3RD QUARTER 2024

SHIPREPAIR & MAINTENANCE

A publication of THE ROYAL INSTITUTION OF NAVAL ARCHITECTS
For more related news please visit: www.rina.org.uk

MIDDLE EAST YARDS KEEP BUSY

PERFORMANCE EXCEEDS EXPECTATIONS ACROSS THE REGION

EverClean

The **always clean** performance solution

Save fuel
Reduce carbon emissions
Minimize downtime
Maintain biosecurity
Improve performance

Find us at SMM in the US Pavilion B7.224 to learn more about robotics for hull inspection and cleaning.

Greensea IQ
Intelligent Ocean Solutions

CONTENTS

3rd Quarter 2024

FEATURES

SHIPREPAIR & MAINTENANCE

Editor: Clive Woodbridge
Production Manager: Nicola Stuart
Managing Editor: Daniel Johnson
Publications Sales Coordinator: Henry Owen
Publisher: Neil Hancock

Advertising Sales
Email advertising: advertising@rina.org.uk
Telephone: +44 (0)20 7235 4622

Published by:
The Royal Institution of Naval Architects
Editorial Office:
8-9 Northumberland Street
London, WC2N 5DA, UK
Telephone: +44 (0) 20 7235 4622
Telefax: +44 (0) 20 7245 6959
E-mail editorial: editorial@rina.org.uk
E-mail marketing: marketing@rina.org.uk
E-mail subscriptions: subscriptions@rina.org.uk

Printed in Wales by Stephens & George Magazines.

A 2024 subscription to Shiprepair & Maintenance costs:

SHIPREPAIR & **MAINTENANCE** SUBSCRIPTION (4 issues per year)		
LOCATION	**DIGITAL ONLY**	**PRINT + DIGITAL**
UK	£70	£110
Rest of Europe	£70	£115
Rest of World	£70	£125

Includes P+P / Inclusive of VAT

The Naval Architect Group (English Edition)
Average Net Circulation 3,771 (total)
1 January to 31 December 2023
ISSN 2513-8227

This title has changed its name (January 2017) and was formerly audited under Shiprepair & Conversion Technology.

MOMENTUM GATHERS BEHIND METHANOL RETROFITS

In the race to achieve net zero, interest in the conversion of propulsion systems to run on green methanol continues gathering pace

In a sign of the growing momentum behind switching to methanol as fuel, MAN PrimeServ has recently announced that from 2025 it will offer a retrofit package for the conversion of conventional MAN four-stroke engines already in service to dual-fuel methanol operation. Customers will initially be able to convert existing MAN 48/60 engines to the latest MAN 51/60R-DF-M engine type with methanol capability.

The new conversion package has been under development for some time and has been tested at its Augsburg plant over the summer. MAN PrimeServ plans to convert the first four-stroke engines for a pilot customer in Autumn next year, at which stage the intention is that the package will be made available to the general market.

The company says it has already received a large number of retrofit enquiries from customers who want to switch to methanol. With the new methanol-retrofit package, MAN Energy believes it can now offer customers an "economically attractive opportunity to convert older engines protecting the climate while ensuring investments in engines remain future-proof". Bernd Siebert, head of retrofits and upgrades, MAN PrimeServ, says: "After all, ships have a service life of 20 to 30 years and, from an economic point of view, retrofitting is much more efficient than installing a new engine or building a new ship."

A number of different market segments are witnessing methanol conversion projects. In the passenger ro-ro shipping sector, for example, Lloyd's Register (LR) and Stena Lines are working together on a project to retrofit two vessels with methanol propulsion.

The conversion will see the *Stena Superfast VII* and *Stena Superfast VIII* ferries, which operate on the Scotland to Northern Ireland route between Cairnryan and Belfast, converted to methanol dual-fuel propulsion. The retrofit process will convert two out of the four main engines in each vessel to run on methanol alongside MGO (marine gas oil). LR's recent *Fuel for Thought: Methanol for Passenger Ships* report shows that methanol is an increasingly technically viable option for shipowners. However, infrastructure and investment need to be prioritised for widespread adoption, LR suggests.

Container shipping is also moving increasingly towards the methanol option. Work on the first of five methanol conversions planned for Seaspan's containership fleet at COSCO Shipping Heavy Industry will start in 2026, all for vessels operating under long-term charters to Hapag-Lloyd. Each conversion project in China is expected to take between 80 to 90 days and the vessels involved are

FROM 2025 OWNERS WILL BE ABLE TO HAVE CONVENTIONAL MAN 48/60 ENGINES CONVERTED TO NEW MAN 51/60R-DF-M ENGINES, BOTH WITH OR WITHOUT A COMMON-RAIL SYSTEM

Seaspan Amazon, *Seaspan Ganges*, *Seaspan Thames*, *Seaspan Yangtze* and *Seaspan Zambezi*.

This project will follow what is believed to be the first conversion of an in-service containership. China's Xinya Shipyard recently docked the 15,000TEU *Maersk Halifax* and the conversion, and other repairs on the vessel, will take about three months to complete.

Tanker ship operators may also evaluate the methanol conversion option more favourably following a report published by the Mærsk McKinney Møller Center for Zero Carbon Shipping. The report concludes that converting tankers to green fuels is both technically and economically feasible, with conversion from fuel oil to methanol being the most cost-effective option, followed by ammonia. The report notes that: "The industry has the right technology and engineering knowledge in place to achieve such conversions."

There are some challenges that remain to be overcome however. Earlier this year a new fire safety study by Survitec claimed that existing firefighting methods used to extinguish machinery space spray and pool fires on conventionally fuelled vessels are inadequate when dealing with methanol-based fires. This followed extensive comparative fire tests on dual-fuel marine engines using diesel oil (DO) and methanol. These tests confirmed that traditional water mist fire suppression mechanisms do not perform as expected on methanol pool fires and methanol spray fires and Survitec believes a completely different approach is required if methanol powered ships are to remain safe. Safety is an issue that must be paramount in conversion projects and will clearly require the attention of all parties involved in such retrofits. ■

NEWS

SINGAPORE

SEATRIUM SECURES HIGH-VALUE REPAIR PROJECTS

POLAR ENTERPRISE IN DRYDOCK AT SEATRIUM IN SINGAPORE

Singapore shipyard group Seatrium has announced a series of repair and upgrade contracts with an aggregate value of Sing$180 million. All of these projects, with the exception of one, will be completed by the end of this year, and include major repairs to offshore vessels, naval vessels, ferries, LNG carriers and tankers, as well as one damage repair project.

Four offshore refits, including two jack-ups and two drillships, have been confirmed by regular customers, Velesto Energy Berhad, Zonda Drilling and Seadrill. Other contract awards in this sector include repair and maintenance work on a heavy-lift pipelay vessel, *Sapura 1200*, from Sapura Energy, while the group has also been awarded the upgrade of *Sea Challenger*, a jack-up installation vessel from Japan Offshore Marine (JOM), a joint venture between Penta Ocean Construction and DEME. Fabrication works are ongoing to ready the vessel for its retrofit in 2025.

Seatrium has also secured significant naval works from the Military Sealift Command, as well as three vessels from Teekay Shipping (Australia), managed under the Australia Defence Maritime Support Services Program (DMSSP).

Other projects recently won by Seatrium include the docking and repair of *Kaitaki*, a ro-ro ferry operated by Interislander of New Zealand; maintenance work and upgrades to two tankers from ConocoPhillips/Polar Tankers; a main engine, dual-fuel ready engine upgrade involving a tanker from Alaska Tanker Company; and a series of seven LNG vessel retrofits from long-term repeat customers. In addition, Seatrium has secured a contract to conduct major steel renewal work for a collision-damaged vessel, which is currently undergoing repairs.

DRYDOCKING

MAMMOET AWARDED HAWAII DRY DOCK PROJECT

Mammoet has entered into an agreement with the DHO (Dragados/Hawaiian Dredging/Orion) joint venture to perform transportation and lifting services for the construction of Dry Dock 5 in Pearl Harbor, Hawaii.

The initial work of installing foundational piles into the harbour waters has begun, with project completion expected by late 2027.

The new drydock will be deeper than the existing drydock, which will be replaced, and will be able to accommodate large naval vessels for repair, maintenance and modernisation. Upon completion, the upgraded facility is expected to have a significantly long life span.

SHIP REPAIR

LONGEST VESSELS REPAIRED AT COLOMBO DOCKYARD

Colombo Dockyard has handled its longest vessels to date, with the docking of the sister ships *SCI Chennai* and *SCI Mumbai* for the Shipping Corporation of India. The 262m-long ships only just fitted into the shipyard's largest drydock, which is 263m long.

Both the vessels underwent routine drydocking maintenance repairs. In addition one of the most extensive parts of the work scope was the repair of 41 hatch covers on each vessel that required significant attention.

Furthermore, both vessels had new ballast water treatment systems (BWTS) installed during their stay, while various works were carried out on deck, including cell guide steel renewals.

INDIA

APCL SUPPORTS RFA MAINTENANCE WORK AT INDIAN SHIPYARD

UK shipyard group A&P Cammell Laird (APCL) has supported maintenance work on two Royal Navy Fleet Auxiliary (RFA) vessels in India, as part of its in-service support contract with the Ministry of Defence. RFA *Argus* and RFA *Lyme Bay* are the first RFA vessels to be repaired in India.

APCL company A&P Group has a longstanding contract to provide through-life support to RFA vessels at its facility in Falmouth. But when both ships required essential maintenance while far from the UK, APCL's network of strategic partners enabled them to dock at Larsen & Toubro's Kattupalli Shipyard in India.

The combined work included coordination and delivery of more than 150 separate work items, which were overseen by A&P Group's support team and carried out by Larsen & Toubro's marine engineers.

A similar arrangement saw work recently carried out on HMS *Scott* at Gibdock in Gibraltar, also under the supervision and with the support of A&P Group.

YACHT REFITS

ALEWIJNSE EXPANDS MEDITERRANEAN PRESENCE

The Dutch company Alewijnse has opened the doors of a new service facility just outside Barcelona, which is recognised as one of the leading centres for superyacht repair and refit in the Mediterranean region. With this strategic move, the electrical system integrator says it can now offer even better and faster electrical services onboard all types of yachts operating in the Southern European region.

Located within Pendennis Vilanova, this new facility complements the existing Alewijnse service hub in La Ciotat on the south coast of France, which was opened in 2015. Together they serve as strategic additions to Alewijnse's service network alongside locations in the Netherlands, Romania and Vietnam.

"By launching a new Spanish branch, we are making Alewijnse's specialised knowledge and service directly available to owners and managers in Spain. We are now able to respond faster and more efficiently to the service needs of the many superyachts sailing along Spain's Mediterranean coast, with coverage extending from Cartagena in the west to Genova in the east," comments Alewijnse service manager Maurice Vlaming.

SOUTH EAST ASIA

NEWPORT ENTERS STRATEGIC PARTNERSHIP WITH UNITHAI

UNITHAI SHIPYARD AND ENGINEERING'S YARD IN LAEM CHABANG

UK-based Newport Shipping is to collaborate with Unithai Shipyard and Engineering, one of the leading shipyards in Thailand, as part of its ongoing efforts to expand its network of partner shipyards globally. The collaboration aims to "enhance service offerings and provide clients with more comprehensive and accessible ship repair, maintenance and retrofitting services."

This partnership is expected to bolster Newport Shipping's presence in the Asia-Pacific region, providing its customers with access to Unithai Shipyard's facilities. These include two drydocks able to accommodate vessels up to 180,000dwt, and workshops equipped with modern machinery and technology for ship repair, retrofitting and maintenance services.

Lianghui Xia, managing director, Newport Shipping, expresses enthusiasm about the partnership with Unithai Shipyard and Engineering. He says: "Their reputation for excellence and strategic location in Thailand align perfectly with our vision to provide our clients with the best possible service worldwide. This collaboration will significantly enhance our operational capabilities and service portfolio."

Unithai Shipyard and Engineering, which was established in 1990, is located within the deep-sea port of Laem Chabang, close to Bangkok, Ko Si Chang and Map Ta Phut ports. As such it is at the heart of Thailand's chemical and oil tanker, container, dry bulk, car and offshore trades.

RETROFITS

BULK CARRIER FUEL-SAVING RETROFITS

Damen Shipyards Group, in a partnership with Atal Solutions and other parties, will undertake the retrofit of four bulk carriers for BAM Shipping, integrating a total of eight different technologies. Damen's role will be to provide the vessels with fuel-saving and emission reduction systems, including exhaust gas scrubbers, carbon capture technology, propeller optimisation, low-friction coatings and its Damen Air Lubrication System (DACS). Following this conversion work, the bulk carriers are anticipated to consume at least 20% less fuel and the work will lead to a significant reduction in greenhouse gas emissions.

Atal Solutions has arranged for the US$123.7 million funding for this project, including a supplier's credit amounting to US$105.2 million, requiring the vessel owners to provide just 15% equity, with a 10-year repayment period at "competitive" interest rates.

The project is currently being implemented and is expected to be completed by the first quarter of 2025.

MARINE TECHNOLOGY

AIR LUBRICATION INSTALLATION DEAL SIGNED BY QATAR SHIPYARD

Qatar Shipyard Technology Solutions has signed a memorandum of understanding with UK-based Armada Technologies, a provider of a new hull air lubrication system. In future the two parties will collaborate on installing Armada's Passive Air Lubrication Systems (PALS) on existing vessels, with the aim of improving their energy efficiency and reducing carbon emissions.

Under the terms of the MoU, Qatar Shipyard Technology Solutions and Armada will explore opportunities to incorporate PALS into vessels owned by the yard's customers. Armada will provide technical and commercial support to facilitate the integration of PALS into vessel designs, including initial efficiency saving estimates and design information on proposed installations.

ENVIRONMENTAL RETROFITS

KR OPTIMISM ON KOREA'S FIRST ONBOARD CARBON CAPTURE SYSTEM

Classification society KR has taken part in the successful installation of an onboard carbon capture system (OCCS) which will soon undergo internal verification testing. The project has been a collaborative effort with three other South Korean companies, HMM, Samsung Heavy Industries (SHI) and Panasia.

As a result of this collaboration, the new OCCS was recently installed on the 2,200TEU container ship *HMM Mongla*. KR conducted the risk assessment and application of relevant regulations in this project, which applies a technology that captures, liquefies and stores carbon dioxide from the exhaust gases generated during the ship's operation. This technology has the potential to be recognised by international organisations such as the International Maritime Organization (IMO) as one of the most promising carbon reduction technologies, making it a proactive solution for reducing greenhouse gas emissions from ships in the future, KR states.

THE OCCS COMPLETION CEREMONY FOR *HMM MONGLA*

TANKERS

WÄRTSILÄ PROPULSION RETROFITS FOR MEDIUM RANGE TANKERS

Wärtsilä will supply its EnergoFlow and EnergoProFin propulsion solutions to four medium range (MR) tankers in the International Seaways fleet.

The devices will be used to upgrade the ships' existing Wärtsilä controllable pitch propeller system resulting in an estimated 5% fuel saving. These will be the first Ice Class 1A FS vessels to be fitted with the EnergoFlow solution.

The propeller upgrading project followed a detailed engineering study to optimise the existing propulsion systems. The four 47,000dwt vessels to be fitted with the Wärtsilä solutions are *Seaways Galle*, *Seaways Gatun*, *Seaways Hercules* and *Seaways Huron*. The refitting installations will be planned to coincide with each vessel's drydock schedule, starting in the summer of 2024.

WÄRTSILÄ WILL SUPPLY ITS ENERGOFLOW AND ENERGOPROFIN PROPULSION SOLUTIONS TO FOUR MR TANKERS, INCLUDING *SEAWAYS GATUN*

OFFSHORE

FPSO PROJECTS COMPLETED BY DRYDOCKS WORLD

Dubai shipyard Drydocks World has completed the conversion and upgrade of the floating production storage and offloading (FPSO) vessel *Voyageur Spirit* and the shuttle tanker *Nordic Brasilia*. Both vessels have been designed for a 15-year lifespan without requiring intermediate docking.

The *Voyageur Spirit* FPSO has been renamed FPSO *Petrojarl Kong*, while *Nordic Brasilia*, now a floating storage and offloading (FSO) vessel, has been renamed FSO *Yamoussoukro*.

The conversion projects were completed in 14 and 11 months respectively. Both vessels are now ready for deployment in the Baleine Field off the coast of Côte d'Ivoire.

PETROJARL KONG AND FSO *YAMOUSSOUKRO* IN DUBAI PRIOR TO DEPARTURE FOR DEPLOYMENT OFFSHORE COTE D'IVOIRE

FERRIES

SCANDLINES TO CONVERT FERRIES TO HYBRID PROPULSION

Baltic ferry operator Scandlines has signed a contract with Wärtsilä to supply electrical systems for the ferries *Schleswig-Holstein* and *Deutschland*, which are being converted to plug-in hybrid electric propulsion. In addition to supplying the actual systems, Wärtsilä will supervise the installation on board and will be responsible for commissioning.

The conversion of the ferries is scheduled to start in the second half of 2025. The project involves replacing an engine and other existing systems with a new shore-charged electrical system, including a large energy storage system. This will allow electricity to contribute approximately 80% of the energy needed for each crossing between Puttgarden, Germany, and Rodby, Denmark.

Wärtsilä will engineer and deliver the hybrid converters, the energy storage system (ESS) and the energy management system (EMS), as well as the switchgears, transformers and the onboard port charger, and will supply replacement components in the existing switchboard equipment. In addition, Wärtsilä will provide preventive maintenance support services.

SCHLESWIG-HOLSTEIN IS ONE OF TWO FERRIES BEING CONVERTED TO A PLUG-IN HYBRID SOLUTION

RETROFITS

THORDON SECURES TUG RETROFIT CONTRACT

Thordon Bearings has secured a significant contract to convert the rubber tailshaft bearings on an entire fleet of Panama-based tugs, pilot vessels and workboats to water-lubricated polymer bearings.

The agreement with the unnamed operator follows the successful retrofitting of Thordon's SXL tailshaft bearings to 12 of its twin-screw tugs last year during scheduled drydockings. The remaining 32 vessels will now be converted in batches at planned maintenance intervals over the next four years, the company states.

WIND PROPULSION

BERGE NEBLINA RE-ENTERS SERVICE WITH ROTOR SAILS

Berge Bulk's *Berge Neblina*, a 388,000dwt Valemax ore carrier, has recently completed a voyage to Brazil following the installation of four 5m x 35m rotor sails by Anemoi Marine Technologies.

The installation, which took place during the vessel's scheduled drydocking, was completed at Yiu Lian Dockyards (Shekou) in China. The rotor sails have been installed on Anemoi's bespoke folding deployment system, whereby the sails can be folded from the vertical to mitigate impact on air draught and cargo handling operations when in port.

By harnessing wind energy, *Berge Neblina* is expected to achieve increased efficiency by reducing the load on the main engine while maintaining speed, therefore substantially reducing fuel consumption and resulting in less greenhouse gas emissions.

BERGE NEBLINA HAS BEEN RETROFITTED WITH ROTOR SAILS BY ANEMOI MARINE TECHNOLOGIES

NORTHERN EUROPE

FUTURE LOOKS BRIGHT FOR DAMEN SHIPREPAIR OPERATIONS

Cruise and offshore wind contracts have provided the basis for another strong performance

Damen Shiprepair reports a busy first half of 2024 across all its North European yards, which include facilities in Rotterdam, Amsterdam, Vlissingen, Brest and Dunkerque. Around 550 vessels visited these yards for repair and maintenance work over the first six months of the year, roughly the same as in the same period of 2023.

However, while there was stability in terms of overall business levels, there were some important differences. As Bas Loohuis, commercial director, explains: "We have seen a dip in demand for work to key ocean going vessel types, like bulkers, tankers and container ships. This reflects the fact that Chinese yards are now back in full swing after the pandemic and also the influence of geopolitical factors which are requiring vessels to take longer routes to access European markets. Offsetting that, we have seen more work coming from the offshore sector, and especially offshore wind, and cruise shipping, as well in the naval, yachting and LNG markets."

Notable projects undertaken so far this year have included major maintenance, including steel renewal to *Saipem 7000*, a floating crane being used for offshore wind projects, and several cruise vessel docking projects in both Rotterdam and Brest. Loohuis says: "We have handled work for most of the leading cruise brands which have docked vessels typically for two- to three-week stays for maintenance and refit works, with more to come later in the year. This includes a particularly large-scale project for a cruise customer that will be undertaken at our yard in Brest this autumn. This will be one of our first cruise ship sustainability upgrades and will include a package of owner-driven items to reduce emissions and improve fuel performance."

Damen is also seeing growing interest from the cruise sector in its Damen Air Cavity System (DACS), an air lubrication system designed to reduce resistance and thereby cut fuel consumption. A number of retrofits of this technology have already been carried out at Damen yards on a wide range of vessel types, with further orders in place.

While offering owners a range of sustainability enhancements, also including the application of high technology low friction paints and alternative fuel conversions, backed up by a supportive financial package, Damen Shiprepair is committed to developing 'green shipyards', with lower emissions from shiprepair and maintenance operations. The company has installed shore power systems, which allow vessels to dock without running onboard generators, in Amsterdam and Vlissingen, in addition to an existing system in Brest. The plan is to roll out shore power facilities to other yards, as local infrastructure allows. The company is also investing in blasting and painting robots which create a more environment friendly operation for these core activities.

Loohuis says: "We aim to help shipowners achieve greener ships through retrofits and upgrades. But also docking at green yards improves their environmental reporting outputs, which is an important consideration currently."

THE CRUISE SHIP *QUEEN MARY 2* BEING DOCKED AT DAMEN'S VEROLME SHIPYARD IN ROTTERDAM EARLIER THIS YEAR

Looking ahead to the second half of this year and into 2025, Loohuis is broadly optimistic, with the prospect of particularly strong demand in the fourth quarter of 2024. A greater amount of long-term booking is in evidence, largely as a result of the need for cruise ships to pre-book dock space for upgrades that fit in with their demanding schedules. As a result Damen Shiprepair's large docks in Rotterdam and Brest are currently booked for six to 12 months ahead.

Loohuis says: "This is a positive development as it allows for better pre-planning. For example, we can make sure we have the labour and the skilled trades we need to carry out a particular job well ahead of time."

Loohuis also sees continuing opportunities to support offshore wind vessels, superyachts and naval craft. He adds: "Over the past few years the North Europe repair market has been overcrowded with buyers looking for dock space. Now we are seeing a better balance between supply and demand and it is more of a buyers' market, with consequently greater competition. However, there is still more than enough work to keep yards in North Europe busy, especially with the growing requirement for sustainability upgrades."

Each of the Damen group's Northern Europe shiprepair yards tends to specialise in certain vessels types. The Brest yard for example is heavily involved with cruise- and LNG-related work, while Dunkerque handles ferries, short-sea trading vessels and container ships.

A NEW SHORE POWER UNIT WAS RECENTLY COMMISSIONED AT DAMEN SHIPREPAIR AMSTERDAM

Damen Amsterdam is also heavily focused on offshore vessels and relatively complex specialist vessel projects, while Vlissingen is busy with yacht and naval work, with its covered drydock proving particularly popular for customers in these segments. The Damen Shiprepair Rotterdam facility handles vessels of almost all types, with customers taking advantage of its proximity to one of the world's biggest ports. ■

MIDDLE EAST

ASRY PERFORMANCE EXCEEDS EXPECTATIONS

The first half of 2024 has seen a more positive ship repair performance than was originally projected

DARIO ARCELLA, ASRY'S COO

Bahrain shipyard ASRY has strengthened its position as one of the Middle East region's leading ship repair services providers. Over the first six months of the year income from ship repair activities has increased as a share of the yard's overall revenue streams, as the rig repair market has cooled. According to the company, income from merchant and naval ship repair projects has overtaken other revenue streams to become the dominant component over the first two quarters of 2024.

Chief operating officer Dario Arcella says: "At the end of 2023, the general prediction for ship repair activities was there was going to be a major tightening of both the quantity and size of projects. However, over the first half of this year that trend has largely been avoided. All our docks have had high occupancy levels, with projects maintaining an average spending per vessel of over US$1 million. While this is around 30% less than the spike in average per project income seen in 2023, it is still higher than the average over the past five years."

Overall ASRY handled 57 ship repair projects in the first six months of 2024, which is a significant increase in vessel dockings compared with the same period of 2023. Interestingly, the company's business so far this year has been fairly evenly split between international (51%) and regional (49%) clients. This represents a shift towards local customers, from the 2023 split, which was 53% international and 47% regional.

Earlier this year ASRY announced it had won an important regional tender launched by the Kuwait Oil Tanker Company (KOTC) to carry out docking and maintenance work for six large oil tankers. ASRY says its success in securing this prestigious project is a testament to its "long-standing experience, competitive offerings, and high-quality services that distinguishes itself in the face of fierce competition within the global marine market."

Some other major clients that have dominated ASRY's order book this year, with repeat dockings, have included Springfield and Dynacom of Greece, Maersk Line and the Shipping Corporation of India, all of which have brought some significant repair projects to ASRY involving major overhauls. There have also been a number of very specialised projects at the yard, including an offshore support vessel (OSV) environmental upgrade for Saudi Aramco, which included the installation of a hybrid engine as part of a package of improvements aimed at reducing carbon emissions. This is in fact the single largest project at the yard in terms of revenue generated this year to date.

Other notable visitors so far in 2024 have included the Kuwait-registered *Jawharah III*, which returned to ASRY for its latest set of improvements, which were complex and intricate in scope. Alongside regular repeat customers there were also some owners who returned to the yard for the first time in many years. This included Larsen & Toubro of India which selected ASRY for a package of work to its pipe laying crane *LTB 300*.

The naval sector has also been busy for ASRY, with a significant package of work completed on the US Navy Support vessel USNS *Robert Goodman*, and a large repair project on RBNA *Sabha* for the Royal Bahrain Navy. Arcella says: "ASRY continues to be the partner of choice for regional naval assets, including those from the USA and other naval fleets. Naval business has consequently remained a strong element in the yard's project mix, with revenues on track to exceed those of 2023."

Founded in 1977, ASRY's yard facilities include a 375m-long, 500,000dwt capacity drydock; two floating docks of 252m and 227m in length respectively; 15 repair berths with a total length of approximately 5,000m; twin 255m slipways, as well as a 250,000m^2 fabrication area, and a wide range of workshops and service centres. As well as ship and rig repair, and naval ship repair work, the yard has a large scale offshore and industrial fabrication business. ■

EMERGENCY REPAIRS DEMONSTRATE ALBWARDY DAMEN'S CAPABILITIES

While benefitting from a steady stream of conventional drydocking work at its UAE shipyards, the company has successfully handled some extensive damage repairs in recent months

The Albwardy Damen business, which spans facilities in Dubai, Sharjah and Fujairah, has seen a sharp increase in newbuilding work, with an order book of over 30 ships, of which 19 are under construction. Nonetheless, the joint venture company remains very busy in the ship repair segment as well. This is a reflection of a combination of factors, including the general buoyancy of local economies given high oil prices; the growing pace of offshore developments and the consequent need for support vessels; major infrastructure works requiring the deployment of a high number of dredgers locally; and a number of marine projects in Saudi Arabia coming online.

Much of the workload is made up of standard drydockings, in all three locations, but Albwardy Damen has also received a number of vessels for emergency repairs of various types in recent months. This work has included more than 10 very large and complex damage repairs to a wide range of vessels, including a car carrier which had sustained quayside collision damage; a 90,000TEU container vessel that had fire damage; and a 150m-long stainless steel chemical tanker which was attacked by missiles in the Red Sea.

The latter vessel sustained damage to its main deck and accommodation area, which required extensive repairs. The necessary work was carried out at the Sharjah Hamriyah yard and the scope of work included renewing the main deck stainless steel plating, as well as replacing electrical cables and various deck equipment affected by the damage.

The car carrier repair saw close cooperation between Albwardy Damen's new construction and repair sections. In this case curved plating prepared by the newbuilding department was fitted by its repair teams.

Lars Seistrup, managing director, Albwardy Damen, says: "Despite the challenges posed by the damages, our 'one-stop-shop', 24/7 model worked very well in these cases. All the repairs were carried out at a lay-by berth on time, to a pre-agreed budget and to a very high quality."

The yard has a robust client base that generates a steady flow of bread and butter 'business as usual' type dockings. Seistrup adds: "We are very proud that around 85% of our revenues are generated by returning customers who are very happy with our service levels, speed of response and technical capability."

The size of the Albwardy Damen team keeps on growing and has increased over the past year or so from 1,500 to 1,700 employed staff, with 300 contractors hired in to cope with higher than expected activity levels.

ALBWARDY DAMEN CONTINUES TO INVEST TO EXPAND ITS FACILITIES ACROSS THE UAE

THE COMPANY'S FUJAIRAH-BASED DIVE TEAM IS BUSY WITH A VARIETY OF UNDERWATER REPAIR AND MAINTENANCE PROJECTS

The company continues also to invest in infrastructure and equipment to keep pace with customer requirements. In recent months Albwardy Damen has opened an additional mechanical worksop in Dubai Maritime City, which will be used for engine, thruster, hydraulic and electrical projects. Moreover, the Damen Shipyard Sharjah facility, which celebrates 10 years in business in 2024, is being further expanded, reflecting the fact that it is often fully booked. The green light has been given by the company's board to the expansion of the yard's dry berth area, adding a new berth and extending an existing one.

Seistrup says: "This is the second phase of expansion since the yard opened. Once this is finished, we will have about 35% more capacity compared to the original layout."

Alongside the berth expansion, further investment is expected to nearly double the size of the workshop area at the Sharjah shipyard. Also planned is the construction of a new warehouse and to cover one berth with a 135m-long, 30m-wide enclosed shed in the near future.

Fujairah port is busier than ever and this is reflected in the workload of the company's workshop, staffed by over 100 employees, carrying out steel, piping and engine works in the port and at anchorage. Albwardy Damen's in-house diving team, based in Fujairah, is also being expanded, and currently stands at over 25 divers. As well as hull cleaning and propeller polishing, the diving team is increasingly busy with underwater hot work repairs, undertaken by its class approved underwater welders. ■

ASYAD DRYDOCK COMPANY FOCUSES ON DELIVERING A GREEN FUTURE

The Omani shipyard is achieving success in providing environmental retrofits and upgrades, while also enhancing the environmental performance of the yard itself

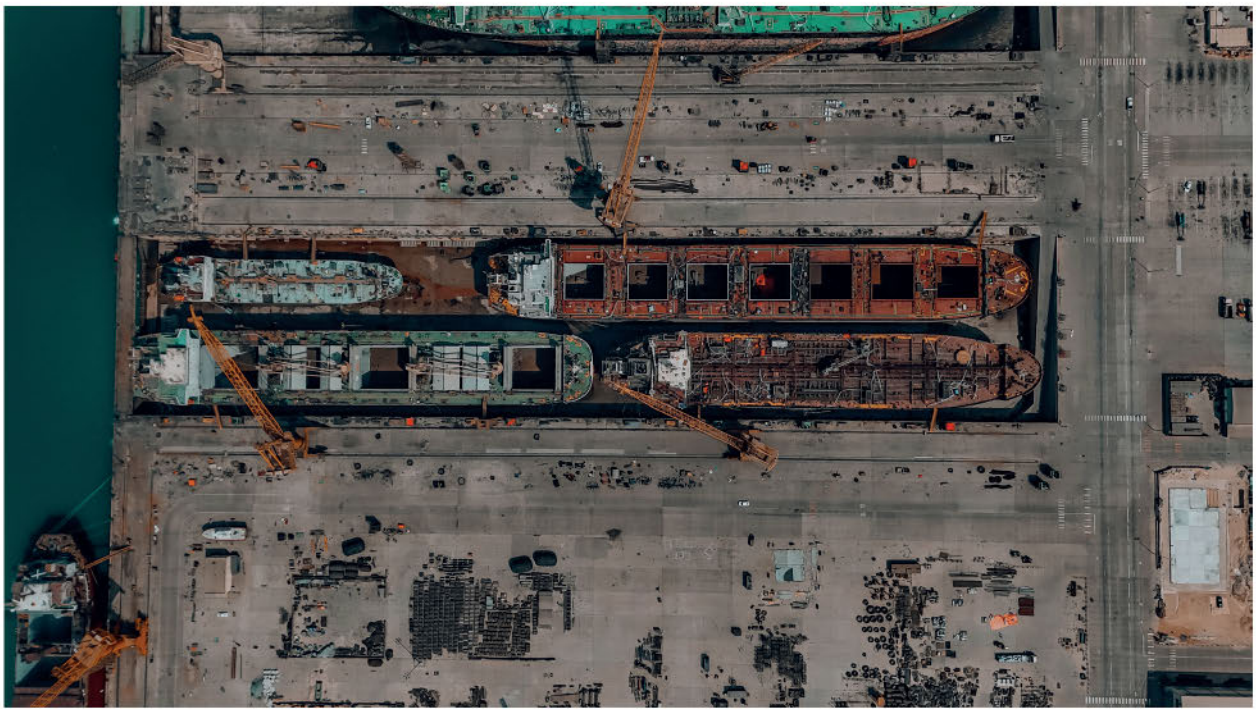
Like many companies in the shiprepair sector, Asyad Drydock Company (ADC) in Oman has experienced fluctuations in work volume influenced by various factors in the first half of 2024, compared to the same period in 2023. However the company, which operates one of the region's largest shipyards in the port of Duqm, says that the second half of 2024 is more promising with strong signs that activity is picking up.

In particular the company notes a key trend for work connected to upgrades related to green shipping and renewable energy, and for efficiency upgrades, such as bulbous bow optimisation and Mewis Duct and Schneeklunth Duct type propeller retrofits.

Amongst the most notable projects that ADC has completed so far in 2024 is a damage repair to the bottom of a grounded ship, which required over 400tons of steel, and tank and special survey repairs to a GTT Mark III Flex type LNG carrier. Abdulsalam Al Rabaani, chief operating officer, says: "The yard managed to deliver both projects within a short period of time compared to the amount of damage. For the first project, with the agreement of the owner we made a decision to pre-fabricate the blocks before the ship arrived, and for the LNG carrier we arranged the required logistics well in advance of the ship's arrival. The challenge was that if there was a mismatch in terms of timing it could have led to a significant amount of rework, which would have impacted the ships' scheduled delivery times. With the proper planning and high quality work by ADC, both projects were delivered on time and budget."

ADC is stepping up investment to meet the evolving requirements of its customer base. The yard has acquired a floating dock, which will help to increase the capacity of the yard, while ADC is additionally investing in a large new warehouse and a new workshop that will include areas set aside to be used as needed by OEMs.

Al Rabaani adds: "At ADC we are always looking for and researching technology which can improve productivity and efficiency. Some recent examples of such investment include new robotic blasting systems and CNC machines that require minimum human intervention. Another option that is being studied for the future is using drones to carry out underwater inspections of the hull of the ship."



WITH DRYDOCKS UP TO 410M IN LENGTH, ADC CAN HANDLE ALL VESSEL TYPES AND SIZES, UP TO 600,000 DWT, INCLUDING VLCCS, VERY LARGE ORE CARRIERS (VLOCS), PRODUCT TANKERS, BULK CARRIERS, LPG AND LNG TANKERS AND CONTAINER VESSELS, AS WELL AS YACHTS AND NAVAL SHIPS

In other initiatives relating to reducing environmental impact, ADC has successfully applied an eco-friendly nano-epoxy silicone anti-fouling paint formulated to save marine life from metal poisoning as well as to deliver significant fuel savings, in a project that was the first of its type in the Middle East. The company has also embraced technical advances in abrasive hull blasting through robotic hydro-jet systems, in order to minimise water usage and to reduce contamination at the drydocks.

ADC has further reduced greenhouse gas emissions from its operations by installing LED lights throughout the yard, while it has also installed a thermal desorption unit to remove contaminants from oily sludge and oil wastes, which will help to minimise the amount of waste disposal to landfills.

In another environmental initiative the company has installed a Continuous Emission Monitoring System (CEMS) at its incinerator plant to analyse gas and particulate emissions.

Al Rabaani says: "Our direction is toward green energy and sustainability, for example through installing solar panels for electricity generation. Additionally, we are equipped to support green energy projects by fabricating the windmill poles required for wind turbines." ■

SINCE ITS OPENING IN 2011, ASYAD DRYDOCK COMPANY HAS COMPLETED OVER 1,820 VESSEL REPAIR PROJECTS

DRYDOCKS WORLD SECURES ORDERS ACROSS MULTIPLE MARKET SEGMENTS

The Dubai-based company has enjoyed a very positive start to 2024

WHILE TANKERS MAKE UP THE MAJORITY OF THE WORKLOAD AT DRYDOCK WORLD, THE YARD IS HANDLING A WIDE RANGE OF VESSEL TYPES, INCLUDING CRUISE SHIPS, BULK CARRIERS, CONTAINER VESSELS, PIPE AND CABLE LAYERS, OFFSHORE SUPPORT SHIPS AND JACK-UP RIGS

Over the first five months of the year, the leading Dubai yard received around 100 shiprepair and conversion related orders, up around 10% compared with the same period in 2023. In the months up to the end of May this year around 80 projects were also completed by Drydocks World, which was slightly down on the 90 that were delivered in the first five months of 2023.

Tankers continue to account for the majority of the Dubai yard's workload. Of those projects delivered up to the end of May, 64% were from tanker owners and operators.

While market conditions overall are positive, there has been a trend for the vessels docked this year to require a lower volume of work than last year.

Chief executive officer Rado Antolovic adds: "We expect to continue receiving a healthy pipeline of enquiries. However, there will also be challenges due to uncertainties in market conditions and the geopolitical situation in the region. We have established robust strategies to overcome these challenges and secure maximum business volume during the second half of the year."

Notable projects that Drydocks World has completed so far this year have included two cruise ship drydocking and repair schedules; a significant modification to an offshore supply vessel; a major repair and drydocking of a pipe laying cane vessel; and a superyacht repair and maintenance project. The yard also completed the conversion, life extension and refurbishment of the FPSO *Atlanta*.

A number of major projects are also still underway at Drydocks World. This includes a series of four vessels that have been block-booked for a major client, and which includes a complete upgrade and the retrofit of ballast water maintenance systems on board. Meanwhile, large scale conversion projects underway include three FPSO units, a FSO and a cable laying vessel, while an FSRU is in dock for significant modifications.

Sustainable retrofit solutions, as well as general vessel upgrades to increase energy efficiency and regulatory compliance, are a key feature of many of the projects completed, or still underway, this year. In particular Drydocks World points out that it is fully geared up to install air lubrication, carbon capture and dual fuel conversion retrofits.

Drydocks World is also extending its capabilities outside of the main yard through its Global Offshore and Onshore Services (GOS) division. This is offering specialised afloat and voyage repairs services, on an

DRYDOCKS WORLD HAS COMPLETED A NUMBER OF FPSO AND FSO PROJECTS IN RECENT MONTHS. THE FPSO *ATLANTA* SAILED AWAY FOR DEPLOYMENT OFFSHORE BRAZIL IN MARCH, AFTER CONVERSION IN DUBAI

around the clock 'anytime, anywhere' basis. GOS has recently extended its coverage for afloat vessel repairs in Jebel Ali, Dubai, and Port Khalid, Sharjah, so that it can undertake specialised and complex projects such as rudder, propulsion machinery and retrofit work, in addition to other standard repair activities.

To support plans to further expand and diversify the yard's workload, some major infrastructure investments are underway. This includes a new dedicated fabrication facility in the South Yard area, covering some 75,000m², which will boost fabrication capacity by around 40%. In addition, a new load out facility with a 37,000tonnes capacity will be commissioned in the third quarter of this year.

The yard is also investing in four new dockside cranes, the installation of a new shed for chemicals and paint storage, and the expansion of its pipe shop by adding a new cryogenic workshop. Further investment in infrastructure and equipment is at the planning stage. This includes adding a high-capacity floating crane, which will be the biggest of its type in the yard; extending its Berth 10 facility by 250m; upgrading the electrical workshop; retrofitting various workshop cranes; adding six new mobile cranes, with capacities of 50 to 145tonnes; and acquiring a new crawler crane with a lift capacity up to 650tonnes.

In recent years Drydocks World has embarked on a digital transformation journey with the aim of automating many existing manual processes, increasing productivity, optimising costs, enhancing the performance of staff and providing real-time data for business decision-making. The yard has worked with sister company DP World Zodiac FZE to overhaul the yard's network connectivity for real-time data streaming, deploy the CARGOES Internet of Things (IoT) platform and integrate it with existing Drydocks World office systems. This project has included the development of a complete 3D model digital twin of Drydocks World facilities and the installation of 143 CARGOES IOT+ real-time tracking devices on eMobile plant equipment.

With the implementation of CARGOES IOT+, Drydocks World can now take advantage of several benefits offered by an IoT platform. For example, the Terminal Visualiser shows both equipment location and status in a centralised platform, while the high-quality data harvested can be used for in-depth operations analysis, automated process control, and dynamic, just-in-time resource and equipment allocation.

Another critical item is the development of a large-scale ERP solution, IFS, to support its operational production function including ship and rig repair, vessel conversions and newbuild projects. Antolovic says: "This is the backbone of our operations, and many of the other digital solutions will be integrated with IFS to provide seamless real-time data on all areas of the production business."

Alongside digitalisation, safety and sustainability are at the heart of the Drydocks World strategy. As Antolovic points out: "In recent years we have reduced our CO_2 emissions by 54%, and last year achieved 35 million man hours without a lost time incident. These are achievements that are worth celebrating."

Further work to cement its environmental and safety gains is also being progressed. ■

THE SHIPYARD IS INVESTING HEAVILY TO EXPAND AND ENHANCE AVAILABLE FACILITIES, TO CATER FOR A RANGE OF PROJECTS, INCLUDING OFFSHORE FABRICATION, AS WELL AS ITS CORE SHIPREPAIR BUSINESS

HULL CLEANING & MAINTENANCE TECHNOLOGY

HULLWIPER BENEFITS FROM INDUSTRY TRENDS

More shipowners, operators and maritime service providers are recognising the value of advanced hull cleaning solutions to address environmental and financial considerations

The hull maintenance sector is growing rapidly at the moment, mainly due to regulatory pressures and technological advances. John Armstrong, managing director of leading remotely operated vehicle (ROV) hull cleaning technology supplier HullWiper, observes: "Demand for hull cleaning services is rising as shipowners seek to improve efficiency while complying with environmental standards. This is being driven by increasing awareness of the importance of clean hulls, which contribute to lower carbon emissions and a reduced environmental footprint."

Stricter regulations to curb invasive aquatic species (IAS) and environmental damage, coupled with the financial benefits of reduced fuel consumption from clean hulls, are further boosting this demand. "While ROVs currently cannot fulfil the entire spectrum of cleaning required by various conventions, they are crucial in modern hull maintenance solutions," says Armstrong. "The preference for ROVs over full diver teams is driven by the improved time constraints and safety levels, making them a preferred choice in the market."

A number of countries and regions have taken specific actions, which the HullWiper network is responding to. For example, Australia has implemented stringent biofouling regulations to prevent the spread of invasive aquatic species. Ships are required to submit a Biofouling Management Plan (BFMP) in accordance with IMO guidelines, detailing biofouling management strategies, including practices and antifouling systems (AFS) used for the hull and niche areas, documented in the Biofouling Record Book (BFRB). HullWiper's lease partner in Australia, K-Rov, provides specialist solutions along the East Coast, including hull cleaning and inspection, in compliance with state and federal biosecurity laws and regulations.

Another location where HullWiper is active is Mauritius, which is involved in the IMO GloFouling Project, which aims to manage IAS on vessel hulls. The Mauritius Green Port Initiative emphasises emissions reduction, energy conservation and pollution prevention, requiring advanced hull cleaning equipment to ensure discharged water is free of

HULLWIPER IS BEING MORE WIDELY EMPLOYED FOR HULL CLEANING OPERATIONS WORLDWIDE

THE COMPANY IS CURRENTLY WORKING TO ENHANCE ITS ESTABLISHED ROV TECHNOLOGY

organisms. The Mauritius Port Authority enforces compliance, offering reduced port dues for eco-friendly practices and revoking licenses for non-compliance.

HullWiper's East Africa partner, Immersub, provides hull cleaning solutions at Port Louis with an ROV team, allowing vessels to minimise port fees and off-hire time by staying just 24-48 hours. Armstrong says: "Whilst initially hesitant, customers in Mauritius have increasingly adopted ROV technologies due to their efficiency, continuous operation, reduced risk to expensive coatings and compliance with stricter regulations aimed at reducing carbon footprints and IAS spread."

In Scandinavia, HullWiper's partner in Gothenburg, Frog Marine Services, is working with the local authorities in Malmö, Sweden, to obtain permission for vessel cleaning in the port, a process that has proven challenging due to stringent environmental regulations and the need for thorough assessments. The company is also now experimenting with top-side filtration using HullWiper technology.

In the UAE, HullWiper has been granted permission from the UAE Environmental Department and DP World to perform vertical side cleaning operations at all quays inside the port of Jebel Ali, making it, the company claims, the only permitted vessel hull cleaning solution in this port. In a particularly interesting project, the HullWiper UAE team recently employed two containerised HullWiper systems simultaneously for the first time. Armstrong says: "We successfully cleaned the vertical sides of a 350m-long vessel with a 14m draft in 10-11 hours, demonstrating the efficiency and capability of our systems in demanding conditions."

Hull cleaning in South Korea is highly regulated to prevent illegal operations by divers that can contaminate local waters with biofouling. HullWiper's South Korean partners have designed and developed *Esther*, an eco-friendly vessel that transports two HullWiper ROV units to ports in Busan, Ulsan, Pohang, Masan, Jinhae, Yeosu and Gwangyang. Deploying two HullWiper ROVs simultaneously saves time for shipowners and operators, halving the required cleaning time, the company says.

Panama's Green Connection Environmental Recognition Programme is another regional effort promoting sustainable maritime practices. It rewards customers who demonstrate excellent environmental stewardship and encourages others to implement technologies and standards to reduce greenhouse gas emissions. As well as offering hull cleaning services at the port of Balboa, HullWiper's partner Talleres Industriales has to regularly manage last-minute requests from clients who book a transit through the Panama Canal and require vertical cleaning just before the pilot arrives for northbound transit. These bookings, typically made within 12 hours before transit, demand rapid response and deployment of cleaning services. Despite tight schedules, the cleaning operations are usually performed within 6-8 hours, with client feedback highlighting a noticeable improvement in fuel efficiency of up to 10-20% post-cleaning, the company reports.

HullWiper indicates that it is currently working on a number of initiatives to make its ROV cleaning unit even more efficient, allowing it to clean faster and more effectively. Currently, a modular add-on is being trialled with an updated surface filter system for locations that require a higher degree of filtration. This system includes potential additional features such as UV filtration and larger capacity for heavy fouling, including barnacles. The company is further developing its ROV unit to be more robust and user-friendly in terms of maintenance, while reducing downtime by extending the lifespan of components, and is enhancing the capture system to meet increasingly stringent regulations.

HullWiper is currently available at ports in Panama, Sweden, Denmark, Gibraltar, the UAE, Mauritius, South Korea and Australia. The company also plans to expand its network of lease partners to South America before the end of 2024. Armstrong says: "Our lease scheme offers a commercially viable opportunity for both existing and new companies to obtain the latest ROV hull cleaning technology, which might otherwise be out of reach. Our goal is to make ROV technology accessible to everyone, benefiting the environment and the shipping industry."

Interest in leasing the ROV technology is being underpinned by strong demand from shipowners and operators for this type of services. As Armstrong concludes: "Our services are being adopted by a diverse range of industry-related entities, including operators of cruise ships, tankers and bulk carriers. Even some large hull coating companies are seeking a hull clean through us for their customers." ■

CRUISE SHIP PROJECTS DEMONSTRATE EVERCLEAN BENEFITS

Reductions in power requirements and greenhouse gas emissions have been demonstrated by two recent cruise ship projects

THE GREENSEA IQ EVERCLEAN HULL CLEANING ROBOT IN ACTION

The EverClean robotic hull cleaning system, developed by Greensea IQ, is gathering momentum as a service for vessels operating in North American ports in particular. Over the first five months of 2024, the company performed EverClean services on 22 hulls, covering 308km^2 of hull surface area in total. Customers have included operators of cruise ships, tankers, container vessels, tugs and offshore support vessels (OSVs).

The EverClean programme offers a robotic solution designed to prevent the deterioration of a vessel's hull condition, maintaining it fouling free. The robots, which stay on the ship's hull using negative pressure from a vortex impeller, have been designed to remove fouling from hull coatings, with a 0.7m-wide cleaning swath. The robots operate at speeds of 0.3-0.5m/s, typically achieving a production rate of 540m^2 per hour, Greensea IQ says. The EverClean robots also collect continuous video of the coating during cleaning operations, as well as hull-related positional data. Videos of the hull can be broken down into still frames, matched with the robot's location, and then stitched together into geo-referenced composition images. This approach, says Greensea IQ, provides a wide perspective of hull conditions and an understanding of the changes seen in the vessel's powering performance.

The brushes used on the robots are designed to remove fouling without causing damage or hastening coating wear rates. Made of soft nylon, these brushes are designed for microfouling removal, and generally will not remove macrofouling like barnacles.

Greensea IQ has recently issued data on two cruise vessels, both operating in the Gulf of Mexico and the Caribbean, where fouling pressure is high. The first vessel, with capacity for around 4,000 passengers and 1,500 crew, was cleaned once over four calls to its home port of Galveston, while the second vessel, with space for 3,000 passengers and 1,100 crew, was cleaned proactively for seven months over 19 port calls with typically two to three cleanings per month.

Reviewing the impact on Vessel 1, Greensea IQ says powering performance improved significantly, with a 2.5% drop in power requirements over the 90 days after cleaning, compared to 90 days before cleaning. Similarly, Vessel 2's powering performance steadily improved, by 9% after four months, 12% after six months, and nearly 20% after seven months.

According to Greensea IQ, the data demonstrates the tangible impact of the EverClean service on fuel efficiency and greenhouse gas emissions. Vessel 1, despite being significantly fouled before cleaning, experienced a notable reduction in fuel consumption and powering requirements, resulting in savings of approximately 80tonnes of fuel and 256tonnes of CO_2 emissions in just 90 days post-service. Meanwhile Vessel 2 benefited from proactive cleaning over seven months, and saw even more significant improvements, with fuel savings of 320tonnes and a 1,024tonnes reduction in CO_2 emissions.

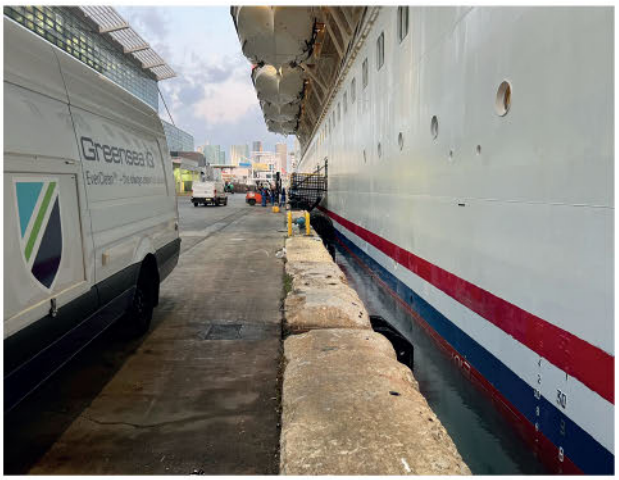
EverClean is typically delivered as a service by Greensea IQ, and the company is not currently selling its technology. There are two standard service models. One is port-based, where the Greensea IQ service team meets the vessel in port and carries out a cleaning service. The second, resident-based option provides for the EverClean robots to

be housed onboard ship and the crew is instructed in how to launch, recover and manage the robots. Remote control from Greensea IQ's US service centre is also available.

Greensea IQ continues to upgrade the EverClean technology and the most recent updates to the cleaning robot include a wider brush deck, which is said to increase service speed by around 30%, reducing the time required to carry out the clean in port or at anchorage. The company has also updated a number of components to make the system more capable of operating in strong currents and being more reliable in the field.

While EverClean is being used on several vessel types, cruise shipping has proved to be one of the most successful markets for the service since its launch. A leading cruise brand has just entered its first ships into EverClean service while Greensea IQ is also working on several vessels for Carnival Cruise Lines.

Recently Greensea IQ successfully performed an EverClean service on a Carnival Cruise ship in New Orleans on the Mississippi River. Rob Howard, chief growth officer, says: "This is significant because until now they did not have a solution due to the zero visibility and very strong current that make traditional methods prohibitive due to safety and efficacy concerns. The resulting success led us to open a service hub in New Orleans where we now have our first ships in full time service."



THE GREENSEA IQ SERVICE TEAMS CAN MEET VESSELS IN PORT TO CARRY OUT HULL CLEANING USING THE EVERCLEAN ROBOTS

As well as working with shipowners, Greensea IQ is also doing a lot of work with coatings manufacturers to help provide the anti-fouling for new, safer coatings free of biocides and other chemical anti-fouling solutions. Howard says: "Our robotic anti-fouling service allows coatings to focus on longevity and durability extending the wear and performance of the hull while moving away from biocides and other detrimental anti-fouling materials." ■

CRUISE SHIP REPAIRS & UPGRADES

GIN GROUP BUILDS UP CRUISE ORDER BOOK

The Genoa-based group, which operates in both Italy and southern France, will work on nine cruise ship drydockings in 2024, rising to 15 next year

The Genova Industrie Navali (GIN) group, whose facilities include the San Giorgio del Porto (SGdP) and Chantier Naval de Marseille (CNM) yards in Genoa and Marseille respectively, has handled some significant cruise ship projects this year, strengthening its market position in this key sector. Moreover, GIN yards have a number of large-scale cruise repair and refit projects on the way for the latter part of 2024 and into 2025.

So far in 2024, GIN yards have welcomed a total of six cruise ships for repair work and will dock another three by the end of the year, with the CNM yard in particular working with most of the major cruise operators. According to Manolo Cavaliere, commercial director at SGdP and CNM: "Compared to 2023, the trend is increasing and is expected to grow further in 2025 and 2026."

The most important cruise ship project to date in 2024 was carried out in Marseille when *Carnival Legend* visited for a drydocking lasting about a month. The main scope of works included upgrades and overhauls to the propulsion systems, in addition to general maintenance, repair and refitting tasks. While *Carnival Legend* was in dock, it also underwent some significant upgrades to interior spaces, including the addition of ADA-compliant cabins, bars and restaurant areas, balcony renovations and new decking throughout the ship.

For 2025, the GIN group expects to work on about 15 cruise ships in its shipyards, of which three will be major drydock projects similar to that carried out with *Carnival Legend*.

Cavaliere says: "Demand is on the up but the trends remain the same. Projects are increasingly focused on being green and in compliance with new regulations and reducing emissions and fuel consumption is still a top priority. We are very satisfied with the growth of the cruise segment and, in general, with the return to normalcy after the pandemic period."

To meet growing demand GIN has acquired some new working spaces at Marseille and is making some structural modifications to optimise operations. At the same time, the Port of Marseille is working on the electrification of the CNM docks to enhance environmental performance. ■

CARNIVAL LEGEND AT CNM IN MARSEILLE

SEASPAN GETS OFF TO POSITIVE START

The Canadian yard's cruise business is performing well and should get a boost with the arrival of a new drydock

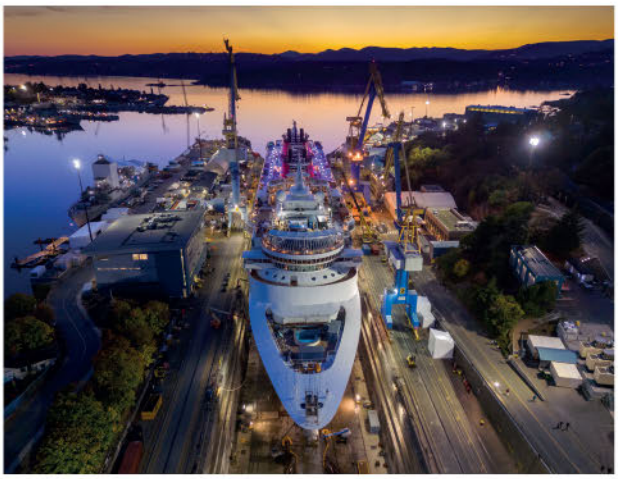
To start off the cruise ship season, Seaspan's Vancouver Drydock welcomed the *Roald Amundsen*, a hybrid expedition cruise vessel owned by Hurtigruten Expeditions, which had visited in the yard on two previous occasions. The vessel stopped by in early July for a short four-day visit, allowing the Seaspan team to complete minor repairs while the operator conducted in-water repairs alongside the drydock.

Meanwhile, Seaspan's Victoria Shipyard welcomed the cruise ship *Norwegian Sun* and successfully replaced the vessel's bulbous bow in the Government of Canada-owned Esquimalt Graving Dock, earlier this year. According to Seaspan, this was a complex project that had to be completed within a tight time scale. Nonetheless, the company adds, it was finished on time and on budget thanks to its skilled team.

The volume of cruise ship repair and refurbishment work handled by Seaspan to date is broadly in line with prior years, with the cruise season only just beginning for the Pacific Northwest. Looking ahead, Seaspan reports that it has at least two other cruise repair and maintenance projects planned for later in the year, at both Vancouver Drydock and Victoria Shipyards.

Paul Hebson, vice president and general manager at Vancouver Drydock, says: "There has certainly been an increase in the number of expedition cruise vessels that are docking on the West Coast, particularly at the start and the end of the cruise season, when vessels like to be well prepared and undergo maintenance to be ready for the next season. We have a positive reputation at Seaspan with cruise ship owners and have been able to capitalise on that."

Some notable investment projects should strengthen Seaspan's position in this niche market still further. Vancouver Drydock has recently acquired a new floating drydock which will increase operational flexibility and provide additional capacity to work on more cruise ships at the yard. Seaspan's new drydock recently arrived in Vancouver Harbour on board a heavy lift ship and, with some help from three Seaspan tugboats, it is now anchored near the city's Ironworkers Memorial Bridge as it awaits a new paint job.



SEASPAN VICTORIA SHIPYARDS HOSTED DISNEY CRUISE LINE'S *DISNEY WONDER* FOR A VISIT IN SEPTEMBER 2023, AT THE GOVERNMENT OF CANADA-OWNED ESQUIMALT GRAVING DOCK

This drydock is part of a planned expansion of Vancouver Drydock and will increase Seaspan's capacity for ship repair projects by about 30%.

The new drydock is the larger of two that Seaspan has planned, and both will be installed following the construction of a work pontoon, and other in-water works such as the installation of piles.

Both repair yards in Vancouver and Victoria have also invested in automatic pipe spool welding technology to improve quality standards and shorten the production time of pipe spools. This will also have benefits for cruise and ferry customers at the two yards. ■

THE NEW FLOATING DRYDOCK ARRIVING IN VANCOUVER HARBOUR

FINCANTIERI BROADENS ITS CRUISE HORIZONS

The Italian group aims to support cruise ship servicing not just in Italy but worldwide as well

VIRGIN VOYAGES' *BRILLIANT LADY* IN DOCK AT FINCANTIERI'S PALERMO SHIPYARD EARLIER THIS YEAR

Over the first half of this year Italy's Fincantieri group has handled four cruise ship drydockings, broadly in line with the volume of work seen over this period in recent years. Virgin Voyage's *Brilliant Lady* and Norwegian Cruise Line (NCL)'s *Oceania Marina* were docked at Fincantieri's Palermo shipyard, as was Cunard's *Queen Anne*. The latter is a newbuilding which underwent its delivery drydocking. The Trieste shipyard has also been active in the cruise ship segment, berthing Royal Caribbean Line's *Silversea Whisper* earlier this year for class survey and repair and maintenance work.

Prospects for the rest of the year appear very positive as Fincantieri Services is preparing seven significant cruise ship projects together with some of the world's leading cruise brands. It is expected these will be carried out at the group's Italian facilities over the coming months.

However, Fincantieri Services points out that not just providing its repair and maintenance services at the group's own shipyards but is offering shipowners and operators the benefits of the extensive experience, resources and capabilities that the company has gained over many years in this sector outside of Italy as well. The group's Services division is offering a range of services from feasibility studies to basic and functional design, planning, procurement, engineering, supervision and project management, which can be undertaken for shipowners and operators in third party shipyards on a worldwide basis.

One of Fincantieri's strengths is its ability to implement green technologies and help cruise lines move to zero emissions. Towards the end of 2023 and in early 2024 two high-voltage shore connection (HVSC) systems were installed and commissioned on two cruise ships while they were in normal service, while one system was installed and commissioned during a drydock stop. Two other HVSC systems were live tested by Fincantieri together with class before being delivered to the owners.

Fincantieri has a number of ongoing initiatives and projects to reduce cruise ships' environmental impact and is committed to strongly supporting the energy transition to achieve greener ships in this sector, as set out in its 2023-2027 Business Plan. It points out that it is able to provide both energy saving hydrodynamic measures and power management systems and is also developing projects for refitting existing ships with alternative fuels in cooperation with the engine makers.

According to Massimo Costa, vice president, Fincantieri Services: "Our role, within the context of repair and upgrade work, is assisting shipowners and the operators to implement the vast portfolio of new green technologies available on their existing ships and supporting them with our services to maintain an efficient fleet which meets today's demanding standards."

In a significant win for the company, Fincantieri Services is also the main contractor for the Americans with Disabilities Act (ADA) remediation plan covering cabins and public spaces on cruise ships. The project involves modifying some cabins and public spaces onboard to meet ADA rules and this work will be carried out during drydockings. Around 3% of the cabins on each ship will have to be demolished and rebuilt following the demanding standards and requirements of the ADA regulations. The refurbished cabins will be then inspected by the USA Department of Justice to obtain the necessary certification. For each project a team of around 200 workers will be involved, and a specific logistics services package put in place to support them. Fincantieri Services is now carrying out these projects both in its owned shipyards in Italy and worldwide, in line with shipowner's requirements.

One of the keys to Fincantieri Services' extending the availability of its cruise ship services beyond its own Italian yards for projects like this is the support provided by Fincantieri Services USA based in Miami. Costa says: "Our US division provides cruise fleet operators with quick responses to their specific requirements, followed by ship inspection and onboard assistance for repair and refurbishment activities." ■

NAVANTIA LEADS CRUISE REPAIRS SECTOR

Having one of the largest drydocks in Europe, and an excellent all year round climate, has helped Cadiz Bay maintain its position as a market leader

NAVANTIA'S CADIZ BAY YARD HANDLED A TOTAL OF EIGHT CRUISE SHIP DOCKINGS OVER THE FIRST SIX MONTHS OF THE YEAR

Navatia continues to see strong growth in its cruise ship related activities. The Spanish company's facilities in Cadiz Bay, which offer significant capacity for the repair, revitalisation and modernisation of cruise ships of all sizes, handled the most cruise ships of any yard worldwide in 2022 and 2023, and are set to maintain that record in the current year also.

Navantia repaired 14 cruise vessels in 2022 and 13 in 2023, for most of the major global cruise brands, including Royal Caribbean International, Carnival Corporation and Disney Cruise Line. The most extensive project undertaken last year was the comprehensive refurbishment of *Carnival Pride*, with a substantial amount of work undertaken in a short space of time. Over a month-long docking Navantia and its subcontractors in the Cadiz area deployed nearly 700 people around the clock to complete the refit and update of the ship. Also last year Navantia manufactured and integrated on board the upper part of the funnel, the so-called 'whale tail' on *Carnival Freedom*, in only 15 days.

This year the company says it expects to dock a total of 16 cruise ships, with eight projects handled over the first half of 2024. Visitors up to the end of June included *Carnival Vista*, *Carnival Sunrise*, *Carnival Firenze*, *Carnival Glory*, *Star Pride*, *L'Austral*, *Celebrity Equinox* and the luxury cruise ship *Scenic Eclipse*. Eight more cruise ships have been booked in for repairs in the second half of this year, with strong advance bookings for 2025 and 2026 as well, thereby consolidating Navantia Cadiz's position as the world leader in terms of vessels of this type.

To accommodate strong demand the Navantia shiprepair unit in Ferrol Spain has also joined in the group's cruise shiprepair offer, in support of the business led by Cadiz Bay. According to Navantia, Ferrol is an ideal option for small and medium-sized cruise ships, and is a viable option for shorter duration projects especially. A statement adds: "Customers with cruise ships operating in North Europe now have access to the same experience, quality and technical capacity as at Navantia Cadiz, but with less deviation from their usual commercial routes." Occasional support for certain special cruise ship projects can further be provided by the group's facilities at Puerto Real, which are also located in Cadiz Bay. ■

TO DATE THIS YEAR, NAVANTIA HAS HANDLED CRUISE SHIPS FOR CARNIVAL, CELEBRITY CRUISES, WINDSTAR CRUISES, THE SCENIC GROUP AND PONANT, WITH THE LATTER PUTTING THE 264 GUEST-CAPACITY *L'AUSTRAL* INTO CADIZ BAY

ENVIRONMENTAL CONVERSIONS

PREPARING TANKERS FOR GREEN FUEL CONVERSION

The Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping has published a report that outlines the opportunities and challenges relating to converting tankers to run on methanol or ammonia fuels

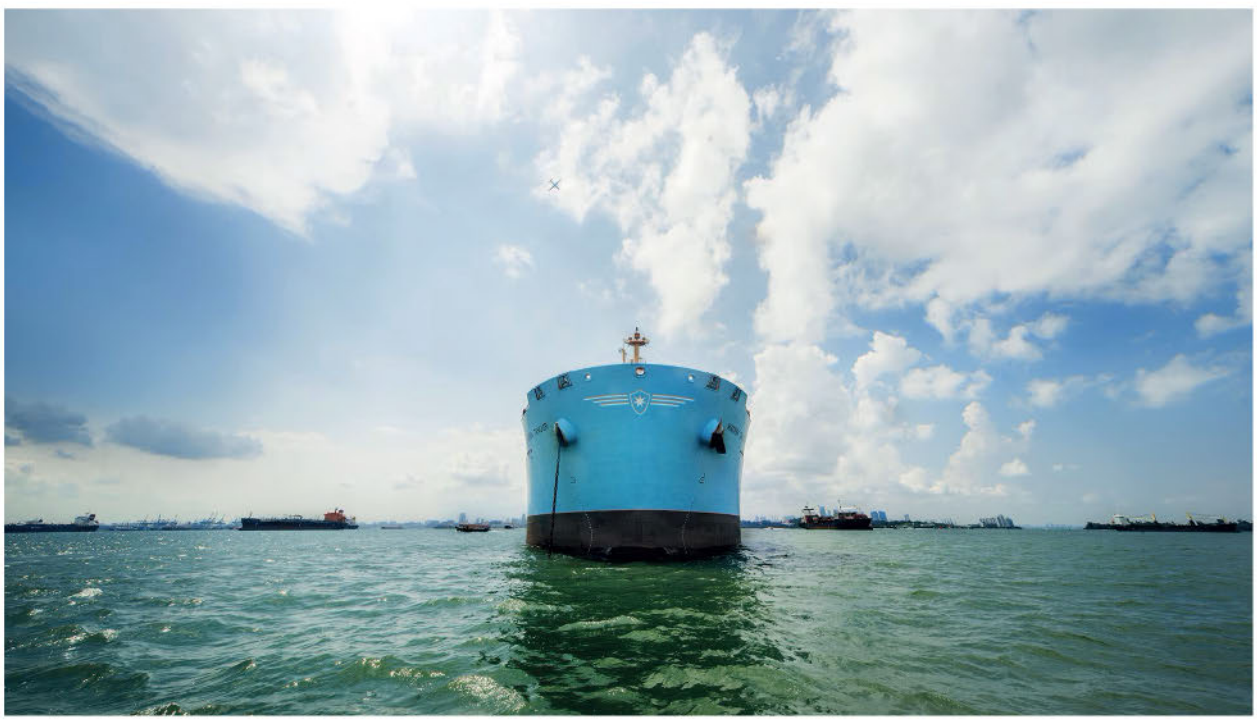
Transitioning to climate-friendly alternative fuels is essential for the decarbonisation of the shipping industry. However, vessels being built or ordered today are likely to be operating for decades to come, and many alternative fuels are not yet available at scale.

As a result, shipowners face a challenging decision in choosing which alternative fuel and technologies they should build their decarbonisation strategies around, as well as how to most effectively time their investments in these solutions. For example, is it better to build a vessel that is ready to operate immediately on alternative fuels such as methanol or ammonia, or a vessel that can be converted to operation on these fuels at a later date? If the latter, how much should be invested in preparation for the alternative fuel at the newbuilding stage compared with later retrofitting?

To help address these challenges, the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping (MMMCZCS) has analysed the technical, economic and environmental impacts of preparing vessels for conversion to alternative fuels in a recently published report which outlines results related to converting tanker vessels to methanol or ammonia fuels.

The report considers reference designs for two types of tanker vessels: LR2 and VLCC. These vessel types are two of the largest in the tanker segment, often travel long routes, and have a high fuel consumption As a result MMMCZCS believes they can provide a good illustration of the economic and environmental impacts of different choices relating to vessel conversion. For each vessel design, MMMCZCS defined five levels of preparation for alternative fuels, ranging from no preparation (Level 0) to a dual-fuel newbuild ready to operate on methanol or ammonia (Level 4).

Alternative fuels are less energy-dense and so require more storage space than fossil fuels for the same distance travelled. Therefore, the interaction between fuel storage capacity, cargo capacity and vessel range is a key consideration for this study. For this reason, MMMCZCS has included options for transitioning the vessel to a reduced, but still commercially relevant, range after conversion.



CONVERTING TANKERS TO GREEN FUEL IS TECHNICALLY AND COMMERCIALLY FEASIBLE, THE REPORT CONCLUDES

The report says: "It is important to highlight that conversion to alternative fuels impacts a vessel's operating envelope, due to the energy density of the alternative fuels and their corresponding fuel tank size requirements. To keep the same operational range as on fossil fuels, shipowners must consider either adding tanks on deck – with a resulting impact on deadweight tonnage – or giving over part of the cargo capacity to fuel tanks." Consequently the report has focused on options that reduce the vessel's operating range but preserve its cargo capacity.

For example, for the VLCC design, maintaining the same range after conversion to methanol or ammonia would require installing fuel tanks in the cargo space, leading to a loss of cargo capacity. MMMCZCS says generally a full-range VLCC operating on ammonia would not be commercially viable. However, operating the VLCC with a reduced range after conversion to either methanol or ammonia would allow all fuel tanks to be located on the deck, preserving the cargo space.

MMMCZCS says its analysis indicates that the conversion of tanker vessels to operation on alternative fuels after five or even 10 years of operation on fossil fuels creates a large reduction in lifetime operational greenhouse gas (GHG) emissions. Furthermore, the CO_2 emissions resulting from the conversion itself are minimal, equivalent to only around 0.5% of the vessel's lifetime operational emissions using fossil fuels.

The report concludes: "Converting tankers to green fuels can be technically and economically feasible when carefully considered in the context of fleet transition planning and asset age profiles. The industry has the right technology and engineering knowledge in place to achieve such conversions."

When it comes to the economic impact, the MMMCZCS report points out that the differences in CapEx vary depending on the desired green fuel and vessel range chosen. "In general, the most cost-effective option is tanker conversion from fuel oil to methanol, followed by conversion to ammonia," it concludes. "Even conversions after 10 years of operation on fossil fuels can still yield considerable environmental impact. However, one must also consider the financial viability of making such a CapEx investment at this point in the vessel's lifetime." ■

The report Preparing Tankers for Green Fuel Conversion is available to download at https://www.zerocarbonshipping.com

PAINTS & COATINGS

PPG PUSHES ELECTROSTATIC APPLICATION SOLUTIONS

The coatings supplier continues to focus on the integration of electrostatic application method with its marine coatings range

PPG IS A FIRM BELIEVER IN THE BENEFITS OF ELECTROSTATIC APPLICATION OF COATINGS DURING VESSEL DOCKING PROGRAMMES

PPG reports that an increasing number of shiprepair yards are applying its Sigmaglide 2390 fouling release coating electrostatically, taking advantage of the greater efficiency, precision and sustainability benefits of this application method.

"Shipowners and shipyards are being encouraged to look for innovative solutions in order to comply with stricter environmental regulations and meet their sustainability goals," says Sijmen Visser, PPG sales director, protective and marine coatings. "We see an increased demand not only for biocide-free and copper-free hull coatings to reduce vessel emissions, but also for more sustainable application procedures by yards. We strongly believe in the sustainable concept of electrostatic application and are promoting the concept in shipyards in Europe, Singapore and China."

Electrostatic application increases transfer efficiency compared to airless spraying, resulting in reductions in overspray and waste, and provides a cleaner operation and an improved work environment for the applicators, PPG states.

One particularly significant project was recently carried out at the EDR shipyard in Antwerp which achieved a 40% reduction in overspray through the electrostatic application of the PPG fouling release coating. The project was carried out on the underwater hull of Stena Line's *Stena Transporter* and is the second successful electrostatic application project carried out by EDR.

"Electrostatic application increases the weather window in which painting activities can take place, as well as reducing overspray significantly," says Philippe Trouillard, commercial manager, EDR. "It is impressive to see how the charged paint droplets are attracted to the vessel surface almost like a magnet. You only have to look at the dock floors at the end of the project to see how much paint has been saved from disappearing into the environment. Due to a cleaner operation, we have spent less time masking the vessel and covering the dock, saving valuable time and costs."

In another recent case study, with ForestWave Navigation, a shipping company in the north of the Netherlands, a combination of electrostatic application with PPG Sigmaglide 2390 was used on the general cargo vessel *Trio Navigator*, once again demonstrating the benefits of this spraying technique. Visser says: "Through a combination of electrostatic application and Sigmaglide 2390, we were able to support ForestWave live up to their commitment to remain sustainably responsible, all while delivering tangible economic benefits by reducing fuel costs through improved efficiency."

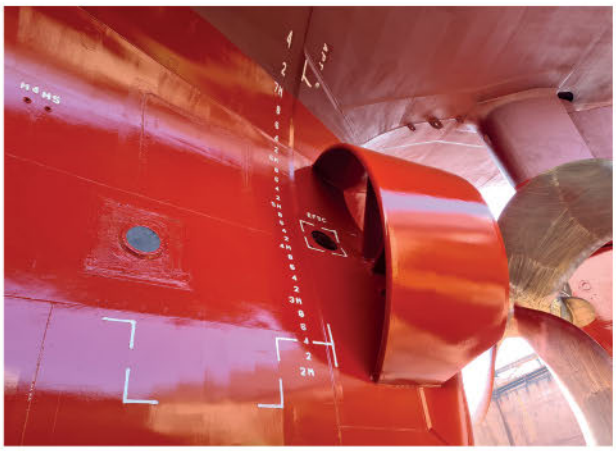
Earlier this year PPG introduced a new marine coating product, PPG Nexeon 810, a low-friction copper-free antifouling product designed to reduce vessel emissions. This new product can also be applied using electrostatic application methods, PPG points out.

Visser says: "Building on over 25 years of copper-free technology experience, PPG Nexeon 810 will help shipowners and operators to achieve a reduction of

up to 25% in greenhouse gas emissions compared to traditional antifouling. At the same time, it supports 60 days of idle time resistance with minimal speed loss over the operational period. Its unique formula integrates photodegradable biocides while also providing outstanding colour retention throughout the entire service life of the vessel."

Independent tests are said to confirm that the ultrasmooth surface of PPG Nexeon 810 coating can yield an immediate boost in power of up to 10% and enhance operational efficiency by up to 15% due to improved fouling control performance.

PPG says over the past year there has been a notable rise in the demand for hull coatings that can effectively reduce power demand and vessel emissions. According to Visser: "Stringent environmental regulations are driving shipowners to prioritise coatings that not only meet but exceed regulatory standards. This shift is evident in the growing preference for advanced, innovative coatings that support sustainability goals. Beyond regulatory compliance, these coatings provide economic benefits by reducing fuel costs through improved efficiency and this dual advantage of regulatory adherence and cost savings is propelling the demand for innovative coating solutions."



THE COMPANY IS TAKING PART IN RIGHTSHIP'S ZERO HARM INNOVATION PARTNERS INITIATIVE

To encourage maritime sustainability, PPG is now collaborating with RightShip's Zero Harm Innovation Partners Program, which aims to foster the development and adoption of innovative solutions to promote a more sustainable future in the maritime industry. PPG's Sigmaglide 2390 biocide-free silicone fouling release is the only hull coating to be approved by RightShip to date, the company says. ■

REGULATORY PRESSURES DRIVE OWNERS AND OPERATORS TO ADOPT GRAPHENE-BASED COATINGS

One of the strongest materials available, graphene is now being used as the basis for a range of innovative coatings developed by GIT Coatings of Canada

Nova Scotia-based GIT Coatings is achieving considerable success with its graphene-based biocide free, hard foul release hull and propeller coating products. Recently Baltic Sea operator Finnlines has decided to use the XGIT-Fuel coating across its ro-ro and ro-pax fleets. Starting with a first vessel in 2022, Finnlines has already applied this hull coating to four vessels as part of a recently signed fleet agreement, reducing fuel consumption and emissions by around 7% compared to previously used coating in the process.

XGIT-Fuel is formulated to not only reduce vessel drag, but enhance resistance to mechanical damage, making it more suitable for vessels that navigate through crushed ice. It can also be cleaned without affecting the surface of the coating. Requiring only one layer, the application of XGIT-Fuel is considered more efficient compared to alternatives, and the temperature range for applying the coating, from -5 to 40°C, broadens the application period and enables Finnlines to enhance the performance of vessels scheduled for winter drydocking.

SHIPYARD STAFF APPLYING GIT'S GRAPHENE-BASED COATINGS ON A VESSEL HULL DURING DRYDOCKING

In addition, dry bulk carrier operator Pacific Basin is to apply GIT's graphene-based propeller coating XGIT-Prop across its entire fleet. After observing positive results on one of its Supramax dry bulk vessels which had been coated with the product, Pacific Basin has started the rollout of XGIT-Prop across 40 vessels scheduled for drydock maintenance in 2024. XGIT-Prop is designed to withstand the rigorous conditions faced by propellers, overcoming some of the disadvantages of conventional, biocide-based soft foul release coatings that release silicone oils and often peel away from propeller blades. Combining a strong adhesive primer with a hard foul release topcoat, XGIT-Prop is intended to ensure the propeller's surface stays smooth over the drydocking cycle, GIT notes.

Norway-based Grieg Maritime Group recently applied GIT coatings to both the hull and propeller of the open hatch carrier *Star Lysefjord*, the first vessel in its fleet to be coated with a graphene-based product. According to the company, with traditional coatings, it has to sandblast and apply a new coating to the vessel every five years. Due to the strength of the new GIT solution, the aim is to do it every 10 years. In a statement Grieg Maritime added: "This advance promises more efficient sailing, less fouling, and a significant reduction in energy consumption. We are truly excited about this game-changing technology!"

Regulatory factors are certainly moving the industry to examine graphene-based solutions more closely. Patrick Wadden, GIT's marketing manager, says: "The latest IMO regulations are focused on decarbonising ships to achieve net zero by 2050, through measures like CII and EEXI. These metrics are certainly pulling the industry towards more technologically advanced marine coatings with superior performance to traditional systems. This technological shift has had a profound impact on the demand for certain coating

FINNLINES HAS RECENTLY APPLIED XGIT-FUEL TO THE HULLS OF A NUMBER OF ITS VESSELS

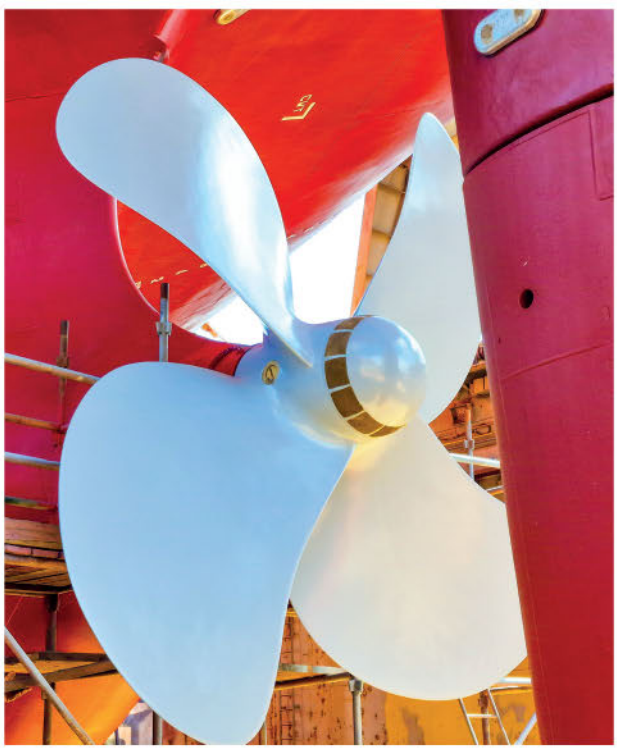
products including our hard foul release graphene-based marine coatings."

GIT believes the future of biofouling management and hull maintenance includes a low-friction hull surface out of dock, no biocides, minimal degradation over the service life, and no downtime during the application and operation. To achieve this, it argues, it requires a biocide-free hard foul release coating that can offer very low friction, for immediate fuel savings after application; superior foul release properties; improved mechanical durability that will allow for repeated cleanings with no paint damage, or increase in roughness; and no leaching of biocides or other active ingredients into the ocean environment to protect marine life and mitigate bioaccumulation and biomagnification of heavy metals.

A second component required for success is an onboard hull cleaning robot, operated remotely in port or by the crew, to carry out frequent inspections and cleaning to the hull at a micro-fouling level, up to FR20, keeping the hull always free of slime when in-service.

To support operators using its graphene-based coatings, GIT's vessel performance team has developed a number of pre-docking advisory services. These include ship-specific simulations of hull performance for different biofouling management scenarios; a techno-economical assessment of different biofouling management choices; and a ship-specific biofouling risk assessment based on historic trading patterns to define the optimal hull cleaning and maintenance schedule. Post-application services include hull roughness measurements and in-service measurement and comparison with post-docking data to assess the low-friction effect of the coating.

Additionally, there are a range of other in-service advisory services offered by GIT. These include operational support in implementing the biofouling management plan in tandem with the hull cleaning robot supplier; automated fouling warnings when idle in high fouling risk waters to trigger the need for inspection; and a hull condition assessment based on automatic recognition of fouling type and coverage per hull zone, which can be used to inform decision making. ■



XGIT-PROP IS A GRAPHENE-BASED HARD FOUL RELEASE PROPELLER COATING THAT HELPS TO IMPROVE VESSEL PERFORMANCE BY KEEPING THE PROPELLER SMOOTH OVER TIME

JOTUN SEES GROWING DEMAND FOR ITS HULL PROTECTION SOLUTIONS

Shipowners are placing greater focus on premium antifouling products to deliver environmental benefits, the Norwegian manufacturer reports

One of the market leaders in the marine coatings sector, Jotun continues to actively enhance its range of products to help support customers in meeting targets relating to decarbonisation, safety and protecting biodiversity.

Morten Sten Johansen, global marketing director, hull performance, says: "We have recently developed several innovative solutions by integrating high-performing premium antifoulings with multi-disciplinary elements like robotics, analytics and algorithms. This includes the Hull Skating Solution, for proactive cleaning to keep the hull always clean, and HullKeeper, a digital platform providing active hull condition monitoring to enable shipowners to make better and faster decisions to maintain hull efficiency and environmental performance."

In addition to expanding its range of topcoats and primers, Jotun has recently launched a new antifouling, SeaQuest Endura, a three-component biocidal foul release coating based on Elastotain technology. Optimised for vessels requiring operational flexibility, and subject to frequent changes in trade, SeaQuest Endura is formulated to produce a smooth surface profile that enables very low frictional resistance. This reduces hull deterioration, and improves hydrodynamic performance, thereby cutting fuel consumption and contributing to environmental protection by lowering carbon emissions.

Johansen adds: "We see an increasing interest in our Hull Performance Solutions (HPS), including both SeaQuantum X200 and SeaQuest Endura. We have had a record high activity in the last 12 months delivering HPS to our customers. Moreover, more customers are also turning to our digital solution, HullKeeper, as a tool for active hull condition monitoring and risk management. Such services are benefiting shipowners and operators by providing data-driven insights to get better maintenance decision making."

MORTEN STEN JOHANSEN, GLOBAL MARKETING DIRECTOR, HULL PERFORMANCE, JOTUN

JOTUN CONTINUES TO IMPROVE ITS HULLKEEPER DIGITAL PLATFORM WHICH FEATURES A UNIQUE PROPRIETARY ALGORITHM

Through its HPS, Jotun estimates that in 2023 it supported the industry by decarbonising 10.4 million tons of CO_2. This is equivalent to approximately US$1 billion in fuel savings, it claims.

"Given the increased concern to decarbonise and maintain a good CII rating, as well as new and upcoming market-based measures, there is an increased willingness to invest more in premium solutions," suggests Johansen. "We see that shipowners are making a conscious decision to adopt a proven antifouling system for their vessels, with documented performance in terms of fuel savings, CII ratings, CO_2 emissions reduction, operational efficiency and flexibility."

In addition to environmental regulatory requirements, Jotun also reports more focus on protecting biodiversity. According to Johansen: "In the past this has mainly focused on ballast water treatment systems, but now ships' hulls are gaining attention. We all know the strict regulations that Australia and New Zealand impose for hull condition and the consequences of being denied entry. With the new biofouling management plans in place for vessels, this will gain greater importance globally in the future."

While improving its foul release coatings range, Jotun is also enhancing the digital tools it offers the industry, including HullKeeper. "We are continuously adding more features and functionalities to enhance the user experience and benefits from HullKeeper during sailing intervals," says Johansen. "The ability to identify fouling risks before they become a problem helps shipowners and operators save fuel, reduce greenhouse gas emissions and minimise the transfer of invasive species, thereby protecting biodiversity."

Jotun points out that having a cleaner hull will eventually result in reduced docking costs relating to blasting and coating application at the next docking. "A clean hull improves bottom line and contributes to a more sustainable shipping industry," Johansen concludes. ■

RESEARCH AND DEVELOPMENT DELIVERS POSITIVE RESULTS

Nippon Paint Marine's ongoing innovation in hull coatings is supporting environmental progress for shipowners and operators

The international shipping industry faces a significant technological and operational challenge to reduce its greenhouse gas emissions and the negative effects its operations have on the marine environment.

According to Kazuaki Masuda, corporate officer, Technology Division, Nippon Paint Marine: "To transition to more sustainable practices, the industry will need to engage with a range of innovative solutions, whilst identifying and pursuing technologies and opportunities that offer realistic and achievable benefits to the environment. Our coatings use the latest science and technology to make our customers' lives simple and reduce their environmental footprint, whether that is through helping to reduce fuel usage, costs and related GHG emissions, or through lowering drydocking costs by providing greater coverage and requiring less paint, or delivering longer time between layup periods and drydocking."

As an interesting case study, in 2019, the Taiwanese container line Wan Hai Lines conducted a performance analysis on the vessels in its fleet using Nippon Paint Marine's A-LF-Sea and found an 8% reduction in fuel consumption and emissions on a like-for-like basis, compared to vessels using conventional hull coatings. In 2021, after nearly a decade of using Nippon Paint Marine coatings on the hulls of its vessels, Wan Hai was interested in exploring the latest developments to achieve even greater efficiency savings. As a result, Wan Hai began applying Nippon Paint Marine's Fastar coating to its container ships during their drydocking cycles.

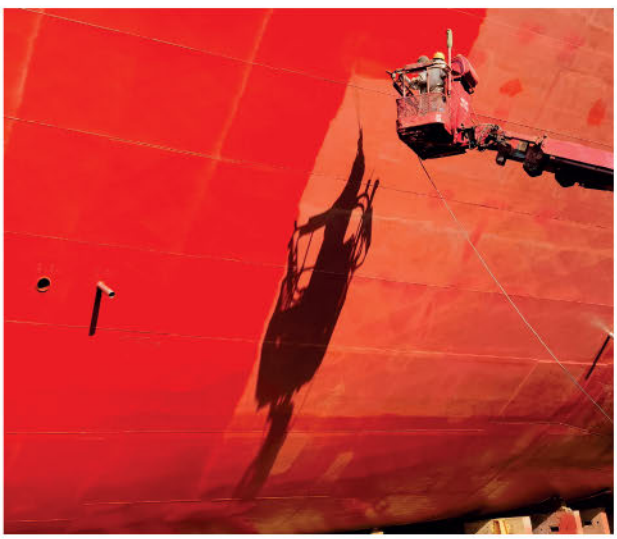
Masuda says: "Wan Hai is a long-standing customer and from their first use of A-LF-Sea to their adoption of Fastar for 10 vessels within its fleet, the operator has seen the benefits of our commitment to research and development over the last decade. Both A-LF-Sea and Fastar have enabled the organisation to achieve significant fuel and emissions savings compared with the industry standard."

A-LF-Sea and Fastar, the company's fourth generation anti-fouling launched in 2021, are based on Nippon Paint Marine's patented HydroSmoothXT water-trapping technology, to produce a smoother hull and reduce vessels' hydrodynamic drag. HydroSmoothXT technology mimics a cell structure often found in marine life which lowers frictional resistance. Fastar introduces enhanced self-polishing and self-smoothing properties to anti-fouling capabilities and the Japanese company's R&D team used nano-domain technology to alter the performance of the coating's surface to slow the rate at which biocides were eluted, by as much as 50%. The hydrophilic and hydrophobic nanodomain structures in the coating enable a wider diffusion of the biocides across the coating's surface, creating a more effective anti-fouling performance.

Masada adds: "Continuing innovation by our scientists to advance our biomimetic coatings solutions has helped our customers, including Wan Hai, to enjoy fuel savings of up to 14% thanks to an average speed loss of 1.2% over a 60-month period. This is compared to the market average speed loss of 5.9% over a similar time period. To date, we have applied HydroSmoothXT-based coatings to more than 5,000 vessels worldwide, including more than 1,000 with Fastar."

In a recent recognition of its contribution, in May 2024, the Japanese Chemical Industry Association gave the Fastar product series its Environmental Technology award. The first marine coating to receive this award, Fastar was celebrated for its ability to reduce fuel consumption, whilst also supporting the continued protection of marine life and the environment.

Masuda says: "The Fastar coating is also formulated to reduce air pollution during its application and enable a more efficient process, which reduces costs as well as time in drydock. The positive results that Fastar is achieving, even at this early stage, are very encouraging and are important for both Nippon Paint Marine, and our customers. It is technology and solutions like Fastar that will play a vital role in supporting the shipping industry's continued efforts to achieving net-zero emissions." ■



SINCE ITS RELEASE IN 2021, FASTAR HAS NOW BEEN APPLIED TO OVER 1,000 VESSELS

HEMPAGUARD HELPS OWNERS MEET EEXI AND CII TARGETS

Container ship project yields environmental performance benefits

ESL DANA HAS EXPERIENCED SIGNIFICANT FUEL SAVINGS SINCE BEING COATED WITH HEMPAGUARD AND SEAMFLOW

German-based Peter Döhle Schiffahrts-KG, like most shipping companies, is working to reduce CO_2 emissions from its vessels in a number of ways, including the use of advanced hull coatings, formulated to minimise drag in the water. With such coatings less fuel is required to move the ship, which lowers both fuel costs and associated emissions.

A long-time Hempel customer, Peter Döhle asked the coatings supplier to recommend the most effective solution for its managed container ship *ESL Dana* and the Danish company suggested a combination of its Hempaguard X8 hull coating and SeamFlow weld fairing solution.

Hempaguard X8 is an advanced fouling defence coating based on ActiGuard technology that Hempel says delivers an 8% lower fuel oil consumption and emissions level than market average antifouling coatings. The company's SeamFlow system further reduces carbon emissions by smoothing protruding weld seams.

The two solutions were applied to *ESL Dana* during a scheduled drydocking in April 2022, which included a propeller upgrade. To accurately assess results, Hempel's digital analysis tool, Systems for Hull and Propeller Efficiency (SHAPE), tracked the ship's fuel consumption both before and after the docking and, according to Hempel, the results were clear.

"The combination of Hempaguard X8, SeamFlow and the propeller upgrade resulted in an immediate and significant energy efficiency increase right after its return to operation. The following service period confirms a fuel consumption and therefore CO_2 emission reduction up to 20%," says Alexander Enström, executive vice president and head of marine. "As fuel remains the number one operating expense for a large container vessel, this translates into significant savings for the owner. More importantly, it also contributes to better environmental performance and has put *ESL Dana* well on the way to meeting its IMO EEXI and CII targets."

Having seen the improvements to fuel efficiency on *ESL Dana*, Peter Döhle has now decided to apply Hempaguard hull coatings on more vessels in the near future, Hempel reports.

Another example of a company that has benefitted from Hempel's high-performance hull coating solutions is Formosa Plastics Marine Corporation (FPMC) which specialises in the transportation of raw materials required by the parent group, as well as the commercial business of spot and long-term charters. Since IMO's CII and EEXI regulations went into force, there has been a significant impact on its operations and FPMC was interested in the ability of the Hempaguard antifouling coating to not only improve the fuel efficiency of its vessels, but also reduce CO_2 emissions, and thereby enhance its CII rating.

Therefore, in October last year, during a docking at Yiu Lian Dockyards in China, FPMC chose Hempaguard for the first time to coat its tanker *FPMC C Lord* and also decided to apply the SeamFlow weld fairing system. Hempaguard X7 is expected to significantly reduce CO_2 emissions and save fuel with a smoother hull, while SeamFlow will help to reduce costs and meet environmental goals by smoothing rough welds to reduce drag. Vessel performance is currently being monitored to assess the impact in service.

Hempel has recently passed a key milestone of 4,000 Hempaguard applications since 2013. Furthermore in June this year the coating system received DNV validation of its performance claims and emission savings model. Enström says: "The verification objectively confirms Hempaguard's outstanding performance during the period from 1 January 2013 to 31 December 2023 when it comes to the reduction of CO_2 emissions for the maritime industry. In addition, fuel savings potential of up to 20% and average speed loss of 1.4% have been validated by a third party." ■

The Royal Institution of Naval Architects Presents:

Human Factors 2024 Conference

8-9 October 2024, Wageningen, The Netherlands

REGISTER NOW

In Partnership With:

MARIN

Scan the QR Code
for more information

The conference will provide an opportunity for human factors experts, naval architects, bridge officers and others to get together and discuss recent developments. It will focus on lessons learned from interventions and applied research that were successful, or even more interesting, unexpected or bad results. For example, implementation of new automation on board that worked out differently or behavioral interventions that had unexpected effects. It is all about applied research that provides learned lessons for future Human Factor research, specifically for the Maritime domain.

As part of the conference, the delegates will have a unique opportunity to visit the new Seven Oceans Simulator centre of MARIN on 10th October 2024, where the attendees will have a chance to:

- Tour in the brand new Seven Oceans Simulator centre.
- Attend a workshop on how to design a bridge layout for special purpose vessels with physical mock-ups.
- Attend a workshop measuring human performance covering eve-tracking, emotion recognition, heart rate variability and galvanic skin response.

..... and more!

Keynote Speakers

Job Brüggen, LVNL

Job Brüggen holds a masters degree from Delft University of Technology in Aerospace Engineering. In 1986 he started working for the National Aerospace Laboratory where he later became the head of the Air Transport Division. His particular interest in safety led him to Air Traffic Control the Netherlands, to become their first safety manager in 2002. He is particularly known for his activities in Just Culture developments and was one of the first to demonstrate the detrimental effect of prosecution of air traffic controllers on incident reporting. In 2003 he re-created the CANSO Safety Standing Committee and chaired it for six years. He also advises in the health care industry on safety matters with a particular focus on safety leadership. From November 2014 he was co-chairman of the Eurocontrol Safety Team, until 2019. For the Air Traffic Controllers academy of LVNL, he is the chairman of the examinations committee.

Dr Rafet Emek Kurt, Reader, in Maritime Safety and Human Factors, Department of Naval Architecture Ocean and Marine Engineering, University of Strathclyde

Dr. Kurt also serves as the Director of the Maritime Human Factors Centre, further demonstrating his commitment to advancing research in this field. Additionally, he holds the position of Associate Editor in Ships and Offshore Structures, showcasing his dedication to the dissemination of knowledge within the maritime community. Dr. Kurt is also a member of the International Ship and Offshore Structures Congress (ISSC), where he collaborates with peers to develop ship design criteria informed by human factors, further highlighting his commitment to the advancement of maritime safety practices.

Over the years, Dr. Kurt has worked on many research projects aimed at integrating human factors, safety, and risk into maritime practices. His work has been published in respected journals and conferences, igniting essential discussions in the maritime community.

https://rina.org.uk/events/events-programme/human-factors-2024/

The Royal Institution of Naval Architects Presents:

2024 President's Invitation Lecture

13 November 2024, London, United Kingdom

REGISTER NOW

Join us for the prestigious President's Invitation Lecture, a key event in the Royal Institution of Naval Architects' calendar, at the stunning new venue One Great George Street.

Scan the QR Code for more information

- **Exclusive Early Bird Tickets:** Only 30 tickets available! Secure your spot early.
- **Meet Our President:** Catriona Savage will welcome you at the drinks reception from 6pm.
- **Network with Industry Leaders**: With 100+ annual attendees, expect superb networking opportunities.
- **Dinner and Dialogue:** The lecture will be followed by a three-course dinner and extended networking in the Great Hall.

https://rina.org.uk/events/events-programme/2024-presidents-invitation-lecture/

ADVERTISERS INDEX

If you would like to receive further information on the advertisers featured within Shiprepair & Maintenance please contact: **advertising@rina.org.uk**

METS TRADE MARINE EQUIPMENT TRADE SHOW

GET YOUR FREE TICKET

REGISTRATION OPENS 26 AUGUST

WHERE THE GLOBAL LEISURE MARINE INDUSTRY COMES TOGETHER

19 - 20 - 21 NOVEMBER 2024
RAI AMSTERDAM

WWW.METSTRADE.COM

The METSTRADE Show is the world's largest marine equipment trade show and the only truly international B2B exhibition. With excellent networking opportunities, a broad range of showcased innovations and located in one of the most beautiful cities in the world, the METSTRADE Show is an unmissable event for every professional in the marine industry.

METSTRADE FEATURES

FTP FOILING TECHNOLOGY PAVILION

STP START UP PAVILION

CMP CONSTRUCTION MATERIAL PAVILION

SYP SUPER YACHT PAVILION

MYP MARINA YARD PAVILION

ORGANISED BY

rai AMSTERDAM

POWERED BY

ICOMIA

MEMBER OF

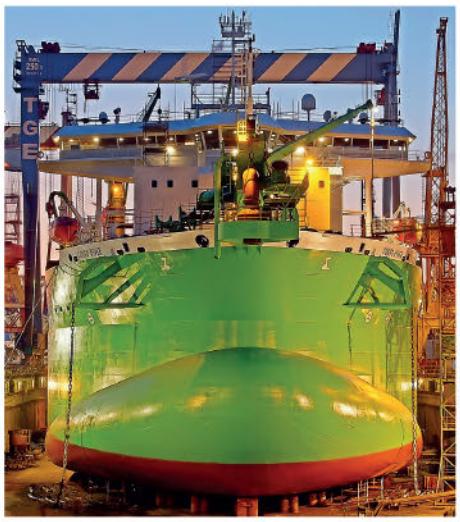
IFBSO

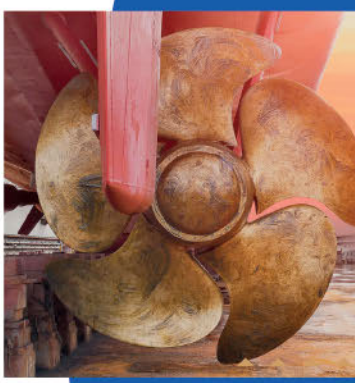
OFFICIAL CATALOGUE PARTNER

IBI

Ingenuity That **Floats**

50+ Years Experience





Industrial Projects

Ship Building

Ship Repair & Conversion

Offshore Oil & Gas Vessel