

SWZ | MARITIME

Magazine for maritime professionals

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DUTCH YACHTS ARE TOP NOTCH



Whistling in the wind?

SH2IPDRIVE researches hydrogen



Royal Huisman going strong

Jidde Looijenga seeks out the (im)possible



Becoming a pilot

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16 | Yacht special



Yacht building is in a comfortable market position. In this yacht special, we look at what Royal Huisman, Balk and Wajer are up to as well as the boats currently being 3D printed and NMT's yacht building training programme.

28 | Hydrogen ships: Whistling in the wind or inescapable?



How can hydrogen (H₂) play a role in green shipping, what technical challenges are to be expected and what might possible solutions be? To start it all off, let's look at the rationale behind these impactful changes.

44 | Education and training of pilots in the Netherlands



Through the years, the Dutch Pilots have developed a system of selection, initial education and continual professional training. What is the current state of affairs?

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Cover: In July, the 52.42-metre Feadship superyacht *Gallant Lady* transited the Dutch canals after undergoing a year-long refit at Feadship's Aalsmeer yard. The refit included an update of the engine room and interiors (photo Feadship).

Dutch yachting from leisure to industry

With the outbreak of war between Russia and Ukraine, the focus of the media was immediately on the superyachts of the Russian oligarchs. Except for the problems with the Russian ownership of Heesen, which has been transferred to a Dutch foundation controlled by CEO Arthur Brouwer and chairman of the supervisory board Anjo Joldersma, the consequences for the Dutch superyacht building industry are limited. As far as we know, no superyacht yards have gone bankrupt or closed down. Customs did place fourteen yachts owned by Russian owners under enhanced surveillance at Dutch yacht builders. These include twelve yachts under construction, including superyachts over 35 metres, and two yachts undergoing maintenance. When they are eventually confiscated, there is a very willing market waiting to buy these Dutch top products.

Some people think differently about having success and the right to create private property, but the fact that the richest people in the world come to the Netherlands to have their luxurious toys built at Dutch yards by Dutch craftsmen can also be taken as a huge compliment for our knowledge and skills. Know-how and abilities that have grown during at least four centuries since our Golden Age, when increasing wealth brought the first opportunity to build yachts just for leisure and to enjoy being on the water of the many lakes and canals. While our September issue last year focused on superyacht construction, this year, SWZ|Maritime offers a glimpse of the broader industry of yacht building, including the smaller boats. The coordination of this issue was in the hands of our colleague Sander Klos, who toured several well-known yacht and boat builders to provide a proper insight in an industry that has such a long tradition in our Dutch history. But an industry that also has to innovate, as one can read in this edition.

It is also notable that this industry, in contrast with a lot of other branches, got through the Covid-19 crisis fairly well. Because just as the rich went on ordering their superyachts at Dutch yards, the less wealthy also turned their interest to leisure on the water with their own or rented boat. It offers holiday pastimes within the enclosed space of the yacht with your own family or selected guests without too much risk of being exposed to the general public and more chance of catching Covid. I hope our readers will once again enjoy the commitment of our colleagues and have a good time reading this edition of SWZ|Maritime, on the job, at home or maybe even on the water.



Antoon Oosting

Editor-in-Chief
swz.rotterdam@knvts.nl

RINA approves Aurelia's 100% hydrogen powered ro-ro design

Aurelia Green Ship Concept Design has unveiled a new design with 100 per cent hydrogen propulsion. The ACD01 1000, a ro-ro vessel, features electric propulsion using highly compressed H₂ as fuel. RINA has issued an approval in principle for the design.

The certificate of approval in principle has been issued by RINA based on the newly published RINA Rules for Hydrogen Fuelled Ships and the RINA Guide for the Approval in Principle of Novel Technologies. The ship's hydrogen-based engine system is said to be suitable for application to other ship designs.

The fuel to operate the vessel is 100 per cent compressed hydrogen, which generates no environmentally harmful emissions with a design that can be considered as zero-emission not only in port, but also during navigation. The hybrid propulsion is based on battery and fuel cell power modules and it is not supported by internal combustion engines supplied by petroleum-based conventional fuels. The batteries are used as an energy storage source to supply power for the hotel load too.

Furthermore, the new design complies well beyond the limits set by EEDI Phase 3 according to MEPC.203(62), the ballast water treatment plant is in accordance with the latest amendments of the International Bal-



The ro-ro ACD01 1000's hydrogen system will also be suitable for other ship designs.

last Water Management Convention and the hull is designed to ensure excellent hydrodynamic and maximum propeller efficiency.

Ton Bos, partner and co-founder of Aurelia, comments: 'The world of zero emissions is a pioneering world open to new opportunities, which to some extent reminds me of the first operations in the heavy-lift sector, where there was also no experience yet. In this sense, the cooperation with RINA is a strong signal that the maritime world is ready to work together for clean shipping.' 'This new design for a compressed hydrogen ro-ro is part of a long-term cooperation

between Aurelia and RINA in which we will develop a liquefied hydrogen propulsion system that could be used for heavy-lift, cruise and Ro-Pax vessels,' Raffaele Frontera, founding partner of Aurelia Green Concept Design, adds. 'This cooperation with RINA will ensure that the design of renewable ships becomes a reality and does not remain a distant dream.'

Aurelia is a start-up with offices in the Netherlands, Italy and Argentina. The company wants to influence the maritime world by proposing zero-emission ships, introducing a new way of designing vessels starting from operational knowledge.

Wärtsilä launches engine ready for carbon-free fuels

Wärtsilä has introduced its new Wärtsilä 25 medium-speed 4-stroke engine. The engine can operate on diesel, LNG, or on either gas or liquid carbon-neutral biofuels, and can easily be upgraded to operate with future carbon-free fuels as they become available. The engine's modularity offers maximised flexibility, while its efficiency and fuel economy deliver minimised emissions. The flexibility of having different valve timing options is a key enabler for future fuels and emissions optimisation. The 25 is intended to be the first Wärtsilä engine to run on ammonia as a fuel – technology development is currently underway with a technology concept readiness slated for 2023, followed by planned product release soon thereafter.

When operating with natural gas, the engine is IMO Tier III compliant, as it also is with diesel when integrated with a Wärtsilä NO_x Reducer (NOR) emissions abatement system. It enables economically viable compliance with regulations, such as the IMO's CII and EEXI protocols that enter into force in 2023.

The 25 is designed for long periods of maintenance-free operation and it supports dry-docking schedules with a time-between-overhauls (TBO) of up to 32,000 hours. As a result, both downtime and operating costs are significantly reduced. The engine also features a highly efficient turbocharging system with a high pressure ratio. It is now available in 6L, 7L, 8L and 9L cylinder configurations, while the dual-fuel (DF) version

has a power output ranging from 1.9 to 3.1 MW, and the diesel version from 2.0 to 3.4 MW. The common-rail high pressure fuel injection technology optimises combustion and the fuel-injection settings at all loads. This in turn promotes smoke-free operation. Other features include a self-learning proportional, integral, derivative (PID) control to reduce calibration needs, and the gathering of critical engine data for predictive maintenance, reporting and analysis purposes. The modules can be replaced "on the fly", so there is no need for separate software downloads. Optional and easy-to-apply adjustments for arctic or tropical conditions and for reducing emissions to the level of a pure gas engine are also available.

Construction starts on MARIN's new simulator centre

Construction of MARIN's new Seven Oceans Simulator centre (SOSc) officially kicked off on 5 September. The facility is to make maritime operations safer and more efficient through realistic simulation of the behaviour of and the interaction between maritime structures, ships, the environment and humans. The SOSc will be operational at the beginning of 2024.

The research centre will have spherical and moving simulators, a virtual reality/augmented reality experiment room and human factor measurement and observa-



The SOSc will have spherical and moving simulators.

tion techniques to simulate complex maritime operations. 'The spherical simulators with moving bridge will be unique worldwide because the environmental projection

is not only all around, but also upwards and downwards,' explains Arno Bons, Manager Simulation & Visualisation. It is also possible to link simulators to simulate complex multi-ship and multi-tool operations. MARIN's Managing Director Bas Buchner adds that the centre also makes it possible 'to experience the behaviour of future ships during the design phase'. He adds: 'It gives the (inter)national maritime sector the opportunity to develop innovative ships with safe and maximum operational deployment under the most difficult sea conditions.'

Hypermodern training vessel Ab Initio put into service

On 2 September, STC's new training ship Ab Initio was christened in Rotterdam. The 67-metre ship, built by Concordia Damen, will play a large role in STC's maritime education programmes and is equipped with the technologies of the future. STC educates young people to become seafarers, skippers or skipper/entrepreneurs. Sustainability played a major role in its design and construction. Chris Kornet, Managing Director Concordia Damen: 'Recyclable materials were used and the Ab Initio is equipped with a hybrid propulsion system. Not just via a modern Stage V diesel engine, but also electrically and on hydrogen via a fuel cell. The ship can even generate part of its own energy through 200 m² of so-

lar panels. The generators are easy to change, which makes the Ab Initio suitable for future fuels.' The Ab Initio – which means "from the beginning" – replaces the Prinses Beatrix and Prinses Christina training ships built in the 1960s and offers improved safety and comfort. There are 39 beds on board. The Ab Initio has become a product of cooperation and support from the entire maritime sector. The initiative was taken by STC. Thanks to sponsorships from the municipality, Stichting De Verre Bergen and the business community, an ultramodern ship was built. The hull was built in Serbia in cooperation with Gebroeders De Jonge Shipbuilding Services. Via the Danube,



Caroline Nagtegaal-van Doorn, Member of the European Parliament for Dutch political party VVD, performed the christening ceremony.

Rhine, Waal and Merwede, it was pushed to the yard of Concordia Damen in Werkendam, where it was finished in cooperation with CCM3. On 25 August, the ship was delivered and handed over to STC.

EemsEnergyTerminal's FSRUs arrive in Eemshaven

Two Floating Storage Regasification Units (FSRUs) have arrived at Eemshaven, Groningen; the Golar Igloo (built by New Fortress Energy) on 4 September followed by the Eemshaven LNG (built by Exmar) on 6 September. Together, they comprise the EemsEnergyTerminal. This floating LNG ter-



The Golar Igloo and Eemshaven LNG in Eemshaven.

minal turns LNG delivered by tankers into gas. EemsEnergyTerminal expects to be able to receive, unload and ship around eighteen LNG cargoes up to 31 December. The FSRUs are leased for a period of five years. The terminal will be able to provide 8 billion m³ of natural gas to the national natural gas network of Gasunie per year. Han Fennema, CEO Gasunie: 'The EemsEnergyTerminal makes an important contribution to the security of supply and helps the Netherlands and Europe to reduce their dependence on Russian gas. In the longer term, Gasunie wants to use the terminal for green hydrogen.'

Until this year, the Netherlands only had an

LNG terminal in the Port of Rotterdam. The expansion in Eemshaven and the optimisation of the terminal in Rotterdam will double the import capacity for LNG.

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OPTIMISM ABOUT DECARBONISATION UNDER THREAT OF A CHINA-US WAR

Times change for better and for worse, that much was obvious at the latest SMM, which took place from 5 to 9 September in Hamburg. Here, some 30,000 maritime professionals could meet once again after a four-year break from live exhibitions. Better times are coming as more and more technological innovations are being developed that bring us closer to a future in which ships can sail without climate-threatening emissions. The SMM was once again the showcase for manufacturers' breakthrough innovations. On the other hand, there are very disturbing reports of Chinese plans not only to conquer Taiwan, but, just as Japan tried in 1931, to wipe out the US from the whole of South-East Asia.

Geopolitical developments have a huge influence on shipping and shipbuilding. Until the 24th of February, citizens and most politicians in the European Union seemed to have forgotten that these industries have a decisive impact not only on our economic prosperity, but also on our freedom. Think of the consequences for the economy of the closure of the Suez Canal by the Ever Given, the rigid Covid lockdowns that disrupted the supply chains of our industries and the threat to freedom when dictatorships like Russia, China and Iran intimidate their neighbours. Thus, it is not surprising that for the first time, two days at the SMM were set aside for the MS&D, the international conference on maritime security and defence.

The transition has begun

But let's begin with the progress that has been made in decarbonising shipping. This transition has now definitely begun. Four years ago, disbelief and pessimism prevailed as to whether it would ever be possible to get the international shipping industry to kick its addiction to heavy fuel oil, and criticism and resistance were mainly voiced against the IMO's and particularly the EU's overly prescriptive coercive measures. Now, optimism prevails about the feasibility of getting a large part of the shipping industry to switch to CO₂-neutral fuels and propulsion. 'Newbuild orders and recent industry projects prove that the maritime energy transition is accelerating. The necessary practical considerations are taking shape, and shipowners have started to future-proof their assets,' writes Knut Ørbeck-Nilssen, CEO Maritime at DNV, the leading classification society in the shipping industry and main sponsor of the SMM, in his foreword of the latest edition of DNV's "Flagship Report – The Maritime Forecast to 2050". In this report, DNV points out that 'encouragingly, newbuild vessels are increasingly being ordered ready to run on alternative fuels, with LNG dominant for now. Substantial investment is going into researching safe and economically feasible alternative carbon-neutral fuels and into developing fuel technologies.'

Fuel availability is key

'But this will count for little if the industry and its stakeholders do not collaborate to overcome the ultimate hurdle: fuel availability,' DNV's Maritime CEO warns. DNV's 6th Maritime Forecast to 2050 report zeroes in on this key issue and outlines under what conditions each new fuel type will proliferate. Which of them capture sustainable shares in the 2050 fuel mix – be it biofuels, e-fuels, or fossil fuels with carbon capture and storage – relies on sound global industry decisions and collaboration. The maritime industry must continually seek consensus with other industries to ensure that sustainable energy resources are directed to where they can reduce greenhouse gas emissions most. DNV foresees that by 2030, five per cent of the energy for shipping should come from carbon-neutral fuels, requiring huge investments in



onboard technologies and onshore infrastructure. 'Navigating the options is complex, not least because there is no single "winner-takes-all" alternative fuel and technology. Our updated modelling points to a diverse future energy mix of carbon-neutral and fossil fuels, with the latter gradually phased out by 2050,' Ørbeck-Nilssen writes. To get to full decarbonisation by 2050, the fuel infrastructure needs to deliver about 270 million tonnes of alternative fuels, according to DNV's modellings.

Strong alliances needed

'We should use all available options to progress towards and reach net zero. Our findings reinforce the need for strong alliances to push the development of supply chains that can ensure fuel availability. The entire maritime value chain – charterers, energy majors, fuel suppliers, governments, financiers, ports, and shipowners – should collaborate to ensure adequate funding and apply it to the right projects. Green shipping corridors can serve as launch pads, also reducing the risk of port infrastructure becoming obsolete as the fuel mix shifts.'

In its Maritime Forecast, DNV also points out the importance of smart digitalisation for the energy transition of the shipping industry. 'En route to decarbonisation targets, employing the full power of digital tools for more energy-efficient vessels can deliver up to fifteen per cent of GHG emission savings required by 2050. Many such tools are available, and I am confident that even more promising ones will be launched in the coming decades.' The decarbonisation of the shipping industry is a mammoth challenge, warns Ørbeck-Nilssen, but he is 'convinced that, together, we can build a better, greener maritime future.'

Innovation is gaining momentum

For visitors of the SMM, the importance of the fair lies above all in meeting each other again after such a long time to exchange knowledge, discuss projects and perhaps even place orders. Manufacturers use the fair to present innovations and launch new projects. Many of these projects again involve DNV, which was active not only in Hamburg, but also at Gastech 2022 that took place at the same time in Milan. In Italy, DNV awarded approvals in principle (AiPs) to both Samsung Heavy Industries (SHI) and their Japanese counterpart, an alliance of Mitsui O.S.K. Lines (MOL) and Mitsubishi Shipbuilding (MHIMSB), for their new liquified CO₂ (LCO₂) carrier designs.

An AiP is an independent assessment of a concept within an agreed requirement framework, confirming that it is feasible and that no major showstoppers prevent it from being realised. Just like the Koreans, MOL and MHIMSB both foresee a growing market for the transport of liquified CO₂. 'Carbon capture, usage and storage (CCUS) is gaining traction around the world as a technological solution, which helps reduce the impact of CO₂ emissions. Maritime transport can play an essential role in building up an efficient CCUS value chain, which is expected to lead to an increasing demand for specialised LCO₂ carriers going forward,' says Vidar Dolonen, Regional Manager DNV Maritime Korea & Japan.

Wind power returns

And while Gavin Allwright of the International Windship Association (IWSA) can boast an ever longer list of projects and newbuilding orders for ships with wind assisted propulsion at every conference, including the one at the SMM, Korean Daewoo Shipbuilding & Marine Engineer-

ing (DSME) and DNV signed a memorandum of understanding (MoU) in Milan to establish new wind assisted propulsion technology. This will include a rotor sail solution and fuel saving device technology, and they

will cooperate in promoting future-related businesses.

What Daewoo and DNV are researching, Japanese MOL is already putting in practice. In Hamburg, MOL showed a model of its new bulk carrier that will set sail this October with a telescoping hard sail system, the Wind Challenger. One Wind Challenger can reduce GHG emissions by about five to eight per cent. MOL also presented a model of the Wind Hunter, a ship design with large sails to

generate electricity, which is converted into hydrogen with seawater. The hydrogen is unloaded in port for use in the industry or by other ships.

The threat of China

And while we in Europe, Japan and since Biden also in the US are trying to save the climate, China is building a massive navy that outclasses all other navies in the world, including that of its archenemy the US. By 2050, the Chinese navy will be bigger than all the navies around the Pacific put together. In her presentation at the MS&D conference at the SMM, Dr Sarah Kirchberger, Head of the Center for Asia-Pacific Strategy & Security at the Institute for Security Policy of the Kiel University, outlined how fast the Chinese are enlarging their navy. According to Kirchberger, the Chinese rulers have a deep obsession with the idea of being encircled by the hostile (island) states of South-Korea, Japan, the Philippines, Vietnam, Malaysia, and Indonesia.

One of their deep frustrations is that a large part of their coastal waters is too shallow for their fleet of six nuclear-powered ballistic missile submarines, six nuclear-powered attack submarines and 46 diesel-powered attack submarines. Only the east coast of Taiwan would offer immediate access to deep waters. According to Kirchberger, some high-ranking retired Chinese military officers play with diabolical war plans. 'As the Americans are terrified of body bags, just torpedoing one or two US aircraft carriers with a 5000 crew each would be enough to chase away the Americans from the West-Pacific. The history of the Japanese attack on Pearl Harbor threatens to repeat itself. A war for the Ukraine is nothing compared to that.'



Antoon Oosting

Freelance maritime journalist and SWZ|Maritime's Editor-in-Chief, swz.rotterdam@knvts.nl



The Vertom Patty is the first of the Vertom 7000 vessels and will hit the water on 23 September.

NEW ORDERS

Vertom 7000/5600

What was already concluded some years ago, is that the fleet of multi-purpose vessels (MPVs) is of age and almost outdated. Therefore, shipowners are desperately in need of

new tonnage, resulting in a high demand for new future-proof designs. In response, Groot Ship Design BV (GSD), Leek, has been working on such designs. For the Vertom Group BV, Rhoon, GSD prepared the Vertom 7000 design (4750 GT) of which six have been ordered at Thecla Bodewes Shipyards, Kampen. This design is a front-runner project showing the

Name	Imo	Yard number	Delivery
Vertom Patty	9938729	358	Nov-2022
Vertom Cyta	9938731	359	Apr-2023
Vertom Thea	9938743	360	Aug-2023
Vertom Tomma	9938755	361	Dec-2023
Vertom Elisabeth	9972763	363	Jun-2024
Vertom Anette	9972775	364	Dec-2024

The Vertom 7000 or Labrax 7000 series being built by Thecla Bodewes Shipyards.



The Vertom 5600 is based on the same platform as the Vertom 7000.

possibilities of a single propeller MPV with an electric drive system. These diesel-electric vessels are equipped with one to four generator sets with two electric motors mounted to a single gearbox on a nozzled single propeller. The total system is energy efficient, fully redundant up to the gearbox and future proof. In future, one or more generator sets can be swapped for new powering technologies. For example, a generator set could be running on alternative fuel, an H₂ unit or a battery pack. The well-balanced installation in combination with bow/hull shape ensures improved power and fuel consumption with optimum vessel performance in speed and durability. Based on the same platform, sharing hull design, propulsion concept, accommodation and configuration of the ship's systems, GSD proceeded with a smaller version, the Vertom 5600 (3840 GT). The Vertom Group ordered six vessels of this type from Chowgule Shipyard Pvt. Ltd., Loutolim, Goa.

Imo	Yard number	Delivery
9980083	C-293	2024
9980095	C-294	2025
9980100	C-295	2025
9980112	C-296	2026
9980124	C-297	2026
9980136	C-298	2027

The Vertom 5600 series under construction at Chowgule Shipyard.

ASD tug 3212

Muller Dordrecht contracted Damen Shipyards for the supply of an ASD Tug 3212 (yard number 512576, imo 9949443) on 22 August. The keel had already been laid at Damen Song Cam Shipyard, Haiphong, on 9 July 2021. The tug will be completed within nine months' time. Rederij T. Muller, which has been known



The ASD Tug 3212 for Muller Dordrecht.



The RSD Tugs 2513 Fairplay-90 and Fairplay-91.

for its En Avant tugs since 1918, operates a fleet of nine tugs in offshore and seagoing towage support. Upon delivery in May 2023, the new tug will start work in the North Sea area, operating out of Rotterdam. The technical details of the Bureau Veritas classed ASD 3212 are: 450 GT, 135 NT – Loa (pp) x B x D (d) = 33.35 (31.90) x 13.40 x 5.35 (5.90) metres. Propulsion is provided by two Caterpillar main engines, type 3516C HD+ (170 x 215), with an IMO Tier III after-treatment system for low NO_x emissions and a total output of 5050 kW or 6772 hp at 1800 rpm on two RR azimuth thrusters, type US 255FP with a diameter of 3000 mm for a speed of 12.5 knots and a bollard pull of 83 tonnes. The bunker capacity is 134.6 m³. The ASD 3212 is equipped with a Heila deck crane, type HLM 10-2S, with a lifting capacity of 1.1 tonnes at 7.8 metres and a support boat.

Fairplay-90 and Fairplay-91

In August, the Fairplay Towage Group ordered two RSD Tugs 2513, the Fairplay-90 (yard number 515018, imo 9920485) and Fairplay-91 (yard number 515027, imo 9932177) with Damen Shipyards. The tugs are to be delivered in January 2023. The vessels are already under construction at Damen Song Cam Shipyard, Haiphong, so a short delivery time could be guaranteed. The keels were laid on 18 November 2020 and on 19 March 2021.

The details of the twin-fin Reverse Stern Drive (RSD) Tug 2513 built under class of Bureau Veritas are: 353 GT – Loa (pp) x B x D (d) = 24.73 (22.51) x 12.50 x 4.95 (3.50) metres. The propulsion system consists of two MTU main

engines, type 16V4000 M63L (165 x 190), IMO Tier III compliant with a total output of 4480 kW or 6086 hp at 1800 rpm on two RR azimuth thrusters, type US 255, with a diameter of 2700 mm for a bollard pull of 75.3 tonnes and a speed of 12.5 knots. The bunker capacity is 80 m³. Accommodation is provided for four crew members.

LAUNCHINGS

Fairplay-37

At Safe Sp. z.o.o., Gdansk, the Shoalbuster 2711 Fairplay-37 (yard number 571836, imo

9952995) was launched on 27 April by two floating sheerlegs, the Conrad Consul and Maja. The keel had been laid on 29 September 2021. Upon delivery to Fairplay Towage Polska Sp. z.o.o., Szczecin (scheduled in September), the Fairplay-37 will be the first Shoalbuster 2711 featuring ice class to enable working all year round to perform various operations, including in the offshore wind industry in the Baltic and North Sea.

The details of the Shoalbuster 2711 ICE are: 327 GT – Loa (pp) x B x D (d) = 27.02 (23.82) x 11.63 x 4.25 (3.00) metres. The propulsion installation consists of two Caterpillar main engines, type 3512C B (170 x 215), IMO Tier III certified, with a total output of 3750 hp or 2760 kW at 1800 rpm via two WAF773 gearboxes (7.087 : 1) on two fixed pitch Promarin propellers with a diameter of 2250 mm in Optima nozzles for a bollard pull of 45 tonnes and a speed of 12 knots. The hydraulic bow thruster has an output of 200 hp. The bunker capacity is 125 m³. The workdeck has a surface area of 75 m². Accommodation is provided for seven persons.

Solvik

At Royal Bodewes, Hoogezand, the 4288-DWT pneumatic cement carrier Ulvik (yard number 712, imo 9944089) was launched on 2 September. Godmother was Isobel Reed, legal advisor at SMT Shipping. The keel had been laid on 21 December 2020. It is the second in a



The Fairplay-37 is the first Shoalbuster 2711 featuring ice class.



The pneumatic cement carrier Solvik is the second in a series of four.

second series of four ice class 1A cement carriers ordered with Bodewes by Eureka Shipping (SMT), Limassol.

The details of the Solvik are: 2627 GT, 4288 DWT – Loa x B x D (d) = 89.98 (84.98) x 12.50 x 8.60 (6.00) metres. Propulsion is provided by an ABC main engine, type 6DZC (256 x 310), 1802 hp or 1326 kW at 1320 rpm, single propeller in a nozzle for a speed of 11.5 knots. The bunker capacity is 154.17 m³. The four holds have a capacity of 4215 m³ or 148,851 cft. The cement carriers are equipped with a mechanical loading and pneumatic Lovik unloading installation, which can load up to 1000 tonnes per hour or unload approximately 250 tonnes per hour. The first in the series, the Ulvik (yard number 711), was delivered on 21 July 2022. The third, the Florvik (yard number 713), under construction at Foxhol, is scheduled for March 2023 and the last (yard number 714) will follow in the course of 2024.

Two FCSs 4008 Patrol

Damen Shipyards at Antalya launched the first Fast Crew Supplier (FCS) 4008 Patrol of two for the Romanian Border Police on 5 July. The keels for the vessels were laid on 5 and 23 August 2021. The construction of these FCSs Patrol (yard numbers 545111, 545112 and imo 9943451, 9943463) is part of a procurement contract concluded on 10 March 2021 between the Romanian General Inspectorate of Border Police and Damen Shipyards Gorinchem BV. The contract also includes two

years of maintenance. The two vessels will be used by the Politia de Frontiera in border patrol missions for Frontex Agency, search and rescue operations, and other activities specific to maritime border control and surveillance. The Romanian Border Police manages 2070 km of the external border of the European Union, of which 225 km are at the Black Sea, and a maritime space of approximately 20,000 km² (inland maritime waters, territorial sea, contiguous area and exclusive economic zone). The FCS 4008 Patrol can perform missions lasting up to three days and up to a wave height of 4 metres. The ship has a crew of 28 people, but the stern deck can accommodate up to eighty people. The FCS 4008 has a steel hull and an aluminium superstructure. The details of the FCS 4008 Patrol are: 299 GT – Loa x B x D (d) = 42.95 x 8.65 x 3.90 (3.05) me-

tres. Propulsion is provided by four Caterpillar main engines on four fixed pitch propellers, with a total output of 6500 kW for a maximum speed of 30 knots. The vessel has a range of at least 600 nautical miles.

DELIVERIES

GD 4000

Albwardy Damen Shipyards, Sharjah, delivered the stationary Cutter Suction Dredger (CSD) 650 GD 4000 (yard number 561614) to HAC Cranes for Gulf Dredging and General Contracting Co., Kuwait, on 29 June. The CSD 650 was launched in the last week of November 2020 and completed in January 2021. The dredger was mobilised ex-stock and outfitted, inspected and delivered from the yard to the end user in just 44 days from contract signing. The standard CSD for capital mining and maintenance dredging was customised in accordance with the principal's requirements by adding an anchor boom installation, a deck crane, and a dredging instrumentation package, including navigation and communication equipment.

The Bureau Veritas coastal classed CSD 650 is a 535-tonne construction, with the dimensions: Loa including ladder: 61.20 metres, length over pontoons: 49.30 metres, beam: 10.50 metres, depth: 2.80 metres, draught: 1.65 metres and air draught: 8.40 metres. The spud carriage results in an impressive swing width of 63 metres at maximum dredging depth. The suction dredger is equipped with a powerful 700-kW cutter head with a diameter of 2100 mm, made for dredging at a maximum dredg-



The Fast Crew Suppliers 4008 Patrol for the Romanian Border Police.



The CSD 650 GD 4000 in tow of the mt Heisco 23.

ing depth of -18 metres. The dredger is fitted out with an inboard dredge pump, type BP-6560MD, driven by a Caterpillar diesel engine, type 3516C TA HD, with a continuous power rating of 1825 kW at 1600 rpm, located in a separate pump room. The total installed power of the CSD 650 is 2972 kW. The high efficiency dredger has a mixture production of some 7000 m³/h. The diameter of the suction/discharge pipe is 650 mm. For local after-sales support in the region, a Damen Service Hub is available.

Adriaen Coenen

The new research vessel Adriaen Coenen

(yard number NGS-35) for the Royal Netherlands Institute for Sea Research (NIOZ), Texel, was christened at Next Generation Shipyards in Lauwersoog on 6 July 2022 by Joke Cofino, widow of fleet replacement project manager Alex Cofino, who died unexpectedly last year. The keel laying took place on 8 July 2021 and the launching followed on 22 June.

The new vessel was designed by C-Job Naval Architects, Hoofddorp. The aluminium vessel (Loa (wl) x B (d) = 19.00 (16.25) x 5.58 (0.85) metres) provides facilities for two crew members and twelve passengers, including scientists, assistants and other guests. Its shallow draught of 85 centimetres allows the vessel to

pass the slack waters at high tide and beach itself on the sandbars. The new vessel can tow or push small objects, such as the Wad-tower (a mobile bird observation platform). The spacious working deck has room for two rubber boats or a 10-foot container. Propulsion is provided by two diesel generators on two Hamilton waterjets for a maximum speed of 20 knots (cruising 16-18 knots). The range on full power is twenty hours. A diesel substitute, HVO (hydro-treated vegetable oil), will be used as an energy source. This ensures a significant reduction in emissions, such as ninety per cent less CO₂. In combination with particulate filters and a catalytic converter on the exhausts, this is at least equivalent to the emission reduction achieved for example with methanol. The Adriaen Coenen is equipped with an A-frame with a safe working load (SWL) of 2 tonnes.

The vessel is named after the sixteenth century "citizen scientist" Adriaen Coenen (1514-1587), who was a fishmonger from Scheveningen.

Estoril

Damen Dredging BV delivered the modular MultiCat 1507/DOP Dredger 200 Estoril to Emodraga E.P. - Empresa Moçambicana de Dragagens, Beira, the leading dredging company in Mozambique, on 20 June. The Multi-Cat had been launched on 3 December 2021. The Estoril is designed for sand mining and maintenance dredging. The modular DOP Dredger can be dismantled and easily transported by trucks or in standard open top containers, even to remote locations. Additionally, reassembly can be done swiftly due to its plug and play design and the limited unit weight. After testing in the Netherlands, the modular dredger was disassembled and transported to the Port of Beira, where it was reassembled in only six days.

The total weight is 34 tonnes and the dimensions are: Loa x B x D (d) = 15.00 x 7.35 x 1.80 (1.30) metres, length over pontoons 11.70 metres and air draught 8.10 metres. The DOP 200 is equipped with a jet water-assisted suction head with a capacity of 180 m³/h and a pressure of 8 bar. The submersible dredge pump (maximum power at pump shaft 120 kW) can reach high mixture concentrations during maintenance dredging activities, pumping a maximum of 800 m³/h. The diameter of the



The Adriaen Coenen is a new research vessel for NIOZ (photo Flying Focus).



The DOP Dredger 200 Estoril can be transported by truck or in open top containers (photo A. Boer).

suction/discharge pipe is 200 mm and of the spherical passage pump 125 mm. The maximum dredging depth is 50 metres.

Patrick Blackett

In a ceremony held at Her Majesty's Naval Base (HMNB) Portsmouth on 29 July 2022, the Royal Navy "NavyX" innovation team took delivery of a Fast Crew Supplier (FCS) 4008 as the new experimental vessel XV Patrick Blackett (yard number 545101, imo 9762302). The FCS 4008 is intended to have a distinctive appearance, not painted grey, but matt black, carrying a large NavyX logo, and the pennant number X01 highlighted in gloss. Damen Shipyards won a tender to supply the high performance support vessel, a modified Damen FCS 4008. It is the first Damen vessel delivered to the UK's Royal Navy. The FCS 4008 has been acquired for use by the NavyX programme as a platform for trials and experimentation with new technologies. From start to finish, the experimental vessel procurement has been completed in less than a year for a total cost of just GBP 7 million. The project was launched in August 2021 and a tender was issued in December specifying a vessel that must have been built already. The requirement for an existing vessel meant there were very few suppliers able to meet this specification and a Damen FCS was obviously the likely solution. In January 2022, a Damen-built FCS 4008 was down-selected and the contract was signed the following month. The FCS 4008 series with a steel hull and aluminium superstructure are primarily designed

to transport up to ninety personnel and cargo to and from offshore oil and gas installations. The unique axe-bow hull design developed by Damen enables the vessel to slice through the waves with reduced resistance. The hull was launched at Kozle (Poland) on 16 January

2016 and arrived in tow of the mt Cyklop in Dordrecht on 12 February for completion and stock at Gorinchem. After trials on 23 March, ownership was transferred to the Royal Navy and work to adapt the vessel at Damen's covered shipyard facility located at Gorinchem in the Netherlands was started in April. The XV Patrick Blackett sailed from Stellendam to Portsmouth on 22 July.

The details of the FCS 4008 are: 270 GT, 140 DWT – Loa x B x D (d) = 41.20 x 8.70 x 3.90 (30.00) metres. Propulsion is provided by four Caterpillar main engines, type C32 Acert, total power 6500 kW on four fixed pitch propellers through four individual Reintjes WVS gearboxes for a speed of 30 knots. The hydraulically driven bow thruster has an output of 120 kW. Range at maximum speed is 1700 nautical miles or 3000 nautical miles at 20 knots. The bunker capacity is 65 m³. The aft deck has a surface of 140 m² unobstructed area for unmanned aerial vehicles (UAVs), autonomous underwater vehicles (AUVs) and other cutting edge technology. The large wooden work



The modified FCS 4008 XV Patrick Blackett for the Royal Navy.



The FCS 2206 E-Seven.

deck has a capacity of up to 100 tonnes (maximum deck load 2.5 tonnes/m²), securing points for two TEU containers together with electrical power and cooling water supplies. The foldable deck crane with a lifting capacity of 4 tonnes can be used to embark stores or deploy small craft over the side. Accommodation is provided for a core crew of five Royal Navy personnel plus overnight accommodation for up to twelve people in four two-berth cabins and one four-berth cabin. The XV is named after Patrick Maynard Stuart Blackett (1897-1974), a renowned experimental physicist.

E-Seven

Emar Offshore Services BV, Raamsdonkveer, acquired two Fast Crew Suppliers (FCSs) 2206

from stock on 30 March. The first, the E-Six (yard number 532325), has already started operations at Soyo, Angola, for offshore activities near the West African coast on 24 May. The identical E-Seven (yard number 532326) followed on 22 July. Both aluminium FCSs were built at Damen Shipyards in Antalya. The technical details of the FCS 2206 are: 65 GT, 52 NT, 10 DWT – Loa (pp) x W x D (d) = 22.10 (19.80) x 5.38 x 2.57 (1.17) metres. Propulsion is provided by two Caterpillar main engines, type C32 TTA, total power 1938 kW or 2634 hp at 2100 rpm via Reintjes WVS 430 on two Hamilton water jets, type HM 521, for a maximum speed of 30 knots. The bunker capacity is 6.15 m³ and the range at a maximum speed is 315 miles. With an extra fuel tank, the range is extended to 350 miles. The cargo

deck area has a surface of 25 m² with a maximum allowable deck load of 1.5 tonnes/m² or a total of 4 tonnes. Accommodation is provided for two crew members and seating for 42 industrial personnel. Additional features as specified by Emar are the fire-fighting capability, secondary gensets for redundancy and an auto pilot and night vision package.

Wellingdorf

Holland Shipyards BV, Hardinxveld-Giessendam, completed the hybrid ferry Wellingdorf (yard number HS2020-0702) in June. The Wellingdorf is completely emission-free and entirely powered by an EST-Floattech Green Orca battery system with a capacity of 1092 kWh. The ferry (24.70 x 7.20 metres) will be operated by Schlepp- und Fährgesellschaft Kiel mbH (SFK) within the area of Kiel, between Reventlou and Wellingdorf. The vessel has a capacity of 140 pedestrians and sixty bicycles. For power generation on board, twenty solar panels have been installed on the roof. The technology is considered to be so reliable that no diesel generator is installed for emergency power. The Wellingdorf also has an unconventional automated electric-hydraulic mooring system with electric-hydraulic mooring hooks. These are located on both sides of the ship and are operated from the wheelhouse. While moored, the propulsion system does not need power, resulting in even lower energy consumption. With the identical Düsternbrook (yard number HS2019-0072, delivered in December 2020), the Wellingdorf will extend the ferry service between Reventlou and Wellingdorf via Dietrichsdorf over the Kieler Förde. In tow of the mt Siskin, the ferry arrived at Kiel on 27 June 2022. The christening ceremony took place at Kiel on 22 August.



The fully electric ferry Wellingdorf.

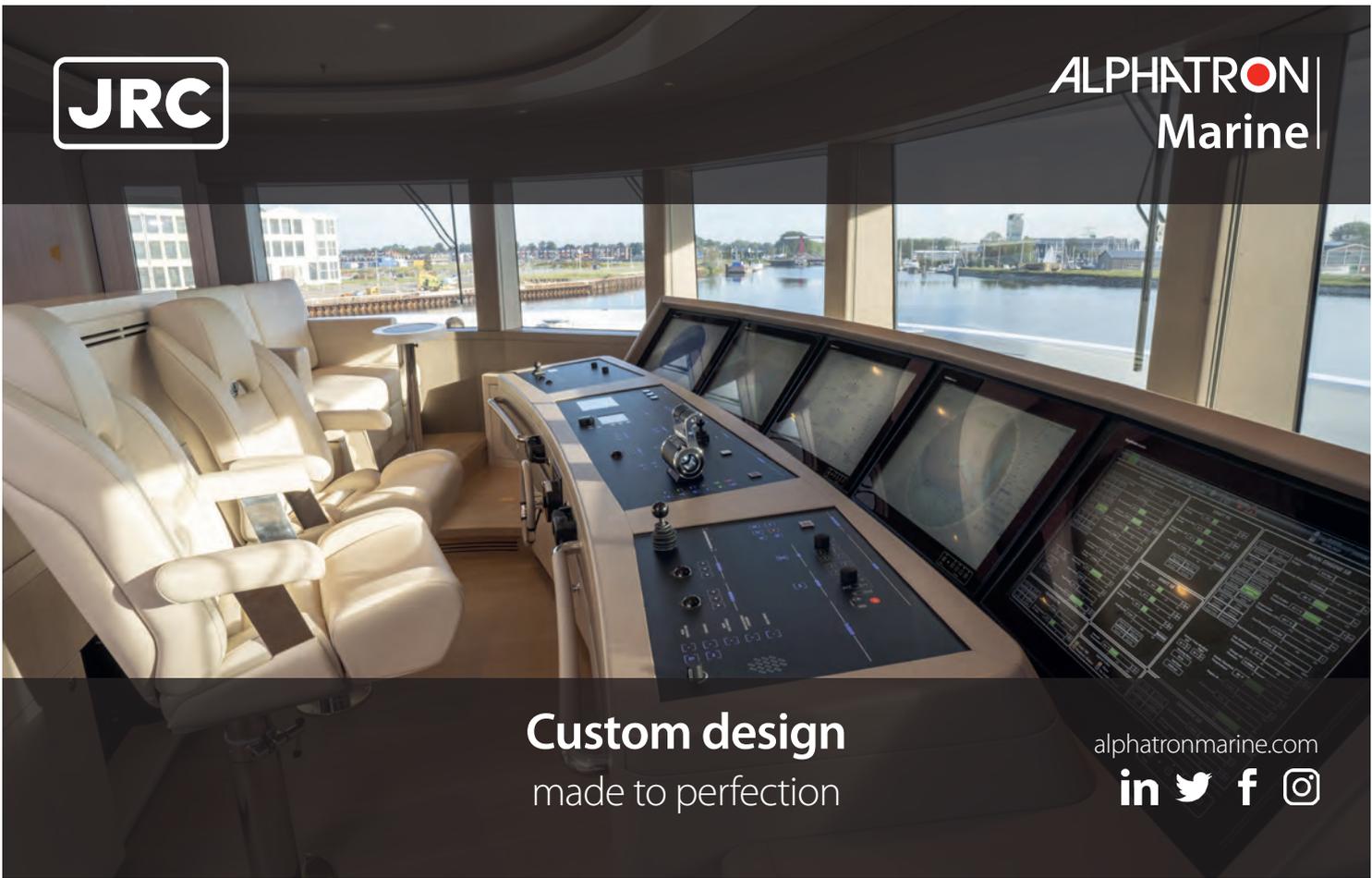
Gerrit de Boer

Has been a maritime author for over fifty years and is one of SWZ|Maritime's editors, gerritjdeboer@kpnmail.nl



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The fire risk of batteries

As reported before, Lithium-ion (Li-ion) batteries are increasingly impacting shipping safety with a number of fires. Allianz Global Corporate & Speciality (AGCS) marine risk consultants have now issued a bulletin describing the hazards and storage concerns associated with the newly manufactured Li-ion batteries being shipped on vessels as cargo or installed in electric vehicles. The bulletin mentions four main hazards:

- Fire: Li-ion batteries contain electrolyte, an ignitable liquid, and auto reignitions are common.
- Explosion: this can result from release of ignitable vapour/gases in a confined space.
- Thermal runaway: a rapid self-heating fire that can cause an explosion.
- Toxic gases: the first three hazards can produce irritating, corrosive or poisonous gases.

The most common causes of the hazards mentioned are:

- Substandard manufacturing of battery cells/devices.
- Over-charging of the battery cells.
- Over-temperature by short-circuiting.
- Damaged battery cells or devices.

Loss prevention guidance:

- Choose a reputable manufacturer: Manufacturers can range from excellent to substandard; manufacturing is a complex process and packaging specifications are and need to be very detailed as well.
- Check the battery's state of charge: The ideal state of charge for transport purposes is between thirty and fifty per cent depending on the manufacturer's recommendation, battery type and size, time anticipated in storage before use and its ultimate usage.
- Beware of short circuits: Short circuiting is a problem if the protection provided by the manufacturer and shipper between the terminals or cells is compromised. Once a short circuit develops, the internal temperature may rise to a point of ignition, which may quickly be followed by a thermal runaway event or an explosion.
- Follow packaging instructions and train your staff: Battery shipments, whether large standalone storage units or palletised container loads that have been packed according to Dangerous Goods Regulations, have to withstand the rigours of transit. Cartons can get dropped, hit by forklifts, or crushed by superimposed cargoes, any of which can compromise the battery/cell itself and introduce one of the listed hazards.
- Currently, there are limited fire protection options for Li-ion batteries. Contrary to the belief that Li-ion batteries contain lithium metal, which is highly combustible and reactive with water, this is not true. Water is the best medium to cool and control Li-ion batteries and has been proven to be the best agent to fight a fire involving Li-ion batteries. Other extinguishing agents may temporarily extinguish the fire, but they do not provide cooling like water. The heat generated

by the ongoing chemical reaction will rapidly spread back through the battery and can reignite any remaining active sections.

The main take away from the Allianz risk bulletin: All parties in the supply and transport chain must understand the hazards!

Fire-retardant thermoplastic piping

At the Seatrade Cruise Global exhibition last April in Miami, the Swiss company GF Piping Systems presented HEAT-FIT, a fire-retardant, lightweight, corrosion-free thermoplastic piping system for essential applications on board of ships. The demand for thermoplastic piping systems has grown considerably over the last few years. The use of such pipes can make ships more efficient whilst reducing maintenance cost. The HEAT-FIT jacket system allows thermoplastic piping to be used for essential applications on board cruise ships, merchant vessels and offshore platforms. Such applications require high safety standards, including a level of fire resistance.

The pipe jacket system consists of two layers of TPU (thermoplastic polyurethane). Between these layers is a high temperature fiberglass fabric, which protects the pipe beneath, as well as an intumescent coating that is non-toxic and water-based, an environmentally safe material. In the event of a fire, this graphite char coating expands and creates a protective barrier. As a result, HEAT-FIT is capable of withstanding temperatures of up to 1000 degrees Celsius for thirty minutes at a pressure of 3 bar. The system can easily be installed and has a scratch and stain resistant coating specially developed for the demands of the harsh marine environment.

This fire-retardant piping system has been subjected to various tests, such as fire resistance in accordance with IMO Resolution A753 fire endurance L3 Code, and surface flammability as well as smoke and toxicity in accordance with IMO Resolution A653 2010, FTP Code Part 5 and Part 2. The approval process with the various authorities is in hand. (Based on information from press articles and information from the manufacturer.)

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GOOD TIMES FOR YACHT BUILDING

Royal Huisman builds first sportfish yacht of 52 metres

Yacht building is in a comfortable market position. Various domestic and foreign shipyards are reporting a good first quarter. Yacht builder HanseYachts saw its order book double in the first three months compared to last year. And in the Netherlands, Wim Beelen has ambitious plans for a yard in Amsterdam (ADM site) and Balk Shipyard in Urk wants to specialise in yacht building in a new harbour near Urk on the IJsselmeer.

Royal Huisman in Vollenhove has already chosen a specialisation and, according to spokesman Jurjen van 't Verlaat, has a healthy order book containing at least six projects, four of which were under construction in June. Here too, things have changed. For a year now, the yard has been working with an innovation team and a “five-slice pie chart”, consisting of the spearheads sustainability, Featherlight, sailing systems, user experience and tools and methods.

Choice of sails

In addition, Royal Huisman opts for sailing yachts without a doubt. ‘They are more fun to travel from A to B, while motor yachts have the looks to be in A or B,’ the yard says. Is that, combined with the use of free wind energy, enough to book extra sailing yacht orders? According to Van 't Verlaat, that is exactly the story with project 410, the 85-metre “New World Sloop”, which is also considered to be the world’s longest single-masted

yacht. Because measured across deck, it is four metres longer than record holder Athena. On board, much attention is paid to green and silent energy. Rondal designed the carbon mast and boom and sailing system. ‘The client chose this, while many of his friends have motor yachts.’

On another yacht under construction, project 405, lighter materials, if class regulations allow it, will bring weight savings of up to eleven per cent.

Fishing boat

But Royal Huisman is not averse to motorised craft either. A striking example is project 406, a six-deck, 52-metre sportfish boat. ‘It is our first sportfish yacht and the client could not find another yard willing to take on the project. So we started the design from scratch.’ In the construction hall, aluminium hull and superstructure lie side by side. The reporter looks doubtfully at the ceiling. ‘They put the superstructure on for a short moment and found that some eighty

Photo: Client teams ask Royal Huisman’s innovation team consisting of Jidde Looijenga (left) and Hermen de Jong what can and cannot be done.



The 52-metre-long sportfish yacht is being turned (photo Tom van Oossanen).

centimetres up to the ceiling remained.'

The other motor yacht – with two modest masts – in the order book is in fact a refit, but so radical that the shipyard refers to it as a newbuild. This Atlantide from the 1930s will be completely overhauled and restored in two years' time for an American owner.

'Plenty of demand'

Van 't Verlaat is familiar with Wim Beelen's plans to establish a superyacht yard at the ADM site in Amsterdam and knows that Balk in Urk wants to focus entirely on building yachts. 'There is enough demand and all those yachts require the necessary annual maintenance. The more supply, the more Dutch expertise. On the other hand, they could of course also become competitors when the market shrinks.'

Royal Huisman, its subsidiary Rondal in Vollenhove and Huisfit in Amsterdam employ over 300 people on a permanent basis, as well as a diverse group of co-makers and trainees. 'It's harder to get new personnel. We now have fourteen vacancies, which is more than we used to have on average.'

Innovative duo

In Huisman's working method, client teams submit the wishes of the client(s) to innovation teams to see what can and cannot be done. Jidde Looijenga and Hermen de Jong make up the innovation team,



An exoskeleton protects the workers at the yard.

which for special questions can rely on specialists in the organisation. That is why we asked them a few questions.

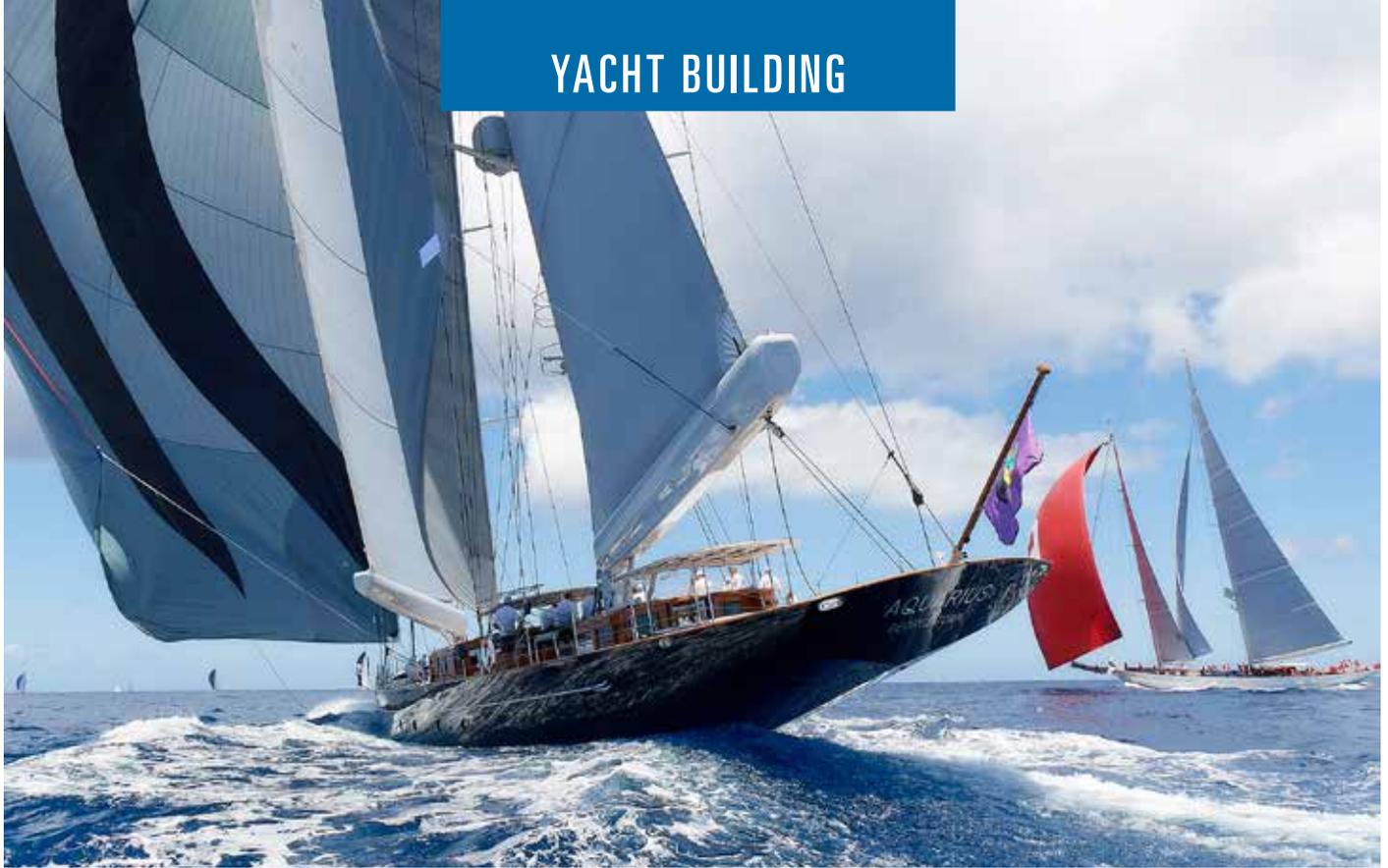
What innovative propulsion techniques are used in projects 404 to 410 (such as the foam-cored interior of project 405)? I can imagine that the choice for a certain fuel leads to different constructive requirements.

Whereas the application of various innovative fuels is a choice in itself. And what consequences does the fuel choice have for hardware like propulsion units, batteries and fuel cells?

'To a greater or lesser extent, all our newbuild projects use hybrid propulsion'

Innovation managers De Jong and Looijenga: 'To a greater or lesser extent, all our newbuild projects use hybrid propulsion, regeneration on the propeller and winches, and large battery packs for peak-

shaving and quiet times. Sailing yachts also use a lot of hydraulics and we have created solutions that fit into our hybrid energy con-



Racing with the Aquarius. It was designed by Dykstra Naval Architects and measures 56 metres overall and 41 metres on the waterline, which gives it a hull speed of sixteen knots. With its draught of 4.8 metres, it won't compete on the IJsselmeer.

cept. The result is more comfort, more redundancy, more flexibility and lower fuel consumption.

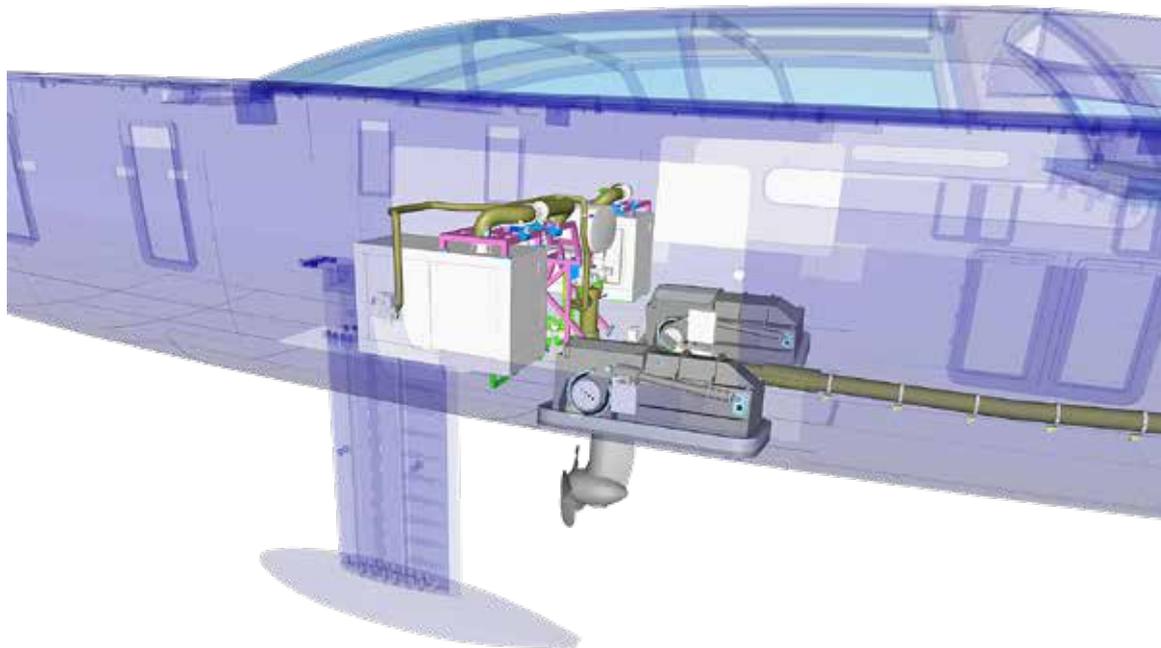
What seems to be the ideal – holistic – solution (the holy grail)?

De Jong: 'For the near future, we conducted a broad feasibility study into possible sustainable fuels and their suitability for our yachts. We focused on non-fossil and emission-free solutions. What the future solutions will look like differs per yacht and per type of customer and they can consist of a combination of batteries, hydrogen and methanol. In our opinion, all solutions always go hand in

hand with increased awareness of energy consumption and reduction of energy needs. The big advantage of sailing yachts is that they can generate their own energy and that makes the solutions we work on rather unique.'

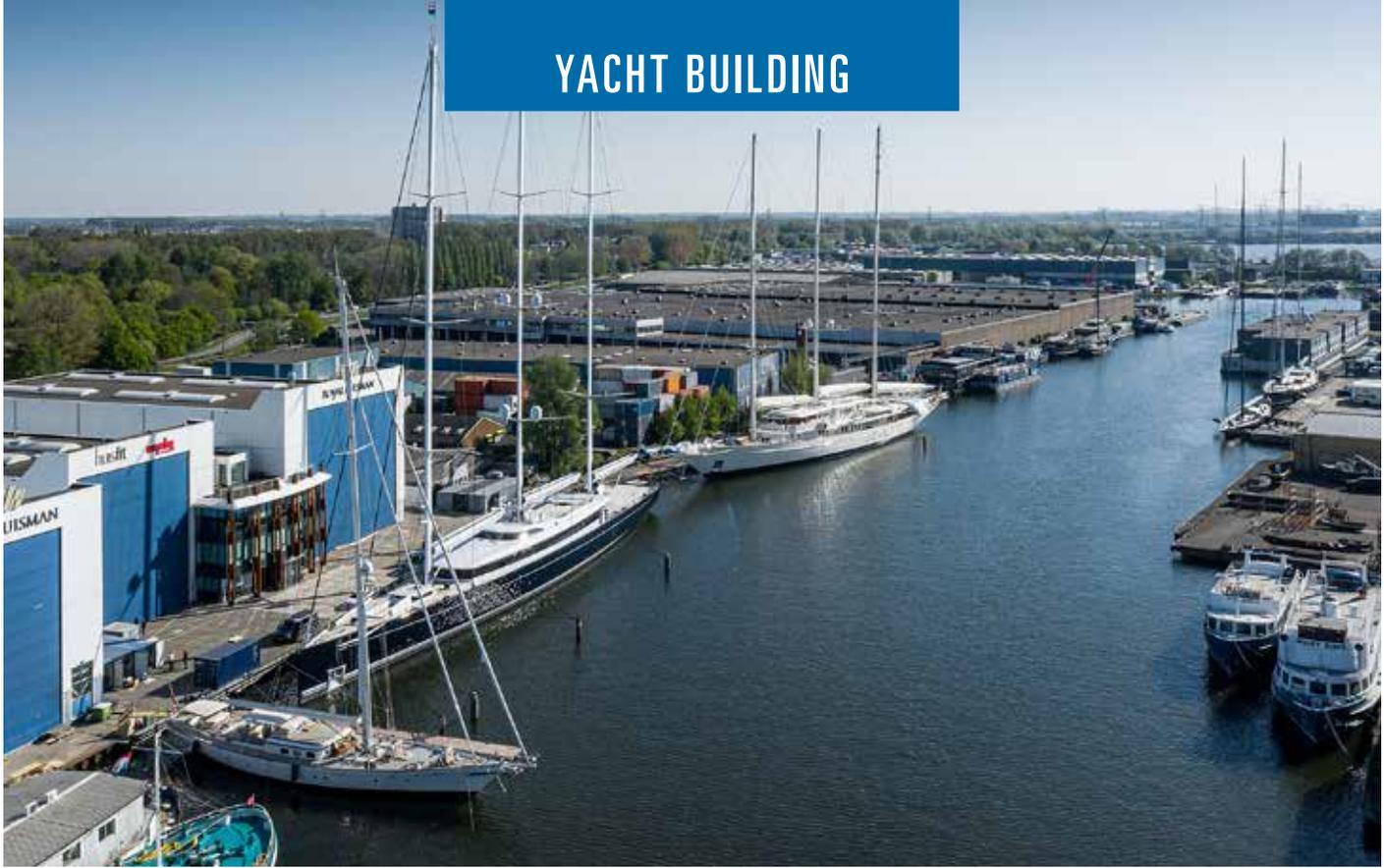
Do clients really order "greener" ships? Apart from dimensions and comfort (Featherlight), what are the important drivers? Does the (future) crew also have a say?

De Jong: 'As can be seen from the solutions in our newbuild yachts, hybrid and electric propulsion are now self-evident for customers



The electric propulsion unit of project 404, a 59.7-metre-long "high performance sloop".

YACHT BUILDING



Royal Huisman's location, Huisfit, close to Amsterdam (photo Tom van Oossanen).

and for us as a shipyard. Indeed, the crew, be it the captain, the engineer or the chief officer, often plays a major role in determining the intended use and layout of the yacht.'

Van 't Verlaat (PR & Communications): 'Sometimes the obvious is not so obvious at all, like the large amount of energy available on the ocean: wind! Many of our yachts are therefore already very "green and sustainable". It surprises us sometimes that the majority of superyachts worldwide are not yet propelled by sails. Wind propulsion will always surpass the energy consumption of motor yachts. Moreover, wind energy is "free" – of gases,

costs and noise. And sailing is fun, too... We expect that more and more motor yacht owners will switch to a yacht that uses the wind.'

In your spring newsletter, you say that fuels of the future and reusable materials 'are being researched'. What does that look like in practice? Who are you working with, where do you find knowledge about these new materials?

De Jong: 'We research new materials and fuels together with partners such as potential suppliers, knowledge institutions and architects. Where necessary, we build prototypes that we test to prove their performance and gain new, practical insights.'

What developments do you see coming for the sailing systems on board?

De Jong: 'The current rigs are high tech and will continue to interest performance-oriented customers. We expect that a group of customers will emerge that is interested in more accessible sailing systems: simpler in form, more freedom of design for the yacht, cheaper to buy and use, quickly deployable and easy to automate.'

Things are also changing in tools and methods.

De Jong: 'We have developed algorithms that enable extensive structural optimisation. This has allowed us to save up to eleven per cent of aluminium hull weight in recent projects.' 'Other weight savings result from hybrid constructions, in which we make large structural parts such as the castings for the keel, superstructure and cockpit in carbon fibre and integrate them with the aluminium hull. For these and other applications, we have researched a lot of constructive and flexible adhesive connections.'



Sander Klos

Freelance maritime journalist and one of SWZ|Maritime's editors, info@mediamaritiem.nl

BALK TO TARGET YACHTING

'We help the Chinese owner bring his own yard to a higher level'

The somewhat modest shipyard Balk at Urk got a lot of publicity over the last few months. The takeover by the Chinese company Zhongying International in January led to questions in Dutch Parliament and shortly thereafter, the yard declared it would start concentrating on (super)yachts.

So plenty of reason for an interview, although it was a little different than expected. Although figurehead Daan Balk is in the office on the 30th of June, we talk to Evan Kortmann (53), who had been getting a feel for the yard over the past few weeks, but whose official appointment as commercial manager only started the next day. He doesn't think Balk will elbow its way to the top of the Dutch super-yacht sector, but wants a more artisanal image. The famous commercials of Dutch beer brewer Grolsch *vakmanschap is meesterschap* (craftsmanship is mastery) can be a good example, he thinks.

Newcomer

Kortmann is a newcomer to shipbuilding, but his father owned an expert office, specialised in pleasure craft and houseboats. He worked in the wholesale of wood and do-it-yourself materials for 25 years and made a career switch into the sea transport of yachts in 2015. 'The yachting business is often more focused on selling new ships and less on quality of delivery and after sales.'

'As a yacht transporter, I got to know Daan Balk, who had an order for rebuilding the motoryacht Sandalphon. Another example of such a rebuild is project L V (Feadship, ex-MQ2, 1975). This yacht (50.50 x 8.45 metres, 485 GT) is completely being rebuilt and all decks are extended by 2.5 metres. The interior and design are being renewed as well, just as the electricity, communication, navigation and entertainment systems. The sundeck gets a jacuzzi, bar and lounge.'

'The yachting activities at Balk have increased enormously, with a large role for refit and rebuild. A lot of work is carried out for colleagues in the sector, such as Feadship and Heesen. At first, this concerned yachts of up to forty metres, but nowadays these are forty to sixty metres. That difference in length forces us to make choices. Working on a smaller yacht, you mostly communicate with the owner. With larger yachts, you are dealing with bureaus and advisors and tougher appointments. From seventy metres onwards, you do business with large, professional companies.'

The sector is cautious with names of clients and cooperating companies. When asked about that, Farouk Nefzi, head of marketing at Feadship, explains: 'Subcontractors can name Feadship on their list of references in one-on-one situations. We try to avoid that in the media, because a lot of subcontractors are proud to work with and

for us (and we with them). You can get an enormous deluge of media messages naming Feadship and that hinders our story line. Moreover, competitors can use this information to state that they deliver the same quality when they work with the same subcontractors.'

Balk becomes a brand

Focusing on yachting means adjusting the organisation. The three-headed management consists of CEO Daan Balk, CFO Ronald Frijling and Kortmann. 'We were always modest and conventional, but now we seek more publicity. Up until now, Daan was the figurehead of Balk, but this company is more than that. And you can't expect one man to have the total overview of everything that's going on. For the Balk "brand", we are making plans in which marketing and professional sales techniques play a larger role. We have a neat website, but we can do better and we will do more on social media. We have been attending the shows in Monaco and METS in Amsterdam for years now, but possibly we will also join Boot Düsseldorf again. Or we can organise seminars, for instance about developments in yacht design.'

Chinese owner

Although the website calls the relation with Zhongying a 'strategic partnership', Kortmann frankly says the 'large investor' is the new owner of the shipyard. He refuses to be specific about the takeover amount. 'In China, it's still inappropriate to show off your wealth, so they seek investments with a good return. Zhongying invests in plantations for tea and tobacco and plane hire. They contacted us, I understood.'

According to Kortmann, the new owner has a yard in China for yachts up to 46 metres and Balk is not counting on any Chinese orders. 'Modesty is also important with superyachts. Therefore, Chinese owners share their yachts; five people invest 2.5 million each. That's still acceptable for their surroundings. Zhongying sees us as a service point in northwestern Europe and chooses for the maximum say in the company so far as that is concerned. Until now, we have experienced very little interference in our operations.' We get no chance to speak to the new owner or his representative.



Kortmann at the propellers of the Flying Manta, which is being refitted at the yard in Urk.

Balk, however, is to help bring the Chinese yard to a higher quality level.

Investments from abroad

He has no comment on the questions by CDA Member of Parliament Hilde Palland, who expressed fear of leaking important knowledge. 'We read about it in the local paper. Prior to that, the CDA had no contact with us about these worries. Therefore, we did some research for ourselves' (see text box).

A lot of Dutch yards use or used foreign capital, like Heesen in Oss (Russian) and Oceanco, with money from the Middle East. 'How reliable are those relationships, compared with our Chinese? Our work is capital intensive with large risks and we can't ask a bank for support for half a year. So we need other resources. And if your capital comes from the US, then you have to deal with short term strategies. In comparison to that, Asians have more patience.'

The shares in Heesen owned by the Russian oligarch Vagit Alekperov, were sold this spring for an unknown amount to a foundation set up by Dutch board members of the yacht builder. Heesen feared it would suffer from the consequences of European sanctions against "friends of Poetin" because of the war in the Ukraine.

Harbour Flevokust

Another interesting development is the, albeit somewhat hesitant,

construction of the new Flevokust harbour between Urk and the bridge at the entrance to the Ketelmeer. Balk wants to build a new yard there. 'I understand that the provincial government needs more time. Due to all the developments concerning the emissions of nitrogen, the sentiment is changing. Furthermore, environmental and

nature organisations are launching more protests where infrastructure projects are concerned. I guess the project has an eighty, ninety per cent chance of success, but there are constantly new surprises.'

'To build the harbour, the province has provided an unknown investment credit. And even if we knew how much it is, we are not allowed to tell. At a wild

The yachting activities at Balk have increased enormously, with a large role for refit and rebuild

guess, I think the province has to invest between forty and fifty million euros. And the entrepreneurs will invest a similar amount in their own locations. I estimate the total investment in the harbour at more than a hundred million.'



With these slipways and a lifting system, the yard can swiftly get ships in and out of the water (photos Sander Klos).

NEW LAW MUST HELP PROTECT OLD KNOWLEDGE

Member of Parliament and co-questioner Hilde Palland from Kampen, answers our question by saying that the questioners didn't pursue the case around the Chinese owner of Balk. 'The problems are more widespread and meanwhile Parliament has passed a law for checking the safety of investments, mergers and takeovers. We want rules that help us to master risks for our national security by acquisitions of all forms. A test will be in place for activities that lead to changes in control over or influence in vital companies and suppliers or businesses that possess sensitive technologies,' Palland says.

The CDA aimed higher. 'This law does not cover the takeover of crucial research and innovative systems and/or clusters of companies of national or strategic importance to the Netherlands. Therefore, the sale of the hightech campus Eindhoven to a state-owned company from Singapore wasn't checked. We amended the law to broaden it to acquisition activities around the management of a company campus. We also ask the government to see which extra instruments can help protect places such as company campuses or regional clusters for research and innovation.'

Kortmann thinks the investment of Balk himself has risen from the original twelve million euros to approximately thirty million euros. Daan Balk has already sold the existing yard to fellow townsman Hartman, who, according to Johan Hartman, will continue building and maintaining yachts of up to 65 metres as well as other ship types. At the new yard, Balk will still welcome fishing vessels and other commercial vessels.

'Market is big enough'

Kortmann is not worried about competitors close by and thinks Royal Huisman in nearby Vollenhove plays in another, higher league. 'The market is big enough. Although all newbuilders worldwide have waiting lists, that can change quite suddenly. You can't count on constant growth and this sector has a highly cyclical sensitivity, but we can protect and influence our market by putting customer satisfaction first. We cherish the clients that visit us each fall for maintenance. And when the twenty per cent of Russian owners really have to leave the market for a longer period, the shortening waiting lists will deliver challenges of their own.'

Okay 2022

At the end of June, the order book contained seven yachts in working progress and three newbuilds that have been signed for. 'We normally can handle fifteen ships a year and can work on six ships simultaneously.'

Without specifying amounts, he calls 2021 ‘a very nice year with a similar profit’. He estimates 2022 will score thirty per cent higher thanks to some good and large projects. ‘For a sound base, every year, you need one or two fat orders that take more than one year. And usually, summer is the low season, but not this year.’ Rather remarkable is the order for a hull for a US aluminium yacht builder. When orders are too big for the housing at Urk, the building moves to Harlingen in the north, for instance. Although not a priority, Kortmann mentions negotiations for complete newbuilds.

Call the customer

Balk aims at ‘super satisfied’ customers, so Kortmann called some clients. ‘The central message is, that they think we are a good and modest company without unpleasant surprises in terms of costs. And we need to smoothen our communication.’ Balk has eighty employees and 25 per cent of them work freelance. The company has about fifteen vacancies for project managers and good technicians. ‘We maintain a sort of labour pool with Vitters, De Vries Makkum, Huisman and Wajer.’ About five per cent of the employees lives at Urk. According to Kortmann, Balk pays his employees more than the collective agreement on wages in the Dutch metal industry. ‘We talked about this with our people and everybody said Balk works “above average”. It’s a good sign that we have employees from the third generation.’

Aiming at IMO targets

Where the environmental goals of the sector are concerned, he declares that Balk works according to the IMO goals that sea shipping must emit forty per cent less CO₂ by 2030. ‘Although superyachts don’t belong to the range of IMO ships, the sector works hard on lowering emissions. Our clients have a limited amount of sailing days and for a large part of the time, the vessels are in port. There they use electricity from land, so in most cases without CO₂ emissions. Our generators are becoming greener and there is a growing use of sustainable fuels like hydrogen. Balk Shipyard mostly works in the market for refits and sees that customers are showing more interest in cleaner generators and engines. We are continuously in contact about these topics with suppliers and clients.’



Sander Klos

Freelance maritime journalist and one of SWZ|Maritime's editors, info@mediamaritiem.nl

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WAJER LAYS OUT FUTURE FUELS AND H₂ PLAYS PART

New and larger type in planning phase

King Willem-Alexander has one. Wim Beelen and Ferry Sint (ADM-site in Amsterdam) have one (the Lucky Us). Best quarterback in American football Tom Brady also has one; a motor yacht from Wajer. A good reason to have a chat with Ronald van Hulst (54), who as director of operations at Wajer in Lemmer is responsible for “all new product lines” and discuss the activities of innovation engineer Dennis Bos. After the Wajer 55 (55 feet) and the 77, Wajer is working on a new line. A Wajer 99? He visibly hesitates, but does not admit to anything.

After 27 years of Rondal and Huisman, Van Hulst switched to Wajer a few years ago. ‘A totally different dynamic; from a builder of one-offs to a series builder, from mainly sailing yachts to only motor yachts. And Wajer is a family business again. The company is mega progressive and in thirty years it has grown from a seven-metre captain’s launch (*kapiteinsloep*) to a Wajer 77. With our 200 employees, we have an annual turnover of 100 million euros, comparable to that of Huisman.’

Type 77 is catching on

He joined Wajer as a business developer after a sabbatical of more than three months and a cycle trip to Rome. In the meantime, the builder had a 38 and a 55-footer in its range. The ‘somewhat tougher’ 55S, thanks in part to its distinctive lines, brought the Wajer brand worldwide notoriety with a photo of quarterback Tom Brady throwing the Superbowl cup from his aft deck to another boat. Van Hulst played a large role in the development of the 77, of which three have now been delivered and another seventeen have been

sold to new and existing customers. He looks with pleasure at the rendering behind him on the wall, in fact an assembly photo, in which the 77 cuts through the waves true to life.

‘I like the fact that the Wajers aren’t into prototypes. Once everything has been sorted out, we just start building. According to the Wajer DNA: graceful lines, clever technology.’

He points out on the photo where the 77’s hawseholes are: in the corners of the portholes, among others, and in such a way that you hardly see them.

Sales pitch

Dries Wajer toured around with the rendering. ‘He got approval and a letter of intent. Later, two more letters followed and that was enough to give the go-ahead, because with four boats a year, we have a business case. In the meantime, things are going so well that we are expanding the annual capacity in an extra hall to seven. That brings our total annual capacity to over forty ships of various lengths.’

The 77 differs from the rest of the family in terms of construction material. These were made of polyester (GRP), the 77 of aluminium. ‘In terms of lifespan, polyester is excellent, but the initial costs of a design are high. This is less of an issue with aluminium, while customers have a higher quality feeling with aluminium.’

55 with towing eye

Wajer sells an “all-in concept”. Service points on Ibiza, Mallorca, in Port Grimaud near St. Tropez and recently Miami provide skippers and service mechanics. When a customer wants to sail, the skipper makes sure everything is ready and the fridge is filled. Often, the skipper sails while the family and guests relax.

In that case, a 55 – with four berths – is suitable for day trips, while the 77 offers space for nine people in three cabins and can there-

BEST PRACTICES

In the Wajer magazine, practical tips on anchoring (‘a surface other than sand gives less bite, so you have to throw more chain’), dry sailing (‘either stationary at 5 knots, or smooth sailing at more than 14 knots’) and water sports (‘16 to 18 knots for water skiing, around 12 for wakesurfing’).

And let’s not forget the section “Did you know that...” ‘Dries is pulling his hairs out when he sees a Wajer navigating outside the harbour with all of its fenders out.’



The rendering behind Van Hulst shows the Wajer 77 sailing true to form. Sufficiently convincing for three potential buyers. Below left is the design for a new steering wheel.

fore be used for several days. A customer would pay over two million euros for a 55 and over six million euros for a 77. The latter has a top speed of 39 knots at a weight of 50 tonnes.

In special cases, the motor boats are used as chase boats for superyachts. 'That is why the 55 has a towing eye.' Really big superyachts of more than 100 metres sometimes have a Wajer 38 in dock.

Styling and hidden technology

To explain the focus on styling, Van Hulst shows a new steering wheel printed in plastic. 'This will be given our logo, a nice finish and will be upholstered. We can then use it on all our ships.' He points to the rendering behind him. 'Characteristic of our boats is the flared bow and the tumbling home stern post.' In his opinion, a timeless design.

Asked about innovative differences between the 55 and the 77, which were about six years apart, he mentions the 'flexibility on deck'. We watch animations, in which two benches with accompanying tables on the sun deck slide towards each other, creating a large dining table with surrounding benches. 'You don't want to see any rails under those benches, so there are motors with wheels un-

der the benches. Very expensive to build, but that's how we want to distinguish ourselves.'

Another animation shows how Wajer circumvents the "cake server" behind the stern. 'We build a platform "between the cheeks" that can move in all directions – even under water – and over which we launch the dinghy, for example. The focus is on the styling and to show as little underlying technology as possible.'

He rises from his desk chair. 'This is the office version of the Wajer chair, for which we looked closely at the seat of BMW's M3.'

Hydrogen seems best

Wajer is looking at hydrogen (H₂), among other things. For the time being, that seems to have the most advantages for planing motor yachts. 'For a planing motor boat, sailing on electricity is not yet an option in terms of power requirements and weight of the installation and batteries. Once you're planing, it requires very little energy, but to get the boat planing, you need a lot of power.'

The current vessels use Volvo Penta IPS diesel engines with pulling thrusters. 'The 55 has three times 650 hp, the 77 three times 1350 hp. They can run greener on biodiesel, but diesel propulsion is finite in the long run.'

Hydrogen as a fuel requires a lot. 'For bunkering, we are thinking of energisers on our serving points and perhaps in ports like Amsterdam. On board you have to deal with the kilos and the required pressure. We have the H₂ storage in relatively large tanks on board

For the time being, hydrogen seems to have the most advantages for planing motor yachts

ready on paper, whereby the high pressures require good provisions, so that the people on board can leave immediately in case of emergency.' The designers put all the characteristics of a fuel like hydrogen in a matrix. 'Costs, space requirements, prices. You wonder how long it will be before you can supply hydrogen via a third party in Ibiza, or whether you will have to aim for your own energiser.

At the moment, hydrogen is still expensive at around 4.50 euros a kilo, but we expect that to drop quickly when it is more widely used and other fuels, especially diesel, get a more negative ring to it.' Whether today's hydrogen is already completely green remains to be seen. 'But we are moving towards a future where wind turbines at sea produce hydrogen and ships can bunker there.'

Looking around

When it comes to staying up to date with new knowledge, he recalls how the 'extremely visionary' Wolter Huisman visited many companies. 'He came away from Fokker with the idea of overalls with the company name on them and wanted the work floor to be clean as a dining table. Later, other companies followed that example. At a trade fair like Monaco, you mainly get ideas for styling, but hardly

PRODUCTION PROCESS IN BRIEF

The magazine covering Wajer's thirtieth anniversary provides the following brief overview of the production process.

After the design letter has been drafted, a sketch plan of the interior and exterior is made and a general plan with profiles and layouts. After the "design freeze", the architect gets to work with structural calculations, a lines plan, weight calculations, power and speed, weight and trim, and CE requirements.

Wajer develops all this into a production model that includes determining the structural design, bulkheads, floor heights of tanks, engine room layout, outfitting, deck equipment and a stripped-down 3D model.

This results in a cutting package and drawings for the hull builder. Meanwhile, Wajer continues with details like outfitting and deck furniture, work drawings for the yard and information for purchasing.



Van Hulst: 'Hydrogen fits with a planing motor yacht' (photos Sander Klos).

any technical ones. What does help is that the Wajer name is better known now, which opens more doors for us. We visit technical companies, network and sponsor. For example, we support the hydrogen coaching boat of a sailing club. In return for our support, they keep us informed about their experiences with pressure distribution, storage, the fuel cell and the distribution system.'

A design engineer from Wajer will attend the HISWA Symposium in November at the RAI in Amsterdam, but otherwise Van Hulst does not think highly of cooperation in associations. 'The Holland Yachting Group once had a plan for a central Dutch refit location. It would have been good for the Netherlands as a whole, but it proved impossible to get competitors to cooperate in one place.'

Green and jobs

Van Hulst is also asked to what extent there is tension between making a product as sustainable as possible that in itself is not so sustainable in terms of raw material use.

'It is true that our ships are not a primary necessity of life and you can think about the sustainability of a ship in relation to the owner, who is flown in by private jet because of his busy schedule. But on the other hand, construction, maintenance and everything that happens around boating provide a lot of jobs and thus livelihoods for many people.'



Sander Klos

Freelance maritime journalist and one of SWZ|Maritime's editors, info@mediamaritiem.nl

ENERGY TAKES CENTRE STAGE AT HISWA YACHT SYMPOSIUM

In view of the climate transition, “Get Energized” is the theme of the HISWA Symposium on Yacht Design and Yacht Construction on 14 and 15 November in RAI Amsterdam. The theme also refers to the energy required to meet this challenge.

TEXT: SANDER KLOS, FREELANCE MARITIME JOURNALIST AND SWZ|MARITIME EDITOR, INFO@MEDIAMARITIEM.NL

The programme is a mix of scientific presentations and their applications in everyday life. The symposium aims to connect science and practice, share knowledge and accelerate innovation. Climate goals demand a drastic reduction of the emission of greenhouse gases. The European Climate Law aims at climate neutrality by 2050 and a 55 per cent reduction in greenhouse gas emissions by 2030, compared with 1990. So we only have eight years to go.

Design for cruising speed

One of the topics at the symposium is the design of the hull. A lot of yachts are designed for a certain top speed. Research on the use of motoryachts shows that top speeds are rarely achieved. As a result, 99 per cent of the time, a yacht sails with a less efficient hull. This requires more energy than a hull design based on cruising speed. A missed opportunity, because energy that's not used, is the first gain. Research institute MARIN and De Voogt/Feadship present their research results on this topic.

Hull Vane, fuels, rotor

Yacht architect Van Oossanen explains the dynamic Hull Vane, a method to reduce resistance and energy consumption. A new feature is the adjustability of this “underwater spoiler”. Lateral, a designer that is closely associated with superyacht builder Oceanco, explains the ins and outs of alternative fuels, their environmental impact and how they will influence yacht design. The most sustainable ways to propel a boat are sailing and rowing. The sail, as a vertical wing or in alternative forms, is still being researched to increase its performance. TU Delft shows research results on a vertical rotor with “wing tips”. This technique also offers opportunities for commercial yachts.

Open source

Dykstra Naval Architects was commissioned to design a 68-metre sailing yacht without internal combustion engines. Energy, generated by regeneration and the sun, is stored in batteries. Remarkable is the fact that the owner has made all the information about the de-

sign, research and software development of this yacht available completely “open source”. This is a break with the usual practice as normally, a lot of knowledge is confidential. This could accelerate knowledge development and innovation if more parties were to adopt it.

After this, Royal Huisman presents the results of research into a new type of wing sail.

Talking to students

The organisation attaches great importance to the participation of students. Therefore, students pay a lower entrance fee. It is important that students and businesses in yacht building meet. Students of the TU Delft will also give a presentation on the foiling boat that runs on hydrogen, which they have designed and built.

Entrepreneurs and others can get in contact with students through a “matching app”.

The full programme is available at www.hiswasymposium.com. The symposium can be attended either physically or online. For more information, please contact Michaël Steenhoff, m.steenhoff@hiswarecron.nl.



The dynamic Hull Vane provides active pitch stabilisation (photo Hull Vane).

HYDROGEN SHIPS: WHISTLING IN THE WIND OR INESCAPABLE?

SH2IPDRIVE aims at reliable, safe, scalable and cost-effective hydrogen-based systems

In an era of rising climate awareness, fluctuating fossil fuel prices and increasingly interdependent international trade, making the maritime sector more sustainable is as relevant as ever. How can hydrogen (H₂) play a role in green shipping, what technical challenges are to be expected and what might possible solutions be? To start it all off, let's look at the rationale behind these impactful changes – why should the sector transition in the first place?

The scientific consensus is clear; average global temperatures are rising due to anthropogenic activities and it is of vital importance that emissions are cut to mitigate the detrimental consequences of climate change. The war in Ukraine and the consequential international tension make for an additional incentive to reduce our economies' dependency on fossil resources.

Ships and planes

This brings up the question what the responsibility of the maritime sector is. It is clear that a significant amount of global greenhouse gas (GHG) emissions can be traced back to this industry. Although sources differ in the exact amounts, the contribution amounts to

three to five per cent [1], comparable to the impact of the aviation industry.

From a broader environmental view, one will see that several other pollutants originate from maritime sources; of all nitrogen and sulphur oxide emissions for example, respectively nineteen and eleven per cent are caused by the maritime industry. In addition, waterborne transport has significant impact on particulate matter pollution and to a lesser extent to emissions of CO and non-methane volatile organic compounds (NMVOCs) [2].

More shipping, more emissions

Critics will point out that per travelled kilometre, shipping is still the least polluting transport method. Although true, two important as-

Photo: This barge has a projected H₂ installation and is based on FPS' container barge MSC Maas (rendering by Future Proof Shipping, project partner and secretary of SH2IPDRIVE).



THE SH2IPDRIVE PROJECT

SH2IPDRIVE stands for Sustainable Hydrogen Integrated Propulsion Drives. It focuses on the reliability, safety, scalability and cost-effectiveness of hydrogen-based propulsion and energy systems for vessels. No less than 25 parties, varying from innovative start-ups to well-known companies and renowned knowledge institutions, cooperate in the project to work towards a zero-emission ship design. By doing so, the more fundamental research findings can immediately find their way to the Dutch maritime industry.

SH2IPDRIVE is sub-divided into eight work packages. Of these, the first three aim at development of new technologies (bunkering and storage, hydrogen carriers and low temperature (65-80°C) fuel cells), whilst the other five focus on integrating obtained knowledge into a safe and functional ship design. As requirements of vessels differ greatly depending on vessel type and operational profile, five vessel categories have been selected: inland water transport new and retrofit, coastal navigation, passenger and specialised operations.

The project spans from 2021 to 2025 and contributes strongly to the Maritime Masterplan's ambition to develop the Dutch maritime sector as a world leader in sustainable ship design and navigation. To support this development, 24.2 million euros of the total 34-million-euro project budget is funded by the Dutch government via the "Groeifonds" (Growth Fund).

pects have to be considered to put that into perspective. First of all, the amount of waterborne transport is expected to increase as international trade will intensify. Compare it to buying a more efficient car – even though the fuel use per kilometre will go down, the over-

Borohydrides and liquid organic hydrogen carriers are expected to have better energy densities

all fuel consumption (and thus emissions) will still go up if you drive more often than you used to. On top of that, many non-maritime entities have set emission reduction goals that are considerably more ambitious than the maritime sector has set for itself. Several nations, including the Netherlands, aim to reach net-zero emissions by 2050 for example. There are even 100 well-known European cities that aim for climate neutrality as early as 2030 [3]. In contrast, the International Maritime Organization (IMO) aims for a less prestigious figure of fifty per cent GHG emission cuts (compared to 2008) in 2050. Even though these IMO ambitions might be increased from mid-2023

onwards, other sectors clearly have a head start. Consequentially, as they cut their emissions at a quicker pace than the shipping industry, the relative contribution to pollution of the latter is expected to increase further in the coming decades.

Tougher than houses and cars

Tougher than houses and cars

To be fair, other sectors often already have suitable alternatives at hand that allow them to move away from fossil resources. Households can exchange natural gas for heat pumps, insulation and induction plates. Road transport can reduce emissions greatly by incorporating battery technology in passenger cars.

For the long-distance maritime industry, fully battery-powered designs are not an option – you would need about fifteen to forty times more space to obtain the same amount of energy from a battery pack compared to using marine diesel oil (MDO) [4]. Yet, luckily, there are different options on the horizon for sustainable shipping, ranging from incremental changes, such as more efficient logistics, to transformative ones, such as changing the entire vessel design and fuel type. The SH2IPDRIVE project aims to contribute the necessary innovation by developing hydrogen-based propulsion and energy systems for maritime applications.

H₂ in the maritime field

Hydrogen is an energy carrier that can be used to generate electri-

cal power via a fuel cell (FC) without emitting harmful emissions. Additional advantages are that FCs have a relatively high efficiency and generate negligible noise and vibration. Yet, several challenges are still to be faced before hydrogen can be implemented in the maritime field. Three important ones are developing safe and energy dense hydrogen carriers, designing adequate bunkering and storage technologies, and increasing the power output and durability of fuel cells. On top of that, sustainable hydrogen production still has to scale up significantly (an issue outside of the SH2IPDRIVE research scope).

Four options

For hydrogen-based vessels, safety and energy density are two important parameters used to select new fuel types. Four H₂ options are currently promising: liquid hydrogen (LH₂), compressed hydrogen (CH₂), liquid organic hydrogen carriers (LOHCs), and borohydrides (BHs).

One problem is that the energy densities of marine diesel oil (MDO) and heavy fuel oil (HFO) are unchallenged when compared to the alternative H₂-based fuels. For example, LH₂ requires about four times and CH₂ about seven times more space to deliver the same amount of energy as HFO [4]. And this does not yet take into account the auxiliaries needed, such as cryogenic tanks or (de)pressurisers that will take up additional space on the ship. BHs and LOHCs are expected to have better energy densities, therefore SH2IPDRIVE will experimentally test and validate the most promising candidates to increase their technology readiness level (TRL).

Safer infrastructure

For bunkering and storage, LH₂ and CH₂ have a sufficiently high TRL to be operational. Yet, aside from having low energy densities, the

infrastructure and storage technologies do not yet meet the required safety. SH2IPDRIVE aims to develop both a standardised 700-bar maritime CH₂ container and the first LH₂ storage tank of Europe to facilitate implementation and infrastructure development. For the lower TRL hydrogen carriers, new strategies have to be developed to manage and regenerate the spent fuel. SH2IPDRIVE will look into this to start shaping the full circular supply chain.

Low-temperature fuel cells

Lastly, the low-temperature fuel cell still leaves room for improvement. In order to facilitate adoption in the maritime field, both the power output and power density should increase, while overall costs should be lowered. For that reason, SH2IPDRIVE will study a new generation of low-temperature fuel cells in which non-noble metal catalysts are used, investigate possibilities for stack mass production and low-temperature heat utilisation, and develop monitoring strategies for lifetime and degradation assessment. On top of that, a part of the fuel cell working group will look into the maritime applicability of high-temperature fuel cells.

Different ships and fuels

So, coming back to the title of this piece – is the integration of hydrogen just whistling in the wind and doomed to fail or is it an inescapable innovation that we will all have to adapt to at some point? We do not know a definite response to this question. However, the SH2IPDRIVE project will most certainly bring us a step closer to it. What is clear, is that change is needed, also in the maritime field, to move towards a more sustainable system. Most likely the future of our sector will be a more diverse one, where different (hybrid) vessel types use different types of fuels stored in a variety of ways. There are enough challenges that still need to be faced before H₂ can claim its role in that future. Nonetheless, stating that the marine industry can do without hydrogen probably doesn't hold water.



Annabel Broer

Representative of SH2IPDRIVE and PhD student at the department Maritime and Transport Technology (MTT) at TU Delft, a.broer@tudelft.nl

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SLEPEN VAN EEN SUPERJACHT VERGT NAUTISCHE PRECISIE

Triplex met tapijt voorkomt lakschade

Diverse grote jachtwerven zitten aan kleine vaarwegen in Nederland. Het blijkt nauwelijks een belemmering om ook op die locaties concurrerend te zijn met werven aan groter water en hoofdvaarwegen.

Tot die grote bouwers aan kleine vaarwegen behoren Royal Huisman in Vollenhove, Heesen Yachts in Oss en Feadship (fusie van Royal Van Lent Shipyard en Koninklijke De Vries Scheepsbouw) in Aalsmeer, Makkum en Amsterdam. Die plekken vergen sleeptransporten van jachten van 13,80 meter breed door brugopeningen van 14 meter. Daarom steken we ons licht op bij transporteur Koninklijke Van der Wees.

Projectvoorbereiding

Wanneer de sleepopdracht binnenkomt, worden de precieze afmetingen van het vaartuig vastgesteld en vervolgens het vaartraject

ARTIKEL 1.06 – GEBRUIK VAN DE VAARWEG

Een schip of een samenstel mag niet deelnemen aan de scheepvaart, indien de lengte, de breedte, de hoogte boven water, de diepgang, de manoeuvreerbaarheid of de snelheid van dit schip of dit samenstel niet verenigbaar zijn met de karakteristiek en met de afmetingen van de vaarweg en van de kunstwerken.

beoordeeld. De speelruimte bij diverse bruggen en sluisen onderweg bedraagt meestal enkele centimeters.

De afgelopen jaren sleepte Van der Wees jachten van de Kaag of Aalsmeer naar Amsterdam, van Alblasterdam naar Rotterdam en Amsterdam en van Oss naar Harlingen. Bij dit laatste transport gaat de bovenbouw op een ponton binnendoor naar Harlingen en het casco gaat van Hoek van Holland buitenom naar Harlingen. De projectleider bepaalt in samenspraak met kapiteins en operationele binnendienst een vaarplan. Nautisch planner Christian de Korte: 'Dit vaarplan geeft in detail de tijdstippen van passage door de diverse kunstwerken. Het is precisiewerk op het hele traject, maar de bemanningen zijn ervaren en goed op elkaar ingespeeld.' Op basis van het vaarplan wordt bij Rijkswaterstaat een vaarvergunning aangevraagd volgens artikel 1.06 van het Binnenvaart Politierglement (BPR, zie kader). Vanwege dit artikel moet het sleepbedrijf een vergunning dan wel ontheffing aanvragen om het transport te mogen uitvoeren.

Ook worden overheden van de te passeren provincies en gemeenten geïnformeerd, want bij sommige klapbruggen wordt de klap met mobiele kranen van een gespecialiseerd bedrijf helemaal recht op gezet. Dit biedt meer ruimte voor de hoge opbouw van een groot jacht.

De hulpdiensten worden vooraf geïnformeerd dat de brug langer

Foto: De Galactica van Heesen Yachts werd voorzichtig door diverse kunstwerken gemanoeuvreerd.

dan gebruikelijk openstaat. Soms plaatsen hulpdiensten aan weerszijden van de brug een wagen om toch snel op een calamiteit te kunnen reageren.

De speelruimte bij diverse bruggen en sluizen bedraagt meestal enkele centimeters

Varen tijdens het slepen

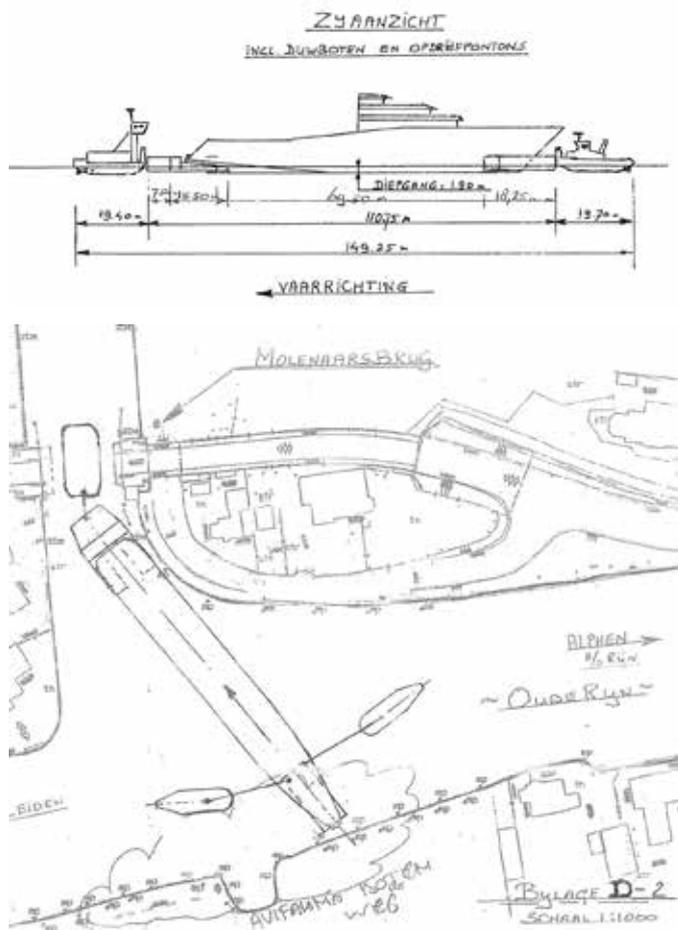
Bij het transport van een superjacht worden een duwboot en een sleepboot ingezet. Afhankelijk van de afmetingen van het jacht, zowel als casco of volledig afgebouwd, worden alle operationele aspecten zorgvuldig voorbereid. Van der Wees heeft twee gedeeltelijk afzinkbare opdrijfpontons, die zijn ontworpen voor het achter- en voorschip van een super-

jacht. Voor het transport worden beide pontons onder het jacht geplaatst en ontballast, zodat de diepgang vermindert. Het grootste jacht dat de afgelopen jaren op die manier werd ver-

sleept van de Kaag naar Rotterdam was 101,50 meter lang en 13,80 meter breed. De totale lengte van dit sleepkonvooi bedroeg inclusief opdrijfpontons voor en achter en de duw- en sleepboot 149,25 meter.

Eenmaal onderweg

Voor passage van een brug gaan twee bemanningsleden met de bijboot vooruit en geven vanaf de brug aanwijzingen voordat het brede achterschip inclusief opdrijfponton in de brugopening komt. De nieuwe duwboot Pieter van der Wees is altijd bij deze transporten betrokken. Schipper Ben Kik: 'Voor de brugpassage leggen we het konvooi stil om alle waterzuigingen die ontstaan door het varen



Dit soort tekeningen behoren bij de technische voorbereiding van de sleepklus.



De veertien meter brede Woubrugse brug in Woubrugge ligt niet recht in het vaarwater (afbeelding Google).



De Galactica is 80,07 meter lang en 13,40 meter breed en is volgens de bouwvermeting met een top van 29 knopen 'het grootste en snelste aluminium motorjacht met conventionele schroefaandrijving' (foto's met dank aan Van der Wees/Heesen Yachts).

te minimaliseren of te voorkomen. En dan rustig, al communicerend zachtjes drijvend naar de brugopening manoeuvreren.' De lastigste brug in het traject van Aalsmeer en de Kaag naar Gouda of omgekeerd is de veertien meter brede Woubrugsebrug in Woubrugge. Die ligt namelijk niet recht in de vaargeul van de Heimanswetering. Bij deze passage moet de sleepboot vooraan tijdelijk de koppeldraden vieren om de oever niet te raken. Ook de bocht maken op de kruising Heimanswetering richting Oude Rijn door de Molenaarsbrug tegenover Avifauna vraagt de nodige

voorzichtigheid en stuurmanskunst.

De brugpassages van Oudewetering en Nieuwe Wetering zijn alleen 's nachts mogelijk. Hier worden bij beide bruggen de geleidewerken in de brug verwijderd om een breedte van 14 meter te krijgen. Het traject tussen sluis Gouda en de Kaag van circa 34 kilometer vergt ongeveer 24 uur.

ARTIKEL 2 – SLEEPCONDITIËN 1965

Voor rekening van de eigenaar van het schip, of zo deze het contract niet heeft gesloten noch daartoe is toetreden van de contractant, is alle schade, anders dan terzake van dood of letsel van personen, die het gevolg mocht zijn van schuld of nalatigheid van de bemanning van de sleepboot en/of personeel in dienst van de sleepdienst en/of personeel door de sleepdienst of diens tussenkomst geleverd om dienst te doen aan boord van de schepen.

Krassen voorkomen

De nautische projectleider vaart op het superjacht mee. Soms staat de kopschroef van het jacht stand-by. De propellers van het jacht worden vastgezet. De roeren staan iets uit het midden. Daardoor blijft het achterschip rustiger op koers.

Op het jacht worden extra camera's geplaatst, want alles gebeurt op zicht. Tijdens het slepen staat een door de werf geregelde "fenderploeg" gereed. Met tapijt afgedekte triplex platen voorkomt die lakschade door contact met het kunstwerk.

Onder de sleepklus ligt een contract volgens de Sleepconditiën 1965 (zie kader). Deze condities sluiten schade aan het sleepobject uit, tenzij de sleepdienst nalatigheid verwijtbaar is.

Na de afbouw maakt het jacht diverse technische proefvaarten. Hierbij heeft de sleepdienst één of twee sleepboten stand-by, mocht zich onverhoopt een technisch mankement voordoen.

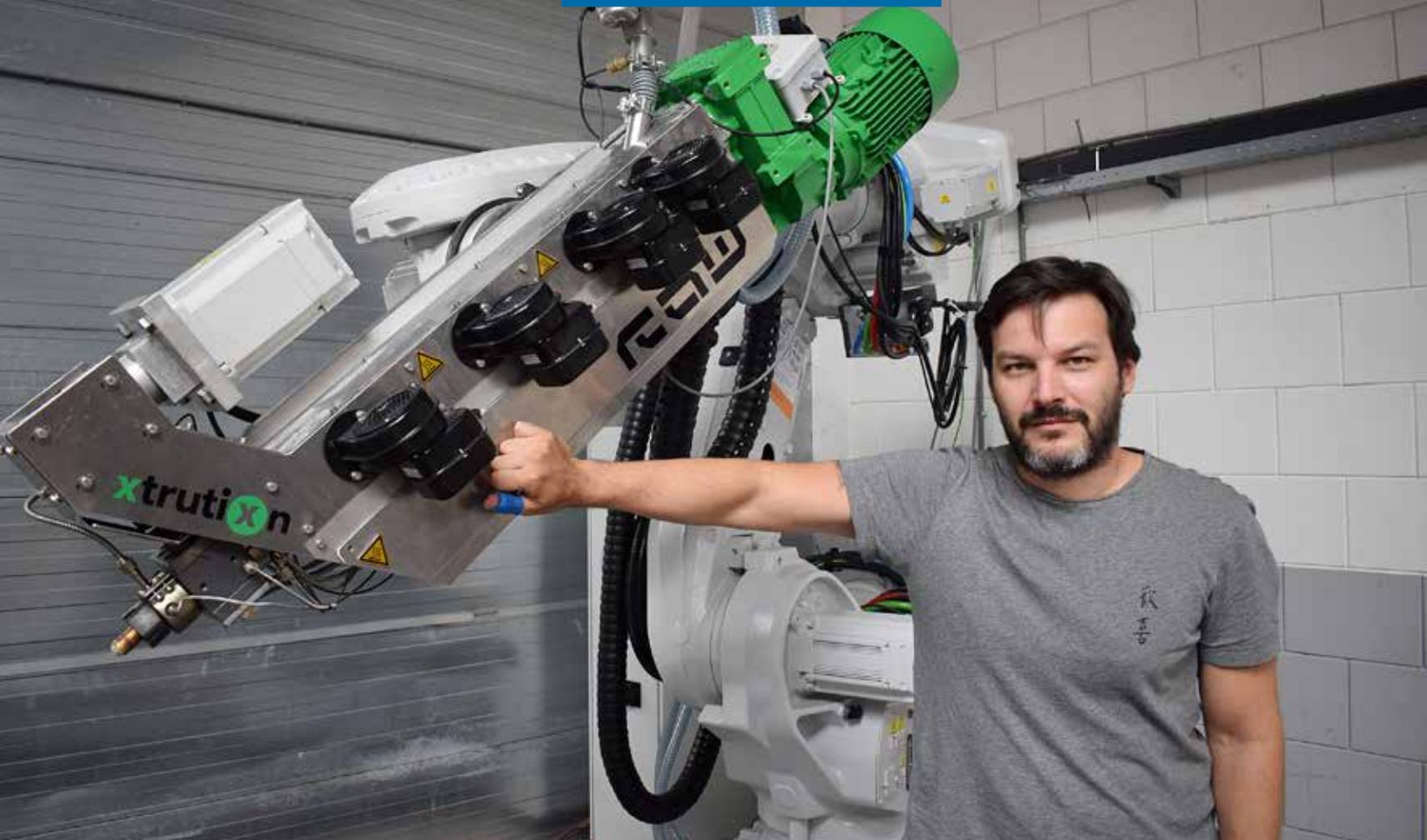
TRANSPORTING YACHTS WITH CENTIMETRES TO SPARE

Several large yacht builders are located along small waterways in the Netherlands. Their yachts have to be transported to sea and pass bridges and locks with sometimes just centimetres to spare. Van der Wees tells us how they prepare for and conduct such special transports.



Martin van Dijk

Onafhankelijk adviseur binnenvaart en redactielid van SWZ|Maritime, mhzefir@gmail.com



FROM €15,000 YOU ARE SAFE FROM STORMS AND FLOODS

Dutch 3D printer Tanaruz

Alexey Shifman (37) of Tanaruz in Rotterdam works with four of his own designs. 'Tanaruz is just a brand name, the 3D printing company behind it is called Raw Idea and can also print more than just these motor boats,' explains the St. Petersburg native. He leafs through the June issue of this trade magazine with interest. 'That's where my office was,' he calls out when seeing an aerial photograph of the Damen complex in Gorinchem. He left his homeland at the age of 21 and worked as a naval architect for Ulstein and SBM, among others.

He started his own business, because as an employee he could not do enough with his entrepreneurial spirit. 'Moreover, I felt restricted there. The organisation did not ask for new ideas, or such an idea would run aground in the hierarchy.'

Tanaruz, according to Shifman, is a guard against storm and bad weather in Norse mythology. His boats are thus partly born out of

rescue thinking; how can people in flooded areas get to safety at a reasonable price? So it should come as no surprise that the initials DDM on the large cabin boat in the range stand for "DoomsDay Model". 'That's an exploration boat. We didn't build one until now.'

Climate initiative

Co-founder Hans Franke prefers to stay out of the spotlight, but he

Photo: Shifman and his printer. The raw propylene pellets are heated to 80 degrees, dehumidified and stripped of dust and then heated in steps to 220 degrees in the four chambers in front of the printer mouth (photos Sander Klos).



The raw granular material is 'fed' to the printer in various mixing ratios. 'Three per cent is enough to apply colour.'

does explain a few things. 'I have always been very concerned about climate change. Twenty years ago, as an entrepreneur, I was planting trees because of deforestation; three years ago, I was working on boats because of the rising sea level. To avoid the hassle about the best model, which is the perennial debate in the sailing world, I had the idea of printing my own models via an app. In this way, everyone can make and print their own model. When I met Shifman, I had a render of the DoomsDay Model as a sailing vessel, but no technical design for the hull. My design was inspired by Sven Yrvind's work and my sailing experiences. The app was developed by Dotswan (<https://dotswan.com/#/home>), and engineered in Iran.' 'In addition to coaching the business and the name Tanaruz, I spend most of my time raising capital for this and other ventures. In the future – again because of climate change – we want to do more with floats, pontoons and houses on water, which we can then adapt to local preferences and possibilities with 3D printing, all with recycled or recyclable plastic. In total, we have raised around 2.5 million euros in capital for this development with our investors over the past two years, but we need a lot more to do this on a larger, perhaps global scale.'

Certification needed

Because 3D printing is still so new, there are few international rules. 'Together with a classification society, we would like to look at stability requirements for a safety certificate in coastal waters up to 7 Beaufort, for example,' Shifman continues.

'3D printing is very promising, but there are still many challenges regarding strength, shape and types of materials.' He shows a printed example, which demonstrates how small angles are printed smoothly and compactly, but a 45-degree angle leads to sagging and holes in the structure.

Because 3D printing is still so new, there are few international rules

For projects such as houseboats, they are now also studying a stronger honeycomb structure, which may also be useful for the larger boats.

Specific tools

Another problem is warping. Printing takes place at temperatures of 200 degrees or more and after that certain parts of the print cool down faster than others, which results in deformations. 'You can't see everything in advance and compensate for it in the software, so a practical test has to show what happens. How do you control the

That requires constant research; it's fun at first, but at some point you get tired of it. We cope with large angles in a design by dividing them into more parts with smaller angles.'

For projects such as houseboats, they are now

cooling process and calculate the various components? And how to handle buckling after reheating the material for welding extra metal parts?'

'On the one hand, 3D printing is very modern and we already do it with aeroplanes and bridges, but on the other hand, many specific tools are still missing. The question is, whether we can develop those tools ourselves.'

Sustainability

Shifman gets his raw material polypropylene from the Belgian company Resinex. 'We also looked around in the Netherlands and Germany, but this company offered good value for money, is always keen to work with us and is flexible.'

It is possible to have different views about the boats' sustainability. 'The boat itself is made of recycled materials, so is sustainable, but we use electric batteries for propulsion, so you can always discuss to what extent the latter are sustainable in terms of raw materials.' With five months of sailing experience, Shifman believes that coating or antifouling is unnecessary. 'Polypropylene is made for the food industry and they want absolutely no adhesion. The hull of the boat does have some form of fouling or dirt, but when sailing or with a light scrub, it's gone in no time.'

One year, one million

Shifman and his financial business partner invested one million euros in the first year, which they raised through fundraising. Half of that was for the printer, the rest for things like a straight (printing) floor, a generator and all the electricity. From which he has learned: 'Every solution creates ten new problems.'

He is considering a second printing line, but it will cost two million euros and take a year to prepare. Perhaps the development of the company will take precedence for a while.

With a length of eleven metres, the printer was ready for operation in December 2021. The first boat was launched in February. Printing a 4.5 metre DSI requires 65 hours of constant printing, the 5.5 metre DSI requires 110 hours. 'We are constantly working on speeding that up and expect to do a DSI in two days.'

He has already learned a thing or two. 'In the beginning, we were optimistic and naive. We wanted to build something futuristic, a bit more aggressive than usual. But then the printer came... And so this design rolled out of our team.'

He thinks he can print boats up to ten metres with this printer and, depending on the design, even eleven metres could be possible. 'A second printer will make the same hull lengths, but wider.'

Shifman deliberately stays away from the higher segment. 'There you have to deal with completely different competition, investments and expectations.'

Order book

The order book has sixty boats in it. 'The orders are mostly from companies that want to resell the boats. Among them a distributor in the US and a Dutch customer wants ten. We can adjust our basic types to their wishes. But we refused a Croatian customer who wanted a 3.9-metre boat.'



That's how hard a 3D printer struggles with larger angles, like the 45-degree angles on the right.

What is striking about the types is that they all have a range of thirty kilometres when sailing electrically. 'We have remained on the cautious side, because at a cruising speed of five knots, you can sail for nine to eleven hours.'

At the Willem de Kooning Academy in Rotterdam, they tinker with the technology of their batteries and accumulators and use the Red Apple Marina as their operational base. 'It's a good place to test the large waves that sometimes break on the Nieuwe Maas River.'

Trainees studying maritime and yacht building at STC in Rotterdam are involved in this research. 'For cooperation with a technical university, you have to be able to deliver sufficient quality for an excellent graduation result. Moreover, our team of five engineers is too small to guarantee good supervision.'

No subsidies

According to Shifman, the company did not receive any subsidies. 'Apparently, 3D printing is not a priority for funds and governments. And EU funds prefer to work with large manufacturers.'

He does see opportunities for cooperation with builders of large and superyachts when it comes to smaller craft. 'There are already such contacts, but a project like this will cost each of the partners at least a year's preparation.'

When asked, some builders of large yachts say they are interested in what – sustainable – 3D printing of small parts of their products can bring.



Sander Klos

Freelance maritime journalist and one of SWZ|Maritime's editors, info@mediamaritiem.nl

IMPACD AIMS AT GROWTH OF 3D PRINTED MOTOR BOATS

'Superyacht builders can do more with lifecycle assessment'

'Superyachts are far too big for 3D printing as we apply it, but there are possibilities, such as certain parts and dinghies. We have talked to those builders, but their products are too big and too complex to switch to 3D printing in a few steps. But with our experience and cooperation with TU Delft, we could help them increase the role of Life Cycle Assessment in their products. That's a win-win. Their clients will also pay more attention to sustainability and as builders they can set an example.'

SUBSIDIES

A start-up and sustainable business has a chance of receiving subsidies. ImpacD has received or is applying for money from Samenwerkingsverband Noord-Nederland (SNN), the Waddenfonds ('sustainable transport up to nine metres'), the Rijksdienst voor Ondernemend Nederland (RVO) and the province of Friesland. De Boer does not reveal the amounts involved in these grants: 'The amount is often customised and depends on the preparation time and working hours. For a company with five people, an application takes quite some time and sometimes it is just too complicated and time-consuming.'

Marieke de Boer (34) of ImpacD Boats (formerly Duurzame Sloepen) in Woudsend, together with her partner Jörgen de Jong (37) and her father Peter de Boer (65), and now two members of staff, is hard at work.

To put it mildly.

Two small 3D printers are humming in the office at the Woudsend marina, while De Boer explains how they were busy 3D printing sustainable motor boats (*motorsloepen*; 'there is no good translation for the Dutch word sloep!' and the English word "sloop", although originating in Dutch, means a small sailing boat: a fore-and-aft rigged boat with one mast and a single jib) when they got the chance to take over the marina in Woudsend. Although banks were (or had to be) hesitant to finance them, ABN Amro saw enough potential in a

Photo: 'You have to have a start when printing. Otherwise, your wire simply falls to the ground,' says De Boer. So there is a 'starting block' on the bow, which is removed later.



Wieger Haarsma is finishing a Ds 635. A paddle needs to be added and the electric motor is in the printed engine box. Manufacturer Propel supplies electric inboard and outboard motors.



Marieke de Boer on a 550 under construction. 'With ImpacD, we want to shake things up' (photos Sander Klos).

marina with 85 berths and quite a few regular customers and the need for capital of a sustainable start-up. Consequently, a showroom has been set up elsewhere in Woudsend. 'From there, people can try our boats on the nearby lakes and in a few minutes, they can be at the marina, where we build them.'

Do it yourself

Partner Jörgen is the technical man, Marieke was a business manager. Father Peter owned a water sports company and helps both owners with his knowledge and experience. 'We once wanted to hire a "sloep", but that proved to be difficult. Jörgen decided to do something himself, but different from the usual. He decided on a printed hull in combination with a completely

sustainable finishing. So we produced the hull from recycled materials, it has a 10 kW electric D1 motor from Propel in Amsterdam and the cushions, spray hood and deck are as sustainable as possible. For with all our knowledge, we still don't have a solution for ships at the end of their lives, while people are slowly realising that what they make and buy should not become our children's problem.'

Price helps

The company, active since 2020, won a Start Up Award last year 'for its 3D printed "sloep" made from recycled materials'. For the jury, a major factor was the cooperation with TU Delft ('some 25 students were involved in the research') to substantiate the sus-

tainability claim ('74 per cent more sustainable than the industry standard') and to record it in a Life Cycle Assessment according to a method developed by the Dutch National Institute for Public Health and the Environment (RIVM), in which human health, climate and raw materials play a significant role.

'There is no good translation for the Dutch word sloep!'

The award creates more awareness and trust among its own employees and De Boer believes it helps potential customers overcome any misgivings they might have had. ImpacD Boats has now delivered eight boats with another sixteen in the order book. Those customers have a "printing slot" for 2022. 'We can still adjust things until shortly before the printing week starts.

We print a Ds 550 (5.50 x

2.15 x 0.60 metres) in 55 hours, the Ds 680 MB in 72 hours. We are now in contact with the next forty customers.'

De Boer distinguishes two product lines: the more traditional 550 and 635 and the line designed by Martin Bekebrede with the 500, 570 and 680. The market for these boats are private individuals, former sailors and charterers. 'Charterers like to have boats on consignment, so we cooperate with DE Sloepverhuur, another start-up. They buy our boats and sell them to rental companies.'

External printing

ImpacD Boats does not yet own large printers – think twelve metres long and seven metres high and wide – but will purchase them in time. 'We now print at Royal3D in Rotterdam and 10XL in Hardinxveld. In principle, anyone with enough money can buy a printer, but it's about knowledge, a printable design and coherence between design, production, use and end of life. There are still many development opportunities, for example in the field of standardisation, floor options, glues and sealants. If your readers would like to share knowledge or ideas about production methods and materials, please do. We would like to raise our 74 per cent to ninety, but the last few per cent require the highest effort.'

Although in principle, the hulls do not need antifouling, many customers still insist on it. 'In such cases, we recommend Finnsulate, which is 94 per cent more durable than copper-based foulings. And

because coatings are often not so durable, we try to avoid adding components later. Because then you get welds, which you can only get rid of with a coating.'

The company prefers to make other external adjustments using wraps with durable film. For instance, to match the mother ship. 'We can make many colours, from royal blue to a kind of yellow. This can also be done afterwards with a coating, but the adhesion of powder coating on plastic can still be improved and the coatings must become more sustainable for our product lines.'

Further development

The new name includes the term "boats", and this has been given quite some thought. 'There is no good international term for a "sloep" and we are working on "specialties", such as a twelve-metre long, fast sailing cabin sloep. The TU Delft helps us with the design and the reinforcements such a longer boat needs. Together with engine supplier Propel, we are thinking about the best way to motorise the boat. Propel originates from the automotive industry and that sector is developing more rapidly in the electrical field. They want to do a lot with apps, for example. We work together strategically, also in the field of batteries.'

The intermediate step to the twelve-metre version is the 895, which De Boer says will be available in 2023. 'At the end of 2023, we start serious planning for the 12-metre model.'

Among the special types, she also includes catamarans, small boats for instructors at sailing schools and workboats. 'But focus is important – especially for a small company – in order to develop quickly. If you are too idealistic and want too much at once, everything takes longer.'

And they have to stay alert, also with the design software for the printer. 'A simple update can lead to unexpected deviations in the print. And there are only a few really good printing engineers. But knowing that some are already printing meat, this technology is going to take off over the coming years.'

ON TV TOO

Bridges, houses and (parts of) planes are being 3D printed. And everyone lives in a house, so Dutch TV channels like RTL 4 and Videoland are developing a TV programme about ImpacD, which will air in September. De Boer: 'People can also follow our story via social media.'



Sander Klos

Freelance maritime journalist and one of SWZ|Maritime's editors, info@mediamaritiem.nl



MET EEN CURSUS OVERSTAP MAKEN NAAR DE JACHTBOUW

'Wel vraag naar een doorstroomcursus'

Je kunt heel veel inspanning doen om een scheepsromp te verbeteren, maar langzamer varen bespaart veel meer brandstof. 'En langzaam varen levert ook een mooiere foto op,' schertst Jaap van der Velde.

Zestien cursisten, onder wie vijf vrouwen, volgen in Dordrecht bij hem een tweedaagse NMT-cursus jachtbouw. Van der Velde (50) zit na zijn opleiding scheepsbouw in Delft bijna 25 jaar in de scheepsbouw. 'Ruim twintig jaar voor Damen in diverse functies, altijd met de nadruk op productontwikkeling en sales. Het grootste deel bij Damen zat ik in de jachtbouw (Amels/Damen Yachting).'
Hij is zo'n vijftien jaar cursusleider en verzorgt ook drie tot vijf keer per jaar de cursus scheepsbouw, zowel voor individuele cursisten als *in house* bij werven en leveranciers. 'De cursussen jachtbouw en scheepsbouw zijn voor tweederde gelijk, daarom adviseer ik nie-

mand beide cursussen. En een doorstroomcursus is er eigenlijk niet, hoewel daar wel vraag naar is. Bij nog meer diepgang zou je moeten denken aan een voltijds mbo- of hbo-scheepsbouwopleiding.'

Training manager Jeanette Lucas: 'In ons programma bieden we technische trainingen die zeer diep ingaan op (deel)onderwerpen. Dit doen we in samenwerking met TU Delft, TNO en MARIN. Sommige deelnemende engineers zie je daarom nog wel eens doorstromen naar andere delen van ons trainingsprogramma. Dat hangt wel af van hun opleidingsvraag, want we bieden geen volledig programma aan, zoals mbo- of hbo-scheepsbouwopleidingen.'

Photo: Van der Velde licht ontwerp en bouw van de machinekamer toe. 'En alles moet wit glimmen, in hooggls' (foto's Sander Klos).

EFFECTEN NOG ONBEKEND

Desgevraagd zegt NMT de effecten van deze cursussen op de sector niet zo direct te meten. Training manager Lucas: 'Het totale NMT-trainingsportfolio is via de Netherlands Maritime Academy afgestemd op het overige aanbod in de sector om overlap te slechten. Daarbij is geconcludeerd dat deze training nergens anders in de sector wordt aangeboden. Zij wordt gezien als een belangrijke invulling om nieuwe medewerkers, met een niet-jachtbouw, maar wel technische achtergrond, snel "up-to-speed" te krijgen aangaande dit cluster. Dat zie je terug aan het aantal herhaalschrijvingen, doorverwijzingen door collega's en het groeiend aantal *in-company* aanvragen na deelname door open inschrijving van bedrijven.'

'De NMT-training wordt gezien als "objectief". Vanwege het brede netwerk en de brede achterban in de jachtbouw is het mogelijk de inhoud in de volle breedte van de jachtbouw in te kleuren en niet slechts vanuit een of twee bedrijven.'

'Verder is de training voor nieuwkomers (medewerkers, maar ook start-ups en bedrijven die toegang tot de sector willen) ook vaak het begin van hun netwerk in de sector. De diversiteit aan cursisten zorgt dat ze de basis leggen voor een netwerk.'

Toegankelijk

Van der Velde: 'Ik deel mijn ervaring twee dagen lang met de groep, direct van de praktijk het lokaal in. Het leukste is als cursisten dat ook doen, dan krijg je een hele interessante uitwisseling.'

'De mix is altijd heel divers; van secretaresse tot TU-ingenieur, van schilder tot jurist. Daarom moet de cursus heel toegankelijk zijn en bij elk onderwerp begin ik weer op het basisoniveau. De vragen uit de groep bepalen uiteindelijk de diepgang van de stof. In principe is de training bedoeld voor mensen met een technische achtergrond, die bijvoorbeeld de overstap naar onze sector maken, maar dat is niet noodzakelijk. In

de praktijk zien we dat organisaties veelal gewoon alle nieuwe medewerkers sturen.'

'En er is altijd een *wiseguy* én een grappig persoon. Dat houdt leven in de cursus en bepaalt de diepgang. Hoe meer ik word uitgedaagd, hoe leuker.'

Nieuwe trends

'Gemiddeld zijn er meer mannen dan vrouwen en dat is een afspiegeling van de scheepsbouw. Vrouwen hebben wat vaker een administratieve, personeels- of juridische achtergrond en haken qua

'Extra snelheid
vergt vaak
onevenredig veel
extra energie'



De mix van de cursisten is altijd heel divers.

technische diepgang soms af. Maar er zijn ook genoeg vrouwelijke cursisten die *hardcore* techniek zijn.'

'Het boek Scheepskennis en mijn sheets zijn vrij onveranderd de afgelopen jaren; de reden dat een schip blijft drijven is ook nog niet veranderd. Marktinformatie en nieuwe trends worden wel bijgehouden. En elk jaar doe ik weer nieuwe ervaringen op en die deel ik met de groep.'

Lucas vult aan: 'We proberen ons programma en de individuele trainingen te blijven ontwikkelen. Onze connectie met de sector en

'BETER INZICHT IN PROCES ROND JACHT'

Richard Dikken is CAD engineer op het gebied van Propeller Shaft Installation bij Rubber Design. 'Het bedrijf ontwerpt aandrijfassen voor luxe jachten en dan voornamelijk voor jachten groter dan vijftig meter. Eigenlijk was ik bij mijn vorige werkgever ook al betrokken bij luxe jachten, maar dan voor equipment als luiken en deuren die hydraulisch worden bediend.'

'De cursus vond ik superinteressant. Ik weet wel veel van jachten, maar net niet genoeg. Door deze cursus is dat een stuk beter geworden. Ook heb ik een beter inzicht in hoe het proces in zijn werk gaat. Het bezoek aan de firma Slob in Papendrecht, waar diverse jachten in aanbouw waren, gaf je echt een idee wat er allemaal komt kijken bij een jacht.'

'De cursusleider was perfect. Man uit de praktijk, die daardoor alle ins en out kan vertellen.'

'IK GA ZEKER OVERSTAPPEN'

Jeroen Lammers (47) is 'helemaal niet werkzaam in de jachtbouw'. In het voorjaar schreef hij zich in voor "Jachtbouw voor niet-jachtbouwers". 'In juli was het dan zo ver; de tweedaagse training waarin van alles wordt verteld over de jachtbouw. Jaap van der Velde heeft heel veel kennis van zowel de wet- en regelgeving als veel technische knowhow en wist dit op boeiende manier over te brengen. Ik ben salesmanager bij een internationale toeleverancier in de auto-industrie. We ontwikkelen samen met autofabrikanten turbo's en produceren in Almere ongeveer drie miljoen turbo's per jaar. Wel heb ik een technische achtergrond in de automotieve en elektronica. Jachtbouw heeft me altijd al geïnteresseerd en nadat ik zes jaar in München had gewoond, verhuisde ik naar een dorpje in de kop van Overijssel. Met net 500 inwoners, maar wel twee botenbouwers. Het was dan ook in een gesprek met Peter Oord, eigenaar van Abim Yachting, dat deze training ter sprake kwam.'

'Ik had ondertussen al eens gesolliciteerd bij een van de giganten van de Nederlandse jachtbouw. Helaas kwam ik niet door de selectie door gebrek aan productkennis. Deze introductietraining was voor mij dan ook een mooie kijk in de keuken van boten bouwend Nederland. Ik heb veel kennis opgedaan, maar vooral mezelf ervan kunnen overtuigen dat ik in de toekomst toch echt de switch wil maken naar dit mooie product, waarbij techniek, functie en design bij elkaar komen.'



Jeroen Lammers: 'Deze introductietraining was voor mij een mooie kijk in de keuken van boten bouwend Nederland.'

onze onafhankelijke positie, waarbij het trainingsprogramma een niet-commerciële service naar de leden is, zorgt dat we weten welke behoeften aan kennisontwikkeling de sector heeft.'

Van Froude tot Bernoulli

Wanneer de verslaggever binnenkomt, gaat het net over het Froudenummer. Dat varieert van kleiner of gelijk aan 0,35 voor een waterverplaatsend schip, 0,35 à 1 voor een halfglijder en meer dan 1 voor een planerend schip. Uiteraard uitmondend in de berekening van de theoretische rompsnelheid van schepen, waarbij de wortel uit de waterlijn lengte een grote rol speelt.

Van der Velde drukt zijn cursisten op het hart, dat extra snelheid vaak onevenredig veel extra energie vergt. 'Om twee knopen harder te varen, is soms wel tweemaal zoveel vermogen nodig. En dat is een grote *penalty*. Langzamer varen bespaart meer brandstof dan rompoptimalisatie.'

Vervolgens passeren begrippen als de werking van een schroef (Wet van Bernoulli), cavitatie (onderwatergeknetter van speedboten) en de mysterieuze "zingende" schroef ('gebeurt regelmatig, niet helemaal te prognostiseren').

Snelle waterjet

Aparte aandacht gaat uit naar de waterjet, ooit ontwikkeld voor racen op ondiepe rivieren, maar nu wereldwijd gebruikt voor snelle motorboten, die in uiteenlopende omstandigheden moeten werken, zoals reddingboten, maar ook grote ferry's aan een top van veertig knopen helpen. 'Jets zijn boven de 25 knopen efficiënter dan schroeven en hebben geen last van cavitatie bij hoge snelheden.'

'Heavy fuel oil wordt niet op jachten toegepast, omdat het schip dan zwart van het roet zou worden'

'Waterjets zijn veel compacter dan schroeven bij hoog vermogen. Als je deze aandrijft met gasturbines krijg je een zeer compacte voortstuwingsinstallatie. Hoewel het brandstofgebruik hoger zal liggen, is dit vaak de enige manier voor grote jachten en andere schepen om hoge snelheden te kunnen behalen. Een schroef-dieselmotorvoortstuwing zou fysiek niet passen.'

'De meest effectieve aandrijving is nog altijd diesel-direct met dieselmotor-reductiekast en schroef met een verlies van rond de vijf procent. Deselelektrisch kent door de vele omzettingen een hoger verlies van wel tien tot twaalf procent. In bepaalde operationele situaties kan deselelektrische voortstuwing voordelen hebben. Voor jachten zijn trillingen en geluid een belangrijke reden, maar ook de mogelijkheden om een hybride aandrijving te kunnen toepassen.'



Uitleg over de vermogenskromme van een displacement-jacht.

Motor werkt

Op de vraag of iedereen weet hoe een dieselmotor werkt, valt een stilte.

Dus duiken we de wereld van *low*, *medium* en *high speed* in, draaiend op *heavy fuel oil* (low-speed- en medium-speed-dieselmotoren) en *marine diesel oil* (high-speed- en medium-speed-dieselmotoren). 'Heavy fuel oil wordt niet op jachten toegepast, omdat het hele schip dan zwart van het roet zou worden. De meest toegepaste is de high-speed-motor. Op jachten boven de honderd meter zie je ook medium-speed-motoren.'

En ook hier weer keuzestress. 'Een medium-speed-motor is betrouwbaarder en duurzamer dan een high-speed, maar die laatste is weer compacter en past dus makkelijker in een jacht. Bovendien vaart een jacht maar zo'n 800 tot 1500 uur per jaar, terwijl een gemiddeld vrachtschip zo'n 8000 draaiuren maakt. Daardoor valt de keus over het algemeen op de high-speed-dieselmotoren.'

YACHT BUILDING COURSE

NMT offers courses for yacht builders, their new employees and people that are interested in a career in yacht building. A technical background is a plus, but not a must. The NMT training is considered to be 'objective'. Because of the organisation's large network in yacht building, the courses can lean on a lot of companies, instead of only two or three. One of the students says: 'Yachts are a beautiful product, in which technology, function and design come together.'



Sander Klos

Freelance maritiem journalist en een van de redacteurs van SWZ|Maritime, info@mediamaritiem.nl



EDUCATION AND TRAINING OF PILOTS IN THE NETHERLANDS

Through the years, the Dutch Pilots have developed a system of selection, initial education and continual professional training. What is the current state of affairs?

To be admitted to the selection, the candidate has to have a certificate of competence (CoC) Master all Ships or Chief Mate all Ships. In the Dutch system, the holder of a CoC Chief Mate all Ships has completed all education, training and examinations necessary to become a master, but lacks only a limited amount of sea time. The candidate will possess a BSc. The selection consists of five parts:

- Intake: Information is given about the selection procedure, the

initial education, the possible career paths, and life as a pilot. The candidate has ample opportunity to ask questions.

- Psychological test: The candidate will have a full day psychological assessment at an independent bureau. Some aspects are role plays, capacity tests and personality tests. A number of psychologists, familiar in observing behaviour on the bridge, evaluate the candidate and come to a recommendation.
- Test with a training ship: Candidates have a one hour test in

Photo: Preparing to do exercises with a tug.

which they are asked to perform some simple prescribed manoeuvres. This test is about insight and aptitude to act. Although it would be nice if the candidate is already a good ship handler, at this stage, it is not the most important point. Experience has shown that ship handling skills can be taught successfully to persons who have never handled a ship before. The candidate is evaluated independently by two trainers.

- **Physical examination:** Pilots climb ladders when ships are rolling and pitching, are winched from a helicopter to the ship, and jump down on the pilot tender. They have to work longer or shorter hours at unpredictable and varying times. This requires good general health, for the safety of the candidate as well as for the organisation. Therefore, the pre-employment physical examination is more stringent than the standard maritime physical test.
- **Final interview:** Selection ends with a final interview. The admissions committee consists of the President of the Dutch Pilot Cooperation, the President and Vice President of the Regional Pilot Cooperation, and the national Coordinator of the training organisation. Candidates can explain their motivation to become pilot.

After the interviews, the committee discusses all aspects of the selection and a final conclusion is drawn.

Initial national education

The initial education is given by STODEL, the training organisation of the Dutch Pilots, and is accredited to an MSc University of Applied Sciences level.

The apprentices, or rather students, of all Dutch regions come together for ten weeks of training in the aspects that are the same nationwide. There are some refreshers, such as the ColRegs, some subjects that will be discussed to a greater depth, such as tides or buoyage systems, and there will also be subjects that might be new to the students, such as the inshore Rules of the Road. Of course, a lot of attention is paid to the theory underpinning ship handling and national and international legislation with respect to pilotage. There is a carefully designed programme with exercises in practical ship handling with a training ship.

The students get simulator training in traffic situations, with a heavy emphasis on the applicable rules of the road and the use of Standard Marine Communication Phrases (SMCP). The national part is concluded with examinations.

Initial regional education

After successfully completing the national part of the initial education programme, the student starts in the region. Each region has slightly different requirements depending on the specific circumstances. The regional part will take (close to) a year.

The main part consists of 200-250 trips accompanying licensed pilots. The first few trips are only to observe. Subject to the approval of the captain and under the guidance of the pilot, student pilots will take more and more of the navigation until, under benign circumstances, the student pilot will perform almost all of the ship handling, including working with tugs. Coach pilots will assess their progress.

These trips are not just about ship handling; other important aspects include how students interact with bridge teams and their ability to anticipate, both with regards to their own ship as well as to others. It is this intricate combination of situational insight and awareness, technical ship handling and integration within the bridge team that gives the best chance for a safe and efficient voyage.

Furthermore, students spend on average a day per week on theoretical lectures: local rules and regulations, topography, and all the local peculiarities that have a bearing on navigating and ship handling, for example tides and special wind effects. The students will also be an observer at the vessel traffic services (VTS) traffic tower. There are sessions with trainers of the tug companies and the stu-

New pilots can draw a chart of the area from memory, with all depths, distances and directions

dents will spend a number of days on board tugs. A training ship is utilised for a number of sessions, such as use of anchors, and there is additional time on the simulators. Attention is paid to the information portable pilot units, which use the ship's pilot plug, can supply and their limitations. During this period of training, there are exams at certain intervals to check if the apprentice pilot's progress is sufficient.

At intervals, the students have to write a report reflecting on past periods, which gives an indication of their introspective capabilities. This is a very important aspect of being a pilot, as there is little opportunity for the organisation to observe a pilot's day-to-day way of working. When things don't work out as planned, an attitude of self-righteousness (thinking that it happened because of the boatmen, tugs, crew, captain, etc.) is not very helpful. Even if some aspects of a less than perfect voyage might be traced back to other parties, an important aspect of the job is to try to work out how to act yourself to minimise the chances that boatmen, tugs or others act differently than intended.

During regional training, there is some additional national training as well, such as a Personal Safety Training focussed on the needs of pilots with exercises such as falling off the pilot ladder, Helicop-

ADVICE FROM PILOT ASHORE

During bad weather or other special circumstances, the pilot may board smaller ships when the ship has reached a more sheltered position. From the formal pilot boarding ground to the place the pilot actually boards, the ship gets advice from a pilot based ashore, who uses a dedicated radar position at the VTS centre.



Embarkation training with a special installation on the training vessel.

ter Underwater Escape Training (HUET), a Man Overboard Exercise, a Dutch writing lesson for the research report, and a Bridge Resource Management course.

During the national part of the training, students pursue the theory of research. At the start of the regional part, they choose a topic. The research consists of a problem, method, analysis, conclusion and recommendation, which leads to a thesis.

In the Netherlands, a pilot is also a partner in the cooperative. Pilots must understand annual accounts and budgets and need to know the role of the entities he or she has to work with in the port. Students are prepared by four exercises, which lead to a portfolio with four parts that have a connection with the Dutch pilot organisation. The initial education is completed with an oral exam of the theory, a presentation of the research and twelve practical exam trips.

ACKNOWLEDGEMENT

Some parts of this article originally appeared in Seaways, the magazine of The Nautical Institute.

Gaining experience and professional training

After passing the exams, the new pilots are able to draw a chart of the area from memory, with all the depths, widths, distances, directions, etc. They know all the relevant rules and regulations, procedures and so on. They are local experts, even though learning all this local knowledge represents only about 25 per cent of their education, most of the rest is ship handling, while using this local knowledge.

During their student trips, they have built up an understanding of the possibilities and limitations of piloted ships of all sizes. Starting with small ships, at planned intervals, the pilot is admitted to pilot larger ships, and simulator training is given to prepare pilots for the next step. Training is designed to give the right information at the right time: when the pilot is going to make use of it. Depending on the region, admittance for all ships takes up to eight years. On top of this, are specialisations with the required additional training. Examples are Deep Draught Ships and Shore Based Pilotage (SBP). Both these training programmes are a combination of theory, simulator and practice. For SBP pilots, the examinations are overseen by the VTS authority.

Repeater training is given depending on the need, Deep Draught pilots get yearly refresher courses for example, SBP pilots a repeater course every three years, which is concluded with examinations.

Exchanging information

The pilot organisation makes sure that all pilots are informed of the relevant development and changes in their region. On a regular basis, pilots are given the opportunity to meet and talk about all operational issues. One item on the agenda is discussing incident and accident reports, so that all pilots have the opportunity to be aware of the issues involved.

Just as important as this formalised exchange, are the informal meetings of pilots on the pilot tenders and the pilot station. A lot of experiences are exchanged starting with: "What happened on my last...".

Additional training

All pilots can take a voluntary simulator training one day per year during which they can ask the instructor for specific exercises of interest.

In most regions, a Chief Pilot is stationed 24/7 at a VTS centre. This pilot oversees the pilotage operations and can discuss operational matters with the VTS team leader. Formalised training is provided for this function.

The Personal Safety Training including HUET is repeated every four years.

Keeping education and training up to standard

Training has a dynamic function and what is adequate now will not necessarily be adequate in the near future. Therefore, there are systems in place to evaluate all education and training, and to share knowledge and experience between the instructors and training coordinators within a region and nationwide. The training is updated on a regular basis.



Students on the bridge of the Mercuur during an instructional trip.

A lot of experiences are exchanged starting with: "What happened on my last..."

Although outside the scope of this article, the quality of the instructors is of prime importance. Instructors are selected and trained in the required knowledge and skills, both nautical-technical and instructional. And of course, they need continuing input in the form of courses and conferences to stay up to date and to maintain a fresh perspective. Systems are in place to feed-back the information of accident and incident reports to the trainers, so that these reports have an effect on the education and training.

A different job

We hope that by presenting the Dutch training of pilots, we have made clear that a captain and a pilot have closely related, but different professions. Captains have an education aimed at the multitude of responsibilities and tasks they have to fulfil. For captains, the focus of their task is to safely and efficiently run the ship as an enterprise. Pilots, on the other hand, have specialist knowledge in the navigation of the ship in a specific small area.

The students have already completed all formal education to become a captain, the pilotage education is on top of this. Pilot education is more than just gaining local knowledge. If that would be the core skill, pilots would be ready to pilot all ships immediately after finishing their primary pilot education. However, the new pilot still has to gain a lot of experience and take a number of additional courses before being allowed to handle all ships.

Pilots have worked with hundreds to thousands of different bridge teams. Keeping in mind their education and training, pilots should be able to identify the strong and weak point of a bridge team and fill gaps where needed.

The Australian Transport Safety Bureau (ATSB) described the role of a pilot in a safety study as: 'A marine pilot's local area knowledge and skills allow safer navigation of the area. In conducting a pilotage, the pilot effectively has control of the ship's navigation, but legally only provides relevant advice to its master who remains responsible and always in command of the ship.'

The Dutch Pilot Corporation aims to provide a system of education,

training, provision of information and required experience. This equips pilots with general navigational, ship handling and team skills, and specific knowledge of the influence of local conditions on ship handling and navigation and seeks to maintain these. All to enable pilots to anticipate all critical parts of the voyage, for their own ship, as well as for other ships that they might meet. This leads to developing safe strategies with a maximum chance of a successful, expedient and successful passage under all hydrological and meteorological circumstances, including aborting or not commencing the passage if conditions make the risk too high.

We hope that we have been able to explain what we see as important for the career change of mariners to pilots: from generalists with overriding authority to specialists working under the authority of captains; and how we try to maintain the required knowledge and skills in order to provide these for the specific ship, captain, port and circumstances.



Ed Verbeek

Master Mariner, holds a Master's degree in Human Factors and System Safety, former pilot and instructor Shiphandling for CSMART, ed.verbeek@live.com



Eline van der Vlist-Lammers

Coordinator education and training for STODEL, the training institute of the Dutch Pilot Corporation, e.vandervlist@loodswezen.nl

CHECK IF A SHIP IS STABLE AFTER ANCHORING

Mariners' Alerting and Reporting Scheme

Two anchors are not always enough: Mars 202232

As edited from NTSB (USA) MAB-21/15

A loaded general cargo vessel had left berth, but went to anchor in the river for repairs before proceeding to sea. The pilot showed the master and chief officer his intended anchoring position on the ship's ECDIS and informed them of his plan to use both anchors, establishing a 'good spread' between the port and starboard anchor chains. There were thunderstorms forecast for that afternoon that could bring strong and gusty winds to the area and river water levels were high, causing an outflow current of about four to five knots.

The starboard anchor was let go (position 1 in the diagram). The vessel then manoeuvred to port and, five minutes later, the port anchor was also let go (position 2). The starboard anchor was heaved to four shackles on deck and the port to three shackles in the water.

About fifteen minutes after the port anchor was let go, the pilot informed the master that the anchoring was finished. The pilot was satisfied with the situation (position 3), but recommended keeping the engine on short standby due to the inclement weather that was due to arrive and the strong river current. Another issue was that the vessel's stern was only 150 metres from the bow of another ship an-

chored astern (shown in red in the diagram).

The pilot left the vessel a few minutes later. Unknown to him, the vessel was not in a stable condition and continued to yaw between the anchors.

Even though the vessel astern was only 150 metres away, the officer of the watch (OOW) set the anchor watch alarm on the ECDIS for a radius of 180 metres. Soon, the vessel was moving astern at a speed over the bottom of about 1.8 knots.

At 1602, there was a watch handover; the relieving officer, unfamiliar with the vessel's ECDIS because he was new, asked why the ship was not in the middle of the ECDIS 'anchor watch' circle. The officer being relieved offered to help familiarise the relieving officer with the ECDIS, but they did not further discuss the vessel's position at anchor as they went on to other business. About ten minutes later, the OOW aboard the vessel anchored astern called on VHF radio giving a warning – he had noticed that the general cargo vessel was moving astern toward his vessel.

At 1639, the OOW became aware that they were now too close to the other anchored vessel. He contacted the engine room and engine control was received on the bridge nine minutes later. The master began using full ahead engine, along with the bow thruster and rudder, to reduce the swing

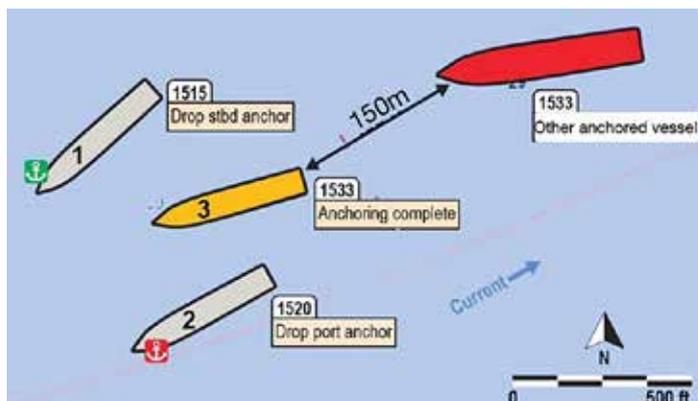
and bring the ship ahead. By this point, the ship was unable to turn to starboard away from the other anchored ship.

At 1655, with the first vessel now broadside to the current and pushing on the bow of the other anchored vessel, both vessels were now dragging anchor.

Tugs were requested to help hold and stabilise the vessel. The first tug arrived on scene about thirty minutes later. A further thirty minutes passed before pilots arrived on both vessels, but more tugs were needed to extricate the vessels from their position. Although these arrived some time later, the vessel nonetheless hit a shore dock at a speed of 6 knots before its bow grounded on the river bank. Damage to the two vessels and the dock were estimated at USD 16.9 million.

Lessons learned

- The first minutes after anchoring are important. Special attention should be given to ensuring the vessel's anchors are indeed holding and the vessel is stable.
- Given the distance of just 150 metres from the stern of the vessel to the bow of the other anchored vessel, the anchor watch alarm radius setting of 180 metres was too large to provide a timely alarm of the ship dragging.
- When at anchor, all means to detect vessel movement should be employed. In particular, the radar should be used to crosscheck ranges to shore or other anchored vessels.
- In this case, there were four shackles on deck on the starboard anchor and three in the water on the port anchor. Best practice with opposing forces ahead (such as in a river current) would be to have equal amounts deployed on each chain to avoid unequal distribution of stress. Unequal distribution of stress could result in one anchor taking the load, then dragging and



This diagram shows when anchors were let go and when the vessel was in its final anchoring position.

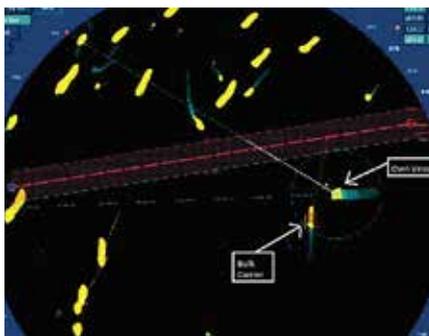


Collision with the other vessel anchored could not be avoided.

putting the load on the other anchor, which in turn takes the load, and then drags. This in effect nullifies the advantages of deploying two anchors. Readers may remember another recent Mars Report where dragging anchor in a crowded anchorage caused problems; Mars 202216.

Near collision – vessels pass at 35 metres: Mars 202235

In darkness, a vessel was proceeding to a busy anchorage under the con of a pilot who had just boarded. The pilot and the master engaged in small talk as they proceeded and there was also an OOW and a lookout on the bridge. Another vessel underway in the vicinity had recently altered course to port and, unknown to the bridge team or pilot, was now in a potential close quarters situation. Almost ten minutes passed before the potential close quarters situation was observed by local VTS and



The other vessel passed astern only 35 metres away.

the bridge team alerted to the danger by VHF radio.

Only now, with the other vessel just 0.3 nm away, was it plotted. There was initially some confusion as to the speed of the other vessel as the value was changing; but this was to be expected in the first minute after plotting as the ARPA target acquisition algorithm needs to refine the calculations. Emergency course alterations were made and the bridge team tried to communicate with the other vessel by VHF radio. As the distance decreased between the two vessels, the bridge team, now under some stress, sounded a long blast on the fog horn. Finally, the other vessel passed astern only 35 metres away.

Lessons learned

- A common mistake when a pilot boards is for the bridge team to relax; the unstated assumption is that the pilot has everything under control. Not so! The bridge team must continue to do their jobs in full support of the pilot and vice versa.
- As part of a bridge team, never assume that someone else will see it. It is possible for any member of the bridge team to make an error or miss a cue. YOU may be the only one that identifies a potentially hazardous situation, and for this reason, every bridge team member should be alert.
- The danger signal is at least five short blasts.

Check your steering gear: Mars 202236

A Seaways reader, member of The Nautical Institute and experienced navigation assessor, has sent the following note of interest. It is well worth reviewing:

One of the most frequent failures I find during navigation assessments is the testing of steering gear prior to departure from port. The ways in which tests are conducted are an eye opener, and range from (simply) turning on the steering motors and turning the rudder a few degrees each side of amidships through to the full test of all equipment. Often, no engineer is present in the steering flat to observe the mechanical operation and hence many elements of the test are not carried out.

Most of the pre-departure tests take place within one hour of sailing – a time when the master and chief officer are busy with administration tasks and hence no supervision is provided.

I have witnessed occasions where these tests could have resulted in serious incidents had a failure occurred during departure. In the most recent example, a failure did occur, but thanks to tugs still in attendance and made fast, a disaster was avoided.

Here are some examples of the items to be checked:

- test of main steering gear;
- remote steering gear control systems;
- steering positions on the bridge;
- emergency power supply;
- all rudder angle indicators;
- steering gear power failure alarms;
- automatic isolating equipment; and
- visual inspection of steering gear and linkages for damage and hydraulic leaks.

The regulations governing steering gear are covered in SOLAS Chapter II-1 Regulation 29 and 30. The key issue is that a minimum of two people are required to carry out these checks; a deck officer and an engineer officer.

All Mars Reports are also published online, www.swzmaritime.nl.



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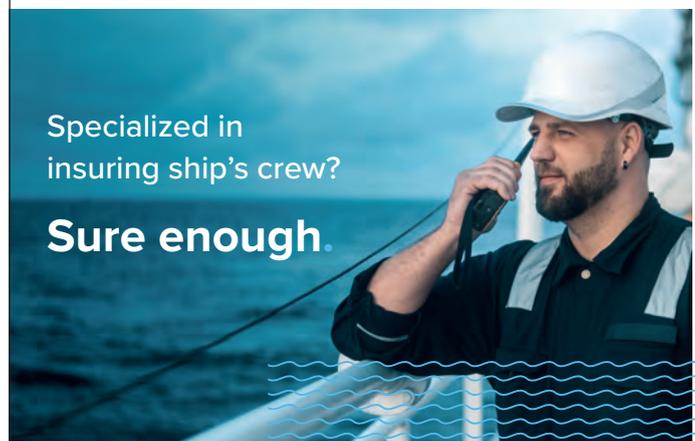


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LEZINGENPROGRAMMA

Afdeling Rotterdam

Donderdag 27 oktober

Presentaties genomineerden KNVTS

Schip van het Jaar-Prijs 2022

Locatie: De Machinist, Willem Buytewechstraat 45, Rotterdam. De Machinist is gemakkelijk te bereiken met de tram, metro en de bus. Er is parkeergelegenheid in de directe omgeving.

Op deze avond worden er presentaties gegeven door de drie ondernemingen die genomineerd zijn voor de meest prestigieuze maritieme prijs van Nederland: de KNVTS Schip van het Jaar-Prijs 2022. Zij zullen een presentatie houden over hun aangemelde schepen. In alfabetische volgorde:

- Damen Naval met de Nuyina, het Antarticisch research vessel/ijsbreker gebouwd in opdracht van de Australische overheid.
- Royal IHC met de CSD Spartacus, de krachtigste cutterzuiger ter wereld, van de Belgische aannemer DEME.
- Royal Van Lent met het superjacht VIVA, gebouwd in opdracht van een Amerikaanse entertainment-ondernemer.

In de juli-augustus-uitgave van SWZ zijn de genoemde schepen beschreven.



Floating solar could be applied in between wind turbines to make use of the infrastructure installed for the turbines.

Inloop met koffie en thee: vanaf 19.00 uur

Tijdstip lezing: 19.30 tot 21.45 uur

Na afloop van de presentatie is er onder genot van een borrel gelegenheid om na te praten. Voor het bijwonen van deze boeiende avond is geen aanmelding nodig.

Afdeling Zeeland

Donderdag 21 november

Onderwerp: Solar energy

Spreker: Don Hoogendoorn, CTO co-

founder Solar Duck

Locatie: het hoofdkantoor van Damen Naval, De Willem Ruysstraat 99, Vlissingen.

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MARITIME STUDENTS AWARDS

Al vele jaren worden jaarlijks Maritime Students Awards uitgereikt aan de beste afgestudeerden/geslaagde examenkandidaten van de maritieme opleidingen op universitair, hbo- en mbo-niveau. Het doel van de prijs is het promoten van het maritieme onderwijs en de studenten aan de maritieme opleidingen te blijven stimuleren voor scheepstechniek en innovatieve ontwikkelingen.

De KNVTS wil de uitreiking weer op dezelfde

manier aanpakken als twee jaar geleden. Dit jaar vindt zowel de uitreiking van afstudeerjaar 2021 als van 2022 plaats. Dit zal zijn op een nog nader vast te stellen locatie. Binnenkort worden universiteiten en scholen benaderd om voordrachten voor de awards te doen. Ten aanzien van de uit te reiken awards geldt dat het afstudeerverslag een door de student uitgevoerd onderzoek betreft, dat bovendien door de betreffende student is geschreven.

Afstudeerprojecten uitgevoerd door meer-

dere studenten komen niet in aanmerking en de prijs mag niet worden verdeeld over meerdere verslagen en/of meerdere studenten. De uiteindelijke voordracht wordt gedaan door het opleidingsinstituut en de voorgedragen kandidaat moet afgestudeerd zijn. Ten slotte wordt aan de winnaars van de awards verzocht een artikel te schrijven over hun onderzoek voor opname in SWZ|Maritime.

SWZ|Maritime is onder meer het periodiek van de Koninklijke Nederlandse Vereniging van Technici op Scheepvaartgebied, opgericht in 1898. SWZ|Maritime verschijnt elfmaal per jaar. Het lidmaatschap van de KNVTS bedraagt € 88,00 per jaar, voor juniorleden € 39,00 per jaar, beide inclusief dit periodiek. Een digitaal lidmaatschap (alleen voor studenten) kost € 15,00 per jaar. Het geeft u de vooraankondigingen van de maandelijkse lezingen, te houden op vier verschillende plaatsen in Nederland en korting op verschillende activiteiten. U kunt zich opgeven als lid bij de algemeen secretaris van de KNVTS, Zeemansstraat 13, 3016 CN Rotterdam, e-mail: secretariaat@knvts.nl of via het aanmeldingsformulier op de website: www.knvts.nl.

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Hoofredacteur: A.A. Oosting
Eindredactie: mevr. M.R. Buitendijk-Pijl, MA
Redactie: G.J. de Boer, Ir. H. Boonstra, Ir. A. de Bruijn, M. van Dijk, mevr. Ing. A. Gerritsen, Ir. J.

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Redactieadres

Zeemansstraat 13, 3016 CN Rotterdam
Telefoon: 010 – 241 74 35 (alleen voor redactieaangelegenheden, voor abonnementen en lidmaatschap KNVTS: 010 – 241 00 94, secretariaat@knvts.nl)
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