and availability to the maximum.

+ modern machinery
+ on-site spare parts warehouse
+ all components are state-of-the-art
+ direct access to all internal specialist departments
+ independent quality assurance and test benches for trial runs

"Our customers' requirements for repairs are as varied as the vessels themselves. That is why we give owners the opportunity to choose the right solution, taking into account various factors, including but not limited to speed, complexity and budget. With our worldwide service team there to help and advise."

Stefan Buch
Vice President After Sales Service at SCHOTTEL

Your contact for After Sales Service:

OFFSHORE: ENERGY FOR THE GLOBE

So far, primarily European countries have been expanding wind power at sea. Now Asia and North America are following suit, driven by mutually agreed climate targets

Photo: Getty Images

The story of offshore wind power began more than 30 years ago outside the village of Vindeby on the Danish island of Lolland. There, eleven turbines turned in the sea for the first time in 1991. Since then, the community of 2,000 inhabitants has been considered the birthplace of offshore wind energy. Today, the power of the plants at that time seems rather unimpressive: each wind turbine generated only 0.45 megawatts. Today's turbines have 15 times that capacity, and future ones will have more than 30 times that.

Meanwhile, offshore wind power is considered a central pillar of sustainable energy supply. Since 2012, the global capacity has increased tenfold. Last year, marine wind turbines provided almost 50 gigawatts of installed capacity. This equates to around 30 nuclear power plants and would be sufficient by German standards to reliably supply 100 million households with electricity. Sounds a lot. But it is not. The International Renewable Energy Agency IRENA calculates that by 2050 the world's offshore wind farms will have to generate 2,000 gigawatts of electricity to meet the climate targets agreed in the Paris Agreement. So in 20 years' time, marine wind turbines will have to generate 40 times as much electricity as they do today. A change in thinking is already under way. "In recent years, there has been a growing understanding of the great contribution offshore wind can make in the fight against climate change," explains Alastair Dutton, Chair of the Global Offshore Wind Task Force of the world association GWEC.

Offshore turbines have a decisive advantage. Due to the constant wind at sea, they generate twice as much electrical energy as onshore wind farms. The dimensions alone are proof of this. The rotor blade of an offshore turbine will reach a diameter of a quarter of a kilometre in the coming years. There is enough space at sea. In the long term, offshore wind power is therefore considered a particularly promising form of electricity generation.

THINGS ARE MOVING OFF THE COASTS

At the same time, operators are building their wind farms further and further away from the coasts because the wind blows even stronger there. This trend will be strengthened by a new type of turbine that no longer needs to be installed in the seabed but rests on anchored floats (see p. 20). This allows wind farms to also be built in areas where the water is too deep for conventional construction methods. Countries with steep coasts can thus also enter the offshore wind power industry.

Falling generation costs are providing an extra incentive for the construction of offshore wind farms. This is not only due to technical progress. Value chains are also becoming more efficient. Planning agencies, construction companies and wind farm operators represent an important pillar. In addition, there are shipyards that manufacture special ships for the construction and operation of wind farms. Brokers arrange the right vessel for use in the offshore wind business.

The industry is currently receiving the biggest push from Asia. China in particular is investing billions in offshore wind power. More than 30 new parks are planned. But Vietnam and Taiwan in particular also have ambitious goals. The GWEC believes that the coasts of Asia hold the world's greatest potential for the expansion of wind power by 2050. But European coasts also continue to offer good conditions. Even in the USA, where there are currently hardly any offshore wind turbines, significant investments are planned for the coming years. The GWEC also sees considerable potential in Australia and South America.

Until 2030, the European countries will still be ahead when it comes to offshore wind power. For a long time, Germany was considered a particularly promising nation. However, in recent years, new construction has stagnated. One reason is new laws that provide for auctions instead of fixed subsidies. Anyone who wants to build a wind farm must submit a bid. The contract is awarded to the bidder who requires the lowest subsidy.

TRAFFIC LIGHT SHOWS GREEN FOR OFFSHORE WIND POWER

In the meantime, the German government has increased the expansion target from 15 to 20 gigawatts by 2030 and to 40 gigawatts by 2035. For 2045, as much as 70 gigawatts are now planned. Experts expect further momentum for offshore wind power. This includes the introduction of contracts for

“ The rotor blade of an offshore turbine will reach a diameter of a quarter of a kilometre in the coming years. ”

difference after winning bids. While they cap profits through higher electricity prices, they also limit the risk. This allows operators a more reliable calculation. Contracts for difference already exist in different variants in Denmark, Italy, France and the UK. In the UK, the offshore wind industry has developed extremely well in recent years. The government has also increased the expansion targets.

Still Prime Minister Boris Johnson announced that by 2030 every British household should receive all its electricity from an offshore platform. The British benefit from their 12,000 kilometres of coastline. Around the 200 nautical mile zone there are numerous areas suitable for the construction of wind farms. What is more, in many places the water is not very deep. The costs of the expansion are thus kept within reasonable limits.

Other important wind power nations in Europe are the Netherlands and Denmark. However, anyone building an offshore wind farm in the Netherlands will have to do without subsidies. A lease may even be required for the constructors. Denmark relies on contracts for difference and is pushing ahead with expansion in the North Sea and Baltic Sea. Among its European neighbours, France is a developing country in the offshore sector – despite its long coastline. However, the government has raised the expansion targets for offshore wind power. At the same time, the approval procedures have been simplified. All nations are putting a lot of effort into the development of technology for floating wind farms. So far, France has not yet produced any wind energy at sea. Only two wind farms are currently under construction. One reason for the slow pace is the fact that more than 70 per cent of the nation’s electricity is generated by nuclear power plants, which emit hardly any CO_2. For this reason, the need for action to meet the climate targets is lower than for other countries.

CHINA TAKES THE TOP SPOT

Asia’s rise in the offshore wind power industry is being driven in particular by China’s efforts. Today, the country has taken the lead worldwide. In 2021 alone, the People’s Republic added 12.7 gigawatts of installed capacity. A gigantic number. In purely mathematical terms, this would allow more than twelve million households in Germany to be supplied with power. The trend in China continues to head upwards: 33 offshore wind farms with a combined capacity of eight gigawatts are under construction and will be connected to the grid in the next few years. But it is not clear how the offshore boom in China will continue. For in 2022, the massive subsidies from the central government will expire. The pace of expansion depends on whether the provincial governments support this type of generation and how the production price develops.

In addition to China, the island state of Taiwan is pushing ahead with the expansion of offshore wind power, although only two wind turbines are

2,000 GW
of electricity the world’s offshore wind farms will have to generate to meet the climate targets outlined in the Paris Agreement.

30 GW
offshore wind power in North America by 2030

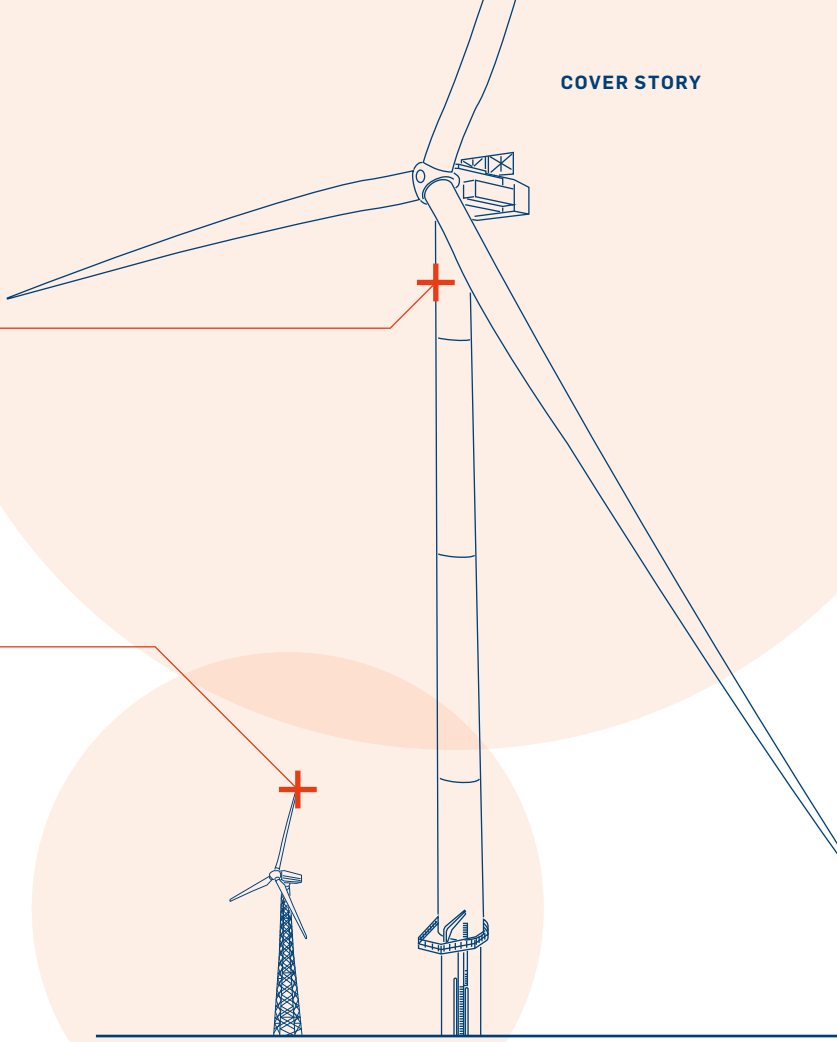
40 GW
offshore wind power in Germany by 2035

8 GW
offshore wind farms are under construction in China

15.5 GW
offshore wind power in Taiwan by 2035

high potentials
for offshore wind farms are seen in South America

largest wind farm in the world
is planned off the coast of Australia



THE BIGGEST

This year, the world's largest wind turbine is scheduled to go into operation in Østerild, Denmark. The V 236 has a height of 280 metres, and a single rotor blade is 115.5 metres long. The manufacturer Vestas has designed the turbine for use at sea. For testing purposes, the company will initially erect the prototype of the 15-megawatt turbine on land. Regular production is scheduled to start in 2024. According to the manufacturer, the giant wind turbine is capable of generating 80 gigawatt-hours of electricity per year, which, according to the company, would in theory be enough to power 20,000 European households.

THE SMALLEST

The smallest offshore wind turbine still in operation was also manufactured by the Danish company Vestas. It generates an output of 0.5 megawatts, has a height of 45 metres and went into operation in 1995. Ten V 39 turbines are still in operation today at the Tunø Knob wind farm off the coast of Aarhus, Denmark. The output of a single wind turbine is said to be enough for about 280 households.

currently in operation off its coast. However, a high population density and mountain ranges with peaks as high as 4,000 metres hardly offer any space for onshore wind turbines. Since the government declared in 2017 that it would phase out nuclear energy by 2025, offshore wind energy has been at the centre of energy supply. The government in Taipei had initially planned to connect plants with a total capacity of 15.5 gigawatts by 2035, and increased these targets by another 50 per cent in 2021. This would allow Taiwan to overtake its neighbours Japan and South Korea, which have also set expansion targets of a similar scale.

An ambitious newcomer to offshore wind power is Vietnam. The country has had a wind farm at sea since 2015. A second project is currently under construction. More parks are currently being planned. GWEC expects the government to announce further expansion plans, adopt a new energy development plan and define the framework for auctions.

LATECOMER NORTH AMERICA

The USA is one of the latecomers. Although the Atlantic and Pacific coasts offer good conditions, only two smaller wind farms on the East Coast generate electricity. Under Donald Trump, the planned projects hardly progressed, but after the change of government, the wind has changed. By 2030, 30 gigawatts of offshore wind power are to be fed into the grids. One major project has passed the final approval hurdle, and other projects are in the planning stage. The Spanish energy company Iberdrola had announced in February that it wanted to invest ten billion euros in three wind farms off the coast of Massachusetts.

Australia is also ready for take-off. For a long time, the government did not care much about a turnaround in energy policy. After the bush fires caused by drought, a rethinking is taking place. The first wind farm off the coast of the continent is set to become the largest in the world and propel Australia to the top of the global offshore countries.

It remains to be seen how the war in Ukraine will affect offshore wind power. In March, European Commission President Ursula von der Leyen pushed for more independence from energy imports. The Europeans absolutely had to break their dependence on Russian gas. At least off the coasts of the continent, a stronger expansion of renewable energies is on the horizon.

"The first wind farm off the coast of Australia is set to become the largest in the world and propel it to the top of the global offshore countries."

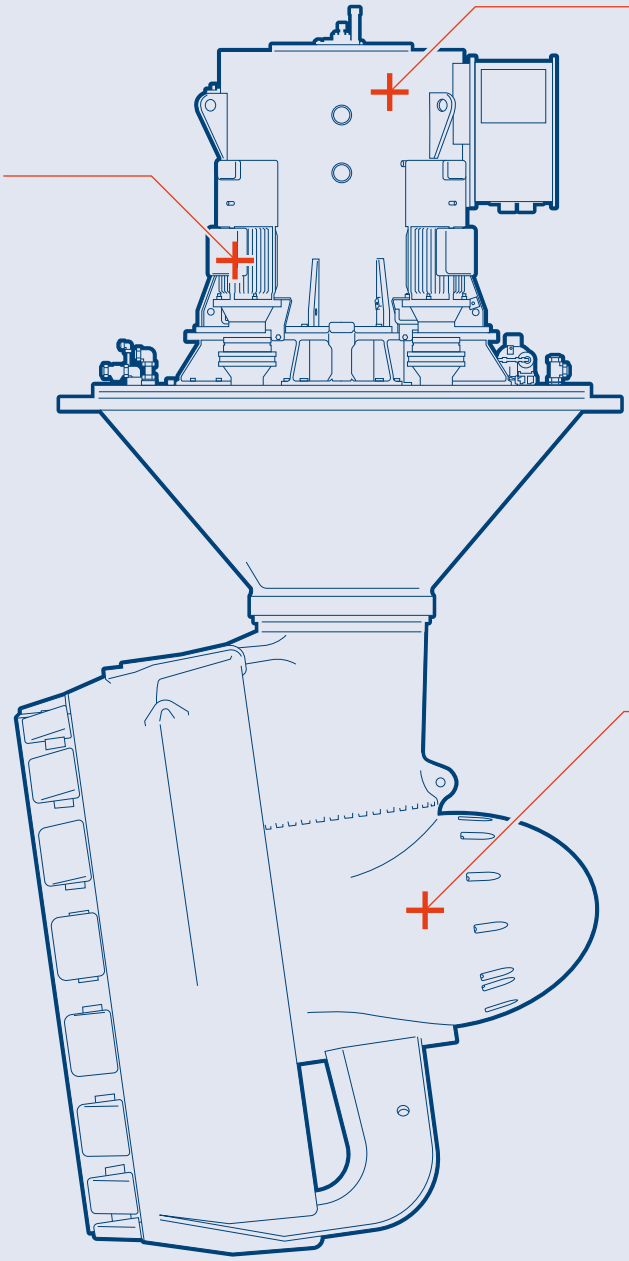
Optimized for DP use

THE NEW SRP-D

With the new SRP-D (“Dynamic”), SCHOTTEL is launching a rudder propeller that even better meets the increased requirements for the efficient operation of W2W vessels. Based on the proven principle of the rudder propeller, an economical yet powerful solution has been developed that greatly improves the positional accuracy of the vessel in DP operation. Operators benefit from the significant increase in performance and thus possible operating times in close proximity to offshore structures, especially in demanding weather conditions.

FAST-RESPONSE STEERING SYSTEM

In addition to reduced propeller acceleration/deceleration times, the SRP-D features a high-speed azimuth steering system with reinforced gear components. This enables faster thrust allocation, so that it is possible to react faster to external forces from wind, weather and currents, thus achieving a higher positioning accuracy of the vessel.



LE-DRIVE

Despite its integrated design, the LE-Drive allows a free choice of motor for vessels with electric, ideally battery-supported energy supply. Due to its compact design, the LE-Drive opens up more freedom in vessel design. The SRP-D is optionally also available with drive train in Z-configuration.

98° LOWER GEARBOX

Thanks to the additional lower gearbox that has an eight degrees downward tilt, the interaction between propulsion unit and hull as well as the propeller flow interaction are reduced. This results in increased thrust efficiency in DP operation and minimizes “forbidden zones”.

Contact us for more information:

sales@schottel.de

SCHOTTEL-sponsored scholarship holders from the Hamburg University of Technology: Jonathan Achstetter, Elias Möller, Nils Sichert

+ Trainee programme

+ Apprenticeship

+ Promotion of theses

+ Dual study programme

+ Scholarship

COMMITMENT TO THE NEXT GENERATION

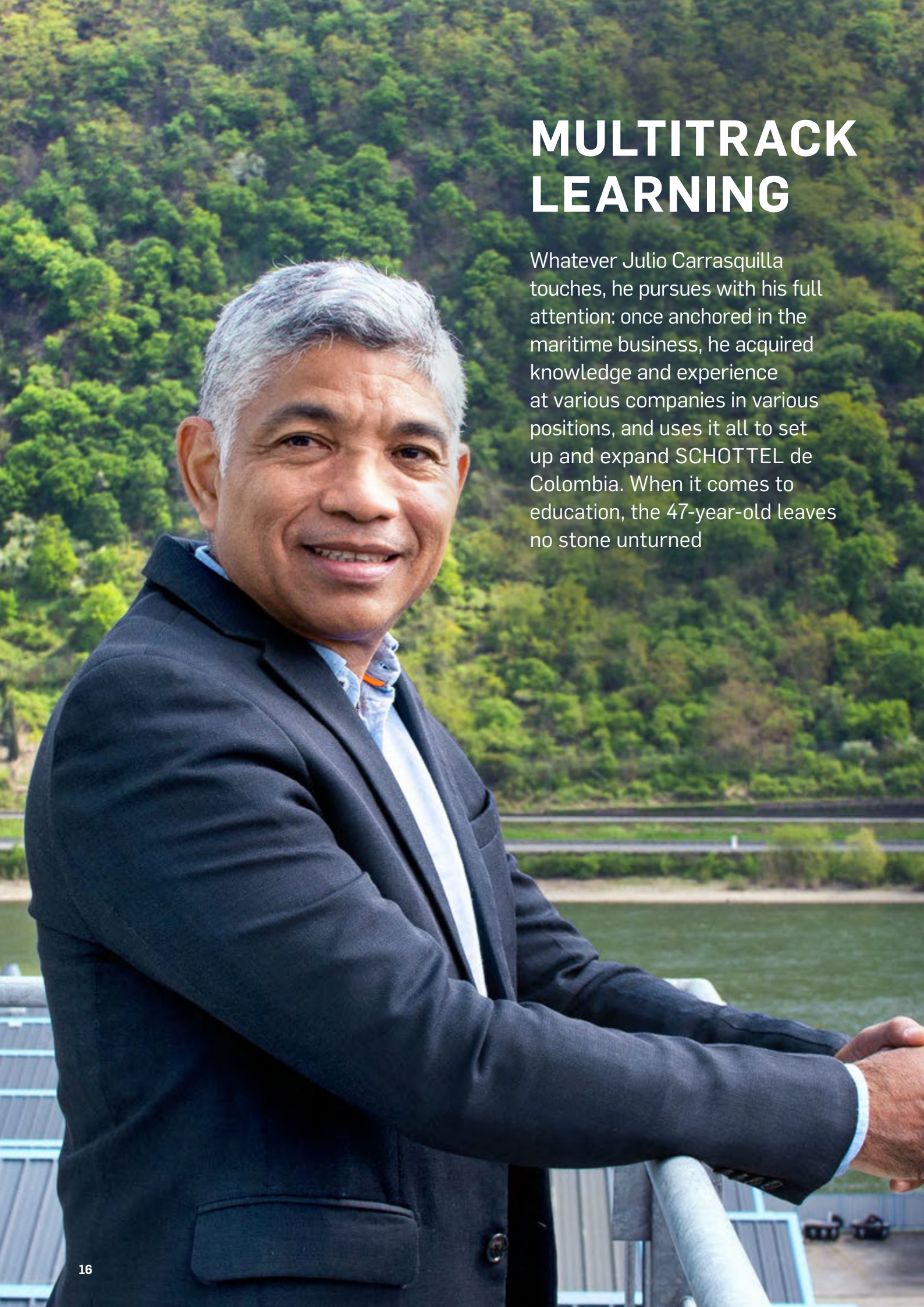
For more than 100 years, employees around the globe have been committed to the success of SCHOTTEL. The company assumes a special responsibility for training young talents to ensure this commitment continues

With the same precision, meticulousness and passion with which the company develops and produces propulsion systems, it also promotes young talent. Christian Bock, Vice President HR at SCHOTTEL: "Whether in the framework of an apprenticeship, a dual study programme, a trainee programme, the support of final theses or the assumption of scholarships: we are convinced that the personal exchange with the executives of tomorrow will create a dynamic network from which everyone in the maritime industry can benefit."

Those who join SCHOTTEL work for a company with attractive additional benefits and long-term prospects that offers development and promotion opportunities to suit individual interests.

Learn more:

Photo: SCHOTTEL



MULTITRACK LEARNING

Whatever Julio Carrasquilla touches, he pursues with his full attention: once anchored in the maritime business, he acquired knowledge and experience at various companies in various positions, and uses it all to set up and expand SCHOTTEL de Colombia. When it comes to education, the 47-year-old leaves no stone unturned

Julio Carrasquilla's start at SCHOTTEL is inextricably linked to setting up the establishment of the subsidiary in Colombia: "In 2015, SCHOTTEL de Colombia was founded with one employee to grant access to the markets of Colombia, Venezuela as well as the trade blocks of the Andean Community, Pacific Alliance and the Caribbean," he looks back on the beginnings. "Since then, SCHOTTEL de Colombia has shown constant growth in terms of revenue and number of employees. I am extremely proud of all our achievements during this short period."

INFECTED WITH THE MARITIME VIRUS

The home of the subsidiary is the megacity of Cartagena on Colombia's Caribbean coast with the country's most important oil and container port. It was here in his home town, where Julio gained his first professional experience in the maritime industry at Cotecmar, the largest Colombian shipyard, specializing in new builds, ship repair and conversions both for civil and naval vessels. Once affected with the maritime virus, he expanded his acquired knowledge in ship construction in Europe. In 2008, he gained further insights into ship construction in the European maritime industry at a renowned institute. In addition, as a PhD researcher at Delft University of Technology, he contributed to a number of projects focusing on improving ship construction efficiency. Before joining SCHOTTEL, he was working as project manager at Damen Shipyards Gorinchem, Netherlands.

"I WANTED TO BE PART OF SCHOTTEL"

What ultimately made Julio Carrasquilla want to work for the German propulsion expert? "With its heritage as the inventor of the rudder propeller, SCHOTTEL is one of the most important propulsion manufacturers worldwide. I wanted to be part of this great company." Coming from a European company, in general, he was used to working in an international and well-structured environment. Once at SCHOTTEL, he was pleasantly surprised by the uncomplicated decision-making process and supporting initiatives. In turn, it is precisely these initiatives and creative freedoms that have favoured the growth of the subsidiary. "The most pertinent part of my job is to focus on what is important for all our customers – availability and cost efficiency. Overall, we aim to provide our customers with the benefits of being a long-term reliable partner," he says, explaining his drive.

Unfortunately for the family man that he is as a father of two, his dedication to his profession also involves frequent absences: "This job is quite demanding, as I travel to customers in the LATAM region very often. Our entire sales territory extends to over 18 countries, so you're on the road and in the air a bit," he laughs. "In addition, my responsibilities as General Manager include developing and implementing growth strategies, with all the associated tasks that have an impact on the day-to-day business. I am lucky to be supported by a very committed team of eleven employees distributed among three departments."

FAMILY TAKES TOP PRIORITY

With eight employees, Spares & Service is the strongest department in terms of personnel, followed by Finance (two) and Sales (one). In addition to the regular meetings at work, the entire team meets for a chat at the end of the week. From time to time, they also gather for social events and sports activities in their spare time. Sports also has a large impact on Julio's life: "I go running and I do CrossFit. I am quite proud to say I have completed several 10K and half-marathon races." However, his family – wife Ayda and twins Emmanuel and Jans – plays the biggest role in his life. Even though he is absent quite often, he loves to be with them every possible minute and enjoys activities like going to the cinema. Furthermore, the city of Cartagena, where they live, offers them a lot in terms of leisure activities with the seaside on their doorstep.

When Julio tells us his plans to complete an MBA "to strengthen my knowledge in management and administration", we start to wonder whether they have more than 24 hours in a day in Colombia. For the future of SCHOTTEL de Colombia, Julio also has ambitious plans: "We want to manage 80 per cent of the LATAM fleet by 2032. To achieve this, I plan to make a major investment in Cartagena for an own building and workshop."

Photo: SCHOTTEL

What customers are saying about SCHOTTEL

“SCHOTTEL HAS NEVER LET US DOWN”

MMC Ship Design & Marine Consulting Ltd (MMC) was founded in 2006 and is headquartered in Gdynia, Poland. Since its beginnings, MMC has designed more than 100 ships for the global energy industry to date. Today, the independent company is one of the market-leading designers for Offshore Support Vessels, Service Operation Vessels and naval vessels

An interview with Michał Olko, Vice President / Chief Designer at MMC

HOW HAVE THE CHALLENGES FACING YOUR COMPANY CHANGED OVER THE PAST 15 YEARS?
Our latest challenge is to adapt our projects to the needs of the rapidly changing world. It is enough to look at how the energy industry itself is changing. In the first decade of our company’s activity, we were designing ships to support oil extraction platforms – today we have more and more requests to design ships that support wind farms. In addition, our customers now have different requirements: ships are to be more environmentally friendly, automated and economical.

WHAT CHANGES HAS THIS RESULTED IN FOR THE PROPULSION SYSTEMS?
The real revolution in designing and constructing ships was the transition from a conventional shaft-line arrangement to azimuth thrusters. From a design office’s perspective, it means new chances to use the space in a better way. Azimuth thrusters are more efficient, less prone to breakdown and provide many new opportunities. For example, by means of computer-based methods their functions and interaction with the hull of a ship can be simulated. Important changes can also be seen in the materials used for constructing thrusters. Next-generation thrusters allow for the design of ships that support drilling platforms and windmills and use a greater dynamic positioning range. This ensures better resistance to unfavourable weather conditions as well as more safety for people.

WHAT ARE THE REASONS FOR YOUR PARTNERSHIP WITH SCHOTTEL?
We have been working with SCHOTTEL since the founding of our company. SCHOTTEL has been active in the Polish market for many years and other design offices and shipyards in Gdańsk and Gdynia have had positive experiences with SCHOTTEL. Another reason was the fact that it is an independent company that focuses solely on the development and production of thrusters.

WHAT DOES SCHOTTEL SUPPORT LOOK LIKE?
During the design stage, the speed in which all necessary information is provided, as well as the quality of the requested data, are important to us. The support in this area is flawless. We have good communication with SCHOTTEL and always receive all necessary information on time. Our partner has never let us down.

WHAT SETS SCHOTTEL APART FROM THE COMPETITION?
For us it is certainly the way the company treats its customers: not simply as recipients of its products, but as equivalent business partners. We feel that our business success is also important to SCHOTTEL. I wish us and SCHOTTEL another 15 years of fruitful cooperation.

Michał Olko, Vice President / Chief Designer at MMC

Photos: MMC Ship Design & Marine Consulting Ltd. (MMC), KOTUG

READY FOR NEW TASKS

In order to support Trans Mountain's stringent commitment to marine safety and to further enhance the overall safety of vessel transits along the Western Canadian coastline, KOTUG Canada's dedicated escort tugs vessels must comply with strict guidelines, especially with regard to environmental protection and reduced underwater noise and emissions. In order to meet these guidelines, tug operator KOTUG Canada* will retrofit two identical escort tugs with an innovative hybrid propulsion concept from SCHOTTEL

To comply with the stringent conditions for the Trans Mountain Pipeline Expansion Project and the increased vessel traffic, a rigid marine safety regime is required which KOTUG Canada exclusively supports with the provision of two state-of-the-art escort tugs. These tugs have special equipment on board, such as storage of recovered oil from tankers in case of a spill, fire-fighting capabilities and sufficient bollard pull to safely escort laden tankers to open sea and being able to provide first support to oil spill events.

The two escort tugs that will enter operation in British Columbia, SD Honour and SD Pride, are identical tugs with 50 metres in length and powered to deliver a bollard pull of 110+ tonnes and a speed of up to 14.5 knots.

ENVIRONMENTAL PROTECTION AND SAFETY

In order to minimize underwater noise emitted from the escort tugs, a potential threat to the endangered Southern Resident killer whales in the Salish Sea as well as to reduce greenhouse gasses, KOTUG Canada will retrofit and upgrade the vessels with two powerful rudder propellers type SRP 710 CP (3,700 kW each) and the mechanical hybrid drive solution SYDRIVE-M from SCHOTTEL. Laurens Korporaal, Business Development Manager at KOTUG Canada: "Our unmatched commitment to First Nations, social responsibility and environmental stewardship is demonstrated by using the new SYDRIVE-M technology. It enables us to support the stringent commitment to marine safety and to enhance the overall safety of vessel transits along the Western Canadian coastline. With the advanced propulsion concept, KOTUG Canada's dedicated escort tugs meet the strict guidelines with regard to environmental protection and reduced underwater noise emissions. That ultimately made us win the charter contract for Trans Mountain-related vessel escort in the Salish Sea."

INVESTING IN THE FUTURE

SYDRIVE-M combines a port-side azimuth propulsion unit with a starboard azimuth propulsion unit so that both can be driven together by just one main engine. "This ensures that the operating hours of the engines are reduced, which in turn leads to lower maintenance costs, lower fuel consumption and lower emissions. The fact that only one motor is switched on also means that the underwater noise levels are much lower," explains Rolf Hendriksma, the responsible Sales Manager at SCHOTTEL Netherlands. "All in all, SYDRIVE-M is an investment in the future of the maritime industry."

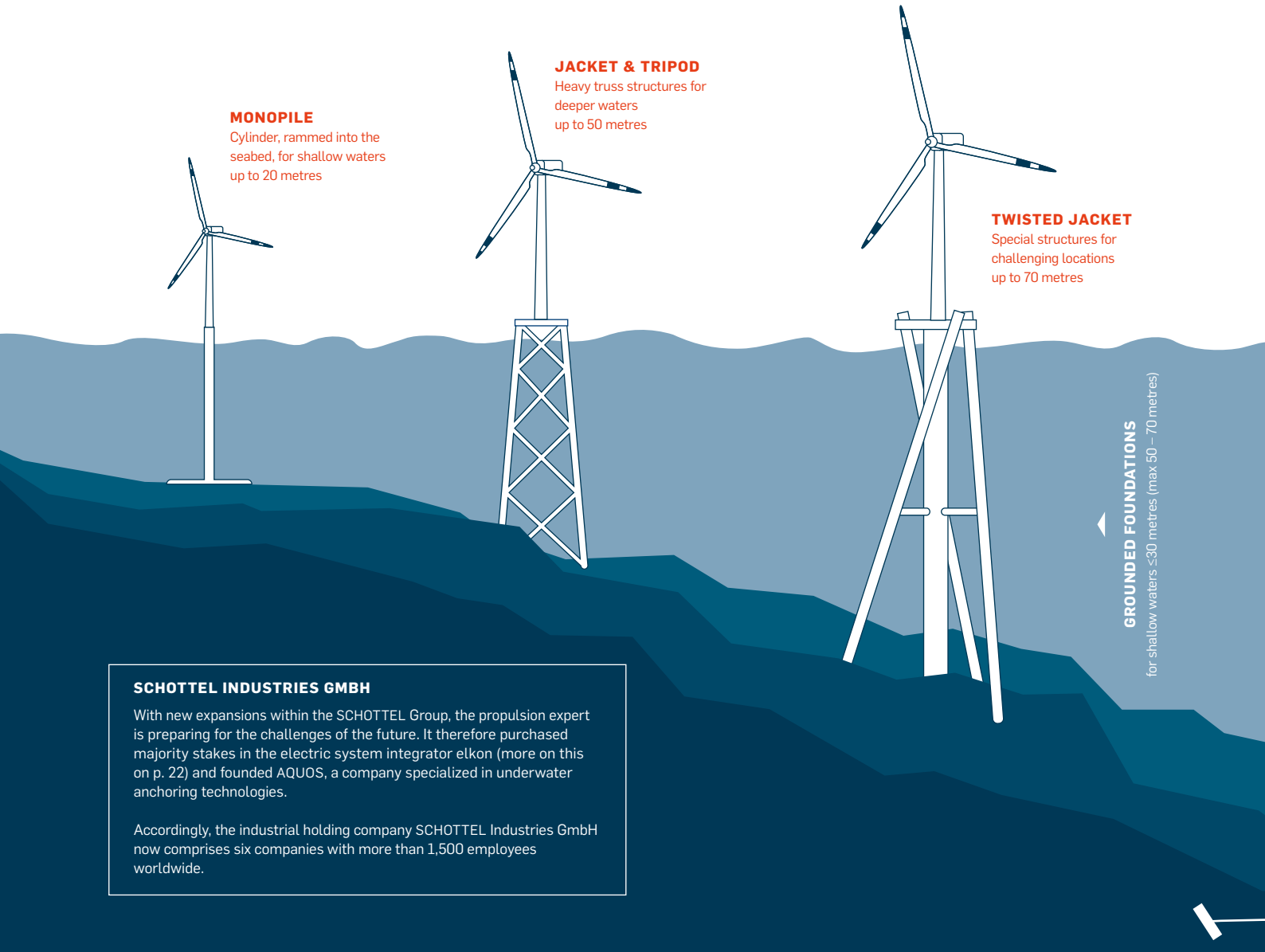
***KOTUG CANADA** is a partnership between KOTUG International and Horizon Maritime

Learn more about SYDRIVE-M:

ACCELERATING THE ENERGY TRANSITION

How can we make our contribution to the energy transition? With innovative anchoring technologies, the newly founded AQUOS SCHOTTEL Marine Technologies GmbH provides a future-proof and sustainable solution

The expansion of renewable energies is progressing rapidly, and the wind turbines required for this process are becoming ever taller and more powerful. In order to be able to securely anchor the floating facilities in deep waters and different seabeds in the long term, new technologies are needed. They allow floating structures to be installed at any depth of the sea where the construction of conventional systems on fixed foundations is no longer technically or economically feasible. Besides the emerging offshore wind industry, this anchoring technology is also suitable for other areas of application, such as photovoltaic systems, aquacultures, buoys or mooring systems.



SCHOTTEL INDUSTRIES GMBH

With new expansions within the SCHOTTEL Group, the propulsion expert is preparing for the challenges of the future. It therefore purchased majority stakes in the electric system integrator elkon (more on this on p. 22) and founded AQUOS, a company specialized in underwater anchoring technologies.

Accordingly, the industrial holding company SCHOTTEL Industries GmbH now comprises six companies with more than 1,500 employees worldwide.

EARLY WARNING SYSTEM FOR THE HIGHEST POSSIBLE SAFETY

The central element for use in rocky seabeds is a self-drilling subsea rock anchor. “The special feature of the new AQUOS anchoring systems is that, in a single installation process, the anchors first drill their own borehole and then permanently secure themselves in it using the associated, special subsea anchor drill rig,” explains Sascha Scholz, CEO of AQUOS. “Furthermore, they are the only type of anchoring system that allows continuous condition monitoring in real time. This ensures maximum safety at all times.”

SIGNIFICANT CO_2 REDUCTION

The novel underwater anchoring technology offers various advantages: it is characterized by a significantly reduced material requirement with lower CO_2 emissions compared to conventional anchoring methods and guarantees permament stationary use in the intended position. Sascha Scholz: “The anchors are set in just a few hours, thus reducing the construction time for the entire wind farm. Operators not only save valuable time, but also money.” Thanks to the unique design of the anchors, a denser installation in the available area is possible.

“With our new anchor technology, we are not only making our contribution to the energy transition, but can even accelerate it,” the CEO adds.

SASCHA SCHOLZ
CEO
AQUOS
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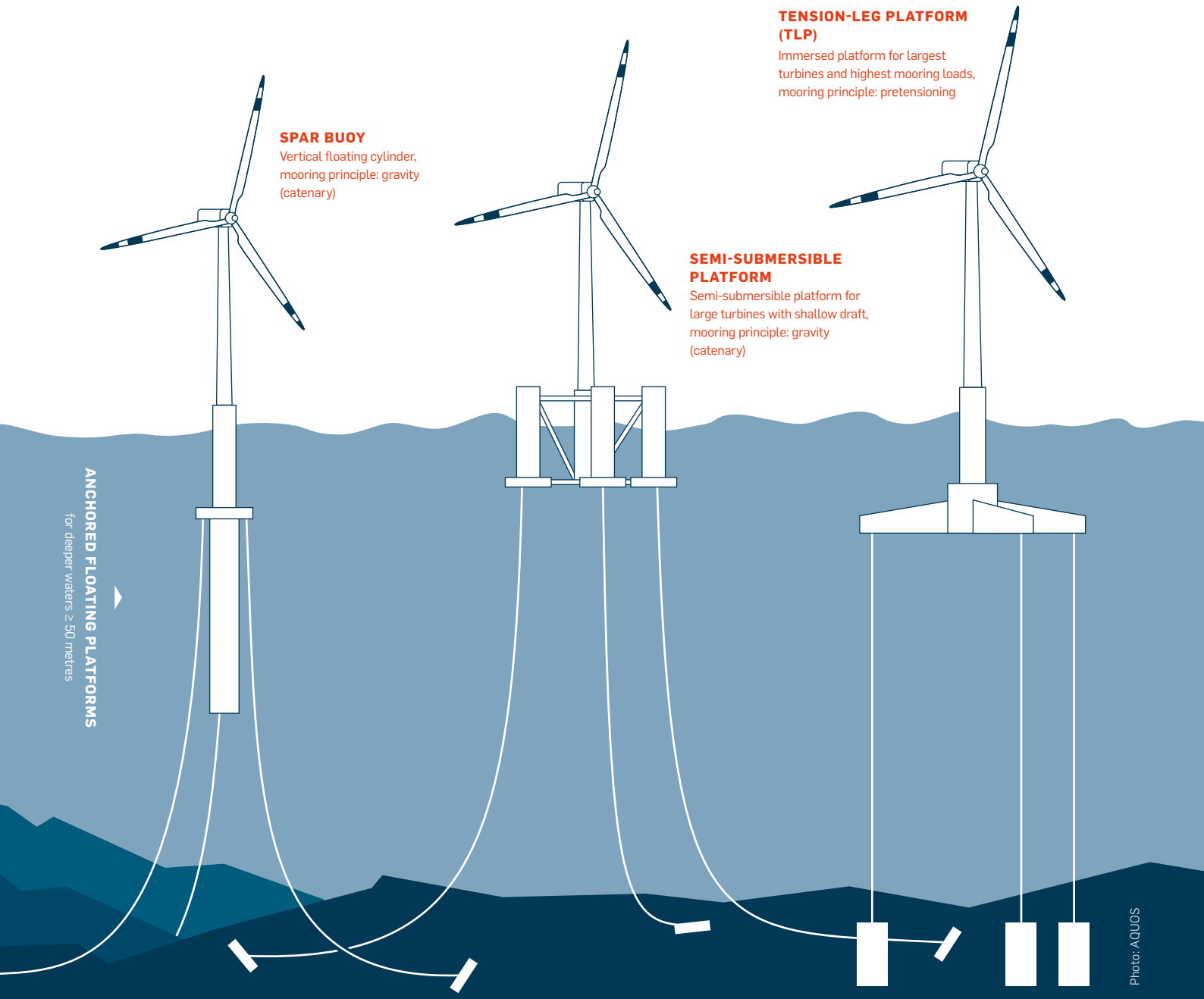


Photo: AQUOS

ELKON AND SCHOTTEL COMBINE THEIR EXPERTISE

SCHOTTEL and elkon are set to operate as partners in the maritime market. Both enterprises now offer complementary and energy-efficient propulsion, hybridization and electrification concepts, with a large overlap in the field of propulsion hybridization for new builds and conversions. Kenan Elmas, Director of Automation, has been with elkon since 2007. He gives us his take on the new cooperation

"After being part of 42 years of history in the Turkish shipbuilding industry, elkon Elektrik experienced one of its biggest turning points in 2022. We have put a lot of hard work into just under 600 projects so far, following the global trends and proceeding on the path we knew was right, without compromising our sustainable growth policy.

elkon is an electric and R&D brand. It employs some of the most well-known names in the industry, international award-winning engineers and innovative minds in the field of marine electric and automation. We are proud to say we have added value to nearly every ship produced in Türkiye over the last years. In our efforts to stay on track with our goals, the international leader in propulsion expertise SCHOTTEL has acquired a majority share in elkon. With SCHOTTEL and its 100 years of experience behind us, we are now in a stronger position to make our dreams from 42 years ago a reality.

As a company that has been producing, using and exporting electrification technologies for years, the partnership with SCHOTTEL will enable elkon to play a bigger role in the world's environmental transformation. We will be able to extend our radar and establish a presence in the countries that have a say in the maritime industry. elkon adopted the culture of globalization many years ago. And with SCHOTTEL's experience and engineering capabilities, we will see different places on the world map, reaching further beyond the borders we once imagined.

Our joint mission is to promote decarbonization, to protect the future of the world and our seas and to make environments livable for our children and all creatures on Earth. As elkon, we will combine our electrical systems integration and R&D studies with SCHOTTEL's propulsion experience in automation and transmission technologies. And SCHOTTEL can gain a new perspective from elkon when doing business in the Turkish shipbuilding market, a market in which the company has been active for many years under its own name. We are happy to add another link to the solid and inseparable chain of Turkish and German cultures from the past to the present.

On behalf of elkon, I warmly welcome all customers to take advantage of the usual agile, professional and independent services both companies offer. Your benefit lies in the expansion of both portfolios and the possibility to commission turnkey solutions for propulsion systems and system integration. The option to involve respective market partners remains available on both sides."

More information on the purchase of the majority share in elkon by the holding company SCHOTTEL Industries GmbH

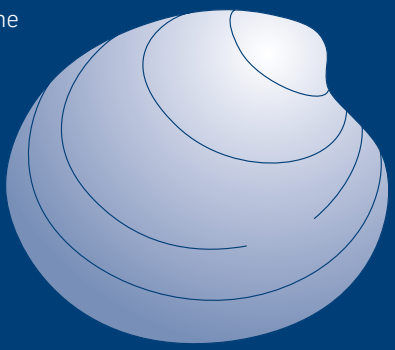
KENAN ELMAS
Director of Automation at elkon
www.elkon-tr.com

Photos: elkon

OUTLOOK

Record clam

The oldest known animal is the Icelandic clam Ming. It was 507 years old when researchers pulled it out of the sea and froze it in 2006. They only noticed the sensational age when they later counted the annual growth bands on its shell. 1*



60,000 km

is the length of the mid-ocean ridge which runs through all the world's oceans, making it the longest mountain range in the world by far. 2*

$20 billion

is the value the gold, silver and precious stones in the wreck of the San José are said to be worth. In 1708, the British sank the Spanish galleon near Cartagena off the coast of Colombia. Since its discovery in 2015, Spain and Colombia have been fighting over the right to salvage it. 3*

75 %

of all active volcanoes are located in the Pacific Ring of Fire, a volcanic belt stretching over 40,000 kilometres. Tectonic activity in this region is not only responsible for a record number of volcanoes: it is also responsible for 90 per cent of all earthquakes worldwide. 4*

5,570 km/h is the speed a submarine would need to have to break the sound barrier. An aircraft can do this at "only" 1,235 kilometres per hour. The reason: sound travels through water about 4.5 times faster than through air. 5*

Vintage wine

The oldest champagne ever drunk was 230 years old. Divers found the sparkling wine in a wreck in the Baltic Sea in 2010 and recovered it from a depth of 60 metres. It held up extremely well and tasted sweet with notes of tobacco and oak. 6*

Sources:
1* www.nationalgeographic.com; 2* www.oceanservice.noaa.gov; 3* www.bbc.com; 4* www.nationalgeographic.com;
5* www.hyperphysics.phy-astr.gsu.edu; 6* www.theguardian.com

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