

# SWZ | MARITIME

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10



## SHIPBUILDING BACK ON TRACK



The nominees  
are...

Dutch maritime  
awards to be  
presented



Offshore  
installation

Fleet evolves to  
meet requirements



Order intake  
doubles

World shipbuilding  
in better shape



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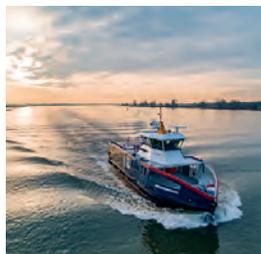
## Zet koers naar de toekomst

ABB helpt motorprestaties te optimaliseren.  
Beter voor milieu, voorstuwingsinstallaties en  
kostenreductie!

In hal 1 van Europort 2021 toont ABB slimme oplossingen voor de toekomst. U bent van harte welkom op onze beurstand 1119. Maak kennis met nieuwe voortstuwingstechnieken, de laatste stand van de maritieme techniek en ons wereldwijde servicenetwerk. Met ons digitale platform ABB Ability™ dragen we sterk bij aan vergroening van de scheepvaart. Kom bij ons langs en ontdek hoe innovatief ABB voor de scheepvaartsector is! Registreer voor een gratis bezoek aan Europort 2021 via onze website: [new.abb.com/benlux/europort](https://new.abb.com/benlux/europort)



## 23 | Ferries vie for KNVTS Ship of the Year Award



All nominees for the KNVTS Ship of the Year Award are fully-electric ferries. Two were built by Holland Shipyards Group – the Düsternbrook and NZK-100 – and the other one by Damen Shipyards – the Bryggen.

## 26 | Dutch shipbuilding in 2020



The Dutch maritime industry suffered greatly from the corona crisis in 2020. In all maritime segments, the order intake decreased drastically. One exception was super-yacht construction.

## 42 | The evolution of offshore vessels



The offshore wind farm industry is a booming industry at present. This has resulted in an evolving fleet of specialised vessels serving this industry.

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Cover: Royal Bodewes has launched the first newly built hybrid ship (diesel/electric from batteries) in Europe. Once delivered, the Aasfjell will sail under the Norwegian flag for Aasen Shipping.

# Finally, we can meet again in real life

It has taken a long time, but maritime professionals probably know better than anyone that you better take safety seriously because otherwise the risks are far too great. Being stuck on a ship with a crew among whom a potentially deadly virus circulates seems to me to be one of the worst things that could happen to you. But now that many have been vaccinated including, fortunately, more and more seafarers, it is again possible to meet at trade fairs and conferences and exchange innovative ideas, solutions and equipment that can hopefully improve not only shipping, but also contribute to reducing the carbon footprint of the maritime industry.

Maritime professionals and those interested can prepare themselves for next month, as there will be a lot to do in the Netherlands in the maritime field. First of all, there is the Offshore Energy Exhibition & Conference with the Navingo Career Event on Tuesday 26 and Wednesday 27 October in the Amsterdam RAI, followed by the international Europort Exhibition in Rotterdam from 2-5 November. Two weeks later, from 16 to 18 November, Amsterdam RAI will also host the Metstrade Show, which claims to be the world's largest trade exhibition for marine equipment, materials and systems.

And for the lucky ones that have been invited or still had enough money to be able to book a table or chair, they can party once again at the Maritime Awards Gala on Monday 1 November at De Doelen in Rotterdam. After two years, the maritime industry again has the opportunity to celebrate the greatest Dutch maritime innovations. Innovations that enable the Dutch maritime industry to keep on being competitive and help our industry to weather severe storms time and again.

If one plans to participate in one or more of these events, it is good to know that SWZ|Maritime is here to help keep you informed about what is really important in the global maritime industry and what is worth a visit at all those exhibitions and conferences. The October edition of SWZ|Maritime is a collector's item with a complete overview of all the nominees for all the five awards to be presented at the Gala. Talking about the offshore industry, one must definitely read the article about "The evolution of offshore vessels" by our editor Björn von Ubisch. Willem de Jong provides an update on the actual state of the global shipbuilding industry, while Gerrit de Boer completed his annual overview of 2020 Dutch shipbuilding production.



**Antoon Oosting**

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## Castor Marine migrates Jan De Nul fleet to VSAT and Iridium

Jan De Nul Group has selected Castor Marine to provide global VSAT internet and Iridium L-Band services to its entire fleet of almost eighty dredgers, offshore construction vessels, crane vessels and (environmental) support vessels. Since all vessels are operational around the globe, Castor Marine had to migrate vessels remotely to its network using the existing equipment on board within a tight deadline. Yet, with up to six migrations a day, within three months of contract signing 98 per cent of the fleet was successfully migrated.

Castor Marine has delivered a tailored VSAT solution for Jan De Nul's fleet, with quality of services specified on the custom-

er's VLAN level. The fleet benefits from the flexibility in the global VSAT network allowing Jan De Nul to easily scale up, based on the ad hoc, dedicated high bandwidth demands per vessel. Included in the internet package are high-quality onboard voice services based on local Belgian telephone numbers for the vessels, which allows cost efficient phone calls at local rates.

Along with the VSAT, Iridium and VoIP services, Castor Marine has delivered fifteen new Sailor 900 VSAT antennas and Sailor 4300 Iridium Certus antennas replacing existing hardware on board. For the newbuild offshore jack-up installation vessel *Voltaire* and the offshore heavy lift vessel *Les*



The CMHI Haimen shipyard in China laid the keel for *Les Alizés*, Jan De Nul's new heavy lift crane vessel, on 29 April.

*Alizés*, a complete set of antenna systems based on the recently launched Sailor 1000 XTR VSAT antennas, including below deck equipment, has been supplied.

## Edwin de Hoog wins IADC Young Author Award

The International Association of Dredging Companies (IADC) bestowed the Young Author Award 2021 to Edwin de Hoog, research and development engineer at Royal IHC in Kinderdijk, the Netherlands, and PhD candidate at the Delft University of Technology. The award is given annually to 'stimulate the promotion of new ideas and encourage younger men and women in the dredging industry'. It is granted at industry-leading conferences, with 2021's winning young author selected from the proceedings of the CEDA Dredging Days, virtually held on 28 and 29 September 2021.

De Hoog was selected as the winner for co-authoring of the research paper "The relevance of time domain effects for the design and stability of hydraulic transport pipelines". Traditionally, hydraulic trans-



The Young Author award was virtually handed over by IADC's Secretary General René Kolman (left) to Edwin de Hoog for his contribution to the paper "The relevance of time domain effects for the design and stability of hydraulic transport pipelines".

portation system design involves analysing energy wells and sources of a pipeline system. More specifically, the energy characteristics of the pump and drive train are balanced against the frictional energy losses of the slurry in the pipeline. Under field conditions, in dredging and mining pipelines, slurry dynamics are caused by fluctu-

ating loads on the centrifugal pump, due to transient variations in the mixture density flowing through the pump. This research discusses which time domain effects are relevant to such temporal design methodology and discusses methods to study these effects to maintain pipeline flow certainty. 'The jury was of the opinion that the winning entry represents solid research that addresses the core of dredging activities,' says René Kolman, secretary general of IADC. 'Building knowledge and optimising techniques is something we have to do. But also something we must continue to invest in, even at a time when dredging activities have to be carried out in an increasingly broader and more complex context.'

## Caterpillar to end production of MaK medium-speed marine engines

Caterpillar has announced to discontinue the MaK prime product engine sales and focus solely on aftermarket services for MaK engines by the end of 2022. The decision will impact the manufacturing plants in Kiel and Rostock in Germany and in China. According to union IG Metall, about 800 people work at MaK in Kiel and Rostock, who may now lose their jobs. The plants at these locations produce engines for cruise ships for example.

The trade union says the works council was not involved in the decision and no social plan has been drawn up to help employees. IG Metall has been campaigning for the employees since mid July as well as trying to engage German politics, but so far without result.

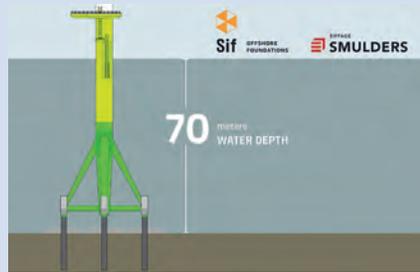
The MaK product line features marine diesel, gas and dual fuel engines used in a wide variety of marine applications. Products include main propulsion engines from

1020 kW to 16,800 kW and generator sets from 979 kWe to 16,111 kWe. Caterpillar acquired MaK from the Krupp Group in 1997. Caterpillar has announced that MaK service partner Bolier remains available for all service matters such as maintenance, overhauls, original MaK spare parts as well as digital solutions – in the workshops and with the service technicians on site. A lot of Dutch shortsea ships are equipped with MaK engines.

## Greater water depths rekindle interest in tripod foundation

Sif, KCI and Smulders are jointly developing a new product line called “The revival of the tripod”. The tripod foundation concept was last deployed offshore at Global Tech 1 windfarm around eight years ago. Yet, the concept has some specific advantages compared with the monopile and jacket at water depths of fifty metres or more.

The concept was abandoned as a foundation of choice after Global Tech 1, because it was not competitive against the monopile at the water depths used in that era. However, with bottom fixed foundations being deployed at ever greater water depths in the northern North Sea basin, we now see



*The tripod is a sturdier construction than the monopile and easier to manufacture than a jacket.*

monopiles being selected for up to fifty to sixty metres of water depth and jackets as the complementary foundation of choice from those or greater water depths. The tripod, however, is a sturdier construc-

tion than the monopile and easier to manufacture than a jacket. It will have its own specific niche application in addition to that of the jacket and the monopile respectively. With its robust history in the German market, bankability of the revived tripod should be less of a challenge compared with floating wind or other completely new foundation concepts.

The tripod will be marketed by a joint venture of Smulders and Sif. Production will take place in Roermond (the central column) and at the Smulders Wallsend site for the final integration. Bracings will be sourced from UK suppliers. Serial production is foreseen to start in 2024.

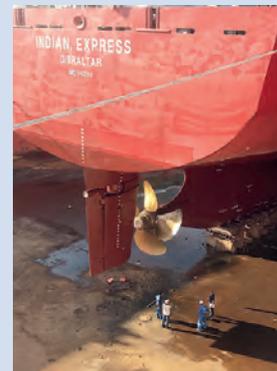
## Vroon retrofits propeller blade on container ship Indian Express to save fuel

Ship operator and manager Vroon asked Berg Propulsion to investigate the possibility of optimising the propulsion system on its container vessel MV Indian Express. Advanced simulation tools were used to develop a new propeller geometry through which a 22 per cent fuel saving overall could be achieved.

The ship was originally fitted with a controllable pitch propeller manufactured by ZF. The aim of the retrofit was to secure the sustainability benefits available through greater ship efficiency, ahead of the IMO’s Energy Efficiency Ship Index (EEXI) and Carbon Intensity Indicator (CII).

‘In close cooperation with the ship owner and ship operator, we analysed the vessel’s current and future operational needs and

defined its operational profile,’ explains David Sakandelidze, Berg Propulsion Business Manager – Energy and Efficiency. ‘Next, the performance of the original propeller blades was benchmarked against the vessel’s defined operational profile.’ Modelling showed the newly developed propeller geometry would achieve remarkably superior performance with regards to the new operational profile anticipated for the ship. In line with these findings, Berg Propulsion designed blades tailored for the operation, improving efficiency significantly, according to Sakandelidze. He adds: ‘Efficiency gains are achieved much of the time and, at 12 knots, the new blades achieve up to fifty per cent higher efficiency than the ones they replace.’



*Advanced simulation tools were used to develop a new propeller geometry through which a 22 per cent fuel saving overall could be achieved.*

With performance improved at the speeds most commonly required during operations, Indian Express would achieve a 22 per cent fuel saving overall, as well as lower emissions that should go farther than the requirements of the IMO’s CII goals for 2026.

## Martin Dorsman leaves European Community Shipowners’ Associations

As of the 1st of October, Martin Dorsman (60) has resigned as secretary general of the European Community Shipowners’ Associations (ECSA). According to the organisation he has decided to seek other work challenges.

Dorsman has led the current Secretariat team at ECSA for four years. Before joining ECSA in 2017, Dorsman had been managing director of the Royal Association of Netherlands Shipowners (KVNR) since 2011.



*Martin Dorsman has been ECSA’s secretary general for four years (photo International Transport Forum/ Flickr).*

‘We warmly thank Martin for leading the organisation during challenging times and

representing European shipowners at the important dialogue with numerous EU policymakers,’ says Claes Berglund, President of ECSA. ‘During his office term, ECSA has continued to be the strong voice for European shipping.’ ECSA is in search of new management. In the meantime, the Board of Directors have appointed Ms. Katalin Dobránszky-Bartus and Mr. Sotiris Raptis to jointly lead the organisation as acting secretary generals.

# IN THE BATTLE AGAINST GHG, THE CHOICE FOR SHIPPING IS R&D OR TAXES

**A lot of shipowners are still making bigger profits than ever due to the logistical crisis caused by the Covid-19 pandemic, particularly the ones that control box ships. Yet, this is also increasingly true for the owners of bulk carriers and multipurpose ships that, for lack of better, are now being used to meet the demand for shipping space for the transport of containers. So much so that they are now all scrambling to order new ships from China and South Korea. But this euphoria could soon be over as the international shipping industry faces possibly historic moments over the coming weeks. These will determine how shipping will be able to operate in just a few years' time and how much can still be earned with it.**

**A**nd this can have far-reaching consequences for the shipping industry. Dropping international aviation and shipping emissions from the draft Paris climate agreement (COP21) in December 2015 raised a lot of criticism from NGOs, governments, and politicians. NGOs Seas At Risk and Transport & Environment (T&E) warned that excluding shipping and aviation from the COP21 agreement would fatally undermine the prospects of keeping global warming below 2°C. The governments that compromised on the COP21 agreement referred to the ICAO (aviation) and IMO (shipping) as the responsible organisations to set standards for the contribution these industries should make to battling the climate crisis.

## Hard-fought compromise

In April 2018, the International Maritime Organization (IMO), based in London, adopted an initial strategy on the reduction of greenhouse gas (GHG) emissions from ships, with a vision to phase them out as soon as possible in this century. In a hard-fought compromise, the IMO agreed to reduce the total annual GHG emissions from shipping by at least fifty per cent by 2050 compared to 2008. Considering the expected growth of the world maritime fleet, this would mean that by 2050, ships would have to emit on average seventy per cent fewer GHGs than in 2008. At that time, it was the best that could be achieved as there was strong resistance from countries like Brazil, Saudi-Arabia, the US, and other especially commodity-rich countries that have no interest in making their export more expensive.

On the other hand, small island states in particular fear to disappear in the rising sea levels caused by climate change, and European nations strive for a far more ambitious climate change strategy. So, this turned out to be a compromise that no one was really happy with. Especially not the NGOs that want more action against climate change. But instead of increasing the pressure on the opposing member states within the IMO, their anger turns in particular against the shipping lobby. However, the IMO is first and foremost an intergovernmental organisation of currently 174 member states and three associate members. Only they have the right to vote. In addition, some eighty non-governmental international organisations have been granted consultative status when they are capable of making a substantial contribution to the work of the IMO. These can be shipping groups, such as BIMCO or Intertanko, but also environmentalists like Greenpeace. The IMO is therefore not the instrument of the shipping lobby.

## Commercially viable

The accusation that the shipping lobby is blocking stricter rules for the emission of climate-threatening exhaust gases is also unjustified. Shipowners do realise that they will have to change their operations and need cleaner ships. But to make shipping cleaner and more environ-



mentally friendly, shipowners must have the guarantee that the chosen solutions are technically and commercially feasible. Technically feasible simply means that the technology works and is safe, but if it is too expensive to operate, the shipowner will simply not get a loan from the bank or other investors to build those innovative ships. In other words, they must be commercially viable.

Instead of joining the climate change deniers, the shipping lobby is pushing for a tightening of IMO's GHG strategy targets. The International Chamber of Shipping (ICS), which organises the different shipping interest groups, submitted plans to the IMO on the 5th of October, detailing urgent measures which governments must take to help the industry achieve net zero CO<sub>2</sub> emissions by 2050. Just one month before the shipping industry's flagship COP26 decarbonisation conference "Shaping the Future of Shipping", ICS (which represents eighty per cent of the global shipping industry) is pushing governments to double the ambition of the IMO's current target, which is to reduce emissions from international shipping by fifty per cent by 2050.

### Shipping wants net zero

The plans of the ICS include a compulsory R&D fund to develop zero-carbon technologies, and the development of a carbon levy for shipping to expedite the transition to more expensive zero-carbon fuels. In its submission, the ICS accepts the vital need to accelerate decarbonisation timelines. But it states that a net zero target by 2050 will only be plausible if governments take the necessary actions to achieve this. The industry has therefore taken the step of proactively setting out the measures that must be taken by governments to make decarbonisation by 2050 a reality rather than a soundbite.

'The adoption by IMO of a net zero target will send the very strong signal sought by the industry, as well as energy providers, shipbuilders and engine manufacturers, so that investments in green fuels and technology can be accelerated and scaled,' the ICS says.

Given the lifespan of new oceangoing ships of 25 years, if the industry is to meet an ambitious net zero target, thousands of zero-emission ships will need to be in the water by 2030. It will therefore be critical for the IMO to adopt those urgent measures required to accelerate an increase in Technology Readiness Levels. A key step is for governments to approve the establishment of the USD 5 billion IMO Maritime Research Fund (IMRF) at a critical IMO meeting this November, simultaneous with the second week of COP26.

### Funding vs taxes

ICS calls for an IMRF (USD 5 billion R&D Fund) as it will provide guaranteed levels of funding to accelerate the development of zero-emission ships, without requiring governments to use taxpayers' money. This is because the IMRF will be funded by mandatory R&D contributions from shipowners globally, via a USD 2 levy, which the shipping industry wants in place by 2023.

To expedite the transition to net zero, the ICS has also made a comprehensive proposal setting out the architecture for a broader carbon levy applicable to shipping, which will be considered by IMO member states at a preparatory meeting in mid October. This global carbon levy will help close the price gap between zero-carbon and conventional fuels and could be used to provide the billions of dollars needed to deploy es-

sential new bunkering infrastructure required in ports worldwide, to ensure consistency in the industry's green transition for both developed and developing economies in the run up to 2050.

### Against EU ETS on shipping

Although the ICS and the European shipowners organisation ECSA support the European ambition to reduce the GHG emissions from shipping, they strongly oppose the EU plans to bring European shipping under the EU Emissions Trading System (ETS). The ICS condemns this policy as just another tax-raising scheme that will only make shipping – so the transported goods – more expensive for EU citizens.

The EU ETS is just another tax-raising scheme that will only make shipping more expensive

'Other than as an ideological revenue raising exercise, which will greatly upset the

EU's trading partners, it's difficult to see what extending the EU ETS to shipping will achieve towards reducing CO<sub>2</sub>, particularly as the proposal only covers about 7.5 per cent of shipping's global emissions. This could seriously put back climate negotiations for the remaining 92.5 per cent of shipping emissions,' ICS secretary general Guy Platten said a couple of months ago.

### Not truly serious

'The failure to include investment in research and development in the proposals, at a time when the IEA (International Energy Agency Ed.) and the new US administration are highlighting that emission reduction will only be possible with the development of technologies that do not currently exist, is disappointing,' Platten also said, and: 'To indicate one thing at the beginning of the process and then to withdraw it to pay for a post Covid recovery sends a clear message to industry that the EU is not truly serious about decarbonising global shipping. This also sends a message beyond shipping that political and investment risk is high in Europe. This only goes to show why we need the USD 5 billion IMO Maritime Research Fund.'



### Antoon Oosting

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## LAUNCHINGS

### Arklow Clipper



The Arklow Clipper is sixth in a series of ten (photo F.J. Olinga).

The Arklow Clipper (yard number 429, imo 9757137) was launched without ceremony at Ferus Smit, Westerbroek, on 10 September. The details of the Trader 5150 are: 2910 GT, 1692 NT, 5085 DWT – Loa (ll) x B x D (d) = 87.40 (84.99) x 15.20 x 7.12 (6.26) metres. Propulsion is provided by a MaK main engine, type 6M25 of 1740 kW on an adjustable propeller for a speed of over 12 knots. The bunker capacity is 101 m<sup>3</sup> heavy fuel oil (HFO) and 96 m<sup>3</sup> marine gas oil (MGO). The hold (48.86 x 12.60 x 8.50 metres) has a capacity of 218,800 cft or 6196 m<sup>3</sup>. The maximum permissible load of the tank top is 15 tonnes/m<sup>2</sup> and of the hatches 1.75 tonnes/m<sup>2</sup>. The Arklow Clipper is the sixth ice class 1A Trader 5150 in a series of ten to be built for Arklow Shipping. The Arklow Clipper is scheduled for delivery in mid-October.

### Gust

The LPG tanker Gust (yard number 843, imo 9876921) was launched at Ship and Steelbuilding BV, Foxhol, on 17 September. The Gust is the seventh seagoing tanker being built on the Winschoterdiep for Chemgas Shipping BV, Rotterdam, under class of Bureau Veritas.



The Gust is the last in a series of three seagoing LPG tankers (photo F.J. Olinga).



The Hanson Thames is a MAD 3500 delivered by Damen Shipyards Galati.

The Gust's details are: 2999 GT, 899 NT, 2657 DWT – Loa (pp) x B x D (d) = 91.09 (89.89) x 14.80 x 7.00 (4.85) metres. The two cargo tanks have a capacity of 3523 m<sup>3</sup> for liquefied gases under pressure (butane, LPG, vinyl-chloride monomer). It is powered by a Mitsubishi main engine, type S8U (240 x 260) with an output of 1825 hp or 1343 kW at 1060 rpm on an adjustable propeller in a nozzle for a speed of 10.5 knots. The bunker capacity is 214 m<sup>3</sup>. Still under construction is the Ghibli (yard number 842, imo 9876347), which was launched on 21 February and is due for delivery in January.

## DELIVERIES

### Lady Habarka

The Lady Habarka (yard number C-252, imo 9835006), fifth in a series of six Swedish/Finnish ice class 1A multi-purpose vessels, arrived in Eemshaven for the first time on 16 September. The Lady H2 type was designed by Conoship International BV, Groningen, and

built under Lloyd's Register class at Chowgule & Company Pvt. Ltd., Loutulim/Goa. Wijnne Barends BV, Delfzijl, took delivery of the Lady Habarka on 21 July. After loading at Port Klang, the new vessel set sail for the first voyage to the Netherlands via Suez and Malta. The details of the Lady H2 with open top notation are: 2995 GT, 1531 NT, 4228 DWT – Loa (pp) x B x D (d) = 98.20 (95.10) x 13.40 x 7.80 (5.60) metres, the air draught in ballast is 23.00 metres. The MaK main engine, type 6M25 (255 x 400), has an output of 1600 kW and an additional 400 kW of power take in (PTI) propulsion power is available for the most difficult situations encountered. The service speed is 11 knots. The bow thruster has an output of 250 kW. The ships have one box-shaped hold (67.20 x 11.20 x 8.34 metres) with a grain/bale capacity of 210,723 cft or a timber capacity of 5900 m<sup>3</sup>. The maximum permissible load on the tank top is 15.0 tonnes/m<sup>2</sup> and the container capacity is 40 TEU/20 FEU. The last in the series, the Lady Hannah (yard number C-253, imo 9835018), is due for delivery in November.



The Lady Habarka is the fifth Lady H2 for Wijnne Barends (photo F.J. Olinga).



The Damen built Benguela Gem for Debmarmine Namibia will be completed in Cape Town.

### Hanson Thames

Damen Shipyards Galati has completed the MAD 3500 Hanson Thames (yard number 563352, imo 9887786) for Hanson Aggregates Marine Ltd., Maidenhead. The keel had been laid on 3 October 2019 and the hull was floated out on 11 September 2020. Trials were executed on the Danube and the Black Sea on 26-27 August and 20-21 September. The MAD (Marine Aggregate Dredger) is equipped with dredging equipment, including a 1400-kW permanent magnet electric motor, which powers the dredge pump, and a screening installation from Damen Dredging Equipment (DDE), Nijkerk, and a dry unloading system from PLM Cranes. The trailing pipe diameter is 750 mm. The Hanson Thames was designed for offshore aggregate extraction of sand and gravel in water depths of up to 55 metres in the North Sea and English Channel. The details of the MAD 3500 are: 4905 GT, 6850 DWT – Loa (pp) x B x D (d) = 103.50 (98.00) x 22.00 x 9.10 (6.95) metres. The propulsion system consists of two Wärtsilä diesel generators, type 6L26, with an output of 2 x 3474 kW at 1000 rpm on two controllable pitch propellers in nozzles with a diameter of 3000 mm for a speed of 12 knots. The bow thruster has an output of 700 kW. Accommodation is provided for fourteen crew members.

### Benguela Gem

Debmarmine Namibia, Windhoek (De Beers Marine Namibia (Pty) Ltd., Luderitz), took delivery of Additional Mining Vessel 3 (AMV3) Benguela Gem (yard number 594001, imo 9854911) on 18 August. This DP 2 offshore vessel was designed by Marin Teknikk AS,

Dragsund, Herøy, as MT 6027 and built at Damen Shipyards, Mangalia. The keel had been laid on 22 January 2020 and the floating out took place on 27 November. After trials from 4 to 9 August, the naming ceremony was held at Mangalia on 18 August. The Lloyd's Register classed mining vessel departed on its own keel from Constanta on 22 August for Cape Town where it arrived on 18 September. Here, the installation of the special diamond mining equipment will take place: a 300-tonne crawler machine, which deploys a mechanical arm that moves in a horizontal arc, dredging material from the seafloor immediately below the hull at depths of around 130 metres. A large onboard processing plant consequently sifts the dredged gravel on board the ship, removing the diamonds and sealing them in metal canisters. Commissioning will take place in the second quarter of 2022.

The details of the Benguela Gem are: 19,461

GT, 14,500 DWT – Loa (pp) x B x D (d) = 176.56 (158.93) x 27.00 x 11.70 (8.30) metres. The energy is supplied by six Wärtsilä diesel generators, type 6L32 (320 x 400), with a total output of 20,802 hp or 15,300 kW at 750 rpm for, among others, powering a complex system of seven Azimuth thrusters. Accommodation for 109 persons is provided on board.

### Boluda Towage Zeebrugge

For the extended concession for towage services in the Port of Zeebrugge, Boluda Towage has taken four newly-built Damen tugs, the VB Bolero, VB Rumba, VB Flandes and VB Samba, into service. The naming ceremony was held in Zeebrugge on 16 September. The tugs comply with IMO Tier III emissions requirements and are certified with the highest fire-fighting standards. The emissions of the tugboats, such as nitrogen oxides, will be eighty per cent lower compared to conventional tugs. Shore power will also become the norm for moored tugboats, so that these can switch off their engines when inactive and during the rest-period of the crew. The ASD Tugs 2813 VB Bolero and VB Rumba were built at Damen Song Cam Shipyard and were already described in the December edition of SWZ|Maritime. The ART80-32 Tugs VB Flandes (yard number 571760, imo 9809942) and VB Samba (yard number 571761, imo 9809954) were built at Albwardy Damen, Sharjah, and delivered ex-stock on 15 July.

The details of the 495-GT ART80-32 are: Loa x B x D (d) = 32.90 x 12.60 x 4.82 (6.25) metres. The propulsion installation consists of three Caterpillar main engines, type 3512C TA/HD+,



The ASD Tugs 2813 VB Bolero and VB Rumba after the naming ceremony at Zeebrugge.



The ASD 2810 Med Regulus after conversion (photo R. Zegwaard).

total output of 6117 hp or 4500 kW at 1800 rpm on three Schottel rudder propellers, type SRP-3000FP, with a diameter of 2300 mm for a bollard pull of 80 tonnes and a speed of 12.5 knots. The bunker capacity is 204.6 m<sup>3</sup>.

## Two ASDs 2810

Two ASD Tugs 2810 E3, the Adventure (yard number 512319, imo 9668025) and Experience (yard number 512320, imo 9668037) were reconstructed into conventional tugs by removing hybrid parts in June 2021. They were then transferred to MSC subsidiary MedTug Antwerp as Med Regulus and Med Polaris. In Antwerp, they joined the ASD 2813 Med Castor (2021 – 380 GT, imo 9890147) that had been delivered on 25 May 2021. Both ASDs 2810 E3 were delivered by Damen Shipyards Galati as Bernardus and Multratug 28 on 14 May 2014 and 10 February 2015.

The details of the reconstructed ASD 2810 are: 294 GT, 88 NT – Loa (pp) x B x D (d) = 28.67 (25.78) x 10.43 x 4.60 (4.95) metres. Propulsion is provided by two MTU main engines, type 16V4000M53 Tier II, with a total output of 3680 kW or 4935 hp at 1600 rpm on two RR azimuth thrusters, type US 205 with a diameter of 2400 mm, for a bollard pull of 60.2 tonnes and a speed of 13.4 knots.

## Rakiwai

The ATD Tug 2412 Rakiwai (yard number 545023, imo 9858254) left Haiphong on its own keel for South Port, Bluff, where it arrived on

17 September. The keel of the Rakiwai had been laid on 3 August 2018, launching took place on 10 June 2019 and delivery by Damen Song Cam Shipbuilding was on 8 July. The details of the Lloyd's Register classed ATD 2410 are: 299 GT, 89 NT – Loa (pp) x B x D (d) = 25.18 (22.22) x 12.63 x 4.60 (3.91) metres, air draught 13.25 metres. The propulsion installation consists of two Caterpillar main engines, type 3516 TA HD, with an output of 5632 hp or 4200 kW at 1600 rpm on two RR thrusters, type US 255, for a bollard pull of more



The ATD Tug 2412 Rakiwai for Southport, Bluff.

than 65 tonnes and a speed of 12 knots. The bunker capacity is 71.8 m<sup>3</sup>. Accommodation is provided for four persons. The Rakiwai is named after a crater lake that sits on the summit of Hananui, which is the Mount Anglem.

## Condor

Neptune Marine, Aalst, delivered the Euro-TractorTug 2410 Condor (yard number 520, imo 9685786) to Verbeke Shipping BVBA, Hemiksem, on 27 August. The keel had been laid on 24 July 2020 and the hull was launched on 14 July. Trials were held on 4, 5, 16 and 17 August 2021 in Rotterdam Europoort.

The details of the EuroTractorTug 2410 are: 223 GT, 66 NT – Loa (pp) x B x D (d) = 24.31 (23.00) x 11.00 x 3.00 (3.80) metres. Propulsion is provided by two Caterpillar main engines, type C 32 (145 x 162) Tier III, with a total output of 1940 kW or 2636 hp on two Voith thrusters



The EuroTractorTug 2410 Condor (photo H. Trommel).



The StanTug 1004 Nellie Bly will sail fully autonomously around Denmark (photo A. Boer).

for a bollard pull of 27 tonnes and a speed of 11 knots. The Bureau Veritas classed Condor is equipped with a 60-tonne towing winch, an A-frame with dredging plough and a compact knuckle boom deck crane. On 2 September, the Condor sailed from Aalst to Wintam.

### Coastal Crown

The Coastal Crown (yard number 332, imo 9920356) arrived in its homeport Den Helder for the first time on 24 September. The Bureau Veritas classed DP 2 hybrid Multicat 3712, built by Bijlsma Wartena BV, Wartena, had been launched on 23 April 2021 and was transferred to Urk on 27 August. Trials were executed on 6 and 13 September. The christening ceremony was held in the homeport near Willemsoord on 28 September. The details of the Multicat 3712 are: 425 GT – Loa x B = 37.00 x 11.84 metres; ultra-shallow draught 1.73 metres (minimum), 2.12 metres (maximum). The triple drive hybrid configuration exists of two Caterpillar main engines, type C32, two Caterpillar diesel generators,



The DP 2 hybrid MultiCat 3712 Coastal Crown.

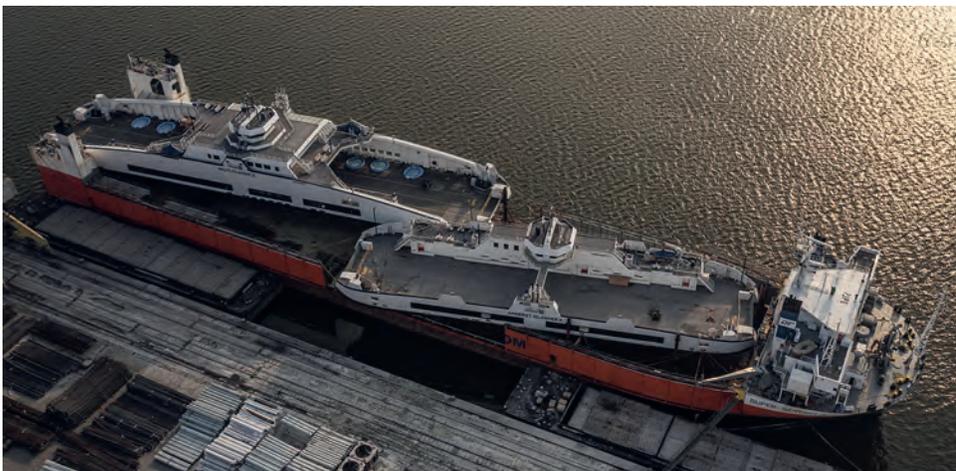
type C18, and one auxiliary diesel generator type C 4.4, all Tier III, and a 300-kWh battery pack for both propulsion and the ship's accommodation. Propulsion output is 2988 kW for a bollard pull of 30 tonnes and a maximum speed of 11 knots. It is also equipped with two bow thrusters (2 x 249 kW) and one stern thruster (470 kW). The bunker capacity is 110 m<sup>3</sup>. The Tier III engines are said to reduce NO<sub>x</sub> emissions by 73 per cent and CO<sub>2</sub> by twenty per cent.

To meet special requirements during a project with a variety of activities and various idle/waiting intervals per day, a smart configuration and use of power is needed. For that purpose, the Coastal Crown has three drive modes: a direct, diesel-electric and battery-electric drive mode. The direct drive mode consists of two direct drive engines on two fixed pitch propellers in nozzles. It is mainly used during transits and when a lot of power is required like during anchor and barge handling. The diesel-electric drive mode has two generators with diesel-electrical drive for an azimuth stern and two bow thrusters. This is mainly used during DP operations and manoeuvring at the project site. The 300-kWh battery pack allows for battery-electric operation for DP back-up power and the vessel's hotel load, which is mostly used during idle/waiting intervals between activities. The battery capacity can be upgraded when needed. The Coastal Crown has a free deck space of 207 m<sup>2</sup> with a maximum permissible load of 5 tonnes/m<sup>2</sup>. The Multicat is equipped with two

hydraulic deck cranes: An HS Marine AKC290 LH3 with a fixed hook safe working load (SWL) of 11.3 tonnes at 16.50 metres or 25.1 tonnes at 8.28 metres and an HS Marine AKC185 HE4 with a fixed hook SWL of 7.6 tonnes at 15.07 metres or 18.7 tonnes at 6.95 metres. Accommodation is provided for up to nineteen persons.

### Nellie Bly

Boston-based Sea Machines Robotics (SMR) has announced plans to embark on a 1000-nautical-mile voyage using an autonomous and remotely commanded tugboat. SMR cooperated with Damen Shipyards Group in their endeavours to convert and operate a fully autonomous demo vessel on very short notice. Since July, Damen Shipyards has had two StanTugs 1004 on stock, which had previously been operating for SD Seahorse Ltd. (Kotug International BV, Rotterdam) in St. Petersburg since 5 July 2016 as RN Temryuk (yard number 501109) and RN Taman (yard number 501110). From here, they were transported back to the Netherlands. Both tugs were built at Changde and arrived on board of the Wilma at Rotterdam on 7 October 2014. After returning to the Netherlands, the first was sold to Norway as general assistance vessel in diverse operations, such as pontoon handling and mooring. The second tug was available for retrofitting an SM300 autonomous command and control system. Obstacle avoidance is also one of the key ingredients of the technology built into the StanTug. The system can interpret nautical data itself, scan the environment and plan the ideal sailing route. Renamed Nelly Bly, the robot tug departed from Hamburg, Germany, on September 30, with full onboard vessel control managed by autonomous technology, while operating under the authority of commanding officers located in the United States for a weeks-long trip around Denmark. This promotional tour is to prove that the world is ready for unmanned transport on water. Two officers will remain on board throughout the voyage. Occasional guest passengers will be allowed on board as the vessel calls at ports along the route to display and demonstrate the technology. Towing is also taking the lead elsewhere in remote-controlled transport. The voyage around Denmark will prove whether the Nellie Bly can keep its digital-data-packed



The Super Servant 4 loaded with two ferries for Lake Ontario.

robot head cool even in challenging conditions. The tug is named after Nellie Bly, an American journalist who made a voyage around the world in 72 days, by steam ships and steam trains in late 1889/early 1890. The details of the StanTug 1004 are: 19 GT, 5 NT – Loa (pp) x B x D (d) = 10.67 (10.00) x 4.54 x 2.15 (1.70) metres. Propulsion is provided by a Volvo main engine, type D9 MH/1 (120 x 138), with an output of 221 kW or 300 hp at 1800 rpm on a nozzled propeller for a bollard pull of 4.1 tonnes and a speed of 8.3 knots. The bunker capacity is 1.62 m<sup>3</sup>.

## Amherst Islander II and Wolfe Islander IV

Loyalist Township/Ministry of Transportation, Ontario, ordered two large new generation zero-emission ferries with Damen Shipyards, Galati: the Amherst Islander II (type RF 6819 E3, yard number 539317, imo 9873137) and Wolfe Islander IV (type RF 9819 E3, yard number 539318, imo 9873149). The hulls were launched on 14 November 2019 and 11 September 2020. Trials were made on the Danube and the Black Sea and both ferries were ready in Constanta for shipment on 26 August.



The SL-26 Anne Marie was delivered by Padmos (photo A. Neighbourfield).

Two days later, the semi-submersible transport vessel Super Servant 4 (1982 – 12,642 GT) arrived and departed to Quebec on 31 August where it arrived on 26 September. After discharging, the ferries have to proceed to Kingston via the St. Lawrence Seaway.

The new ferries are significantly larger and faster than those currently in service: the Frontenac II (1962 – 666 GT) and Wolfe Islander III (1975 – 985 GT). The ferry service between Millhaven (Kingston) and Stella (Amherst Island) currently carries 270,000 passengers and 130,000 vehicles annually and the ferry service between Loyalist (Kingston) and Wolfe Island 1,000,000 passengers and 500,000 vehicles. During construction of the ferries, four new terminals were built including installation of facilities that will enable the vessels to use shore power supplied via integrated shore charging and mooring systems. This will enable them to recharge their batteries while loading and unloading between the short crossings to and from the islands. Both open-deck vessels are equipped to be operated fully-electric, but also have twin diesel generators installed to allow hybrid and full diesel propulsion for maximum redundancy. Due to the harsh winters, the ferries also feature 1B ice class hulls and 1A ice class azimuth thrusters, allowing them to be fully operational down to -25°C.

The details of the RF 6819 E3 are: 1230 GT, 362 DWT – Loa x B x D (d) = 71.70 x 20.20 x 4.20 (2.90) metres. Propulsion is provided by two Caterpillar diesel generators, type C18, with an output of 2 x 565 kW and battery packs of 1800 kWh on four azimuth thrusters with a diameter of 1450 mm for a maximum speed of 12 knots of cruise speed 9 knots. The bunker capacity is 35 m<sup>3</sup>. It has capacity for 300 passengers and forty cars (PAE) or twenty trucks or twenty PAE and two tractor trailers. Accommodation is provided for two crew. The auto-charging system is 1000 Vdc, 1600 A and the Cavotec MoorMaster MM200K12 auto-mooring system has 20 kN holding power.

The RF 9819 is 26.70 metres longer than the RF 6819 resulting in the following differences: 1754 GT, 568 DWT – Loa = 84.40 metres. It has battery packs of 4000 kWh, a maximum speed of 13.5 knots and a cruise speed 11 knots. It has capacity for 399 passengers and eighty PAE or forty PAE and four tractor trailers. Ac-



The thermolicer vessel UV 3514 Camilla Eslea (photo F.J. Olinga).

commodation is provided for four crew. The auto-charging system runs on 1000 Vdc, 3000 A.

### SL-26 Anne Marie

SL-26 BV (E. van Seters & Zoon), Stellendam, took delivery of the twinrigger/flyshooter SL-26 Anne Marie (yard number 222, imo 9909118) from Padmos Shipyards, Stellendam, on 9 September. The keel had been laid on 3 November 2020 at Casco & Sectiebouw Rotterdam (CSR), Rotterdam, and the hull was launched and towed to Stellendam by the mortugs RT Borkum and Adriaan on 26 February.

The details of the Anne Marie are: 251 GT – Loa (pp) x B x D (d) = 24.95 (23.40) x 8.50 x 4.00 (3.60) metres. The propulsion installation consists of a Mitsubishi main engine, type S12R-MPTAW, of 749 kW at 1500 rpm via Twin Disc gear box on a Promarin propeller in a nozzle. Trials were conducted out of Stellendam from 19 till 25 August. The Anne Marie departed from Stellendam to Oostende on 12 September.

### Camilla Eslea

Nauplius Workboats BV, Groningen, delivered the thermolicer vessel UV 3514 Camilla Eslea (yard number N021, imo 9921142) to Inverlussa

Marine Services, Craignure, Isle of Mull, on 8 September. The contract had been signed on 27 August 2020 and the hull was launched at Pattje Shipyards, Waterhuizen, on 2 May 2021. The Camilla Eslea was towed to Delfzijl on 19 July and trials on the Ems took place on 20 and 21 July, after which the vessel moored near Nauplius in Groningen the next day for the final touch.

The details of the Lloyd's Register classed UV 3514 are: 464 GT, Loa x B x D (d) = 34.99 x 14.30 x 3.50 (2.65) metres, air draught about 15.00 metres. The diesel-electric installation includes three Mitsubishi main generators, type S12A2 (Z3) MPTAW (170 x 180), 3 x 677 kW at 1500 rpm, for powering both the propulsion, a Veth bow thruster, type VT 320, 334 kW, as well as treatment equipment such as twin triple vacuum pumps and twin drumfilters. The DP 2 Camilla Eslea is propelled by two electric Veth L-Drive VL-400si propellers, with an output of 2 x 500 kW for a trial speed of 8 knots and a bollard pull of about 15 tonnes. The UV 3514 has been equipped with a heat recovery system, onboard oxygen maker and three deck cranes: 1 x HS Marine AKC 145/23,5 HE5 (2400 kgs at 23.50 metres) and 2 x HS Marine AK 48/18,5 E5 (1100 kgs at 18.55 metres). The maximum permissible deck load is 3.50 tonnes/m<sup>2</sup>. The design was prepared by

Argos Engineering BV, Groningen. On the day of delivery, the Camilla Eslea set sail for Tobermory where it arrived on 11 September. In the weeks after this, the vessel performed live fish trials before entering into full service.

### PW10

The Province of Fryslân commissioned the fully-electric inspection vessel PW10 (yard number 799, ENI 02338902) on 1 September. The vessel (16 x 6 metres) was built at Talsma Shipyards in Franeker. This new and state of the art electric workboat was designed by Vripack Yacht Design, Sneek. MG Energy Systems BV, Leeuwarden, is the supplier of the lithium-ion battery bank with a total capacity of 240 kWh. The high-voltage battery bank provides the energy for both propulsion and hotel load. The electric propulsion can run continuously in electric mode for twelve hours when cruising at normal speed in silent operation. The battery bank consists of four parallel strings of twelve lithium-ion batteries all connected in a series configuration. As a result, the battery system voltage is around 288 Vdc, the same voltage as the main DC busbar. No conversion is needed and there are hardly any energy losses.



The fully electric inspection vessel PW10 for the Province of Fryslân.

### Gerrit de Boer

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



ELECTRIC - HYBRID - HYDROGEN

# NEXT GENERATION GREEN VESSELS.

We are committed to work towards a greener future for the maritime industry. Since the start of our green mission in 2010, we have learned the intricacies of building sustainable vessels that are perfectly optimised for their application.

Our green mission is not only visible in the vessels we build, but also in the production process. Green vessels must be built sustainably.

We truly believe that going green is not a mere option; it is a necessity to leave a habitable planet for generations to come. And we commit to doing our part.



## EU environmental shipping report

In September, the European Environment Agency and the European Maritime Safety Agency launched the European Maritime Transport Environmental Report, marking the sector's first comprehensive health-check. It shows that ships produce 13.5 per cent of all greenhouse gas emissions from transport in the EU, trailing road transport (71 per cent) and aviation (14.4 per cent). In more than 200 pages with many graphs and tables, it covers more than only environmental matters. In 2018, ships calling at European ports generated around 140 million tonnes of CO<sub>2</sub>, some eighteen per cent of worldwide CO<sub>2</sub> emissions from shipping. Sulphur dioxide (SO<sub>2</sub>) emissions in 2019 amounted to around 1.63 million tonnes, approximately sixteen per cent of the world total. The estimated total accumulated underwater radiated noise more than doubled in European waters between 2014 and 2019. Container ships, passenger ships and tankers generate the highest noise emissions. It also reports on the introduction into European waters of non-indigenous species through ballast water and hull fouling and gives details on oil spills since 2010. (*European Environmental Agency, www.eea.europa.eu*)

## Shortage of ship's officers

According to the Seafarer Workforce Report from BIMCO and ICS, there are now 857,540 STCW certified officers worldwide and 1,035,180 ratings. The report warns the industry not to neglect recruitment and training if demand for officers and ratings is to be met. Presently, the Philippines, Russia, Indonesia, China and India are the largest suppliers of officers and ratings. Demand has outpaced supply, with companies struggling to recruit officers and electro-technical officers in particular. It is suggested the shortage may be due to an increase in the number of officers needed on board, due to factors such as larger ships and technological change. An average of 1.4 officers is required per berth to keep the ships at sea. To meet 2026 demand, some 18,000 officers and 7000 ratings need to join the workforce each year. (*Telegraph*)

## Engine with NO<sub>x</sub> aftertreatment

Swiss engine maker WinGD has launched, what it claims, the first marine two-stroke engine to carry its own NO<sub>x</sub> abatement solution, reducing space requirements and installation cost for shipyards. The integrated selective catalytic reduction (iSCR) has been incorporated into its six-cylinder X52 low-speed engine. The high pressure reactor is integrated directly with the exhaust manifold. Locating it directly upstream of the turbocharger results in higher operation temperatures, which also help with NO<sub>x</sub> removal. The iSCR has little heat dissipation, while offering easy switching between IMO Tier II and Tier III compliant modes. (*Naval Architect*)

## 3 billion disappears in thin air

University of Plymouth scientists say some seventy million barrels of hydrocarbons are lost yearly due to evaporation of volatile organic compounds (VOCs) during loading, storage and transportation of crude oil on ships, worth 3-3.5 billion dollars. Different countries and organisations are initiating VOC emission control regimes. Researchers have for example recommended that tanker loading systems are modified, replacing under pressure by positive pressure. (*Splash247*)

## 54 GW floating wind power

The global offshore floating wind power project pipeline stands at over 54 GW if all are constructed, says Renewable-UK. Over half of this is in Europe (30.4 GW), with the UK leading at 8.8 GW. Ireland has 7.7 GW, Sweden 6.2 GW and Italy 3.7 GW. The world's first floating wind farm, Hywind, has been in operation in Scottish waters since 2017. A second floating project, Kincardine, is almost operational. (*Renews.bizz*)

## Breakthrough for air lubrication?

Air lubrication may finally find success in large seagoing ships. Number two container carrier MSC has put in a record thirty-unit order for Silverstream Technologies' air lubrication system, which jets out a thick carpet of air bubbles under the bottom of the hull to reduce drag. The company has also received contracts for Shell LNG carriers, cruise ships of Norwegian Cruise Lines and Carnival and a very large ore carrier. Mitsubishi Shipyard also delivers such systems. Silverstream uses up to eighteen air release units whilst Mitsubishi uses three. (*Marine Professional/The Maritime Executive*)

## Let's go nuclear

In the Naval Architect, Malcolm Latache assumes that the number of ships with nuclear propulsion, be it almost exclusively military, probably exceeds that of all the LNG fuelled ships built so far. He may well be right. The need for decarbonisation has spiked interest in nuclear ships. Last year, UK-based Core Power and US company Terrapower launched a project to develop a molten salt reactor (MSR) for ships. If nuclear ships are to become reality, the MSR looks to be the best choice as it is considered safe and compact. One unit should be able to deliver 10-20 MW electrical power. Assuming opposition to their use can be overcome, nuclear-powered ships have several benefits: no need to refill, so once in operation there are no fuel cost fluctuations. And there is no need for slow steaming, meaning ships could be built for much higher speeds (less ships and crews needed). The first prototype MSR will be trialled in around four years time.



# WORLD SHIPBUILDING IN MUCH BETTER SHAPE

**Uncertainty on how to decarbonise does not stop owners from ordering ships**

**According to the Shipbuilding Statistics of IHS, at the 1st of July of this year, the orderbook of the world's shipbuilders contained 4637 ships representing 148.6 million gross tonnage (m.GT) and 84.1 million compensated gross tonnage (m.CGT). During the first half year of 2021, the total orderintake amounted to 774 ships, with 42.2 m.GT and 20.4 m.CGT.**

**W**ith these figures, the shipbuilders of the world managed to about double the order intake compared with the corresponding figures of the past five years 2015-2020. During these poor five years, world shipbuilding production declined by some forty per cent. Much of this recent order growth has come from the surge in container ship contracts, taking the container ship orderbook to approximately twenty per cent of the existing fleet in terms of TEU.

According to Chinese sources, the shipbuilding market is starting a high growth period. Apart from container ships, there is a notable interest in LNG and LPG carriers, whilst Drewry and brokers expect a growing number of orders for bulk carriers and other ships in the coming years. The orderbooks of the Asian yards are filling up and the average lead time (from contract signing to scheduled delivery) starts to exceed 25 months, according to Clarksons. Consolidation in the shipbuilding industry over the past years un-

der influence of the tough times has led to yards being closed and a reduction of capacity. Back in 2011, China's shipyards numbered 187, today there are 52 yards remaining. In Japan, the number of yards in the same period dropped from 57 to 31. In Korea, only a handful of shipbuilding groups remain, down from seventeen ten years ago. European sources state the consolidation of the Far East shipbuilding industry is being carried out with large government subsidies, flouting the idea of fair competition with yards in other areas.

The increased interest in newbuilding, together with the higher costs for materials and equipment, has led to higher prices, as shown in the following graph from Clarksons. A continuation of substantial ordering by owners in combination with higher prices will most probably lead to a reactivation of yards and increased capacity of running yards; as we have seen under comparable conditions, shipbuilding capacity is not static, but flexible.

*Photo: The container ship orderbook now amounts to approximately twenty per cent of the existing fleet in terms of TEU.*

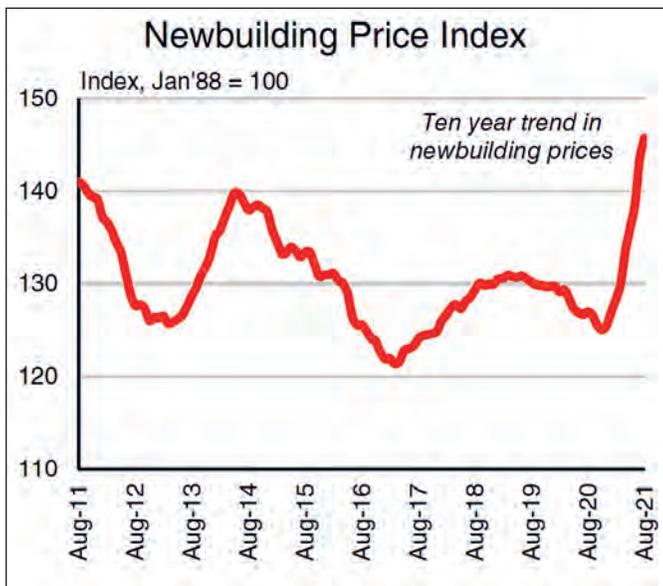


Figure 1. The newbuilding price index (by Clarksons).

### Dominant position of Asian yards

The large Asian yards, enjoying growing orderbooks with sizable series of large and very large ships, are keen to concentrate on such orders and are not much interested in ships like general cargo, multi-purpose and smallish feeder container ships. This may well become a problem for European and other owners planning to build such and other ships, which the Asian yards find too troublesome and economically unattractive. Table 1 shows the orderbook of the largest shipbuilding nations per 1st of

July of this year with China at top spot. Not for long perhaps, judging the latest news about the intentions of the Korean government. 'We will strengthen the shipbuilding industry that cannot be con-

Country	No	m.GT	m.CGT
China, People's Republic of	1643	60.542	31.078
Korea, South	549	49.635	24.229
Japan	568	19.811	9.4
Italy	42	3.369	3.591
Russia	197	3.294	2.922
France	64	2.053	1.896
Germany	35	1.678	1.668
Philippines	43	1.353	0.68
Finland	13	1.283	1.201
Vietnam	129	0.986	0.765
Other builders	507	0.913	1.761
Brazil	44	0.707	0.638
United States of America	56	0.444	0.473
Turkey	178	0.372	0.781
Romania	31	0.362	0.471
Spain	53	0.303	0.459
India	122	0.297	0.52
Iran	12	0.238	0.116
Croatia	25	0.235	0.243
Bangladesh	147	0.221	0.426
Netherlands	78	0.2	0.318
Chinese Taipei	43	0.168	0.18
Poland	58	0.137	0.245

Table 1. Overall orderbook of the largest shipbuilding nations per 1 July 2021.

tested by other countries', declared President Moon Jae-in recently when visiting Samsung's shipyard in Geoje. His government has set out key targets to command 75 per cent in global eco-friendly vessels and fifty per cent in the self-driving ship sector by 2030 to cement its position as the number 1 shipbuilder by dominating the future-promising shipbuilding market.

Table 2 shows a summary of shipbuilding activity for the first half year of 2021 by area. It shows the dominant position of the Asian yards, responsible for more than 75 per cent of the present orderbook, having produced almost ninety per cent of the world total during the first six months of this year, and finally having received in that period about 85 per cent of the new orders, all in terms of CGT. Thereby they are dwarfing the achievements of the European yards.

According to an article in Hansa, at a recent meeting of the German

Area	Orderbook			Completions			Orders reported		
	No	m.GT	m.CGT	No	m.GT	m.CGT	No	m.GT	m.CGT
South Korea	549	49.635	24.229	142	11.735	6.061	239	22.219	9.836
Japan	568	19.811	9.4	223	5.984	3.067	71	2.508	1.184
China	1643	60.542	31.078	433	14.374	6.799	303	16.184	7.698
EU 27	416	9.486	10.095	78	0.65	0.828	29	0.187	0.249
Europe (other)	450	4.004	4.155	84	0.169	0.398	53	0.119	0.218
Rest of the world	1011	5.122	5.106	247	0.828	0.862	79	0.967	0.595
<b>Totals</b>	<b>4637</b>	<b>148.6</b>	<b>84.063</b>	<b>1207</b>	<b>33.74</b>	<b>15.017</b>	<b>774</b>	<b>42.184</b>	<b>20.431</b>

Table 2. Summary of shipbuilding activity for the first half of 2021 by area.

shipbuilders association VSM, its president Bernard Meyer made the following statement: *‘Mittlerweile geht es um mehr als um die Überbrückung fehlender Nachfrage infolge der Corona-Krise. Der europäische Schiffbau verliert seit Jahrzehnten Marktanteile, weil vor allem in Asien mit massiven Subventionen ein Verdrängungswettbewerb praktiziert werde und Europa nichts dagegen unternehme. Deshalb geht es inzwischen um die Frage, ob in Deutschland und Europa in zehn Jahren überhaupt eine zivile Schiffbauindustrie bestehen kann.’*

Assuming that the positive outlook for shipbuilding as seen by many, will be justified, it will be interesting to see whether the European shipbuilders will be able to make use of the situation. Particularly in those segments the Asian yards seem to avoid. So perhaps we should not be too pessimistic. There may be some good opportunities. Shipping and associated activities cover more types of ships than container ships, tankers, bulkers and LNG carriers. Moreover, European maritime activities are not limited to building ships; it also operates a very large marine equipment, consultancy and service industry, supporting clients worldwide. Table 3 shows the orderbook per major ship type.

### Shipping

For most ship types, the shipping market is presently good, for some even very good. Container ship rates have gone through the roof and very recently, the Baltic Exchange’s main dry bulk sea index rose to a twelve-year high by reaching a level of well over 4000. Also, rates for dry cargo ships and multi-purpose ships are much better than we have seen in a long time.

For owners of container ships, bulk carriers and general cargo and multi-purpose ships and a few other ship types, the good market conditions are a great comfort in this period with so many uncertainties. For tanker owners, the situation is not so fortunate and, understandably, the cruise companies are as yet seriously affected by Covid. Most shipping companies and their crews are still suffering from the Covid pandemic, with hundreds of thousands of crew members remaining trapped at their place of work or unable to join ships.

Ship type	Orderbook		
	No	m.CGT	m.DWT
Container ship	509	20.486	46.876
Bulk carrier	645	12.372	52.954
LNG tanker	117	10.052	9.977
Passenger (cruise) ship	104	8.985	0.807
Crude oil tanker	247	8.147	45.532
Chemical/oil products tanker	299	3.63	8.801
LPG tanker	157	3.52	5.948
General cargo ship	311	2.118	2.846
Passenger/ro-ro cargo ship	117	1.859	0.423
Oil products tanker	122	0.847	1.668
Ro-ro cargo ship	39	0.694	0.534
Ore carrier	13	0.586	4.226
Vehicles carrier	16	0.491	0.248
Wood chips carrier	16	0.322	0.882
Heavy load carrier	14	0.319	0.603
Container/ro-ro cargo ship	6	0.245	0.274
Chemical tanker	25	0.171	0.178
Deck cargo ship	14	0.12	0.177
Passenger ship	70	0.109	0.021
Bitumen tanker	7	0.077	0.121

Table 3. Orderbook per major ship type per 1 July 2021.

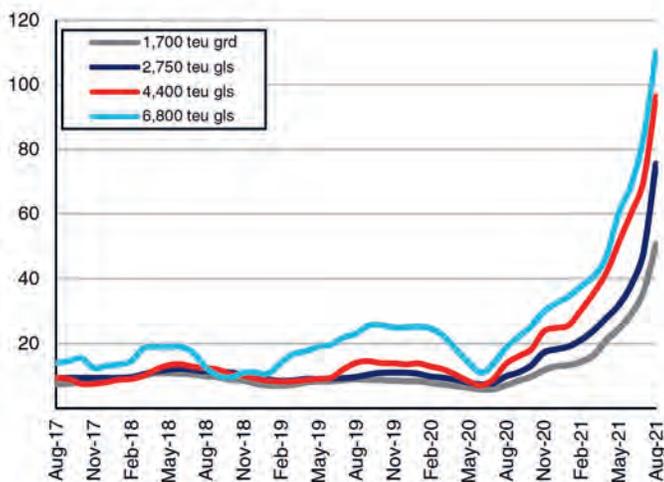
### Upcoming regulations

All owners also have to live with upcoming and still unknown regulations to reduce emissions and increase energy efficiency while not knowing which X-fuel (no word could better characterise the present marine fuel situation than this term) will be used in the not too distant future. At the same time, it remains unclear which propulsion system would allow a reasonable lifetime and a good chance to cover the ship’s capital lay out.

Existing ships will soon have to comply with the Energy Efficiency Existing Ship Index (EEXI) and Carbon Intensity Indicator (CII) regulations, as shown elsewhere in this article. According to broker SSY, less than 25 per cent of existing bulkers and tankers will attain EEXI

## ENERGY EFFICIENCY REGULATIONS FOR EXISTING SHIPS

As of 2013, new ships have to comply with IMO Energy Efficiency regulations. For each newbuilding, the Energy Efficiency Design Index (EEDI) is calculated and the ship is required to comply with set limits. Over time, those limits will become stricter. In November 2020, the IMO also introduced measures to improve the technical and operational fuel efficiency of existing vessels. The Energy Efficiency Existing Ship Index (EEXI) and the Carbon Intensity Indicator (CII) requirements will be applicable from 2023. Initially, for all ships from 400 GT, the EEXI (gCO<sub>2</sub>/t.nm) is calculated and not allowed to exceed a specified limit. Like the EEDI, the EEXI details CO<sub>2</sub> emissions from a ship’s engine power, transport capacity and ship speed. Subsequently, for the larger ships (from 5000 GT), the CII should be rated and by appropriate measures, such as power limitation or the provision of energy saving devices, over time be reduced. The intention is that by 2030, the goal of an overall CO<sub>2</sub> emissions reduction per transport work of forty per cent relative to 2008 will be reached. With a further goal of a reduction of towards seventy per cent by 2050. For owners with pre-EEDI and early EEDI certified tonnage, it is expected that EEXI will not have a significant impact on the operation of their vessels. However, in the following phases, when ships need to adapt technically and operationally to meet specified annual CII reduction targets, that could be another matter.



Container ship six-to-twelve-month charter rates \$,000's/day (by Clarksons).

compliance, leaving most of the global fleet facing either engine power limitations or another form of CO<sub>2</sub> abatement. For the whole world fleet, Lloyd's Register has analysed that close to sixty per cent will need to be improved in order to comply. Or be scrapped. Besides the EEXI regulations, shipowners may also have to prepare for the FuelEU Maritime Regulation and the inclusion of shipping in the EU Emissions Trading System (ETS). The first would impose a limit on the lifecycle CO<sub>2</sub> equivalent emissions per mega joule of energy provided to ships. The proposed reduction requirement is six per cent relative to a 2020 reference line by 2030, increasing to 75 per cent by 2050. This measure is designed to increase demand for sustainable alternative power sources. Penalties are payable based on every megajoule provided to a ship with lifecycle CO<sub>2</sub> equivalent emissions above the target.

The EU ETS was set up in 2005 and works on the "cap and trade" principle. A cap is set on the total amount of certain greenhouse gases that can be emitted by installations covered by the system. The cap is reduced over time so that total emissions fall. When a company has a surplus of ETS certificates, these may be sold, in case of a shortage, certificates have to be bought. Presently, the price of an EU ETS certificate is in the order of 60 euros per tonne CO<sub>2</sub>. So far, shipping was not included in the system, but the EU is now undertaking actions to do so, probably from 2023. For the time being, there are still many uncertainties regarding how the rules for both the FuelEU Maritime regulation and the inclusion of the ETS system for shipping will be finally worked out and agreed. And how these regulations will be enforced and policed by the flag and port states.

### Push for global regulations

Owners are strongly pressing for the introduction of global regulations rather than regional systems. The same holds for another EU idea: the introduction of the Energy Taxation Directive, which would increase the costs of bunkers in EU ports. The International Chamber of Shipping (ICS), representing more than eighty per cent of the world's merchant fleet, proposed to the United Nations in early Sep-

tember the introduction of an internationally accepted market-based measure to accelerate the uptake and deployment of zero-carbon fuels. The levy would be based on mandatory contributions

**Most of the newbuildings will be considerably more fuel efficient than the ships they replace**

by ships trading globally, exceeding 5000 gross tonnage. The money would go into an "IMO Climate Fund", which, as well as closing the gap between zero-carbon and conventional fuels, would be used to stimulate the supply of carbon free fuels such as ammonia and hydrogen. Although presently nobody knows what the outcome of all these proposals and ideas will be, one may be

sure that pretty soon the

use of ships running on fossil fuels will become considerably more expensive. Accompanied by a plethora of extra administrative requirements to operate all these systems.

### Ever more fuel efficient

The majority of the ships now being built and ordered will be fitted with diesel engines and will sail on fossil fuels. A few with more elaborate systems to make them more fuel efficient or with dual-fuel engines and some further provisions to enable the use of future fuels, with less or zero-carbon content. Or with some form of wind assistance. Even without such extra provisions, however, most of the newbuildings will be considerably more fuel efficient than the ships they replace.

According to Clarksons, so called eco very large crude carriers (VLCCs) and eco bulkers built around 2015 are about 25 to thirty per cent more fuel efficient per tonne-mile as the ships built in 2010 and before. To varying degrees, the same applies to other ship types. The combination of the higher operating costs expected for older ships in the near future and the good market conditions seems to explain the newbuilding spree, in conjunction with accelerated phasing out of older tonnage. It all sounds too good to be true. We will see and report again next year!



### Ir Willem de Jong

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# EUROPORT 2021

## The path to a sustainable maritime future

**Europort 2021 takes place from 2 to 5 November in Rotterdam Ahoy and its brand new convention centre. We give you an overview of what to expect from the fortieth edition of one of the largest maritime exhibitions in the world and why you need to be there.**

**C**harting the path to a sustainable maritime future is one of Europort's primary ambitions. To initiate a deeper understanding of the transition trails that are of vital interest to the maritime ecosystem, four major themes will dominate the Europort 2021 agenda: Digitalisation, Energy Transition, the Next Generation and Ship Finance.

The pandemic has reframed the way businesses communicate and connect. Most organisations have surprised themselves by their ability to adapt to fast-changing circumstances. However, users of the online meeting will know that there are limits to what technology can achieve in developing professional relationships. 'One thing we have learned from the Covid pandemic is that online meetings can only be a substitute for face to face meetings up to a certain extent,' says Martin Dorsman, secretary general of the European Community Shipowners' Associations (ECSA). 'For getting to know people, to socialise and to build lasting relationships, meetings in person in a stimulating, positive and inspiring atmosphere are indispensable. And this is what Europort has to offer.'

Given the huge challenges shipping faces – to green the fleet, to attract new talents, to integrate digitalisation – the need for stimulation and inspiration is more pressing than ever, Dorsman adds. 'The shipping industry must be open for new partnerships, and to organi-

sations outside the traditional circle of stakeholders. This is how we will be able to find the answers we seek.'

As an industry partner, ECSA is looking to organise membership meetings 'to stimulate attendance of and involvement with Europort', says Dorsman. 'We're also considering the idea of organising an event on ongoing projects to make sure the future skillset of seafarers is aligned with the need of the industry. This would perfectly match the "Next Generation" theme of Europort.'

### More than just networking

ECSA's ability to influence policy makers on behalf of shipping is closely related to its expertise in the latest industry developments and innovations, according to Dorsman. 'This is an added benefit of visiting Europort.'

Collaborative dialogue is as crucial for marine equipment suppliers as it is for shipowners, meaning that the return to physical events should be seized on, according to Christos Papakis, administrative officer at HEMEXPO – Hellenic Marine Equipment Manufacturers and Exports. 'The pandemic has shown everyone just how important maintaining and building relationships are for doing business. Not only that, but also how much these relationships can benefit from meeting in person.'

*Photo: Finally people will be able to meet face to face once again as they did at Europort 2019.*

Partnerships and friendships are at the heart of Europort's mission to engage with industry peers and create new business opportunities for all stakeholders. To further support business matchmaking, a new data-driven tool is being used this year to match visitors with the people and companies most relevant to their business goals. Europort Connect allows companies to generate leads faster, set their own agenda and organise meetings.

### Conferences and events

Similar to the previous 39 editions, the event offers numerous conferences, thematic masterclasses, matchmaking and networking events, seminars and workshops in close collaboration with its partners and industry organisations. Exhibition manager Raymond Siliakus: 'Once again, a very extensive knowledge programme will be implemented. We're proud to be working with many respected partners in the sector, in order to create a relevant programme for all of our maritime segments.'

Below is a selection of the first highlights of the definitive programme. To see

the full programme and for details on how to book free tickets, visit [www.europort.nl](http://www.europort.nl).

### Opening Summit & Innovation Stage

Maritime peers can get inspired during the official Europort Opening Summit, consisting of challenging questions on the four themes already mentioned and a triggering expert panel discussion.

The Innovation Stage will focus on the four central themes as well over four days. Europort exhibitors and partners will pitch their innovations live on stage. Located in the heart of the fairground in hall 4, the Innovation Stage offers a free access daily programme. Each day another industry theme will be top of mind:

- Tuesday 2 November: Digitalisation & Smart Technology.
- Wednesday 3 November: Safety & Security.
- Thursday 4 November: Energy Transition & Green Shipping.
- Friday 5 November: The Next Generation.

### Smart Digital Ports & Mare Forum

For the first time in its forty years of existence, Europort presents the "Smart Digital Ports" conference. Europort is committed to the next generation of efficient and connected ports. Global ports and the entire supply chain debate, discuss, network and share best practices on latest developments in automation, sustainability and connectivity.

Also new is the first Mare Forum "Funding the European Inland

Navigation". This event creates the chance to discuss and make a difference. With multiple keynote speakers and panellists the following questions will be addressed: Who has a clear view of the design of the barge of the future? What insights do we have into the commercial viability of future ship designs? Who will take the investment risk on these technologies? What is the role of the capital provider and charterer? Is LNG just a transition fuel? Hydrogen, ammonia, batteries, and nuclear? Is there enough infrastructure in ports to facilitate new fuels? Will we have new trades requiring new ship types, for example hydrogen carriers and ammonia product tankers?

### Ship Finance Pavilion

On the initiative of Netherlands Maritime Technology (NMT) and the Royal Association of Netherlands Shipowners (KVNR), this year there will be a dedicated "Ship Finance Pavilion", located in the heart of the fairground. The Ship Finance Pavilion offers a daily programme of short presentations by industry experts in the field of ship finance, funding and/or subsidies for ship owners, shipbuilders and suppliers. The pavilion will also serve as an informal information and meeting desk where visitors can consult financial experts.

### MariMatch & Shipathon

And then there will be MariMatch 2021 on November 3 and 4, organised by the Enterprise Europe Network. This is an international "matchmaking" event for companies and institutions in the maritime industry who are looking for new business and/or research partners. The event offers the opportunity to gain new international contacts for future technology partnerships. The focus is on innovative technology. After registration on the MariMatch website, participants can schedule appointments with other parties or be invited by potential foreign partners. The intermediate network of Enterprise Europe Network plays an active role in connecting parties from different countries.

Furthermore, a Shipathon will be organised where answers are sought by young professionals on many challenges, a variety of promising start-ups will present themselves on the exhibition floor and numerous industry organisations organise their own events.

### Convention Centre

Ahoy's temporary halls are now a thing of the past following the recently completed renovations at the Rotterdam Ahoy Convention Centre (RACC). Exhibitors and delegates will now benefit from a range of state-of-the-art exhibition and conference facilities now available at the RACC. The renovations saw to the expansion of the space and included a new entrance hall, foyers, conference and breakout-rooms and an additional 3100-m<sup>2</sup> hall, all of which have been fully integrated with the existing exhibition facilities.

Furthermore, the renewal project has been achieved using techniques that reflect Europort's over-arching Sustainability theme. These include energy-saving geothermal technology, sound-proofing of exhibition halls, wastewater separation systems, service ware made from 100 per cent recycled materials and locally sourced produce to reduce food miles.

The pandemic has shown just how important maintaining and building relationships are for doing business



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# FERRIES VIE FOR KNVTS SHIP OF THE YEAR AWARD

## KNVTS SHIP OF THE YEAR

Ships that qualify for the Maritime Award: KNVTS Ship of the Year 2021 must – especially with regard to innovative aspects – have been developed in the Netherlands, have preferably been built (for at least a large part) in the Netherlands and must have been delivered between 1 May 2019 and 30 April 2021 (two years this time as the 2020 edition of the award was cancelled as a result of the pandemic). The jury will assess the submitted ships against the criteria Design, Economy, Sustainability and Environment, Safety and Construction Process. The winner will be announced at the Maritime Awards Gala (<https://maritime-awards.nl>) on 1 November in De Doelen, Rotterdam.

TEXT: KNVTS

## Ferry Bryggen – Damen Shipyards

**The ferry Bryggen is an innovative design, fully electric, environmentally friendly, efficient in operation, economically competitive and capable of carrying eighty people. The ship's sustainable credentials are achieved through a series of innovative digital shipbuilding technologies, including the possibility of remote monitoring using an extensive network of sensors. This results in improved efficiency and a reduction of maintenance-induced downtime.**

**T**o meet the design criterion “fully emission-free propulsion”, electrical propulsion was chosen, using batteries as the energy source. No generators have been installed. The choice of batteries is based on the length of the route and the availability of three battery charging stations. The ship's innovative mooring system is fully automatic to maximise charging time, reliability and safety. The charging system is automatically connected to the shore-based power supply during mooring, using an in-house developed system. Due to the choice of batteries, the total battery capacity is fairly small, which saves weight and space. This results in a complex installation for



sailing/discharging and mooring/charging, for which Damen not only provided the ship design, but also designed and realised the shore-based infrastructure for charging the batteries. To properly monitor and control the process of mooring and charging, a newly developed control system was chosen. Everything can be controlled and monitored from the bridge. The entire energy and drive system has been thoroughly tested in a shore-mounted test setup prior to installation. This has minimised teething problems after installation.

The ferry has a robust steel hull with an optimised design (flared bow, dry transom

and high length to beam ratio) to minimise resistance. The bow is ice-strengthened and features a bow thruster for high manoeuvrability in windy conditions. The design meets the stability and safety requirements of both the flag state and class requirements and makes great strides towards zero-emission operation. In this way, it reduces the total NO<sub>x</sub> and CO<sub>2</sub> emissions of public transport in Copenhagen.

Prior to the design of the Bryggen, a thorough analysis of various concepts was carried out, leading to a design that performs well economically and exceeds the environmental performance requirements set

by the client, who demanded “only” partial electric operation. To achieve this, Damen used systems from the automotive industry, thus realising an important technological cross-over. As energy source, lithium titanium oxide batteries are used. Until now, such batteries were not certified for use in ships. With the Bryggen, an important new energy carrier has therefore been unlocked for the sector. Because Damen has also chosen not to build it as a one-off, but as the basis for a new product family, the impact of the design goes beyond “just” Copenhagen. Soon, the first of Bryggen’s sisters will appear on Dutch waterways.

## Foot passenger ferry Düsternbrook – Holland Shipyards BV

**Foot passenger ferry Düsternbrook was designed and built for the Kiel port area on behalf of Schlepp- und Fährgesellschaft Kiel (SFK). The ship can carry 140 passengers and sixty bicycles and forms an important link between the city centre and the college and residential areas on the other side of the Kieler Förde. An important design criterion is that the ferry must be able to sail emission-free (electric) for ten hours a day. It is optimised for speeds below 8 knots, as a maximum speed of 5 knots applies for most of the route.**

**T**he hull design is a hard chine because of cost considerations and to improve the ease of series production. The hull has been optimised by CFD analysis to minimise resistance, while the propeller design has been thoroughly analysed to maximise efficiency while achieving minimal noise and vibrations. The cooling system is a closed loop system (keel cooling). The mooring system is hydraulic and can be operated from the bridge. The system secures the ship while it is docked, allowing the propellers to be stopped. This saves a lot of energy. This system, which moors the ship to shore-mounted poles by means of two hooks, has been developed in-house and is characterised by its simplicity. The drive train is fully electric. Based on calculations, a battery pack of 816 kWh was chosen. Such a large battery pack is required because it is not possible to charge the



vessel during operations. Charging takes place at night and lasts approximately ten hours. Monitoring of the batteries is automated and prevents them from being discharged too deeply. This way, a life span of

eight years can be guaranteed. The type of battery pack was selected to fit the Düsternbrook’s operational profile and the overnight charging concept. The electrical system is split in two, so that if one side

fails, the other will continue to operate. This increases safety and eliminates the need to install an emergency generator set. With the Düsternbrook, Holland Shipyards has delivered a ship where innovation fully

supports operation. The propulsion system, including power supply, has been realised after a thorough operational analysis and the crew has been trained to make optimal use of the system's properties to minimise

total energy consumption. By keeping the rest of the design as simple as possible, the ship is an inspiring combination of "complex where necessary, simple where possible".

## Ferry NZK-100 – Holland Shipyards BV

**The NZK-100 is the first ferry in a series of five, specially designed for the Amsterdam municipal transport company GVB to connect the north and south sides of the North Sea Canal. The ferry has a capacity of twenty cars and 400 passengers. Through a smart movable partition, these capacities can be adjusted according to demand, leading to a maximum capacity of 1200 pedestrians.**

**B**oth the crossing and mooring/embarkation/debarkation take only a few minutes. The drive train is fully electric, with the necessary power being supplied by batteries that are charged once per return journey on the north side of the canal. Two diesel generator sets have also been installed, which take over from the batteries when the weather conditions become too severe or if the ship has to sail another, much longer route.

The electrical propulsion is highly innovative, especially in combination with the battery charging system. During mooring, the ship-based system is automatically connected to the shore-based charger to maximise the duration of the charging process. Due to the short embarkation/debarkation period, charging has to effectively take place in approximately 130 seconds. This results in extremely high charging currents to get the required energy into the batteries. To achieve a reliable concept, the choice was made to use batteries with a very high capacity, enabling charging at very high currents and preventing a deep discharge of the batteries during a return trip. This substantially increases their lifespan to well over ten years. Since the ferry is propelled by electric power, no harmful substances are emitted into the air during operation, which leads to minimal environmental impact. The electrical installation is fully redundant in order to in-



crease safety and operational reliability. A monitoring and control system in which the processes of mooring, battery charging and battery management are integrated, enables the crew to supervise all processes from the bridge.

The ferry uses the so-called Danube mooring principle, whereby it positions the bow against a row of poles that barely protrude above the water. This is a determining factor in the hull form design. Below the water, various hard lines are broken and the bottom is slightly inclined to optimise performance.

In the design, substantial attention has been paid to minimising the expected amount of maintenance. With all-electric propulsion, daily maintenance is minimal

and the way in which propulsors and generators have been incorporated in the design enables very rapid replacement of these components, if necessary. The design and building of the vessel is characterised by a very short lead time. Despite this fast design and build process, specific design requirements of the customer and characteristics of the sailing route that limit the design freedom in a number of aspects, Holland Shipyards has shaped NZK-100 into an innovative first ship in a series of five. Partly due to the fast charging system, NZK-100 and its sister vessels form an important showcase for the further electrification of ships in their segment, both within and outside the Netherlands.



# DUTCH SHIPBUILDING IN 2020

**The Dutch maritime industry suffered greatly from the corona crisis in 2020. In all maritime segments, the order intake decreased drastically. One exception was superyacht construction, which was even doubled compared to 2019.**

**T**he total turnover of the Dutch maritime manufacturing industry decreased by 9.5 per cent compared to 2019 to € 7.0 billion. Total employment in 2020 was 30,797 FTE, including the estimated number of temporary workers. This is 1.9 per cent lower than 2019 (31,392 FTE). Total employment was divided as follows: shipyards: 11,810 FTE; maritime suppliers: 18,987 FTE. At € 283 million, the total order intake in 2020 was 19 per cent lower than in 2019. Orders for shortsea ships remained on par in terms of number and GT, the order book even increased slightly. Newbuild deliveries in 2020 decreased from 43 to 28 vessels, but because it did include a number of large complex vessels, the estimated value was € 825 million, almost double that of 2019. By the end of 2020, the order book was down to 68 ships worth € 1220 million, the lowest level in at least 15 years. Over 1000 ships meant a total turnover of the Dutch maintenance and repair yards of € 332 million in 2020 (2019: € 429 million). They employed 1419 persons (2019: 1655). In 2020, yards for inland navigation, fishing and small seagoing vessels received orders for 176 vessels (2019: 238), 159 vessels were delivered (2019: 182). The order book remained fairly stable with 196 ships (2019: 198), but the outlook is clearly less positive. The number of ordered ships rose from 76 in 2019 to 98 in 2020, partly due to a substantial order for 40 new tankers. Ferry operators are modernising their fleets. No fewer than 19 vessels were ordered in 2020, most with electric propulsion. Due to Covid-19, the order intake for river cruisers dropped dramatically from 19 ships in 2019 to just 1 in 2020. 12 such ships were delivered (2019: 11). The order intake of fishing craft more than halved from 13 in 2019 to 6 in 2020. The number of completed fishing vessels also decreased from 13 to 9. Orders for small commercial vessels and dredging equipment also fell sharply from 125 to 52 new orders.

The order intake for superyachts, with a value of € 2.15 billion, has about doubled compared to the previous year. The order book grew significantly to € 5.38 billion with increasingly larger yachts. In 2020, 6 yachts of 80 metres or longer were sold (2019: 1). The order book contains 15 such yachts. Dutch maritime suppliers saw their turnover drop by 9.4 per cent to about € 3.5 billion in 2020. Employee numbers decreased slightly from 17,574 in 2019 to 17,444 in 2020. The number of hired personnel decreased by 9.5 per cent to 1543. Although not complete due to a lack of information, the map on the middle pages is representative for the ships completed in the Netherlands during 2020. Ships built at foreign yards under supervision and/or licence of Dutch yards have been included. Subscribers can request a detailed overview of the ships delivered in 2020 and the order book (as far as known) for the period from 1 January 2020 by e-mail ([secretariaat@knvts.nl](mailto:secretariaat@knvts.nl)). This list has been compiled by our editor Gerrit J. de Boer in cooperation with Michel Koopman, market analyst at Netherlands Maritime Technology and René Cornel, Deventer. Also take a look at the Sector Annual Report 2020: [https://issuu.com/nmt2020/docs/nmt\\_sectorjaarverslag\\_2020](https://issuu.com/nmt2020/docs/nmt_sectorjaarverslag_2020). Below are some highlights of Dutch shipbuilding in 2020.



## Gerrit de Boer

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*Photo: The shipyard of Royal Niestern Sander in Delfzijl (photo Flying Focus).*

## SILVER ORIGIN

**Type:** Expedition cruiser imo 9837937

**Owner:** Canodros Cruise Line SA (Silversea Cruises Ltd., Fort Lauderdale), Guayaquil

**Yard:** Shipyard De Hoop BV, Lobith (yard number 489)

**Loa (pp) x B x D (d) =** 101.10 (97.43) x 18.92 x 6.50 (4.50) metres

**Tonnage:** 6365 GT, 2001 NT, 1206 DWT

**Power supply:** The energy is generated by four Caterpillar diesel generators, type C32 (145 x 162), for, among others, powering the two counter-rotating Steerprop azimuth thrusters, type 20 CRP (2 x 1450 kW) for a maximum speed of 14 knots and driving two Veth-bow thrusters (2 x 400 kW).

**Class:** Lloyd's Register

**Particulars:** Keel laying 6 February 2019; launching 30 December 2019; delivery 3 June 2020; commissioning 16 December 2020. On 24 March, the Silver Origin was towed



from Lobith to the Wiltonhaven in Schiedam for final completion, including the assembly of the top deck modules, which were pre-built and formed deck 7 and 8. These sections could only be placed after the vessel had passed several inland bridges. The Silver Origin departed on 27 April from Schiedam for a three-day trial on the North Sea. Accommodation is provided for 100 passengers in fifty suites and for ninety crew members. After delivery to Silversea Cruises Ltd., Fort Lauderdale, the Silver Origin crossed the Atlantic Ocean via the Panama Canal to San Cristobal. The Silver Origin makes seven-day expedition cruises to the Galapagos Islands.

## KRIOS

**Type:** Self-propelled 23,684-kW cutter dredger imo 9848235

**Owner:** Boskalis Westminster Shipping NV, Papendrecht/Limassol

**Yard:** Royal IHC BV, Krimpen aan den IJssel (yard number 1277)

**Loa (pp) x B x D (d) =** 152.00 (127.50) x 28.00 x 8.90 (6.00) metres

**Tonnage:** 8981 GT, 2694 NT, 3692 DWT

**Power supply:** The energy is supplied by three MAN B&W main engines, type 6L48/60 (480 x 600), 3 x 6222 kW and a diesel generator of 2160 kW for, among others, driving the electrical propulsion system licensed by Hyundai Electric & Energy System Co. Ltd., Ulsan, on two propellers (2 x 3500 kW at 1000 rpm) for a speed of 11.5 knots. The Krios has a total pump power of 15,600 kW and a maximum cutter power of 7000 kW. The bunker capacity is 2121.9 m<sup>3</sup>.

**Class:** Bureau Veritas

**Particulars:** Keel laying 5 September 2018; launching 1 October



2019; delivery 28 October 2020. The cutter dredger Krios started on 21 September with tests in the Prinses Arianehaven (2e Maasvlakte) and later with trials on the North Sea till 4 October. The Krios has been designed for unrestricted navigation and dredging at depths ranging from 6 to 35 metres up to 15 miles offshore or 20 miles from a port. In a swell less than 2.5 metres, the notification is unrestricted navigation. Accommodation is provided for 45 persons. The Krios is almost identical to the mega-cutter suction hopper dredger Helios (yard number 1276, imo 9739197) delivered to Boskalis on 16 June 2017. Both vessels are among the largest cutter suction dredgers in the world.

## MOONRISE

**Type:** Superyacht imo 9816232

**Owner:** P099 Holdings Ltd. (Hill Robinson Yacht Management-France, Antibes), Georgetown, Grand Cayman

**Yard:** Feadship Koninklijke Scheepsbouw de Vries BV, Makkum (yard number 1008), hull Slob Scheepswerf BV, Papendrecht

**Loa (pp) x B x D (d) =** 99.95 (94.73) x 15.50 x 7.85 (4.35) metres

**Tonnage:** 3945 GT, 1183 NT, 685 DWT

**Power supply:** Propulsion is provided by two MTU diesel engines, twin propeller for a speed of 19.5 knots (cruise speed 16 knots).

**Class:** Lloyd's Register



photo A. Neighbourfield

**Particulars:** The Moonrise was designed by Feadship De Voogt Naval Architects and Rémi Tessier Design. Accommodation is provided for sixteen guests in eight staterooms and 32 crew in sixteen cabins.

## ANCHORAGE

**Type:** Hopper dredger imo 9823792

**Owner:** 347 Exploitatie BV (De Hoop BV), Terneuzen

**Yard:** Barkmeijer Shipbuilders BV, Stroobos

**Loa (pp) x B x D (d) =** 105.90 (102.20) x 15.85 x 8.86 (6.94) metres

**Dredging draught:** 7.00 metres

**Tonnage:** 4343 GT, 1302 NT, 6308 DWT

**Power supply:** The energy is supplied by three Mitsubishi-Marelli Motori SpA, Arzignano diesel generators (1 x 1275 kW and 2 x 2550 kW) for amongst others the propulsion of two electrically driven azimuth thrusters (2 x 1920 kW) for a speed of 14 knots. One emergency generator has an output of 240 kW. The bunker capacity is 530.65 m<sup>3</sup>. The dredger is equipped with a smart diesel-electric system, developed in close co-operation between Barkmeijer Shipyards and D&A Electric, Ridderkerk, which efficiently regulates the energy supply for sailing, dredging and unloading the vessel.

**Class:** Bureau Veritas

**Particulars:** Keel laying 19 December 2017; launching 24 April 2019; delivery 4 June 2020. Two innovative trailing suction hopper dredgers were ordered with Barkmeijer Shipbuilders, Stroobos, by Hanson Aggregates Marine Ltd., Maidenhead, part of the Heidelberg Cement Group as HC Medway and HC Mersey in February 2017. The project proceeded dramatically and



photo Flying Focus

the yard was declared bankrupt on 30 October 2018. Three months later, on 31 January 2019, the 169-year-old yard was taken over by Thecla Bodewes and could be restarted. Both hopper dredgers were sold to De Hoop, Terneuzen. After launching, the hull arrived at Harlingen for completion in tow of the mt Watergeus on 1 May. As Anchorage, the dredger went on trials on the Wadden Sea from Harlingen on 25, 27 and 29 May 2020. After commissioning on 4 June, the vessel left Harlingen for Terneuzen four days later. The 3393-m<sup>3</sup> hopper dredgers were designed by Conoship International BV, Groningen, for extraction of sand and gravel in the North Sea. With an underwater pump in the suction pipe with a diameter of 700 mm, sand or gravel is suctioned from the seabed at a depth of up to 60 metres and the sand or gravel/water mixture is pressed into the hopper. The water is pumped out of the sand or gravel during the voyage to the discharge port so that the cargo can be unloaded dry with a grab crane installed on board. Accommodation is provided for a crew of fourteen. The second hopper dredger (yard number 348, imo 9823807) is still under construction at Kampen and delivery is planned for December 2021.

## THUN BLYTH

**Type:** Naabsa max product/chemical tanker imo 9871062

**Owner:** Thun Tankers BV, Delfzijl manager: Marin Ship Management BV, Farmsum

**Yard:** Ferus Smit BV, Westerbroek/Leer

**Loa (pp) x B x D (d) =** 79.95 (78.15) x 14.99 x 9.00 (6.80) metres

**Tonnage:** 2870 GT, 1340 NT, 5309 DWT

**Power supply:** Propulsion is provided by a Wärtsilä main engine, type 6L25 (260 x 320), 2210 kW, at 1000 rpm on a controllable pitch propeller in a nozzle for a speed of 12 knots. Two diesel generators of 374 kVA, 299 kW, and one emergency generator of 112 kVA, 90 kW. The bow thruster has an output of 275 kW. The bunker capacity is 277.6 m<sup>3</sup>.

**Class:** Bureau Veritas

**Particulars:** Keel laying 24 February 2020; launching 28 August 2020; delivery 6 November 2020. The Thun Blyth is the first of two ice class 1C Naabsa 4800-m<sup>3</sup> product/chemical tankers for Thun Tankers BV (Erik Thun AB, Lidköping), Delfzijl. The Naabsa



(Not Always Afloat But Safely Aground) port max-sized product tankers are able to call at tidal restricted niche ports and are designed to a maximum capacity when temporarily resting safely on the bottom during cargo operations in the UK's Thames and Humber river ports and occasionally elsewhere. This kind of operation generally requires additional care and attention on the part of the master. The eight cargo tanks, each with an electrically driven pump of 96 kW, have a Jotun Flexline Epoxy coating. The second Naabsa max tanker (yard number 462, imo 9897482) will be delivered in May 2022.

## SENDO MARE

**Type:** Sendo Liner XL ENI 2338462

**Owner:** Sendo Shipping BV, Harderwijk

**Yard:** Concordia Damen Shipbuilding BV, Werkendam hull: Tengda Shipbuilding, Yangzhou

**Loa x B (d) =** 122.75 x 14.20 (4.00) metres

**Tonnage:** 5118 DWT

**Power supply:** Power is provided by two Mitsubishi S6R-generators, 2 x 600 kW, on two Oswald electric motors, 2 x 485 kW, two electric Veth Compac Jet bow thrusters, type CJ-1200V, 2 x 450 kW.

**Class:** ?

**Particulars:** The hulls of the Sendo Mare and the identical Sendo Nave (ENI 2338463) arrived at Rotterdam on deck of the semi-submersible heavy lift vessel Black Marlin on 13 August 2019. The Sendo Mare left for trials on 9 January and 7 February 2020. The Sendo Liner XL has significantly more hold capacity compared to a conventional design of 122.75 metres in length. With an innovative ballast system, 233 TEU can be carried on



three tiers, 313 TEU on four tiers and 393 TEU on five tiers. The e-motors are rated for 485 kW when manoeuvring, but as soon as the ship is under way, the e-motors adjust the power to 375 kW for a speed of 18 km/hour. The ship runs on one generator 95 per cent of the time while underway. Customised nozzles allow the Sendo Mare to sail with a draught of 1.35 metres. The hybrid Sendo Liner XL is built in such a way that in the future it will be able to sail entirely on batteries. The KNVTS Ship of the Year Award 2019 was given to the prototype of the Sendo Liner, which is a smaller version of the Sendo Mare.



**Thecla Bodewes Harlingen  
Shipyards BV, Harlingen**  
1x TSHD 3000



**Feadship Koninklijke Scheepsbouw  
de Vries BV, Aalsmeer**  
2x m.yacht



**Machinefabriek Luyt BV,  
Den Oever**  
1x trawler  
1x crab catcher

**Royal IHC BV, Kinderdijk/  
Krimpen a/d IJssel**  
1x CSD 23.684 kW  
2x EasyDredger 2700  
1x reel lay vessel  
1x TSHD 2300  
1x TSHD 8400  
1x TSHD 8000  
2x split barge 350  
2x DMC 1450  
10x Beaver 45 Mk II



**Gebr. Kooiman BV,  
Zwijndrecht/Dordrecht**  
2x inland tanker 135 x 11.45  
1x LNG bunker barge

**Padmos Shipyard BV,  
Stellendam/Bruinisse**  
4x twin rigger



**Damen Maaskant Shipyards BV,  
Stellendam**  
2x twin rigger



**Dolderman BV, Dordrecht**  
11x inland tanker 110 x 11.45  
3x inland tanker 135 x 17.55  
1x inland tanker 81.3 x 10.20

**Damen Yachting  
BV, Vlissingen**  
4x m.yacht



**Zeeland Maritime Services BV**  
Wemeldinge met 2x inland tanker  
86 x 11.45

**Breko BV, Papendrecht**  
4x inland tanker 86 x 9.60  
3x inland tanker 110 x 11.45  
2x inland tanker 135 x 11.45

**OSO Oonincx BV, Werkendam**  
1x inland tanker 110 x 11.45  
2x inland tanker 135 x 15  
1x inland dry cargo 76.50 x 11.45

**Jac. den Breejen BV,  
Hardinxveld-Giessendam**  
1x riverpax 135  
5x inland tanker 110 x 11.45  
1x inland tanker 135 x 17.55

**Veka Group BV,  
Werkendam**  
3x inland tanker 110 x 11.45  
3x inland tanker 110 x 13.50  
1x inland tanker 110 x 17.50

**Concordia Damen Shipbuilding  
BV, Werkendam**  
3x container vessel 90 + 108 TEU  
2x SendoLiner XL 315 TEU  
2x Pusher CSD 2010



**GS Yard BV, Waterhuizen**

1x inland dry cargo 110 x 11.45  
1x inland tanker 125 x 11.45  
4x inland tanker 86 x 9.60  
4x inland tanker 110 x 11.45



**Koninklijke Niestern Sander BV, Delfzijl**

2x survey vessel



**Ferus Smit BV, Westerbroek/Leer**

3x FS 8500 1A  
1x FS mini bulker 16,500  
1x chem tanker NAABSA 4250

**Royal Bodewes Shipyards BV, Hoogezand**

2x Trader 5150  
1x Trader 4800



**Feadship Koninklijke Scheepsbouw de Vries BV, Makkum**

2x m. yachts

**Royal Bodewes Shipyards BV, Hoogezand**

**Hoekman Shipbuilding BV, Urk**

2x twin rigger



**Damen Dredging BV, Nijkerk**

5x CSDs 350  
1x CSD 650  
1x TSD 2000  
1x MAD 3500



**Shipyards De Hoop BV, Lobith**

1x expedition cruiser  
1x riverpax 135 x 11.45

**Holland Shipyards BV, Hardinxveld-Giessendam**

3x hybrid ferry  
1x electric ferry

**Vahali BV, Gendt**

1x riverpax 80 x 11.45  
6x riverpax 135 x 11.45

**Damen Shipyards BV, Gorinchem**

13x StanTug  
22x ASD Tug  
1x RSD Tug  
4x MultiCat  
3x Shoalbuster  
12x ferry  
Several FCSS, StanPatrols and pontoons



**Heesen Yachts BV, Oss**

2x m.yachts



**Ruijtenberg Shipyard BV, Raamsdonkveer**

1x inland tanker 110 x 11.45  
1x inland dry cargo 110 x 11.45

**Asto BV, Raamsdonkveer**

4x inland tanker 110 x 11.45  
2x inland tanker 135 x 17.60

**Teamco Shipyard BV, Heusden**

2x riverpax 135 x 11.45



**Neptune Shipyards BV, Aalst/Hardinxveld**

1x EuroTug 3515  
3x EuroCarrier 2209



# WIE HIELP DE NEDERLANDSE ZEEVAART VOORUIT?

## MARITIME KVNR SHIPPING AWARD

De Maritime KVNR Shipping Award is door de Koninklijke Vereniging van Nederlandse Reders (KVNR) in het leven geroepen om een organisatie of persoon te eren, die de Nederlandse zeevaart in het afgelopen jaar middels innovatie het meest vooruit heeft geholpen. Er is desalniettemin sprake van bijzondere en belangrijke ontwikkelingen sinds de laatste editie van de prijs in 2019. Het gaat niet langer om de technische innovatie, maar de prijs is nu gefocust op, bij voorkeur Nederlandse, organisaties en personen die op innovatieve wijze een onderscheidende rol hebben gespeeld ten behoeve van de positieve positie van de Nederlandse zeescheepvaart. De winnaar wordt bekendgemaakt tijdens het Maritime Awards Gala op 1 november in De Doelen, Rotterdam.

TEKST: STICHTING MARITIME AWARDS GALA

## Maritiem Museum – Zichtbaar maken van de impact van Covid-19 op de zeevaart

**Het Maritiem Museum is een initiatief gestart om de impact van de coronapandemie op de zeevaart te vertellen vanuit het perspectief van de zeevarenden die erdoor zijn getroffen.**

**D**oor het vertellen van deze verhalen draagt het Maritiem Museum bij aan het vergroten van de zichtbaarheid van de zeevaart. En niet alleen de zichtbaarheid van deze impact is belangrijk.

Ook het verzamelen van materiaal en het vastleggen van verhalen, opdat deze impact op de zeevaart wordt opgenomen in het collectieve Nederlandse geheugen is relevant voor de toekomst.

Het Maritiem Museum heeft hiermee, en met zijn grote bereik, een passende rol opgepakt om het verhaal van de zeevaart in deze uitzonderlijke omstandigheden te vertellen en voelt zich daarvoor ook verantwoordelijk.



*Met het vertellen van de coronaverhalen van zeevarenden vergroot het Maritiem Museum de zichtbaarheid van de zeevaart.*

## RIVM – Covid-19 vaccination programme for seafarers

In het voorjaar van 2021 is het RIVM een verkenning gestart ten behoeve van het vaccineren van zeevarenden tegen Covid-19. Zeevarenden waren en zijn een moeilijk bereikbare doelgroep omdat ze vaak niet in staat zijn deel te nemen aan de reguliere nationale vaccinatiestrategie.

**D**oor de internationale activiteiten, het internationale karakter van de bemanningssamenstellingen aan boord van de zeeschepen én de beperkte tijd die zeevarenden in Nederland doorbrengen was een maatwerk aanpak hard nodig. Zonder het RIVM en de persoonlijke inzet van RIVM-projectleider Nils van der Kolk was het vaccinatieprogramma niet in de huidige vorm en in de korte tijd gerealiseerd. Nederland was het eerste land wereldwijd met een dergelijk uitgebreid én specifiek voor zeevarenden opgetuigd programma en heeft zo heel veel betekend voor de Nederlandse zeevaart. Het vaccinatieprogramma stelt Nederlandse werkgevers in de zeevaart namelijk in de gelegenheid om voor al hun zeevarend personeel veel te betekenen in onzekere tijden.



*In juni werden de eerste vaccinaties gegeven in het kader van het vaccinatieprogramma voor zeevarenden. Cora van Nieuwenhuizen, destijds nog minister van Infrastructuur en Waterstaat, was daarbij aanwezig (foto KVNR).*

## ILT – Contingency plan Covid-19 the Netherlands

De Inspectie Leefomgeving en Transport (ILT) is door de jury genomineerd voor de Maritime KVNR Shipping Award 2021 voor het in het leven roepen van het Contingency plan Covid-19 the Netherlands voor de zeevaart.

**D**e medewerkers van ILT hebben in het voorjaar van 2020 snel en pragmatisch gehandeld door een Contingency Plan (CP) voor de zeevaart in het leven te roepen. Hierdoor werden verlopen certificaten van zeevarenden en zeeschepen generiek ver-

lengd, zelfs meermaals tot op de dag van vandaag.

Dit was noodzakelijk omdat zeevarenden vrijwel niet meer konden reizen om onder andere hun certificaten te verlengen. Nederland was hiermee een van de eerste landen wereldwijd met een dergelijke ge-

nerieke verlenging. Met deze actie heeft de ILT oog gehad – zolang als nodig, pragmatisch, snel en oplossingsgericht – voor de moeilijke positie van reders en zeevarenden in 2020 en 2021.

# VERNIEUWINGEN IN ONTWERP

## MARITIME DESIGNER AWARD

De Maritime Designer Award is bedoeld voor individuele ontwerpers, promovendi, recent afgestudeerden en start-ups die menen dat hun werk en aanpak meer aandacht en bredere discussie verdienen. De prijs is gericht op de wijze waarop een ontwerp, een deelsysteem van een schip of offshore-vaartuig tot stand komt. In aanmerking komen bijvoorbeeld originele of vernieuwende aanpakken van ontwerpen of toolontwikkelingen, eventueel inclusief demonstratie. De winnaar ontvangt een geldprijs van € 1000, ter beschikking gesteld door de Samenwerkende Maritieme Fondsen. De jury kan bovendien besluiten vanuit deze fondsen een bedrag van maximaal € 24.000 ter beschikking te stellen aan de winnaar om verdere ontwikkeling van de betreffende ontwerpmethodologie of -oplossing financieel te stimuleren en mogelijk te maken. De winnaar wordt bekendgemaakt tijdens het Maritime Awards Gala op 1 november in De Doelen, Rotterdam.

TEKST & FOTOGRAFIE: STICHTING MARITIME AWARDS GALA

## Ontwerpmethode voor modulair aanpasbare machinekamer voor toekomstige CO<sub>2</sub>-reductie

**Nu schepen bouwen die klaar zijn voor een toekomstige verbouw om CO<sub>2</sub>-arm te kunnen varen. Dat is de insteek van het modulaire scheepsontwerpproces van ir. Julia Benedictus.**

**V**anuit de huidige energietransitie neemt de vraag naar duurzame schepen snel toe.

Scheepseigenaren willen dat hun schip klaar is voor de toekomst of zouden graag zelf meewerken aan een groenere wereld, maar de technische gereedheid en huidige economische haalbaarheid van alternatieven voor diesel-directe aandrijving laat het zeer beperkt toe om een schip nu al CO<sub>2</sub>-arm te laten varen. Daarom is er daarnaast ook vraag naar schepen die nu conventionele aandrijving gebruiken, maar die later – wanneer het economisch wel haalbaar is – gemakkelijk een upgrade naar een lagere CO<sub>2</sub>-uitstoot kunnen doen. Een verbouwing moet echter wel terug te



*Julia Benedictus: 'Door de methode verder te ontwikkelen, kunnen schepen die nu gebouwd worden bijdragen aan een lagere CO<sub>2</sub>-uitstoot in de toekomst.'*

verdienen zijn in de resterende levensduur van het schip en het is nog niet bekend welke optie over enkele jaren het meest geschikt zal zijn voor de situatie van het schip. Een ontwerp voorbereiden op zo'n verbouw geeft daarmee extra uitdagingen. De ontwikkelde ontwerpmethodologie voor een modulair aandrijfsysteem van schepen kan hierin een belangrijke brug zijn en zou daarom zeker verder ontwikkeld moeten worden.

De uitgangspunten van de methode zijn dat er zo weinig mogelijk vervangen moet worden, dat er niet onnodig dingen verplaatst moeten worden en dat het schip niet onnodig complex moet worden ten opzichte van een conventionele aandrijving, om de ver-

bouw betaalbaar te houden. Op basis van de theorieën over modulariteit uit de *systems engineering* is het mogelijk de verschillende systemen aan boord op de juiste plekken onder te verdelen. Door deze subsystemen vervolgens op de juiste ma-

nier te groeperen, kan een deel van het systeem vervangen worden, zonder onnodig andere systeemdelen te verplaatsen of vervangen. Deze methode heeft zijn potentie al bewezen door vijf alternatieve schone oplossingen in te passen in een ontwerp

voor een droge-ladingschip van Conoship. Door deze methode verder te ontwikkelen en toe te passen, kunnen ook schepen die nu gebouwd worden bijdragen aan een verlaging van de CO<sub>2</sub>-uitstoot in de toekomst.

## 3D-printbare aquatic drone op basis van parametrisch design

**Jeroen van Lier heeft voor zijn afstudeerproject in samenwerking met het bedrijf Royal3D een optimalisatiemethode voor een 3D printbare aquatic drone ontwikkeld. Vervolgens is dit aangetoond met een prototype.**

**E**r is een snel groeiende markt voor aquatic drones, ook wel bekend als Unmanned Service Vessels (USV's). Met behulp van een aquatic drone kunnen tegen relatief lage kosten onderzoeken en inspecties op en rondom het water worden uitgevoerd. Bo-

vendien biedt het compacte formaat de mogelijkheid in gebieden te komen die voor normale vaartuigen slecht of niet bereikbaar zijn of waar risico's voor bemanningsleden van schepen hoog zijn. De optimalisatie van de 3D-geprinte aquatic drone naar de specifieke wensen van de klant is

niet beperkt tot de grootte en vorm van de romp, maar omvat ook materialen en sterkte. Als onderdeel van het afstudeerproject is een prototype gebouwd met een 3D-printer van Royal3D en getest in de haven van Rotterdam.

## Verbeterde aerodynamische prestaties Magnus Rotor voor Sail Assist

**Om het rendement van de Magnus Rotor in een groter bereik van schijnbare windrichtingen te vergroten, heeft Lex Keuning een idee ontwikkeld om de rotor te voorzien van een instelbare flap. Dit idee is vervolgens uitgebreid onderzocht in een samenwerkingsproject van de TU Delft, Afdeling Maritieme Techniek, en de Polytechnische Universiteit van Milaan.**

**D**e toepassing van hulpzeilvermogen voor de (hulp)voortstuwning van vrachtschepen neemt een grote vlucht. Een van de mogelijke systemen daarvoor is de Magnus Rotor (Flettner Rotor), die vooral bekend is vanwege zijn eenvoud, gemak van bediening, hoge lift, betrouwbaarheid en bedieningsgemak. De schijnbare wind (de wind die men aan boord voelt) ontstaat door de combinatie van de eigen snelheid van het schip en de werkelijke wind. Bij kleine (voorlijke) invalshoeken

van deze schijnbare wind is echter niet alleen een grote lift, maar ook een lage daaraan verbonden weerstand van belang. Dan is de verhouding tussen de opgewekte lift en de weerstand maatgevend voor de efficiëntie. Door met een kleine flap achter de rotor het stromingsbeeld rond de Magnus Rotor te manipuleren, is deze verhouding effectief te beïnvloeden, aan te passen en zo te optimaliseren voor maximale voortstuwning. Daarmee heeft Keuning een basis gelegd voor mogelijke praktische toepassingen.



*Metingen aan de krachten op een schaalmodel in de windtunnel van de Universiteit van Milaan lieten zien dat de lift/weerstandsverhouding van de rotor, belangrijk bij "voorlijke" invalshoeken van de schijnbare wind, met flap significant hoger was dan die van de conventionele rotor.*

# SUSTAINABLE INNOVATIONS

ENGINEERING AND CONSTRUCTION  
OF HYBRID DREDGERS



# WHO TAKES HOME THE MARITIME INNOVATION AWARD?

## MARITIME INNOVATION AWARD

Netherlands Maritime Technology (NMT) established the Maritime Innovation Award at the end of 2000 on the occasion of the retirement of the then chairman, Mr Gerard Speld. The award is intended to highlight the innovative power of the maritime and offshore supply industry. In addition, the award should stimulate innovative developments within the maritime cluster. The Maritime Innovation Award is an annual award that is presented during the Maritime Awards Gala. This year, the event takes place 1 November at De Doelen, Rotterdam.

TEXT & PHOTOGRAPHY: MARITIME AWARDS GALA FOUNDATION

## OTADES – The next generation of fast and flexible towed arrays

**Optics11's OTADES is a highly innovative towed array solution that addresses the drawbacks of conventional ones. OTADES is a fibre-based thin acoustic array that uses only light instead of electrical signals. The individual hydrophones in the array are smaller in diameter, yet they deliver the same performance due to the use of patented fibre optic technology.**

All submarines use acoustic towed arrays for long-range detection of ships and submarines for their missions. The performance of these arrays, based on electronic sensors, is outstanding and mission-critical. However, existing solutions have one major drawback: the size of the system requires it to be a “clip-on” array, which must be shipped and fixed by a support team from another platform. In addition, the complexity of manufacturing and

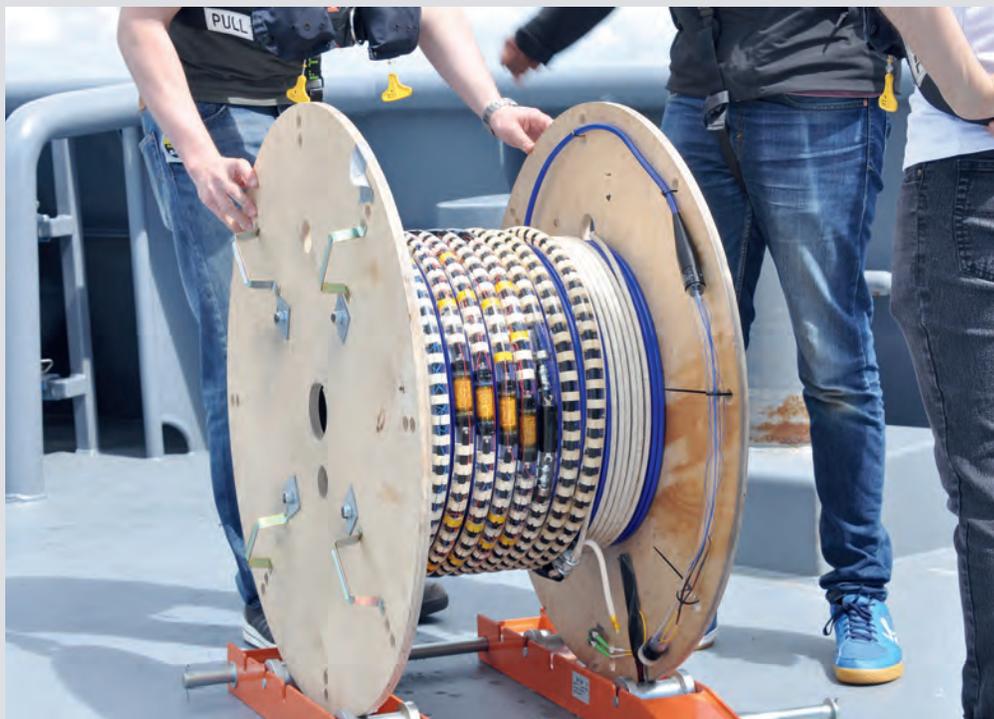
assembly makes it a very expensive sub-system.

The absence of electronics in OTADES makes these sensors simple in design, completely passive, reliable and deployable over kilometres of length. Thanks to its small diameter, the array is fully retractable within the submarine. This eliminates the need for a support team, dramatically improving operational deployability, which is now faster, more flexible and less costly. The application of OTADES is not limited to

submarines. Additional advantages such as low energy consumption, low drag in the water and the option of using long connecting cables also make implementations for autonomous vessels (unmanned surface vessels, unmanned aerial vehicles and gliders), dipping sonars and even port surveillance and environmental detection possible.

The next version of OTADES also includes non-acoustic optical sensors. Basic data such as pressure, depth and temperature

will then become available. In addition, innovative particle velocity sensors (to determine port star-board identification) and shape sensing solutions (to minimise blind time during manoeuvres) will be added. This makes OTADES even more valuable and in a class of its own.



*Thanks to its small diameter, the array is fully retractable within the submarine.*

## Unmanned autonomous vessel with novel positioning system

The growing demand for safe, unmanned, remote and sustainable maritime operations runs in parallel with the increasing need for digitisation and automation. Demcon unmanned systems addresses these challenges with fully in-house developed and manufactured unmanned autonomous vessels (USVs) for surveying, monitoring and maintenance applications in shallow, inland and offshore waters.



**T**he USVs are based on a standardised system architecture and platform design. The vessel design can be customised and scaled in size, power and propulsion to meet customer' specific operating and equipment integration requirements. Demcon delivers custom-built USVs in a cost-effective manner.

*The patented positioning system enables complete (holonomic) motion control in all directions without moving steering parts such as rudders or turntable thruster-pods.*

The novelty in the USVs is the patented positioning system. A fixed thruster configuration enabling complete (holonomic) motion control in all directions without moving steering parts such as rudders or turntable thruster-pods. Vessels with this positioning system are able to perform GNSS(GPS)-co-

ordinate dynamic positioning only by altering the propeller speed per thruster. This results in accurate manoeuvrability even at low speeds in both manual and autonomous operations. By combining the novel positioning system with full electric rim driven thrusters, in a watertight bulkhead-separat-

ed “unsinkable” hull, Demcon has created low maintenance, silent and sustainable USVs. The minimal (moving) parts, absence of gears, lubricants and liquids, and the zero-emission system reduce the impact of maritime operations on the marine wildlife above and below water.

## Marine Performance Systems develops viable air lubrication solution

The engineering team of Marine Performance Systems BV set out to solve the challenges associated with air lubrication. The solution is called FluidicAL, and represents a significant enhancement to known air lubrication solutions with an estimated net fuel savings in the range of eight to twelve per cent.

**A**ir lubrication – the principle of creating and maintaining an air layer between the ship’s hull and the surrounding water to reduce the friction – is not a new concept. It has been around for several years with varying results. While fuel savings have been achieved, these were quickly eaten up by the energy required to generate the bubbles, or the modifications

to the hull were too extensive. Specifically, FluidicAL enables the efficient generation of the micro air bubbles. The solution also allows controlling and maintaining the air layer underneath the vessel. In addition, it can cover the largest area of flat bottom of any existing solutions. FluidicAL was installed on the coaster m/v Tharsis in October 2020, and the results were amazing. The solution was installed

during a week in dry-dock, and commissioned in the period that followed. The captain has confirmed that the efficiency of the ship has improved by seven to eight per cent port-to-port with no impact on manoeuvrability or vessel stability. FluidicAL is in essence a class approved solution, that is ready to be installed on your fleet.



*FluidicAL enables the efficient generation of micro air bubbles.*

# PUTTING THE DUTCH NAVY AHEAD OF THE GAME

## MARITIME RNLN VAN HENGEL-SPENGLER AWARD

To be eligible for the award, a student employed by the Royal Netherlands Navy (RNLN) must carry out research as part of his or her studies, the results of which lead to new insights, concepts or innovations that contribute to better operational deployment of naval units. The award is in keeping with the innovative nature of the RNLN and was first presented in 2013, when the navy celebrated its 525th anniversary. The winner will be announced at the Maritime Awards Gala on 1 November in Rotterdam. The award is named after two naval officers who, in the early twentieth century, laid the foundations for encrypting messages via a rotating machine. This idea gave rise to the famous German "Enigma" machine, which in turn led to efforts on the English side to break the encryption. The English scientist Alan Turing developed the concepts of a computer on this basis.

TEXT & PHOTOGRAPHY: MARITIME AWARDS GALA FOUNDATION

## Parameters determining intercept capabilities – SM-3 versus various threat ranges

**Lt Noah Stam performed his BSc. dissertation at the NLDA on the topic of ballistic missile defence with a focus on intercepting ballistic missiles from a naval vessel.**

**T**he research is inspired by a test from the US Missile Defence Agency and the US Navy in which Hawaii needed to be defended against an inter-continental ballistic missile. Based on open-source information, Noah Stam developed high-fidelity simulation models to recreate the test. The simulation models allow the Royal Netherlands Navy to perform ballistic missile defence smarter and improve its capabilities.



## Thermal behaviour of lithium-ion batteries and the implications for submarine system design

Niels Gartner performed his MSc. dissertation at the TU Delft on the topic of lithium-ion batteries in submarines.

**S**ubmarines face an ongoing battle to improve the operational effectiveness by increasing the submerged endurance and range. Installing lithium-ion batteries has become increasingly interesting based on their relatively high energy density. However, lithium-ion batteries can develop a thermal runaway: a process which exponentially generates heat, leading to the risk of an explosion and fire. Using a thermal model of a lithium-ion battery module Niels has been able to give the Royal Netherlands Navy better insights in terms of module design, module optimisation and material selection for incorporating lithium-ion batteries in (future) submarines.



## Preventing injuries of high speed marine craft operators – Incorporating spinal injury models in the analyses of various seat suspension principles

Lt. Niek van den Nieuwenhuijzen performed his MSc. dissertation at the TU Delft with research on the physical loads to which high speed marine craft crew are exposed.

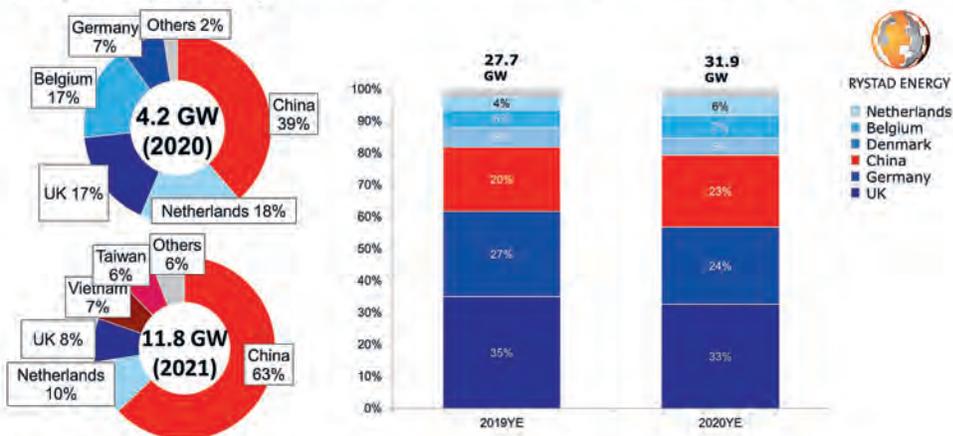
**A**s a result of the exposure to physical loads, the crew suffers from fatigue and injuries, leading to a reduced effectiveness and operational capacity of the marine craft. In an attempt to reduce the physical loads, passive shock mitigating seats can be installed. By developing a finite-element program and implementing injury risk models, the research allows the Royal Netherlands Navy to consider the influence of modifications on the resulting risk of injury with regards to a realistic operational profile. Therefore, the research reduces the necessity of complex sea and lab trials, which positively effects the costs and time in the design process.



# THE EVOLUTION OF OFFSHORE VESSELS

The offshore wind farm industry is a booming industry at present. It started some thirty years ago with an installed capacity of some 0.5 MW. In 2021, it is expected to reach € 46.3 billion with 46 GW installed globally. At present, the largest turbines have a capacity of 9 MW and plans are to install turbines with a maximum output of 13-15 MW. All this has resulted in an evolving fleet of specialised vessels serving the wind farm industry.

**Offshore wind capacity additions forecast, installed capacity at year end (2020-2021)**  
Share per country in percentage



Offshore wind capacity (by Rystad Energy).

Source: Rystad Energy OffshoreWindCube

In 2030, the industry will turn over € 670 billion with 250 GW installed in total, according to Rystad Energy. Capital expenditures (Capex) today are about 95 per cent of the total expenditure while operational expenses (Opex) stand for the remaining five per cent. In 2030, Capex is expected to decline to eighty per cent as the various wind farms globally mature. Foundation manufacturing is about fifteen per cent of the total Capex and is the second major cost element. Cable manufacturing amounts to about fourteen per cent of the total Capex. The major producer of offshore wind energy is China and its installed power is growing.

The various types of service vessels can be categorised as:

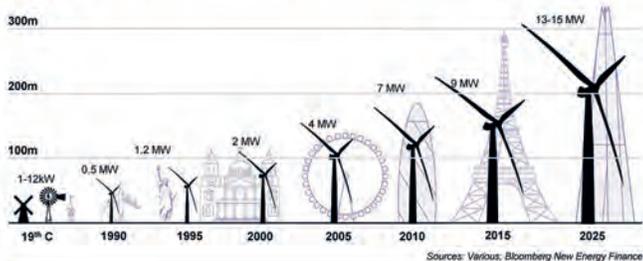
- Survey vessels for bottom survey (survey of sites for foundations and jack-up positions during installation and maintenance).
- Vessels for installing foundations.
- Rock installation vessels (covering power cables and preventing scour at foundations).

- Vessels for installing topsides.
- Vessels for power transmission cable installation.
- Vessels for installing the nacelle.
- Vessels for installing the propeller blades.
- Vessels that provide the transit of service personnel during operations (normally two to three persons per turbine).
- Vessels to repair or replace a nacelle and/or propeller blades after damage. For example in case of a fire (in the nacelle) or bird collision (propeller blades).

These vessels vary in size from a length over all of 26 metres to 216 metres. Some vessels are catamarans, some monohulls and many are jack-ups with four to six legs and with a crane capacity varying from 3 tonnes at 6.5 metres to 5000 tonnes at 30 metres outreach and with a maximum hoisting height of 180 metres.

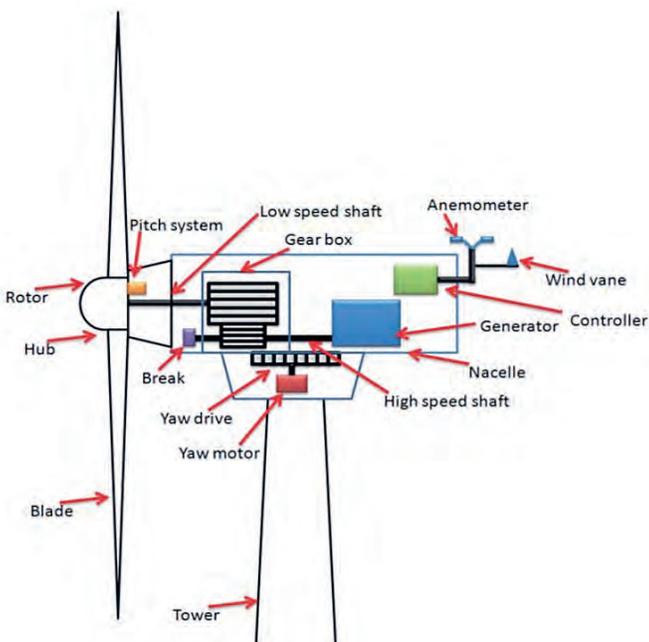
The Monaco/US Company Eneti Inc. has just ordered a self-propelled jack-up vessel for wind turbine installation with South Korea's Daewoo Shipbuilding (DSME). The contract price is US \$

## Evolution of wind turbine heights and output



Evolution of wind turbine size and power output (from Bloomberg New Energy Finance).

330 million and delivery is scheduled in the third quarter of 2024. The vessel is an NG-16000X design by GustoMSC, a subsidiary of National Oilwell Varco. Included in the design is a 2600-tonne leg encircling crane of Huisman Equipment BV from the Netherlands. The vessel is capable of installing wind turbines of up to 20 MW. The vessel is also prepared for using ammonia or LNG as alternative fuels.



Wind turbine nacelle with propeller.

## Foundations

Most wind turbine foundations are seabed supported as to date very few floating wind turbines have been installed. Wind turbine

## The challenge for installation vessels is the ever increasing weight of the foundation

foundations are often installed with a heavy lift vessel. The jack-up type installation vessel is normally used for installing the topsides as the requirement for precision is higher in this case.

The monopile is the most popular foundation type (about 88 per cent 2016) as this is the simplest method in which the monopile is driven into the seabed.

Wind farms are situated in relatively shallow water from a couple of metres water-depth up to some 40-50 metres and are normally located less than 100 kilometres from shore, with the majority less than 50 kilometres from shore. At least one field is planned to be located some 200 kilometres from shore (Wind Europe 2018).

## Topsides

Once the lower parts of the wind turbine tower are settled, the power cables are pulled up inside the foundation. After that, the mounting of the topside tower commences. Some thirty years ago, the height above the waterline of the top of the tower was about 50 metres, but for the new large turbines of 8 MW, this is now about 175 metres. For the larger 13 MW turbines, this will be about 200 metres (see the figure at the top of the page).

The nacelle is a rather complicated machinery house with quite some equipment inside.

## Weights

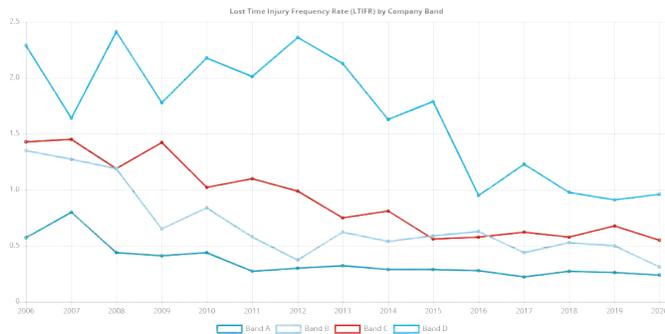
The table below provides some examples of the weights of the different parts of a wind turbine.

## Maintenance, accidents and failures

The wind turbines are equipped with sensors measuring for example lubrication levels, vibration, temperatures, and foundation displacement. A wind turbine installation normally requires about eight visits annually (see the figure on the next page). Older turbines may require more frequent visits. Maintenance costs on average are estimated to about US \$ 0.01-0.02 per kilowatt-hour produced.

Capacity [MW]	Foundation [tonnes]	Tower [tonnes]	Rotor [tonnes]	Nacelle [tonnes]
1.5		71	36	56
2.0		120	37	67
2.3		134	60	82
3.6		180	95	125
5.0	< 1,500*	225	120	300
10.0			105	400

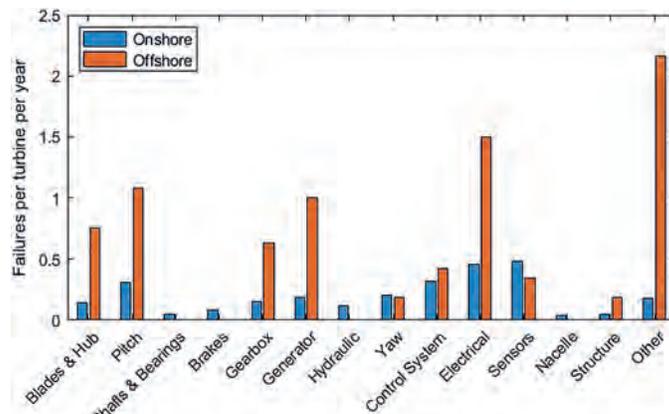
The weights of the different parts of a wind turbine. \* Monopile Ø 11 metres.



Injury rate per million hours worked annually (LTIFR) as reported to IMCA (International Marine Contractors Association) by members for offshore work in the oil industry (non drilling activities).

The personnel accident rate is increasing. The G+ Global Offshore Wind Health and Safety Organization reports that there is an increase in the total recorded injury rate per million hours worked annually (LTIFR). In 2019, the injury rate was 5.5 compared to 4.6 the year before. A total of 62 lost workday injuries were also reported last year (2020) – a dramatic rise from the five year-low of 39 in 2018.

Failure rate for the rotor blades is annually about 0.54 per cent of a



Comparison of weighted failure rates between onshore and offshore databases (Wind Energy, volume 22, issue 12, pages 1848-1871, first published 10 September 2019, DOI: (10.1002/we.2404)).

total of 700,000 blades in operation (study by GCube 2015). About 3800 blades fail each year. Blade failure is the most common type of failure and a single blade can be 80 metres long and weighs up to 40 tonnes and that at a height of 200 metres.

Wind Power Engineering Magazine reports that the annual rate of fire in 2020 was 1:2000. With wind turbines catching fire at a rate of 1 in 2000 each year, a typical wind farm with 150 turbines will experience one to two fires during an operating span of twenty years.

## Major players

In recent years, a number of companies have merged and the major players are constantly changing. Dutch companies like Heerema and Allseas are also looking to the wind farm industry. Huisman Equipment is developing special cranes and other equipment for the various phases of the installation process. Major players are at present:

- Cadeler A/S, Denmark.
- DEME, Belgium.
- Fred Olsen Windcarrier, Norway.
- Heerema Offshore Wind, the Netherlands.
- Jack up Barge BV, the Netherlands.
- MPI-Offshore (Van Oord), UK.
- Seafox BV, the Netherlands.
- Seajacks International Ltd., UK.
- Van Oord NV, the Netherlands.

## Installation vessels

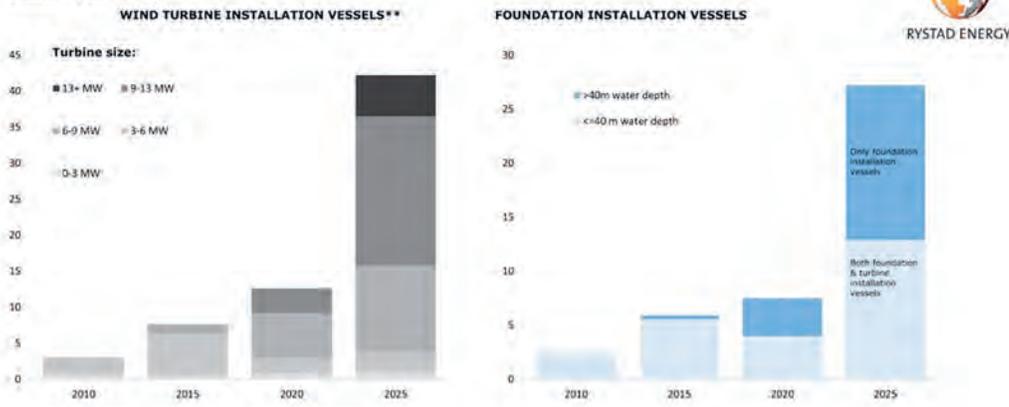
The traditional installation vessel is a four-legged jack-up or one with six legs for a larger vessel size. The Seajacks Leviathan and its sistership Kraken were delivered in 2009. Dimensions of the hull are 61 x 36 x 6 metres with four legs. The vessels are suitable for a maximum water depth of 50 metres. The jacking system is of the rack and pinion type. The unit has four azimuthing thrusters of 1.5 MW each and a dynamic positioning system of equipment class 2. There is a helideck suitable for a Sikorsky S92. The main crane has a boom length of 77 metres and a maximum capacity of 400 tonnes at 18.5



Seajacks Leviathan design (top) and the real thing on trials.

## Global demand for turbine and foundation installation vessels

Vessel years\*



Global demand for installation vessels (by Rystad Energy).

\* Excluding demand from China and intertidal wind farms

\*\* Wind turbine installation vessel demand includes vessel years needed for heavy maintenance and repair

Source: Rystad Energy Offshore Wind Cube, research and analysis

metres with the main hoist. There are also two knuckle boom cranes, one on port side and one on starboard side with a capacity of 10.8 tonnes at 9 metres. The maximum complement is 100 persons in 51 cabins all with en suite plus telephone, TV/DVD and network connections.

A larger sister was delivered in 2015 called Seajacks Scylla. The hull has the dimensions of 139 x 50 x 11 metres. The Scylla has four

legs with a rack and pinion jacking system. The jacking speed is 0.8 m/min and the maximum water depth is 65 metres. There are two retractable azimuthing thrusters forward and three azimuthing thrusters aft, each with a capacity of 3 MW. A DP2 system has been installed.

The main crane has the following capacities:

- Boom length: 105 metres.
- Main hoist: 1500 tonnes at 15-31.5 metres (jacked up), 800 tonnes at 40 metres (floating).
- Auxiliary hoist: 600 tonnes at 15-55 metres.
- Whip hoist: 100 tonnes at 17-92.8 metres.

There are also two auxiliary cranes each with a boom length of 46.5 metres and capacity of 50 tonnes at 10-45 metres. The maximum complement is 130 persons in 67 cabins. All equipped as mentioned above.

The jacking system for the wind turbine installation jack-ups have been taken over from the drilling jack-ups. A drilling jack-up may do one jacking up and jacking down operation a month, but these installation vessels may do several a week. In the beginning (ten to fifteen years ago), there was a fatigue issue with the jacking system, but hopefully this has now been resolved.

An example of a large monohull purpose built installation vessel is

## PARTICULARS OF THE ORION

The Orion is an example of an offshore heavy lift DP3 installation vessel. It was built in 2019 for DEME (Belgium).

Type:	Offshore heavy lift DP3 installation vessel
Classification:	Det Norske Veritas
Length:	216.50 metres
Breadth:	49.00 metres
Depth:	16.80 metres
Operating draught (max):	11.00 metres
Crane capacity main hoist:	5000 tonnes
	3000 tonnes at 50 metres
Auxiliary hoist:	1500 tonnes
Dynamic positioning:	DP3
Propulsion:	4 x 4500 kW azimuth thrusters, 2 x 4200 kW retractable thrusters, 2 x 2500 kW tunnel thrusters
Installed power:	44,190 kW (dual-fuel – diesel oil or LNG)
Pay load (max):	30,000 tonnes
Free deck area:	8000 m <sup>2</sup>
Accommodation:	160 persons (extendable to 239 persons)
Helideck installed	
Moonpool space:	9.6 x 10.5 metres
Auxiliary crane:	2 x 100 tonnes, knuckle boom, man-riding
Other:	8-point mooring system



DEME installation ship Orion (from DEME website).





*Knud E. Hansen design of the Atlas A-Class wind turbine installation vessel.*

this gangway.

Another type of walk-to-work vessel is the fast crew boat. This type is more like a bus and has no sleeping accommodation for the passengers. A typical example is the DEME Arista.

The Arista can take twelve passengers in special, comfortable chairs and has the following dimensions: 25.75 x 10.4 metres with a draught of 1.75 metres. Its top speed is 25 knots and its cruising speed is 22 knots. It can also carry 2 m<sup>3</sup> of cargo fuel oil. The front deck is strengthened for a total load of 10 tonnes. This type of ship drives up to the vertical entry ladder on the base of the wind turbine tower and the passengers will have to climb the vertical ladder to access the wind turbine tower.

Acta Orion, operated by Acta Marine, a Dutch company, is a DP2 offshore support vessel and also a walk-to-work vessel with the following dimensions: 108 x 16 x 9.3 metres with a 5.5 metre draught. It has a deadweight of 4000 tonnes and can accommodate 98 persons. It has a dynamic positioning (DP) system with 2 x 1.5 MW azimuthing thrusters aft and forward 2 x 0.75 MW retractable azimuthing thrusters plus one tunnel thruster of 0.485 MW. The total installed power is 4 x 1.2 MW plus 0.8 MW and an emergency generator of 0.15 MW.



*Acta Orion at the foundation of a wind turbine. The crew is probably pulling in the power transmission cables, installing the lower switchgear and making everything ready for the topsides to be fitted (from the Acta Marine website).*

It also has an Ampelmann gangway and one knuckle boom crane with a capacity of 10 tonnes at 17.5 metres. Acta Marine operates three such vessels, while it also operates nine fast crew boats of the monohull and twin hull type.

## New projects

Knud E. Hansen in Copenhagen, Denmark, has launched a project for a new wind turbine installation vessel. This self-propelled jack-up with four legs, the Atlas A-Class, is specially designed for installing topsides on pre-installed foundations. The jacking system is designed for 5000 load cycles. The crane can lift up to 2500 tonnes and can place a 500-tonne nacelle about 200 metres above sea level. This refers to a 14-MW wind turbine.

There are eight diesel generators installed, connected to a DC bus with a battery pack, enabling the diesels to run at the most efficient revolutions. Its main particulars are:

- Length overall (excluding helideck): 155.40 metres.
- Breadth moulded: 57.40 metres.
- Depth to main deck: 12.50 metres.
- Draught, moulded: 6.50 metres (14.000 tonnes deadweight).
- Speed: 12 knots (at 6.20 metres draught including ten per cent sea margin).
- Complement: 114 cabins.



## Björn von Ubisch MSc

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General Manager of Ubitec Holding BV,  
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# METSTRADE EN DAME AWARDS ARE BACK

After almost two years of not meeting in person, Metstrade 2021 and the International Council of Marine Associations (Icomia) give the opportunity to connect and catch up with over 1300 exhibitors in the leisure marine industry and visitors from dozens of countries. Those who can't come to RAI Amsterdam, can participate through Metstrade TV. The show has a SuperYacht Pavilion, a Marina & Yard Pavilion and a Construction Material Pavilion.

The first breakfast keynote speaker is professional sailor and world record holder Dee Caffari on 16th November. Her speech is followed by the ceremony for the DAME Design Award. Caffari has sailed around the world six times. She is the first woman to have sailed around the world in both directions single-handedly and non-stop and the only woman to have sailed non-stop around the world a total of three times. As an Ocean Advocate, she knows how powerful a sporting platform or sports personality can be in conveying an environmental message.

## DAME Awards

This year, the DAME Awards aims to return to its usual format, with entries judged across seven categories before a winner is chosen. It is assessed by a jury comprising boat, interior and industrial designers, as well as user experts. The assessment criteria are focused on equipment design in all aspects, from styling, functionality and innovation, through to integration, practicality of use, price to performance and presentation. Entrants this year are asked to sub-



Breakfast keynote speaker Dee Caffari has sailed around the world six times (photo Charlie Clift).

mit additional information on the lifecycle impacts of their products. The jury can award a special Environmental Design Winner certificate to a product that represents the best example among all entries that impressively fits the DAME criteria in terms of sustainability.

In 2020, the DAME Award winner was TEMO, an electric propulsion

Photo: The Metstrade Show is the world's largest trade exhibition of marine equipment, materials and systems.

system for boats from France.

The € 150 registration fee per product that each Metstrade exhibitor pays to enter the DAME Awards is donated to the Blue Marine Foundation (BLUE) this year. BLUE is working to restore the ocean to health by creating marine reserves, developing models of sustainable fishing and restoring vital marine habitats.

## Programmes on Metstrade TV

### Tuesday, 16 November

- 11.30-12.00 – “Good Day Metstrade!”
- 12.30-13.00 – “DAME Dynamics”, daily talkshow about innovation and the DAME Design Award Competition.
- 12.30-13.00 – “TechTalk: Internet of Things on board, with remote monitoring-diagnostics, comfort and security”. How IT continues to revolutionise product development. Speakers are Ed Slack, IBI Magazine at IBI/Boat Builder Award jury chairman, and Pontus Fernstrom, EMEA Marine.
- 14.00-14.30 – “TechTalk: Building boats with cleaner composites”. In the past decade, an industry-wide quest for renewable, reusable, and recyclable laminate materials and resins has led boatbuilders to try a myriad of new materials. Some successfully, others problematically. The focus is on the capacities and limitations of some cleaner material options that are proven, available, and practically applicable for boatbuilders in 2021. This TechTalk is organised in cooperation with Professional BoatBuilder magazine.
- 15.00-15.30 – “ICOMIA State of the Industry”, a panel discussion themed leisure marine industry in the post pandemic era. Speakers are Alessandro Gianneschi, Gianneschi Pumps and Blowers, Anders Kurtén, Baltic Yachts, Frank Hugelmeyer, National Marine Manufacturers Association, and Udo Kleinitz, secretary general at ICOMIA.
- 16.00-16.30 – “Sustainability session: Biofouling”. Panel discussion on biofouling and its effect on biodiversity.

### Wednesday 17 November

- 10.30-11.00 – “Good Day Metstrade!”
- 11.30-12.00 – “DAME Dynamics”
- 12.30-13.00 – “TechTalk: Electrification”. As boat handling gets easier and more intuitive, what challenges and opportunities now confront equipment makers?
- 14.00-14.30 – “TechTalk: Drystack to the next level”. Oscar Siches says drystack storage is making serious inroads in marina planning, offering consumers service, safety and security, and hassle-free boating. Modern buildings are feats of architecture; automated and semi-automated stacking systems have new sophistication; and forklifts go electric.
- 15.00-15.30 – “Leadership panel: Female leadership and empowerment”. A panel discussion focused on the future of female leadership and empowerment within the marine industry. Panelists will include prominent female industry leaders. Speaker: Michele Goldsmith, publisher.
- 16.00-16.30 – “Sustainability session: Sustainability powertrains and alternative fuels”.

### Thursday 18 November

- 10.30-11.00 – “Good Day Metstrade!”
- 11.30-12.00 – “DAME Dynamics”.
- 12.30-13.00 – “TechTalk: The boat as workplace”. How does the industry fully embrace the modern boater's need to stay connected at all times? Speaker: Ed Slack.
- 14.00-14.30 – “TechTalk: The smart shipyard”. How to manage next generation new build projects, with optimised subcontracted and improved supply chain efficiency, to increase profit and reduce waste. Speaker: Martin Redmayne, editor-in-chief at The Superyacht Group/The Superyacht Report.
- 15.00-15.30 – “Inside the Boat Builder Award”. Speaker: Ed Slack.
- 16.00-16.30 – “Sustainability session: YETI – Environmental rating system for superyachts”. A joint industry project group consisting of ten shipyards, four naval architects and three knowledge institutes have been collaborating through the Water Rev-

olution Foundation to develop the Yacht Environmental Transparency Index (YETI). The current scope of YETI focuses on the operational profile of the yachts, and in particular the energy it uses. Based on collected data, a study of 130 yachts and 297 years of AIS data has been conducted. An average operational profile has been com-

Caffari knows how powerful a sports personality can be in conveying an environmental message

pared that is applicable to the most common yacht types. YETI compares yachts with one another on their environmental credentials and serves as index to visualise the efforts done to reduce the yachts' impacts and compare them to one another. Speakers: Bram Jongepier, De Voogt Naval Architects (Feanship), and Justin Ratcliffe, Superyacht Times.

Due to the Covid-19 pandemic, a one-off layout has been adopted for Metstrade 2021. It will be held at the Europe Complex (Hall 1-7, Europe Foyer & Elicium) of RAI Amsterdam. The opening hours are 16 November 10:00-18:00, 17 November 10:00-18:00 and 18 November 10:00-17:00.



**Sander Klos**

Freelance maritime journalist and one of SWZ|Maritime's editors, [info@mediamaritiem.nl](mailto:info@mediamaritiem.nl)



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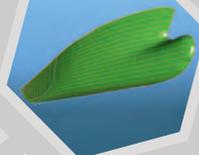
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# TRAINING NEEDED TO INSPECT WIRE ROPE

## Mariners' Alerting and Reporting Scheme

### Rescue boat needs rescuing: Mars 202145

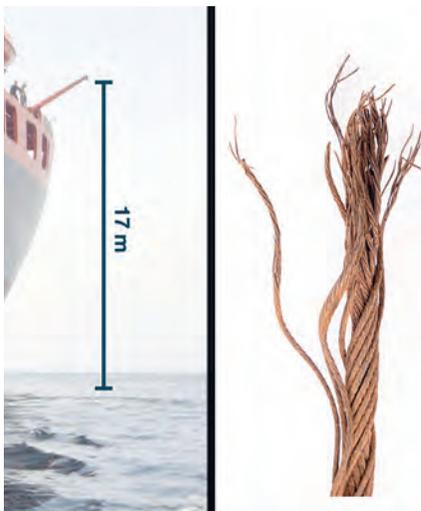
*As edited from official DMAIB (Denmark) report of 1 April 2020*

In calm seas, a vessel was stopped while underway to allow crew to undertake boat drills. While the lifeboats were tested, the rescue boat was launched and manoeuvred close to the ship by a three-person crew. The rescue boat trials lasted for about an hour before the crew brought the boat alongside for recovery. Once the hook and painter line were fastened, the crew in the boat sat on the floor in a stable manner and the hoist was started. When the boat reached the boat deck, the winch was stopped. Suddenly, the wire failed and the boat fell 17 metres, hitting the water upright. The engine was torn off its foundation, the bottom hull cracked, and the boat slowly drifted alongside the ship's port side. All three crew members were still in the boat, but seriously injured. The alarm was immediately raised.

It was quickly decided that the best option was to use the main deck crane to hoist the boat back on board with the crew inside. It seemed that the only option was to have a

**Editor's note:** In the "old" days, before rescue boats and covered lifeboats, we had lifelines to hang on to as the open lifeboat was lowered or raised. During one of my drills, the wire rope on the forward tackle snapped and all the personnel that were holding the knotted line were safe, albeit dangling from their line. The one crew that wasn't holding the line fell down with the boat and was injured. Covered lifeboats have had many dropping accidents as well, but measures to reduce these accidents have seen some success. What additional safety precautions do we need to put in place for rescue boats that are suspended by a single wire?

crew member jump into the sea and swim to the rescue boat to retrieve the painter line, which had been lost over board when the wire broke. One crew member volunteered to don a life jacket, climb down the combination ladder and swim to the boat. Once the painter line had been retrieved, the crew on deck pulled the boat forward below the deck crane. The volunteer swimmer had climbed into the boat ready to fasten the deck crane hook to the boat. After the hook had been fastened, he swam back to the combination ladder and climbed up on deck. Approximately twenty minutes after the boat fell into the sea, it was hoisted up to the main deck. The injured crew members were assessed and given first aid. One victim needed immediate treatment and was taken to the ship's hospital. The next morning the vessel arrived at a port anchorage where disembarkation of the injured crew members was arranged.



*The wire failed and the boat fell 17 metres, hitting the water upright.*

### Investigation findings

The official report found that the rescue boat davit's wire rope parted because it

was corroded to the extent that its load bearing capacity was exceeded when the rescue boat was hoisted. However, the parting of the wire rope was an "accident event", which could not in itself explain why the rescue boat system failed. Even though the company's Planned Maintenance System (PMS) instructed the officers to inspect and maintain the wire rope, they did not act upon the deteriorating condition of the wire rope. Neither did any of the other officers who continuously inspected, maintained and operated the rescue boat system, even when the wire rope was readily visible.

The reason the poor condition of the wire rope was not recognised earlier was a combination of at least three factors:

- The manufacturer's manual and PMS did not specify how to assess the condition of the wire rope.
- An absence of training in assessing the wire rope's condition.
- The PMS activities were compartmentalised. This meant that in practice, only one person was assessing each component. All these factors were compounded by the thorough examination performed by service providers, which gave the officers a blind trust in the system as a whole.

### Lessons learned

- Assessing the viability of a wire rope is not an intuitive process. Some wire rope may appear good, but be unsafe while others may appear outwardly poor, but still be very good. Special training is needed to properly inspect wire rope.
- A wire rope inspection checklist should be used for this task and the checklist should have viability criteria listed as a reminder for the person doing the inspection.

## **Anchors away: Mars 202146**

*As edited from MAIB (UK) Safety Bulletin SB1/2021*

In early 2020, the Covid-19 pandemic forced many cruise ship companies into an operational pause, resulting in many cruise ships anchoring in various locations for long periods of time. Several incidents have occurred since October 2020 where cruise ship anchors or anchor cables have failed, often while trying to ride out winter storms. One cruise ship lost both its anchors within a week.

The strength of anchoring equipment is defined by ship classification rules and it is intended for temporary mooring of a ship within a harbour or sheltered area. In good holding ground, the anchoring equipment should be able to hold the ship to a maximum wind strength of 48 knots in flat water, but this reduces to a maximum of 21 knots wind strength in seas with a significant wave height of two metres.

According to classification rules, anchoring equipment is not designed to hold a ship off exposed coasts in rough weather or to stop a ship that is moving or drifting. In these conditions, the loads on the anchoring equipment increase to such a degree that its components may be damaged or fail due to the high energy forces generated, particularly with ships with high windage.

Failures have occurred in joining links, anchor chain common links, D-links and across the anchor crown causing the flukes to be lost. Of the failures reported so far, the most frequent has been failure of the joining links connecting two shackles of cable, often when a significant amount of cable was out, in some cases as much as eleven shackles on deck.

Although the additional weight of the cable can prevent the vessel dragging anchor, in adverse conditions it will also increase the forces acting on the cable and anchor. When combined with the significant yawing caused in high winds, and cable lying unused in a chain locker since the last time it was turned end for end, it is unsurprising that several anchor equipment failures have occurred.

The issue is further exacerbated when the scope of cable remains constant, causing a

single point of loading and wear, for example, where the cable is in contact with the hawse pipe. The indications are that anchor equipment has been failing due to operational issues rather than fabrication defects.

### **Lessons learned**

- Operational limits for anchoring must be sufficiently cautious to ensure weighing anchor is not left too late, risking overloading anchor equipment. If strong winds are forecast, proactive action should be taken to seek a more sheltered anchorage in good time or proceed to sea and ride out the weather.
- To minimise the wear on the anchoring equipment as much as possible, the anchor in use should be rotated and the scope of cable varied on a regular basis to minimise single point loading. An appropriately experienced crew member should also carry out regular checks on the windlass brake condition and areas where the cable is in contact with the ship.
- While at anchor for significant periods, ensure all watchkeepers are confident in the actions to be taken in the event of dragging or losing an anchor, and that there is a contingency plan ready for implementation in the event of having to proceed to sea or re-anchor. Watchkeepers and senior officers must be aware of the reporting requirements to the coastal state in the event of losing an anchor so that mitigation measures can be put in place if required.

### **MSDS: Read it and apply it to protect yourself: Mars 202147**

In drydock, a crew member was tasked with painting cargo tanks as part of the regular maintenance. He was briefed on the work to be done and, according to the company, about the risks of skin contact with acetone, which was due to be used in the process. However, the crew member stated he had not been shown the Material Safety Data Sheet (MSDS) for the paint and other products to be used (that is, acetone), nor had these been dis-

cussed with him before the start of the job. The spot painting in the tanks took the crew member an entire week; initially preparing the surface and then painting it. He used the prescribed safety gloves and a boiler suit, but was not adequately protected at the wrists so acetone eventually came into contact with the skin causing irritation.

A few days after the drydock, the vessel sailed. During the transit, the crew member informed the master that there were signs of irritation on his wrists. The master immediately notified the company of the event and the victim was advised to apply ointment on his wrists and keep them bandaged during the day. Once in port, the victim was sent ashore for further medical examinations as his wrists still showed signs of irritation.

### **Investigation findings**

Although the company investigation found 'improper use of personal protective equipment (PPE)' as the direct cause of the injury (lack of adequate wrist protection, which allowed contact with the acetone and consequent skin irritation), it is worth noting that the victim worked an entire week in this condition. Under normal conditions of supervision, the PPE slip should have been corrected within the first few hours if not minutes of starting the job.

### **Lessons learned**

- Employers are responsible for adequately informing employees of the risks of particular substances, but employees are equally responsible to inquire and comply.
- Easy and ready access to MSDS information as well as employee requests to review this information is a sign of a strong safety culture.
- Inadequate supervision is a huge contributing factor in many accidents. Are your crew briefings and supervision up to scratch?

All Mars Reports are also published online, [www.swzmaritime.nl](http://www.swzmaritime.nl).

## LEZINGENPROGRAMMA OKTOBER/NOVEMBER

### KNVTS afdeling Amsterdam

**Lecture: Designing an icebreaker with VR**  
**Wednesday November 17th, Amsterdam**  
**Live Event**

*Speakers: Finn Wollesen – Managing Director Knud E. Hansen A/S and Mark de Wolf, Verification, Validation & Acceptance & Trial Manager RSV Nuyina at Damen Naval*

Will you join us to celebrate that we can meet up again? KNVTS Amsterdam proudly presents its first Live Event in 2021. As part of and sponsored by the Metstrade Show, in the afternoon of Wednesday the 17th of November, we will dive into how the very complex and sophisticated icebreaker RSV Nuyina was designed and built. With presentations by naval architect Knud E. Hansen and shipbuilder Damen Shipyards. A very interesting presentation and afterwards we invite you to join us for dinner and drinks in a bar-restaurant near the RAI in Amsterdam, where Metstrade will be held from Tuesday the 16th to Thursday the

18th of November. Please sign up for free as a visitor of Metstrade for Wednesday 17th of November and join us for the lecture, the social gathering and get to play with the virtual reality (VR) tool. Wollesen will explain how Knud E. Hansen used VR to design the vessel and how this proved crucial in times when bringing teams physically together was not possible. De Wolf will speak to us about how Damen built this complex vessel. Knud E. Hansen used ShipSpace as a groundbreaking VR design system that allows engineers, designers and owners to walk on board their new vessels from preliminary design stages all the way through construction. The unique ShipSpace rendering engine brings 3D concepts or CAD models to life with startling clarity and solidity, regardless of size or complexity and allows to explore, design and engineer ship areas. The heavy icebreaker was designed for the

Australian Government to resupply their Antarctic bases and for research and scientific work. The vessel can deploy a wide range of vehicles, including helicopters, landing barges and amphibious trucks to support the resupply operations. The new ship provides a modern platform for marine science research in both sea ice and open water with a large moon pool for launching and retrieving sampling equipment and remotely operated vehicles. During the design phase, the naval architects in Denmark, the chief engineers in Australia and consultants in Canada worked closely on engineering the ship with the use of VR, calling in every Monday to "walk" through the ship to make this complex icebreaker the perfect research ship for the Australian Government. More details on this lecture will be announced soon. This lecture will be given in English.



*Virtual reality was used to design icebreaker RSV Nuyina (photo Damen Shipyards).*

## KNVTS Afdeling Rotterdam

### Onderwerp: Presentatie genomineerden KNVTS Schip van het Jaar-prijs 2021

Donderdag 28 oktober

Op deze avond worden er drie presentaties gegeven door de twee ondernemingen die met hun inzending(en) genomineerd zijn voor de meest prestigieuze maritieme prijs van Nederland: de KNVTS Schip van het Jaar-prijs 2021.

- Damen Shipyards met Bryggen, de eerste volledig elektrische passagiersferry uit een serie van zeven voor de binnenstad van Kopenhagen. Deze schepen, volledig ontwikkeld door Damen en Nederlandse industriepartners kenmerken zich door het automatische snel-laad- en afmeersysteem waardoor het schip elk uur binnen zeven minuten zijn verbruikte energie kan bijladen. Door de toepassing van het snel-laadsysteem, kon de capaciteit van het batterijpakket geminimaliseerd worden, wat leidt tot een economisch aantrekkelijke operatie.
- Holland Shipyards heeft met de Düsternbrook voor Kiel haar eerste, volledig elektrische, ferry geleverd. De boot is revolutionair door haar eenvoud; ze verbruikt slechts veertig procent (!) van de energie die haar voorganger op hetzelfde traject verbruikte. Hoewel veel elektrische schepen vaak een noodstroom-generator hebben, is hier echt gekozen voor puur elektrisch; dus geen hybride, geen dubbele systemen of dure back-up-generatoren. Dit resulteert in een simpele boot en daardoor bijzonder eenvoudig te bouwen. Door de vanaf de brug be-

dienbare, speciaal ontworpen afmeervoorziening is de ferry ook bedoeld om door één man gevaren te worden. De Düsternbrook is compleet in Nederland bedacht, ontworpen en gebouwd door Nederlandse bedrijven. Vanwege het succes van dit schip is de werf inmiddels een zusterschip aan het bouwen voor dezelfde klant.

- Daarnaast heeft Holland Shipyards met de NZK-100 een geheel eigentijdse elektrische vervanger geleverd voor de oude dieselponten op het Noordzeekanaal. Letterlijk onder de rook van Tata Steel een mooie bijdrage aan het verminderen van uitstoot! Naast de elektrische aandrijving op accu's is zeker de laadinfrastructuur uniek te noemen; iedere twintig minuten worden de accu's twee minuten bijgeladen en dat 24 uur per dag oftewel ongeveer 27.000 keer per jaar. Om dit mogelijk te maken dient er volautomatisch aan- en afgekoppeld te worden en hiervoor dienden de systemen van de netbeheerder, het waltrafostation, het laadsysteem, het boordsysteem en het wifi-communicatiesysteem goed op elkaar afgestemd te worden. Omdat het laden met stromen van meer dan 2000 KVA plaats kan vinden, is de veiligheid een belangrijke randvoorwaarde en wordt het ook duidelijk dat we wat "stroom" betreft hier over andere grootheden praten dan bij een normale stekkerverbinding van toepassing zijn. De NZK-100 is de eerste uit een serie van zes identieke boten en compleet in Nederland bedacht, ontworpen en gebouwd.

Op deze avond vertellen de inzenders waarom zij in aanmerking willen komen voor deze prijs en u, als bezoeker, kan door middel van het stellen van vragen in de keuken kijken bij de producenten.

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Voor het bijwonen van deze boeiende avond kunt u zich aanmelden via de link op de website van de KNVTS.

## KNVTS Afdeling Rotterdam

### Onderwerp: *Short tensioning* van schepen die laden en lossen bij wisselend tij en golven en de gevolgen bij het niet toepassen van dit systeem

Donderdag 25 november

Spreker: medewerker KRVE (Koninklijke Roeiers Vereeniging Eendracht)

Voor verdere gegevens en aanmelding voor deze boeiende lezing verwijzen wij u naar de website van de KNVTS. Voor locatiegegevens en tijden, zie de lezing hierboven.

## KNVTS afdelingen Noord en Zeeland

Op het moment van het drukken van het blad waren de gegevens van de lezingen van de afdelingen Noord en Zeeland nog niet voorhanden. Houd de KNVTS-website in de gaten voor verdere informatie.

## IN MEMORIAM

De heer G. Bedet is 2 september 2021 op 79-jarige leeftijd overleden. Hij was het laatst woonachtig in Terneuzen en is werkzaam geweest als Supervisor Marine Operations bij Dow Benelux. Hij was bijna 25 jaar lid van de KNVTS.

De heer ing. J.H. Lubking is 6 september 2021 op 61-jarige leeftijd overleden. Hij was het laatst woonachtig in Rhoon en is werkzaam geweest als SWTK bij Ballast Nedam Baggeren in Zeist. Hij was ruim 38 jaar lid van de KNVTS.

De heer ing. R.J. Kleiman is 18 mei 2021 op 65-jarige leeftijd overleden. Hij was het laatst woonachtig in Barendrecht en is werkzaam geweest als Manager Software bij Techno Fysica BV in Barendrecht. Hij was ruim 18 jaar lid van de KNVTS.

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