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SORJ (Ship and Offshore Repair Journal)

Welcome to the June/July edition of SORJ (Ship and Offshore Repair Journal). This issue majors on the Offshore Industry, which, according to many analysts, is showing real signs for a return to better days. Of course, the move away from fossil fuels and the developing move towards digitalisation, will no doubt affect the offshore industry – but there are still signs that a recovery is imminent. The big news, which has reached us after Press Day, is the fact that the two Singapore-based groups - Keppel and Sembcorp Marine, have announced that they will eventually merge. Quite a thought for the future.



FRONT COVER



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Front Cover: The Front Cover of this edition of SORJ shows Saipem's offshore crane ship *Saipem FDS* in Italy's San Giorgio del Porto for an extensive refit. This yard is owned by GIN Holdings, which also operates the large French shipyard Chantier Naval de Marseille.

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The LNG tanker Maria Energy entering Lisnave

LNG repairs at Lisnave

Despite the low level of growth in the world economy and the global pandemic, Portugal's Lisnave, Setubal managed to close the year of 2020 with positive results and started 2021 with an acceptable level of activity.

The first half of 2021, a total of 37 ships were drydocked with success. Many of these were from repeat shipowners/managers – coming from Greece, Norway and Singapore. The types of ships booked included tankers (14), LPG tankers (10), containerships (5), and bulk carriers, dredgers and LNG tankers, were the type of vessels that docked more often at our shipyard.

A unique and successful drydocking project at Lisnave was PGS Geophysical's 20,367 gt research/survey vessel *Ramform Atlas* is an ultra-high-capacity vessel with the highest quality standards. She came to Lisnave due to the recognised know how, reputation, large dimension drydocks and excellent geographic location. An efficient and successful 16 days drydocking project, which included general drydock maintenance work related to the vessel propulsion and steering system, the hull treatment and painting, upgrading of the seismic equipment, several mechanical units and miscellaneous pipe and steel repairs. Seismic ships like *Ramform Atlas* acquire data for mapping and modeling the subsurface beneath the seabed. Energy companies use seismic data to increase the likelihood of finding oil and gas. Understanding the subsurface

structures also reveals risks associated with drilling projects, like unstable layers, or gas pockets. Revealing shallow hazards is an important step in mitigating potential risks to marine eco-systems.

Another LNG tanker has drydocked at Lisnave - Tsakos Energy Navigation (TEN)'s 162,000 m³ *Maria Energy*. She is a Tri-fuel diesel electric propulsion LNG tanker and was the second LNG tanker to be acquired by TEN, which is expanding the involvement in the LNG segment. Tsakos and Lisnave are business partners for more than 20 years but this was the first time working together on the drydocking of an LNG tanker.

Three vessels have recently been in Lisnave for the replacement of main engine crank shafts and bedplates, representing a challenging and highly complex repair operation. This type of repair work is not frequent but interesting in the fact that all were done during the first half of 2021. Two of these vessels, both bulk carriers, have already been completed – Eagle Management's 56,615 dwt *Star Pyxis* and Log In Logistica Intermodel's 82,834 dwt *HB Tucunare*, and the third one is currently under preparation for sea trials – the 31,362 dwt chemical tanker *Bull Sumbawa*.

The project on the *Bull Sumbawa* was divided into four stages - first one removal all material around the main engine to allow access for pipes, equipment, ventilation ducts, etc. In the second stage, when everything was clean, a gantry crane was installed inside the engine room and the cylinder block, together with A-Frame, was lifted to open an access to

the bedplate, which was removed by turning table equipment and removed through an opening in the hull side shell. In the third stage, a new bedplate and crankshaft, which had been assembled in Lisnave's workshop, was transported to the drydock, and the reverse procedure carried out. With the new bedplate in place, the A-frame and cylinder block was jacked down and the gantry crane disassembled. In the last stage, all parts and equipment inside the engine room were re-installed and the hull access plates closed. The other two projects involving the bulk carriers were similar except for the fact that the main engine parts were removed and installed in the engine room via an access opened to the aft cargo hold.

All types of ships at Remontowa

Poland's Remontowa, Gdansk has been busy over the past month with various repair projects. Teekay Shipping's 92,968 dwt North Sea shuttle tanker *Petroatlantic* has a distinct hull structure and a length of over 200 m. Earlier this year she visited Remontowa for the second time in the last three years. The critical scope of work of this year's repair involved mechanical and piping work.

Van Oord's 18,292 m³ TSHD *Utrecht* arrived at Remontowa in February 2021 for her class renewal, special survey, nearly 50 tonnes of steel renewal on the hull, in the hopper and on the decks. Various pipeline repairs were renewed, and the hull underwent maintenance.

During mid-April, Boskalis' 12,000 m³ TSHD *Willem van Oranje* arrived in Remontowa for class renewal. The dredger is one of the first, which is powered by 100% biofuel. Boskalis also recently had the hopper dredger *Wadden 2* in Remontowa at the beginning of May for repair that mainly involved hull work. The motor hopper is used to transport dredged material for more than 40 years.

Fjord Shipping's 4,300 dwt chemical tanker *Key Breeze* is the latest tanker of this owner's fleet to have a BWM system installed during a stay at Remontowa. Valles Steamship's 45,580 dwt tanker *Seafreight* recently entered the yard for general repairs and the installation of a BWM system. She is the fourth ship from this Canadian owner in the past three years. Following the bulk carriers *Jawor* and *Omak*, Polish Steamship's 29,707 dwt bulk carrier *Juno* was the third ship owned by Polish Steamship



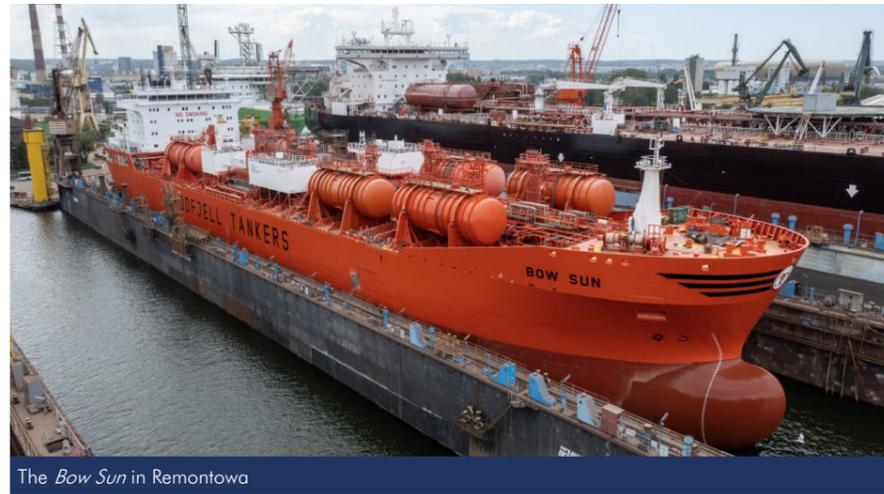
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Repairs



The *Bow Sun* in Remontowa

Company that came to Remontowa for a BWM system installation. Nordic Tanker's 16,909 dwt chemical tanker *Harbour Feature*, came to Poland's Remontowa, Gdansk for repair and installation of a BWM system. Since 2013, this was the second visit of the vessel to this shipyard.

K Line's 17,735 gt car carrier *Malacca Highway* came to Remontowa for the second time since 2019. The vessel can transport up to 1,250 passenger cars, as well as big and heavy cargoes.

During mid-May, Odfjell's 49,466 dwt chemical tanker *Bow Sun* came to Remontowa for various general repairs, including steel work in her ballast tanks and standard maintenance and drydock operations. Since 2010 Remontowa has repaired more than 30 tankers from this owner.

Palumbo Malta busy with cruiseship repairs

Palumbo Malta Shipyard has been extremely busy in the cruiseship repair and refit market recently, as this market segment begins to get ready for a post-COVID period. The main client



The *Costa Firenze* in Palumbo Malta

has been Italy's MSC, ships in the yard over recent months have included the 137,936 gt *MSC Splendida* (work including alongside and drydocking operations), the 92,409 gt *MSC Musica* (alongside and drydocking), the 92,409 gt *MSC Orchestra* (alongside), the 95,128 gt *MSC Magnifica* (alongside and in drydock), the 139,072 gt *MSC Divina* (alongside and in drydock) and the 137,936 gt *MSC Fantasia* (alongside). The yard is also expecting the 92,627 gt *MSC Poesia* and the 65,591 gt *MSC Lirica*.

Work carried out on the MSC cruiseships included:

- Production Multiple tank treatment and application of a specific paint with specific thickness
- Production Removal of a 55 tonne fin stabiliser, shifting the unit to workshop with a multi wheeler carrier - overhaul of all bearings, trust ring, trunnion and crux work carried out on a vertical lathe - extensive machining and drilling was carried for resleeving on all parts of the fin stabiliser
- Hull treatment topside and underwater – cosmetic finish concerning the Cruise line standard
- Works in way of rudders
- Multiple steel jobs over various accommodation sections
- Works involving trunking
- A lot of underwater valves were overhauled
- Removal of window washing/cleaner robot for maintenance
- Tests of all lifeboats, tenders and rescue boats
- Thorough maintenance of the cross-over tunnels
- Main propulsion stern tube seals overhaul
- Thruster blades' repairs
- EGB and auxiliary boilers overhauled

- Drencher system tests and renewals
- Overhauls on the forward and aft mooring stations
- Maintenance on portholes and shipside windows
- Pipework especially on hydraulic S/S systems

Other cruiseships recently in Palumbo Malta Shipyards have included Holland America's 81,769 gt *Zuiderdam*, (alongside repairs), Le Ponant's 9,976 gt *Le Camplain* (drydocking) and Viking Ocean Cruises' 47,842 gt *Viking Star* (work in the port of Malta). The yard also carried out first drydocking for two new cruiseships built by Italy's Fincontieri – Costa Cruise's 135,516 gt *Costa Firenze* and Carnival's 145,281 gt *Enchanted Princess*.

Meanwhile, Croatia's Palumbo Viktor Lenac, Rijeka, has carried out repairs on-board Viking Cruises' 47,861 gt *Viking Orion* (alongside), Tradewinds Voyages 8,770 gt specialised sailing vessel *Golden Horizon* (drydocking) and Scenic Tours (Australia)'s 17,545 gt *Scenic Eclipse* (drydocking).

The dredger repair market has also been successful for the Palumbo Group with four contracts from Belgium's DEME involving four TSHDs – the 11,795 m³ *Brughel*, the 30,190 m³ *Congo River*, the 5,6700 m³ *Arvelde* and the 11,796 m³ *Breydel*, all dredgers drydocked for general repairs.

Ferry work at A&P

Last year (2020) and the first quarter of 2021 have been characterised by a large volume of routine ferry dockings for A&P Group, the leading provider of ship repair, conversion and marine services in the UK. Recent projects have included vessels covered by A&P's commercial partnership agreements with Red Funnel Ferries, Condor Ferries and Wightlink Ferries as well as P&O, Pentland Ferries, Isle of Man Steam Packet Company and Stena Line.

Projects of particular note at A&P Falmouth have included a dry docking of Wightlink's *Wight Sun* as part of the ferry fleet's £5m annual programme of maintenance and refit, while A&P Tyne currently has P&O's cross-channel ferry *Pride of Kent* in the dock for a 14 day programme of repairs and maintenance.

Other significant projects at A&P Falmouth have included a large dry-docking package for Condor's *Commodore Goodwill* as well as routine work for *Condor Rapide* – the fastest



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The Norbank in A&P Tyne

vessel in Condor Ferries' fleet – which required repairs to the ferry's aluminium structure and car deck ramps as well as extensive unforeseen work to the jetovators. This required an additional two weeks in dock at A&P Falmouth during a very busy period. Thanks to Falmouth's three docks, it was possible to move vessels around to accommodate Condor's needs.

Wightlink Ferries' ro/pax *St. Clare* also docked at A&P Falmouth for a programme which included the exchange of the Voith units, hull preparation and painting, prow inspection, hotel works and doors replacements.

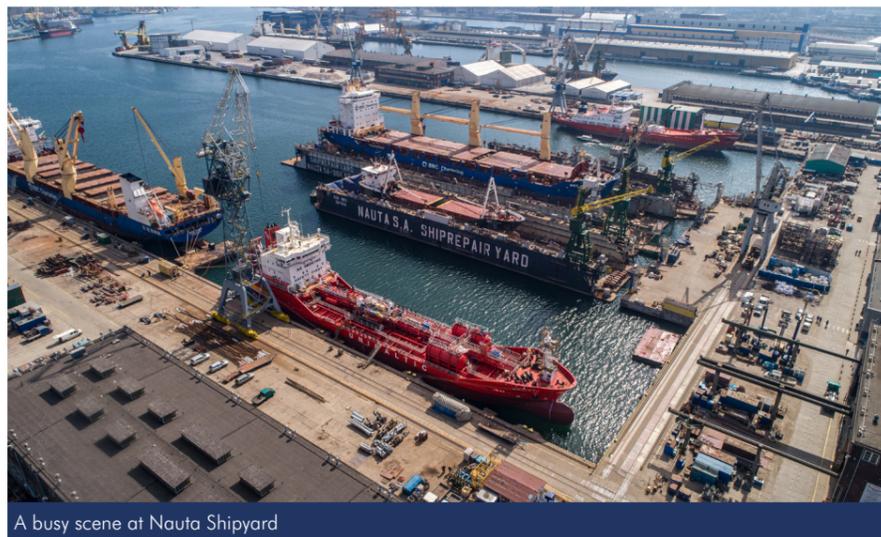
In the North East, *P&O Norbay* recently spent 12 days in dock at A&P Tyne while the team removed, dismantled and cleaned the stabilisers. A&P worked closely with P&O's ship contractor to replace the seals, before the units were re-assembled, filled with oil, tested and refitted. Despite the short time in dock, A&P also overhauled the lower hold operating cylinders and mooring winches and tested the rudders' integrity.

Stena Forecaster also underwent a six-day drydocking at A&P Tyne at the end of 2020 for repairs to the starboard stern tube seal. Underwater inspections revealed the rudder needed repair and A&P worked remotely with OEM Becker to find a solution. Other work included steel repairs and alterations to the vessel's engine exhausts, a comprehensive vessel paint programme and steel repairs in the ballast water tanks and cunifur pipework. Shortly after, A&P Tyne also delivered a 36 hour programme of steel and hydraulic repairs and maintenance for fellow fleet vessel, *Stena Foreteller*.

Busy times at Nauta Shipyard

Poland's Nauta Shipyard, Gdynia, has been busy recently with a number of ships in for general repairs. These have included two sisterships from Cyprus' Interiorient Shipmanagement – the 50,922 dwt chemical tankers *Arctic Bay* and *Arctic Breeze* and two general cargo vessels from Germany's Briese Schifffahrts – the 16,991 dwt *BBC Nile* and the 14,310 dwt *BBC Ruby*.

Other ships recently in the yard include Gearbulk Norway's 23,529 dwt general cargo vessel *Jaeger Arrow*, another Norwegian-controlled vessel Ugland's 4,485 gt offshore hopper barge *UR-93*, Unibaltic's 5,459 dwt



A busy scene at Nauta Shipyard

tanker *Amuleth*, and Folmer's 2,191 dwt general cargo vessel *Hanne Danica*.

There were also two vessels from the Polish Navy recently in the yard – the minesweeper *ORP Druzno* and the hydrographic craft *K-10*.

Dredgers, ro/ro vessels and fishing vessels at Metalships

Spain's Metalships, Vigo recently carried out repairs on-board Jan de Nul's 6,310 gt split hopper dredger *L'Aigle*. She was in the yard for afloat repairs (11 days) and drydocked for 40 days. The main feature of *L'Aigle* is the 3,700 m³ large open hopper hold used to load and transport dredged soil.

The dredger *L'Aigle* arrived in Metalships prior to a new project in Mauritania, for tune-up and servicing. Metalships' Project Controller, Luis de Celis, has been following the repair day-to-day and completing a multitude of organisational skills. Luis said, "We have completed a large steel renovation in the range of almost 50 tons, the renewal of all the hopper seals and the renovation of the hopper split cylinders, plus typical works in the drydock such as blasting, painting, valve changes, electrical works etc.."

Jan de Nul entrusts Metalships for the repairs of its fleet of dredgers. The co-operation between the two companies started in 2013 and Metalships expects to repair more dredgers this year.

The 16,361 gt ro/ro ferry *Galicja* will soon

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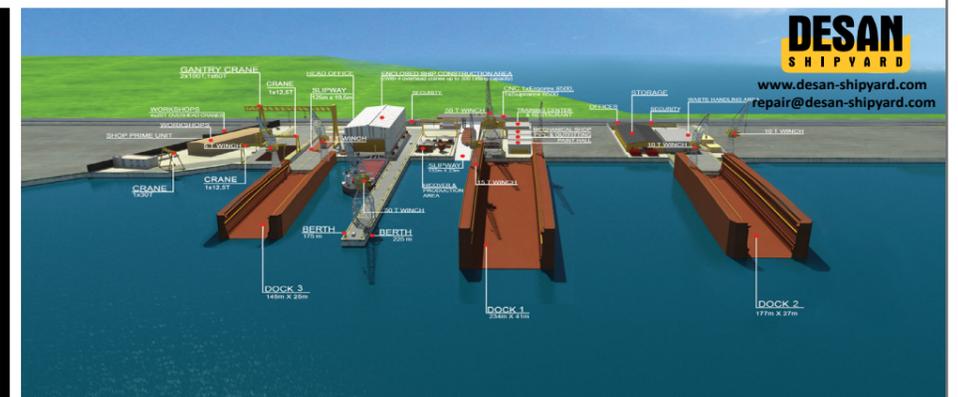
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become a logistics transport vessel for the Spanish Army, and will undertake any of the missions entrusted to her by the Operations Command (MOPS, responsible for Operational Planning, Conducting and Monitoring Military operations) and the Military Emergency Unit (UME). The vessel belongs to Spain's Suardiaz and she will be renamed *Ysabel (A-06)*. She has undergone a process of reconversion and technical renovation (retrofitting).

Several Spanish shipyards bid for this work which, in the end, was taken by Metalships, Vigo, which has carried out the refitting the 2003-built vessel. She was drydocked for 21 days. *Ysabel* has already appointed her first commander - the frigate Captain Pedro Antonio Pérez and who will take over command in June.

The main feature of *Ysabel* is to have one centre ramp 5.70 m x 15.85 m x 60 SWL and two engines with clutches, flexible couplings and single reduction geared to screw shafts driving two CP propellers at 163 rpm with a total power of mcr 8,280 kW (11,258 hp), and a service speed of 17 knots.

Jobs such as the adaptation of the cargo covers, the structural modification or the entrance and exit ramp modification have already been undertaken over the last four months in Vigo.

The Spanish Army has shown interest in the possibility of acquiring another ro/ro ship - the *La Surprise* from the same shipowner - Suardiaz. She is a sistership of *Ysabel*, ex *Galicia*, acquired in November 2020 for more than 7m. With this possible acquisition, the Spanish Army would complete the transportation needs after stopping sailing with the vessels *El Camino Español* and *Martín Posadillo*.

Metalships has also recently received one of its former clients from Killybegs (Ireland) - Western Seaboard Fishing Co. Metalships has carried out the repair of the 34-year old, 1,988 gt fishing vessel *Western Endeavour* - drydocked for 16 days and afloat for 18. The vessel came



The *Western Endeavour* in Metalships



Ships in Turkey's ART Shipyard

to Metalships for the class renewal with the usual jobs such as painting, pipe work in the tanks, mechanical repairs, rudder, propeller and steel works.

ART Shipyard continues to develop its ship turnover

Turkey's ART Shipyard, Yavlova, has secured more than 39 projects for the first half of 2021 from various shipowners for different types and sizes of vessel. In addition, ART has already completed 16 BWM system installation projects, with four projects on-going and another four due before the end of the first half of 2021. The yard has recently welcomed its 10th vessel from Italy and its eighth Turkish Vessel.

ART Shipyard recently completed a number of d'Amico's chemical tanker repair projects – the 39,309 dwt *Cielo di Salerno*, the 51,088 dwt *High Venture*, the 49,990 dwt *High Wind*, the 47,499 dwt *Cielo di Capri* and the 39,202 dwt bulk carrier *Cielo di Tampa*. ART Shipyard also welcomed Statu Shipping's third bulk carrier since the beginning of year. The first two were the 16,988 dwt *Lodestar*, for third special survey and Cosco BWM system installation, and the 17,149 dwt *Mediqueen* for third special survey and steel work.

ART Shipyard has also recently carried out BWM system installation involving various manufacturers:

- Uni-Tanker's 4,684 dwt chemical tanker - Alfa Laval system and third special survey
- Besiktas Shipping's 5,701 dwt chemical tanker - Desmi system, second special survey and MarineLine Cargo Tank Coating.
- Columbia Shipmanagement's 30,878 dwt bulk carrier - Erma First system and second special survey.
- Borealis Maritime's 46,579 dwt containership

Nordic Hong Kong - Erma First system, second special survey, silicone paint application and hatch cover work.

In addition, ART Shipyard recently repaired Bernhard Schulte's 38.763dwt bulk carrier *Interlink Veracity*, in the yard for routine drydocking works. The yard was also serviced Synergas' 4,026 dwt LPG tanker *Syn Turais*.

- Other recent repair projects include;
- Conbulk Shipmanagement's 15,315 dwt containership *Mayfield* (ex. *Lantau Ace*) for special survey and hatch cover works
 - Apollo Maritime's 28,392 dwt bulk carrier *Taurus* - Miura BWM system installation and second special survey.
 - Eastern Mediterranean's 40,327 dwt chemical tanker - Samsung BWM system installation and special survey items
 - Wegener H-P Reederei's 8,932 dwt containership *Spica* for special survey.
 - Allseas's 28,451 dwt bulk carrier *Amalea* - Erma First BWM system installation and standard docking items.
 - Zeaborn's 34,428 dwt bulk carriers *Mobile* and *Montreal* for special survey items, Ocean Guard BWM system installation and cargo hold treatment.

More LNG tankers and cruiseships in Navantia

During April Spain's Navantia Shiprepairs Ferrol Estuary focused its industrial activity on the docking and/or repair works of four commercial vessels. With a total of six LNG tanker repair projects undertaken so far this year already represents more than half of the 10 merchant vessels repaired to date, with several other gas tankers already confirmed to be repaired in Ferrol Estuary over the next few months.

Ships in the yard were Sinokor Tankers' LNG tanker *Bering Energy*, Maersk Tankers' chemical tanker *Bro Agnes*, Hyproc Shipping's LNG tanker *LNG Ougarta* and Leif Hoegh (UK)'s LNG tanker *LNG Arctic Princess*.

During April, Navantia completed the repair projects that had started in previous months of the vessels *Bro Agnes* and *LNG Ougarta*, both repaired alongside in Ferrol, and then delivered to their respective owners after completing their final tests and sea trials.

This facility also started the repair of the *Arctic Princess*, which was drydocked in Ferrol Drydock No.3, with its delivery scheduled for mid-May,



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Harmony of the Seas alongside in Navantia Cadiz

and the *Bering Energy* continues alongside a repair berth in Fene awaiting a second drydocking, once its reactivation process has been resumed, which is foreseen for June.

Among these projects, work included several BWM system installations carried out on-board some of these vessels, and several specialised asbestos removal projects, carried out following the established protocols in accordance with official and yard regulations.

Meanwhile, during the same month Navantia Cadiz Bay focused its activity on the docking and repair works of seven commercial vessels. These projects included two cruiseships – Carnival Corp’s *Carnival Victory* and RCI’s *Harmony of the Seas*. The *Carnival Victory* was drydocked at Muelle de Armamento undergoing steel work and some modifications performed by the external contractors. Navantia is providing logistic support, scaffolding and insulation. It has also started the preparation of surfaces and priming on the boat deck. The *Harmony of the Seas* was undergoing work on her azipods, thrusters and stabilisers, and hull treatment.

The yard was also repairing Balearia Eurolinas’ ro/pax ferry *Avenir Dos*, work including re-engining. Navesco’s general cargo vessel *Sider Colombia* was also in Cadiz for rudder dismantling and installation of a new unit, steel work on the bow, BWM system work.

Meanwhile, the San Fernando Shipyard carried out the drydocking of the tug *VB Boxer*, to change her propellers, and Seacor Marine’s OSV *Seacor Lynx* for main engine repairs and general drydocking operations

The tug *VB Talisman* underwent general surface treatment, starboard side Voith and

valves repairs, steel renewal in her fuel tank and installation of half-round fenders on her stern.

Navantia Cartagena focused its activity during the month of April in the docking and repair works of six yachts – Stargate’s *Yasmine of the Seas*, Arinter Management’s *Tango*, H2 Yachts’ *Hampshire 11*, Carabes des Mers’ *Sea Dream*, Lurssen Werft’s *Nord*, and Aurora Marine’s *Vertigo*.

Ro/Pax project completed at WestSea

The retrofit work on-board Balearia’s 24,760 gt ro/pax ferry *Martin I Soler*, has been completed at Portugal’s WestSea Viana, Viana do Castelo. The main work on this project included the replacement of the MAK 9M43C old diesel



(Above) The *Martin I Soler* in WestSea Viana and the hole cut in the vessel’s side for engine replacement

engines with new MAK 9M46DF dual-fuel engines and the installation of a 360 m³ LNG storage tank (approximately 30 m x 6 m) allowing the ship to have range autonomy of about 1,100 nm.

The installation of the tank was technically complex, the side of the ship had to be reinforced to open an access to the inner decks - several blocks were removed to insert the LNG tank and later welded again. Running on LNG, the ship will reduce by 30% her CO₂ emissions (saving about 9,200 tonnes/year) and will eliminate SO_x and PM emissions.

In addition, the necessary work was carried out to turn the vessel into a smart ship - *Martin I Soler* is now equipped with an innovated technological and digital system, thus improving the customer experience on-board.

WestSea is keeping busy with repairs, many of which from regular customers. Currently in the yard is BSM Hellas’ 16,427 dwt chemical tanker *Erika Schulte*, in the yard for tank coating in her 11 cargo tanks, BWM system installation and extensive drydock work.

Recently drydocking work has been carried out in three TSHDs from Denmark’s Rohde Nielsen – the 1,010 m³ *Viking R*, the 479 m³ *Toste R* and the 1,570 m³ *Trud R*, Naviera de Galicia SA’s 7,796 dwt general cargo vessel *Herbeira*, and Jan de Nul’s 6,200 dwt motor hopper dredger *Boussole*.

During latter May ACSM Spain’s OSV *Artabro* (ex *Bourbon Opale*) entered the yard for a special five year survey. In June, Grupo Bensúde’s 5,555 dwt containership *Furnas*, will enter the yard for normal drydock work, overhaul of cargo tanks’ hatch covers and complete overhaul of the main engine.

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New management team at Lisnave

There is a new management team at Portugal's Lisnave, Setubal. The team is headed by Managing Director, Nuno Miguel Ferreira de Almeida Antunes dos Santos. Nuno Antunes dos Santos was born in 1965 in Portugal and has a degree in Naval Architecture and Marine Engineering and an MBA.

He was at university, where he worked in Research & Development and as an Assistant Lecturer. Nuno then worked in three different shipyards in Portugal with different positions including:

- Production
- Design
- Planning
- Quality
- Sales
- Board of Directors

Nuno was also involved in other activities including:

- President of Colégio de Engenharia Naval da Ordem dos Engenheiros
- Member of the Board of Associação das Indústrias Navais
- Member of the Board of Comunidade Portuária da Figueira da Foz
- Member of the Board of Comunidade Portuária de Aveiro
- President of the Statutory Auditor Board of Lusitânia Fisheries
- Etc.

Most recently, Nuno was employed as the PIT Shipbuilding Specialist at Holland's Royal IHC. He leads a team, which includes - Luís Braga (Commercial Director), Helder Carita (Deputy Commercial Director), Miguel Santos (Sales Manager) and Claudio Danguês (Sales Manager).



Nuno Miguel Ferreira de Almeida Antunes dos Santos

Bollinger acquires Gulf Island Fabrication

US' Bollinger Shipyards, a privately held leading designer and builder of steel military and commercial vessels for the past three quarters of a century, has announced that it has acquired Gulf Island Fabrication Shipyard facilities, expanding Bollinger's new construction and repair capacity and capabilities to better serve its key defence and commercial customers. Financial terms of the transaction were not disclosed.

This acquisition creates expanded opportunities for Bollinger to better serve and deepen its relationships with key defence and commercial customers with an increased capacity for new projects and footprint, access to a larger workforce skilled in steel construction, improved efficiency and enhanced economies of scale. Current customers for Bollinger include the USCG, USN, General Dynamics-Electric Boat, and non-defence and commercial customers servicing energy production to dredging. Gulf Island had been building the Towing, Salvage and Rescue Ships (T-ATS) for the USN and Regional Class Research Vessels for the National Science Foundation and Oregon State University. These projects conveyed with the transaction.

"The addition of the new Houma shipyard further strengthens our position within the US defence industrial base as a leading shipbuilder and vessel repair company," said Ben Bordelon, CEO and President of Bollinger Shipyards. "For 75 years, we've developed a deep expertise in and proven track record of building reliable, high endurance steel vessels for the Coast Guard, Navy and our commercial customers. As the needs of these customers change and grow, we are constantly looking for ways to invest in and expand our capabilities and innovative solutions so that we can continue to provide them with the highest levels of quality, support and service in our industry."

"For three quarters of a century, Bollinger's greatest strength has and continues to be our people and their American ingenuity and quality craftsmanship. I am excited to welcome the Gulf Island Shipyard employees into the Bollinger family. Together, we will ensure that the 'Bollinger Standard' will be the high bar we measure ourselves against for superior quality and safety as we work to deliver the next generation of American made high-performance vessels for our government and



Gulf Island Fabrication

commercial customers."

The new Bollinger Houma facility encompasses 437 acres (1.77 kms²) on the west bank of the Houma Navigation Canal, of which 283 acres (1.15 kms²) is unimproved land that is available for expansion. The facility includes 18,000 ft² (1,672 m²) of administrative and operations facilities, 160,000 ft² (14,864 m²) of covered fabrication facilities and 20,000 ft² (1,858 m²) of warehouse facilities. It also has 6,750 feet (2,567 m) of water frontage, including 2,350 feet (716 m) of steel bulkheads. Located just 30 miles (48 kms) from the Gulf of Mexico, the strategic location provides short and unrestricted access to the newly acquired Houma facility from open waters.

The acquisition also includes a 15,000-short ton drydock, a 4,000-short ton drydock, a 3,000-short ton drydock, and a 1,500-short ton drydock.

Penzance Dry Dock to close

After being in service for the past 187 years, it looks like the end of the line for UK's Penzance Dry Dock, which will cease operations at the end of May this year unless a new owner/



Penzance Dry Dock

operator can be found.

Claimed to be the oldest commercial drydock in Europe, it has been operated since 2009 by The Isles of Scilly Steamship Group, which has decided not to renew its lease of the facility. This shipping and air transport company has regularly drydocked its 1,346 gt 1977-built passenger/cargo vessel *Scillonian III* and the 590 gt 1981-built pallet carrier *Gry Maritha* at this facility. In fact *Gry Maritha* was the last vessel to drydock in Penzance, as she underwent repairs during early May.

The graving dock in Penzance, a Grade II listed building, and measures 75 m x 12 m and is backed-up by a 106 m wet berth and a 50 m x 42 m covered workshop.

Pallentin retires from Lloyd Werft

Rüdiger Pallentin has stepped down as Managing Director of Germany's Lloyd



Rüdiger Pallentin

Werft, Bremerhaven to begin a well-deserved retirement. Carsten Sippel, who holds a degree in business administration, has succeeded him as the shipyard's now sole remaining Managing Director.

Rüdiger Pallentin started working for Lloyd Werft in October 1979 and was employed in a wide range of sectors for nearly 42 years. To begin with he spent some 10 years as a project engineer in costing and became head of that department in 1989. Design and ship-accounting were later added to his sphere of

responsibility before he was named Managing Director in January 2000 and spokesman for the Management in 2010.

During his more than 20 years as Managing Director, Rüdiger Pallentin's fundamental expertise as a graduate shipbuilding engineer along with his calm and clear style of leadership have skilfully guided Lloyd Werft - sometimes through stormy times. He distinguished himself through friendly dealings with employees and business partners on an equal footing, in which a touch of humour always had a part to play.

Apprentice recruitment at A&P

UK's A&P Group is recruiting its next intake of apprentices who will benefit from first class training and the prospect of a long career in the company. Apprenticeship opportunities are available at A&P Tyne and A&P Falmouth, across a number of departments including

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Apprentices at A&P Falmouth

marine engineering, welding, plating and health and safety. The scheme is open to anyone age 16 or over, with A&P welcoming applications from all ages.

Since the scheme was launched in 2008, A&P Group has trained more than 100 apprentices in specialist skills such as engineering, welding, procurement and health and safety and set them on the path for future success. A&P recruits at least 20 apprentices each year.

David McGinley, Chief Executive Officer, said, "Our management team is committed to building a sustainable future for A&P, and our apprentices play a significant role in developing our business in the future."

"At A&P we want our apprentices to grow in stature, learn from our current employees and build their lives upon a work ethic that promotes a good team ethos. The development of highly skilled trades' people has been a major contributor to obtaining the high level of credibility A&P has within the ship repair industry."

The vast majority of our apprentices have gone straight into full-time employment and many have been able to progress their careers with A&P Group as well as gain further qualifications.

Royal visit to H&W

Belfast's Harland & Wolff (H&W) welcomed The Prince of Wales during mid-May to mark its 160th anniversary. Arriving at H&W, His Royal Highness toured the yard, met with workers and signed the company Visitors' Book. During this ceremony, The Prince was then presented with

a framed photo of his late father, The Duke of Edinburgh, on a visit to the shipyard in 1977 along with an original copy of the 'H&W News' which featured The Duke of Edinburgh's visit. The Prince completed the visit by unveiling a celebratory plaque marking the 160th anniversary of the shipyard.

Addressing staff, The Prince commented, "I'm so pleased to hear that there is all sorts of potential new activity here and new fabrication opportunities, that could be really encouraging, and I hope you could encourage a lot more of the young to become apprentices and understand the importance of manufacturing, and to also understand how this country has led the way in so many of these areas."

"We owe all of you an enormous debt of gratitude for your skills and ingenuity, which are so remarkable. Well done all of you and thank you for all the hard work you put in."



Prince Charles at Harland & Wolff

Founded on April 11th 1861 by Sir Edward James Harland and Gustav Wilhelm Wolff, H&W's heritage includes work on some of the most iconic ships, including the famous RMS *Titanic*, RMS *Olympic* and HMHS *Britannic*, right through to the SS *Canberra* for P&O and the *Myrina* – the first supertanker built in the UK.

John Wood, Group CEO commented, "It has been a pleasure to welcome His Royal Highness onto site to commemorate our 160th anniversary. As one of the most iconic names in shipbuilding, this visit marks an incredible moment in our history. We have a great past, and now we're proud to be building a great future. Through our newly launched apprenticeship scheme, we will continue to pass on those skills and traditions and in doing so, put British shipbuilding back on the map. This is no mean feat but as one team, we will return H&W to its former glory."

H&W is a multisite fabrication company, operating in the maritime and offshore industry. Its Belfast yard is one of Europe's largest heavy engineering facilities, with deep water access, two of Europe's largest drydocks, ample quayside and vast fabrication halls. As a result of the acquisition of Harland & Wolff (Appledore) in August 2020, the company has been able to capitalise on opportunities at both ends of the shiprepair and shipbuilding markets where there will be significant demand.

In February 2021, the company acquired the assets of two Scottish based yards along the east and west coasts. Now known as Harland & Wolff (Methil) and Harland & Wolff (Arnish), these facilities will focus on fabrication work within the renewable, oil and gas and defence sectors.



(From left to right) Petter Frøystad, Technical Manager in HAV Design, Gisle Vinjevoll Thrane, Vice President Sales in HAV Design and Kristian Steinsvik R&D Manager in HAV Design

In addition to Harland & Wolff, it owns the Islandmagee gas storage project, which is expected to provide 25% of the UK's natural gas storage capacity and to benefit the Northern Irish economy as a whole when completed.

Modification work at Havyard

More than 120 vessels have been built using a HAV design. Now, HAV Design has been awarded its biggest redesign contract to date for major modifications to adapt a ship to changes in the market. The ship, built using a HAV design, will undergo considerable modifications that also require redesign and new detailed drawings. The 'new' ship is scheduled for operation in the first quarter of 2022.

The width of the ship will be extended by several metres, and a walkway, lift and tower will be installed so that it can take on more assignments and operate in more parts of the market.

Gisle Vinjevoll Thrane, Vice President

Sales of HAV Design says that the company expects more redesign and vessel modification assignments in the time ahead. "The reason is that some segments of the market do not necessarily need more ships, but better ships, as well as a general wish for more circular economy thinking and less use of raw materials."

Kristian Steinsvik, R&D Manager, says that for several years, HAV Design has been engaged in systematic development work to create tools and designs that meet increasingly stringent environmental requirements. "We have the expertise and tools required to design environmentally friendly ships that help our customers to become more competitive and profitable. We will now use the HAV Ocean Lab tools, such as the digital twin and simulation functionality, to improve and utilise the potential of ships that are already in operation."

Given HAV Design's history of deliveries, which extends far back in time, there are many ships that have been built using our own designs that can be adapted to changes in the market by means of new technology and further energy efficiency modifications.

Stringent requirements for cuts in emissions and energy consumption are also expected in many of the segments in which HAV Design operates in the years to come. These requirements will materialise as e.g. increased carbon tax.

"New environmental requirements and orders for emission cuts will result in challenges for the customers, which HAV Design can resolve through new technology and our knowledge of energy efficiency. This way, we increase our customers' competitiveness and help to steer the industry through the green transition."

Southampton expansion for Damen

Holland's Damen Shipyards Group has announced the expansion of its global service hub network with the opening of a new Service Hub in Southampton, UK. The Southampton Hub helps Damen Services provide customers in the region with a local point of contact, fast response times, and a personal approach.

The expansion of Damen's Service Hubs network is an example of the company's dedication and philosophy to 'think global - act local'. Via its internationally located hubs, the maritime services provider tailors its support offering to the requirements of the regional market. In so doing, it stimulates the development of a sustainable regional maritime industry, encouraging wider local employment, and skills development opportunities.

The Southampton Services Hub will provide Damen's clients throughout the UK with a wide range of solutions. Mick Nolan, manager of the new hub explains, "We are putting together a strong team of people to serve our customers in the area. We will also be working closely with locally based suppliers and service providers to ensure our UK-based clients are offered a comprehensive range of services. Damen enjoys a number of close and long-standing relationships with operators in the region and we are looking forward to building on this solid foundation. In the long-term we aim to develop our offering in the UK, extending it in order to support not only Damen vessel operators, but the country's maritime sector generally."

The Service Hub's broad scope will provide customers support with warranty and maintenance issues. From the hub, Damen

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Mick Nolan

international standards with a view to being able to offer a sustainable, responsible and affordable alternative for vessel owners with end-of-life maritime assets. There is also natural synergy with nearby steel production facilities, which can benefit from this new initiative.”

EEC’s Head of Middle East Operations Capt Soumitro Roy, added, “By combining EEC’s all round expertise in the shipping industry, ASRY’s geographic location and technical proficiency, and the proximity to major steel producers, we have an unique opportunity to give global ship owners a tangible solution for ethical vessel disposal.” Dutch-based EEC is deploying an OOR (Own, Operate, Recycle) model which provides exit options for owners wanting to retire their middle aged vessels.

There are significant cost savings from reduced energy usage, reduced wastewater generation, reduced slag production, and reduced emissions – all achieved by using vessel grade recycled scrap steel. Increased pressure on the steel industry to comply with environmental regulations, demand for LEED steel and also a need for the top players to improve their sustainability reputation, will drive greater demand for green steel projects. ASRY and EEC’s initiative aims at vertically integrating this sector by synergising the needs of the ship owners, the yard and the ultimate end beneficiary, the steel mills.

These initial statements of compliance to the Hong Kong Convention and European Union Ship Recycling Regulation, plus the ISO 30000 certification are the foundations of the journey targeting the first vessel to be recycled to global environmental standard in the Arabian Gulf



Bahrain’s ASRY

will also provide a range of training courses to its clients, including vessel familiarisation and maintenance. The services and accessibility offered by Damen’s UK Hub are paired with a wealth of information and connectivity accessible via the MyDamen web portal.

With this, customers can access vessel information, drawings, part information, and part ordering, allowing for fast, easy, and efficient communications between customers and their Damen Services partner.

As with all Damen’s Service Hubs, the Southampton location will be supported by the Damen organisation in the Netherlands, which ensures a consistently high standard of service around the world.

ASRY achieves environmental compliance

Bahrain’s ASRY has achieved compliance with the three highest global environmentally-conscious ship recycling certifications, the Hong Kong Convention, European Union Ship Recycling Regulation and ISO 30000, after being audited recently. These are the latest steps in the shipyard’s programme, in collaboration with the Netherlands-based Elegant Exit Company (EEC), to be able to offer certified best practice green steel recycling. Together, the two firms are aiming to create a leading hub for vessel recycling in the Arabian Gulf at ASRY, by complying with the highest ship recycling standards.

“As ASRY continues on its modernisation drive,” commented ASRY Managing Director, Mazen Matar, “environmental sustainability is a vital part of the facility’s future operations. As a responsible member of the maritime industry, we must not tolerate harmful and dangerous practices of ship recycling, which are common practice across the globe. We have now achieved compliance with the strictest

during the second half of 2021 at ASRY, with a view to increasing capacity, efficiency and turnaround in the succeeding months.

New repair facilities on Canada’s west coast

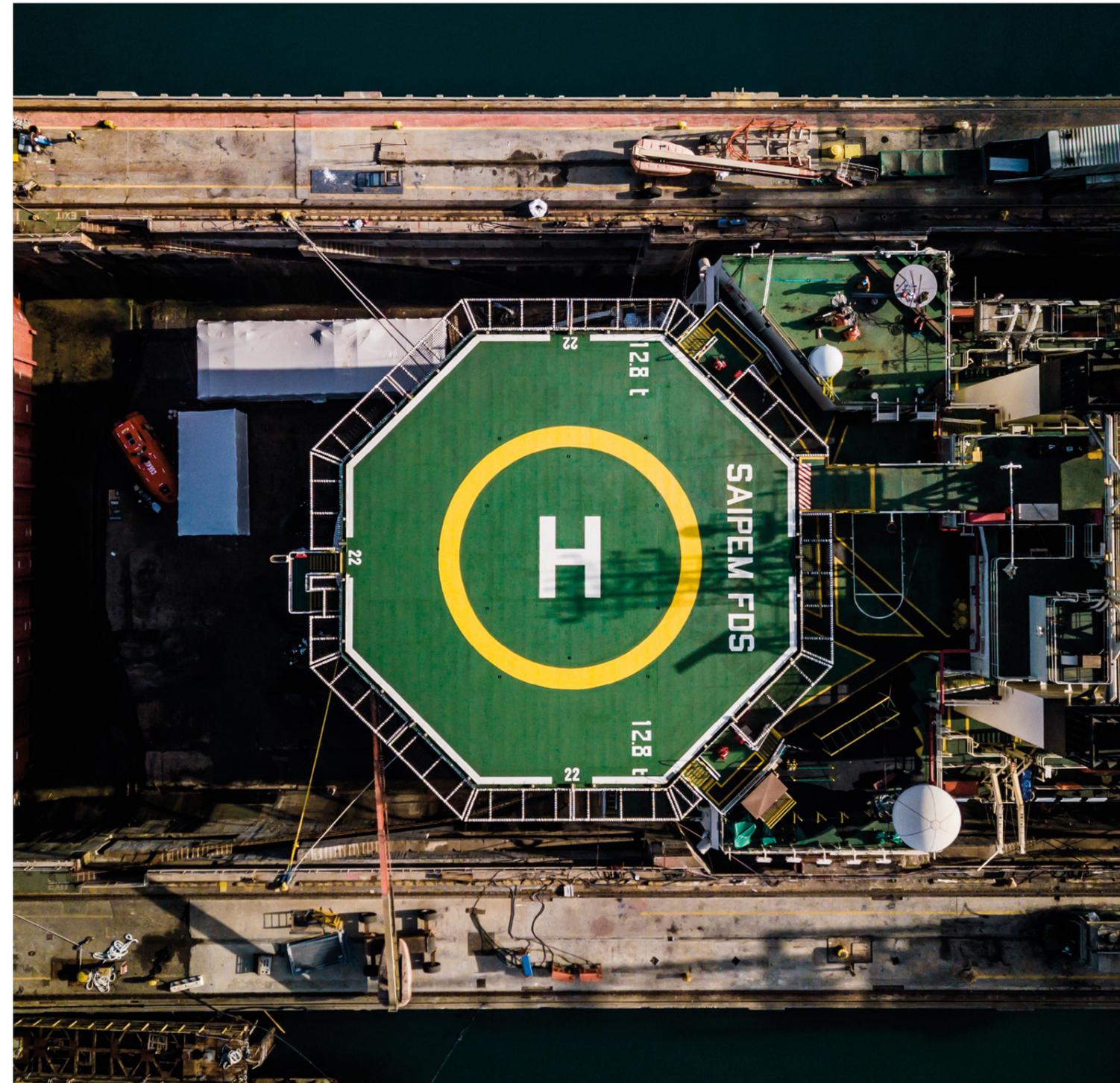
Canada’s Point Hope Maritime, situated in Victoria, British Columbia, is to build a C\$50m graving dock at its current facility at Harbour Road. The new drydock will be able to accommodate vessels up to 170 m in length and with a maximum draught of 6 m.

This means that the new graving dock will be able to accommodate most of the vessels in the Canadian Coast Guard fleet, some Royal Canadian Navy vessels, as well as many of the BC Ferries fleet.

Meanwhile, Canada’s Public Services & Procurement Canada (PSPC) has called for Requests for Proposals for the extension and repairs to the Esquimalt Graving Dock, located adjacent to Victoria, capital of British Columbia. The work scope will involve repairs and refurbishment of the existing dock floor and walls, as well as the extension of the graving dock at its eastern end by 36 m, thereby increasing capacity by 20%.

The Esquimalt Graving Dock was built over 100 years ago and is a multi-user facility, owned and managed by Public Works & Government Services Canada. The drydock is the largest non-military owned repair facility on the west coast of the Americas, measuring 357.5 m x 38.4 m. **SORJ**

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The HullWiper support boat in Pusan

New location for HullWiper

Dubai's HullWiper has launched operations at its newest location - South Korea. Through a partnership with HullWiper Korea, a company based at the Korea Maritime and Ocean University in Busan, it will provide green, sustainable and affordable hull cleaning solutions to all vessel types calling at the country's main ports.

Hull cleaning in South Korea is highly regulated to prevent illegal operations performed by divers contaminating local waters with biofouling. HullWiper offers the most eco-friendly solution using Remotely Operated Vehicles (ROVs) to remove and collect all debris from hulls without releasing them into the sea.

By deploying two ROVs simultaneously, HullWiper saves time for ship owners and operators as cleaning can be performed in half the time needed for a single ROV. HullWiper Korea has also designed and developed the 'Esther', an eco-friendly vessel to transport the

two ROV units to ports in Busan, Ulsan, Pohang, Masan, Jinhae, Yeosu and Gwangyang. The combination of the fast-moving 'Esther' transport vessel and the two ROVs enable a capesize vessel's hull to be cleaned within eight hours. Recent hull cleans for vessels currently in cold and hot lay ups due to the COVID-19 pandemic have shown remarkable results in terms of fuel savings once they are reactivated after being cleaned.

HullWiper's cost-effective, brush- and diver-free approach is an alternative to traditional methods and protects both vessels' expensive anti-fouling coatings and marine ecosystems. HullWiper's ROV is 100% environmentally friendly with all pollutants removed during cleaning and collected by a unique on-board filter unit for safe disposal onshore. The system uses adjustable seawater jets as the cleaning medium, instead of brushes or abrasives, to minimise the risk of damaging coatings. Removing fouling from vessels' hulls results in optimal performance, energy efficiency and reduced CO₂ emissions, while avoiding the expense of recoating in case of damage. In addition, no divers are used, limiting risk

to human life, and allowing cleaning to be conducted day or night, in most weather conditions, and while cargo operations are underway.

"Extending the HullWiper family into Korea makes perfect sense," says Simon Doran, HullWiper Managing Director. "Korea has industry leading new-build shipyards, and is a major location for all types of shipping from ro/ro vessels to LNG tankers. Supporting our Principals with the option of another location increases our global footprint and helps them reach their sustainability targets."

"Time is money for shipping lines," adds Byungsoo Yoon, HullWiper Korea Managing Director. "The launch of our operations will correct decreased voyage speed and reduce high fuel costs due to fouled hulls for vessels calling in Korea, it will also enhance the green corporate image for ship owners, operators and shipping lines."

Mr Yoon highlights that while the cost of cleaning with the HullWiper is similar to that charged by diving companies, the turnaround result differs significantly - traditional methods can take up to five days to complete a full hull

clean, compared to the matter of hours it takes with HullWiper.

HullWiper Korea joins the fast-growing global network of hubs operating under HullWiper's lease agreement, which was introduced in 2017. Since its launch in late 2013, HullWiper has expanded from its first base in Dubai to key locations across the Middle East, as well as ports in Australia, Denmark, Egypt, Gibraltar, Mauritius, Namibia, Norway, Panama, Singapore, Sri Lanka and Sweden.

Miko Marine's first magnetic blanking leaves for Brazil

The first magnetic blanking set destined for the Brazilian offshore sector has left the Miko Marine fabrication plant in Haugesund, Norway. After six weeks of manufacture, the set is now en route to the DSIC yard in Dalian, China. It will then be installed aboard a new Floating Production Storage and Offloading (FPSO) vessel being completed by Japanese platform builder MODEC. On leaving Dalian the new FPSO will be moved to the Bacalhau field offshore Brazil where it will be operated by Equinor.

The new blanking set consists of four cofferdams that can be used for covering sea chests and three inlet pipe covers. Featuring Miko's distinctive black on yellow trade mark colour scheme, their unique magnetic attachment system enables them to be quickly fitted over a hull opening by divers or ROV. They create an immediate water-tight seal without the need for any welding or hull attachments and can be quickly removed for recovery and storage until needed again. The ability to enable repairs and maintenance to be conducted without dry docking is seen as a major cost benefit and necessity for rigs and platforms which can remain on-station throughout.

Cato Stoll, managing director of Miko Marine, believes the delivery operation marks the completion of an important contract for Miko. "This is the culmination of a great deal of hard work and the application of detailed expertise by the Miko design team," he said. "The team's specialised knowledge and experience ensures that the magnetic blanking set will function safely and reliably for many years to come. When the new FPSO is on station offshore Brazil it will possess an operational cost benefit that is unique among

FPSOs in the region.

"Designing and manufacturing the blanking set while the FPSO was under construction provided us with many benefits in terms of convenience and ease of work. Nevertheless, we frequently provide the same service as a retro-fit for ships and platforms whose operators want to avoid the cost and complications of ad hoc blanking contracts," he said.

Miko Marine has developed considerable experience in the design and manufacture of hull closures and cofferdams and has particular expertise in the use of magnetic technology. Each cofferdam or pipe blank is kept in place by a configuration of powerful Miko MAM permanent magnets. With each magnet being capable of holding up to 1000 kg it is possible to achieve an immediate watertight seal for the closures without the need for any other fastening devices being fitted to the hull.

The Miko MAM range also offers magnets with holding powers up to 2,000 kg which can be used if a project demands it. Flotation material is integrated within the blanking plates and this makes them neutrally buoyant and easily handled under water by ROV or

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divers. Each magnet is attached to its closure by a flexible joint that enables the plate to be



The Miko Marine cofferdam and the pipe closure

Underwater Repairs

manoeuvred and positioned precisely against the hull before it is tightened into place. When the repair work is finished the magnets are simply freed by having their release lever rotated by a diver or ROV, enabling the blank to be quickly retrieved by crane and stored on-board.

Miko Marine is based in Oslo, Norway, from where it also provides a range of unique salvage and support products for the marine industry. Most widely known is its range of magnetic plasters which can be used to seal hull damage and enable a vessel to be moved safely to a yard for permanent repair. The company's most recent innovation has been the Moskito oil recovery tool that was recently introduced as the first device that can enable bunker fuels and other hydrocarbon cargoes to be quickly and easily extracted from the tanks of sunken vessels.



Hydrex divers operating in Finnish waters

of a 144 m general cargo vessel were bent. Hydrex mobilised a team to straighten the blades using the same procedure as on the vessel in Rotterdam. They travelled through the snowy landscapes with two vans and the needed equipment to the ship's location.

During the operation the divers had to work in water filled with chunks of ice, but these conditions offered no problem for them. They are used to adapt to different circumstances and carried out the repair without any loss of quality.

If straightening is not an option, the affected area on the blade will be cropped. By doing this the greatest possible efficiency is achieved for

the vessel. This was the case for the operations described below.

With all four blades of a 235 m bulker's propeller severely damaged after impact with ice, the engine was overloading. Hydrex was asked to perform an on-site repair during the ship's stop in Rostock, Germany.

After the equipment arrived at the vessel's location, the team started the underwater operation with a detailed survey of the affected propeller blades. They then used the information acquired during the inspection to calculate and determine the correct measurements needed to crop the blades.



Preparing the bow thruster in Zeebrugge for reinstallation during nightshift

International work by Hydrex

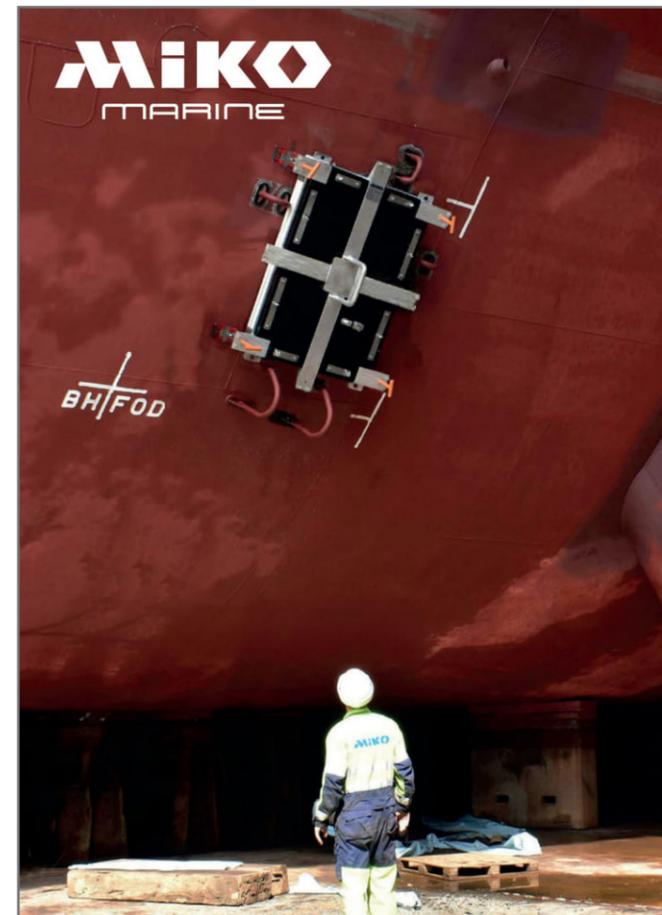
In just over a week Hydrex's diver/technicians travelled to Finland, Germany, the Netherlands and France to assist shipowners with damaged propeller blades. On two bulkers the blades were cropped while on a third bulker and a general cargo vessel the bent blades could be straightened. In all cases the best solution was offered to the customer to restore the propeller's efficiency as close to the original condition as possible.

One of the propeller blades of a 180 m bulker was severely bent. A fast, on-site solution to restore the propeller's balance and efficiency was needed. Hydrex therefore sent a team to the ship's location in Rotterdam along with a workboat.

After the equipment arrived the team started the operation with a detailed survey of the ship's propeller. This revealed that one of the other three propeller blades was also bent slightly. It was decided to straighten this blade as well.

With the survey completed and in close communication with the team leader in the monitoring station on-shore, the divers returned the bent blade to its original state. When the straightening was complete, the technicians polished the blade to make sure that any remaining loss of efficiency would be minimal. The same procedure was then repeated on the other damaged blade.

The conditions for a similar repair in Tornio, Finland were a lot less warm. All four blades



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* Installed by divers or ROV

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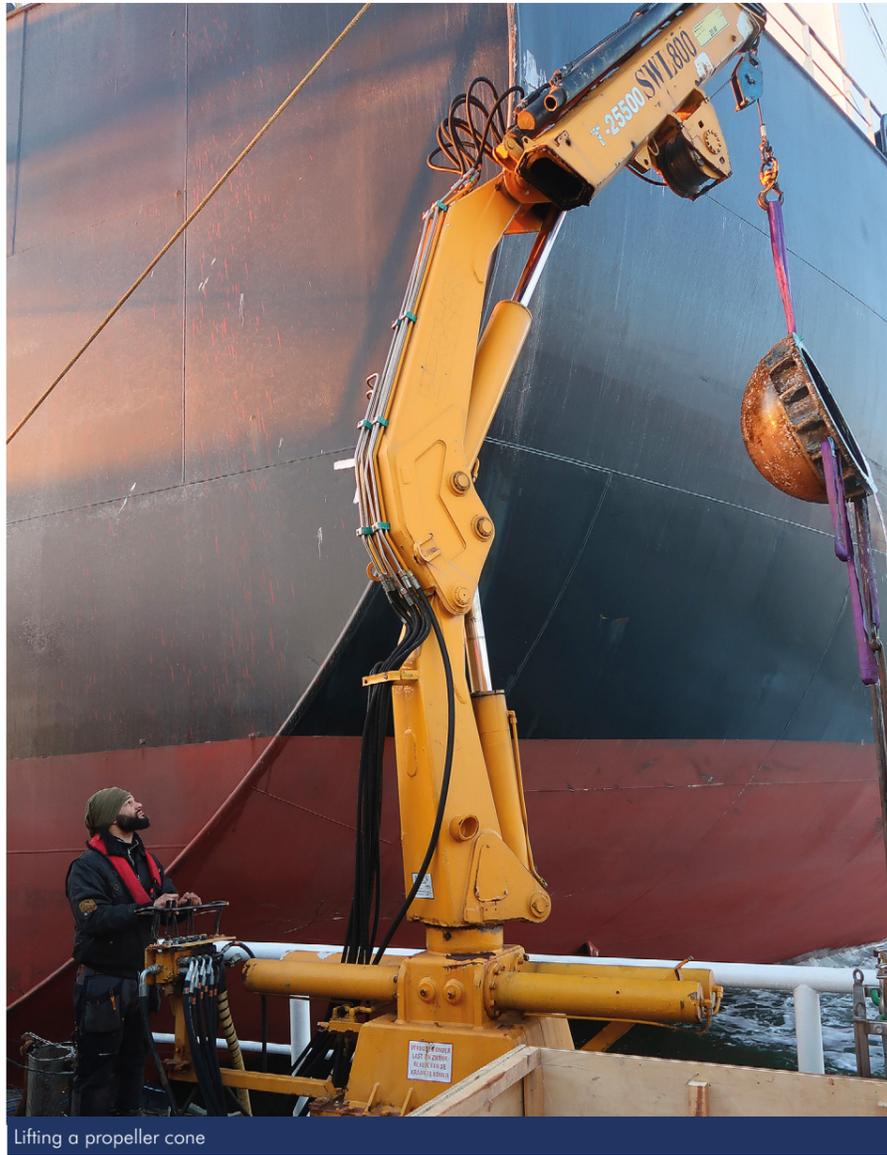


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The fouling it removes is collected by an onboard filter unit to avoid pollution or releasing invasive marine species into the ocean.

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Lifting a propeller cone

Next the divers cropped the blade tips. When the cropping was complete, the blades were smoothed. The five-blade propeller of a 229 m bulker had unfortunately suffered a similar fate. An identical repair was carried out by the diver/technicians in Dunkerque. The result of the operation was also the same - the propeller's balance was restored and the efficiency was brought back to optimum condition.

Hydrex also recently performed afloat bow thruster operations on container ships in Belgium and Spain. In Algeciras a thruster was removed on a 306 m vessel and in Zeebrugge a unit was reinstalled on a 135 m ship. All the necessary equipment was mobilised from the company's fast response centre in Algeciras for the operation in Spain.

After the team set up a monitoring station, the diver/technicians detached the blades one by one. In the meantime preparations were made in the bow thruster engine room for the underwater removal of the unit to avoid any ingress of water once it was taken out.

The next step was to secure the gearbox with hoisting equipment. The team then disconnected the unit from the bow thruster engine room and lowered it onto a cradle. This cradle was designed especially for such operations. The bow thruster was then brought to the surface. Simultaneously they sealed off the tunnel from the bow thruster room. Once the unit was lifted onto the quay it was prepared for transport to the workshop.

The ship in Zeebrugge could be trimmed

enough to raise most of the bow thruster tunnel above the water. This allowed Hydrex to manoeuvre the thruster unit inside the tunnel with the propeller blades already installed.

Next, temporary metal plates were used to seal off the bottom of the tunnel. The divers could then empty the remaining water and perform the required welding work on the thruster brackets and the tunnel grids in dry conditions.

Recently, Hydrex installed propeller cone fins on two chemical tankers - one in Antwerp and one in Rotterdam. Both operations were carried out with the company's dive support workboats. Stationed in these ports, they allow for immediate mobilisation.

A direct result of these underwater operations is that an owner can instantly start benefitting from the fuel savings a propeller cone fin brings. The owner does not have to wait until the next scheduled drydocking for the installation.

Propeller caps like these can recover energy loss of a propeller hub vortex in the propeller's slipstream. This decreases fuel consumption from 3% up to 5% according to the manufacturers and reduces cavitation on rudders and hulls. Hydrex can install propeller cone fins underwater on any size and make of propeller, on both newbuild and in-service vessels. Hydrex carries out these operations following the specific procedures required by the involved OEM, adapted for an underwater installation.

After a preliminary inspection the divers remove the propeller cap and clean the flange where the device is to be installed. They then lower the propeller cone into the water and position it on the propeller. The bolts are put on the correct torque and secured. Hydrex teams can work in shifts around the clock to finish the operation as quickly as possible.

The owner of the vessel can start enjoying the fuel savings the propulsion improving device creates right away. Not having to wait for the next scheduled drydocking to have the propeller cone fin installed can win him up to four years of fuel savings. In contrast, he will have earned back the cost of the underwater installation in only a few months. The savings are considerable.

Meanwhile, Hydrex performed afloat bow thruster operations on containerships in Belgium and Spain. In Algeciras a thruster was removed on a 306 m vessel and in Zeebrugge a unit was reinstalled on a 135 m ship. All the necessary equipment was mobilised from Hydrex's Algeciras fast response centre for the operation



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The new insert installed on the containership

in Spain.

After the team set up a monitoring station, the diver/technicians detached the blades one by one. In the meantime preparations were made in the bow thruster engine room for the underwater removal of the unit to avoid any ingress of water once it was taken out.

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The ship in Zeebrugge could be trimmed enough to raise most of the bow thruster tunnel above the water. This allowed our team to manoeuvre the thruster unit inside the tunnel with the propeller blades already installed. Next temporary metal plates were used to seal off the bottom of the tunnel. The divers could then empty the remaining water and perform the required welding work on the thruster brackets and the tunnel grids in dry conditions.

Ever since Hydrex was founded in 1974 it has strived to keep the impact of repairs for the owner as minimal as possible. By performing these thruster operations afloat, divers made it possible for the owners to keep their vessels out of drydock and avoid downtime.

Hydrex worked in shifts around the clock and finished the jobs within the available time frames. This allowed the ships to sail on schedule, which was a key benefit for the customers.

Over the last few months Hydrex has travelled across Europe to perform hull repairs on a wide range of vessels, including a cruiseship, a container vessel, a drill ship, a ro/ro vessel and a tanker.

In Rotterdam Hydrex divers performed insert repairs on a 145 m tanker and a 300 m containership. These operations were carried out afloat with the use of an external cofferdam.

A wide range of standard cofferdams is available at the Hydrex offices, but a tailor-made cofferdam can also be created to fit a specific hull shape. This was the case for the insert repair on a 228 m drill ship in Palermo, Italy.

Hydrex divers started an insert operation by installing a cofferdam on the waterside of the affected plating. Next they remove any frame, pipe or other obstacle covering the area on the inside. The damaged plating is cleaned and prepared for the operation.

A section of the damaged plating is then removed. The size of this area is decided in communication with the classification society and the owner. Next the team prepares the edges of the hole for the insert and they position the new plate. The insert is then welded following the Hydrex procedure for insert plates,

using a full penetration weld.

Next an independent inspector carries out ultrasonic testing and the repair is approved by the classification surveyor who is present during the operation. Finally the diver/technicians reinstall any obstacles they removed and detach the cofferdam from the hull.

For smaller damages like crack repairs, it is not always necessary to install a new insert. This was the case for a 180 m ro/ro vessel in Zeebrugge, Belgium that had a leak in its ballast tank. Because the Hydrex fast response centres have a large stock of state-of-the-art equipment ready, mobilisation for smaller operations like this can be almost immediately.

When the work area was certified gas free, the divers started the operation with an inspection of the damaged area and this on both sides of the hull. Next the team installed a cofferdam on the outside of the hull. This allowed them to perform work on the crack inside the ballast tank without water ingress. The team then removed the frames to get access to the crack and take the exact measurements - 510 mm. The crack was ground out over its entire length and filled with our class approved full penetration welding.

The repair was inspected and approved by the attending class surveyor. It was concluded by removing the cofferdam. As a result of this temporary repair the owner of the vessel did not have to go off schedule for an emergency visit to drydock but could make arrangements for a follow up repair at a more convenient time and location.

Double Bow Thruster removal by SGS

A valued client contacted US-based Subsea Global Solutions (SGS) requiring underwater support to remove two of its existing bow thrusters during the vessel's port call in Long Beach, California. The client indicated that they would not be replacing the thrusters at this time as no spares were available, as such SGS was asked to remove the damaged thrusters and install class approved blind covers over the hull openings. All work needed to be done during the vessel's cargo operations and in a dry environment (underwater) to avoid potential oil spills and sea water ingress through the propeller hub. Considering SGS has had a history with this vessel and its owners, and having performed hundreds of similar thruster

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Hydrex performs complex permanent underwater repairs to thrusters, propellers, rudders, stern tube seals and damaged or corroded hulls. By creating drydock-like conditions around the affected

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The double thruster being removed

removal and installations afloat in the past, we already had the related equipment and special tooling ready to execute the work as well as the means to palletise and ship the damaged thrusters out of our work shop in Long Beach.

The SGS centralised Technical Repair Department and SGS Long Beach worked closely with the bow thruster OEM and vessel owners to outline our unique thruster removal procedure afloat and once the procedure and risk assessment were approved by the relevant parties, we planned to complete the project working around the clock in 11 x 12-hour shifts with a team for each thruster unit. Each team was composed of a topside technical team with three commercial diver technicians, two commercial diver/welder technicians, and one dive supervisor along with a floating project manager from SGS Long Beach.

The project began with the dive team installing 10-ton pad eyes in and above the thruster tunnels using underwater welding procedures in accordance with the Class A requirements of AWS D3.6M: Underwater Welding Code in the overhead (4F) and vertical (3F) positions. In conjunction with the main rigging points, 1-ton pad eyes were installed in the thruster tunnels for the thruster blade removal. All four blades needed to be removed

prior to removing the thruster unit. The divers installed thruster habitat doors on both sides of the thruster tunnels and de-watered the tunnels with compressed air so the thruster blades could be removed and the blind cover plates could be installed on the blade openings.

In parallel, our internal team was disconnecting shaft couplers and rigging the thruster E-motors to pre-fabricated cradles to gain access to the top of the thruster mounting flange for each thruster. They installed an onsite SGS designed thruster dome/cofferdam that incorporates a unique centre cabling system with a pressure safe packing gland that enables a rigging cable to be shackled to the lifting eye of the thruster pinion shaft. This allows the internal team to lower the full weight of bow thruster unit safely with no water ingress in the bow thruster room. Once the bow thrusters were lowered enough to clear the pinion shafts, the loads were transferred from the centre cable to the underwater tunnel rigging, and then transferred to a 10-tonne lift bag, and finally to a pier side crane that could safely retrieve the bow thruster units.

With both thrusters safely on the pier, the commercial dive teams prepared the sealing surfaces in both tunnel thruster openings by cleaning the mounting flanges and installing

new O-ring seals. They rigged each blind cover plate into position with alignment pins using the centre rigging cable through the thruster dome so the internal team could raise the blind covers into position and seal off each opening with 5-tonnes of internal pressure. The internal team could now safely remove the thruster dome and install the original thruster mounting bolts to the OEM torque specifications.

The vessel was able to sail with no restrictions after a final inspection with Class. The benefits of removing a damaged bow thruster afloat are many. The customer was able to prevent further damage to the bearings and gears caused by the presence of sea water in the gear housing and the procedures allows the units to be overhauled prior to the vessels next dry-dock—or, they can be re-installed afloat by SGS, which would help to eliminate the need for additional tug cost.

Having a centralised Technical Repair Department makes a difference when managing complex underwater repairs on a global scale, as it allows SGS to ensure both our Clients and Class receive the same familiar experience from SGS they are used to, regardless of where the project is taking place. Stay tuned for our second part of this article related to the installation of the overhauled thrusters. **SORJ**



The thrusters being taken away



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Machinery Repairs

Teekay to deploy ABB Turbocharging's diagnostics software

Teekay Marine is deploying ABB Turbocharging's engine diagnostics software to deliver deeper insights at fleet level. Teekay will roll out Tekomar XPERT for fleet, including the software's new CO₂ emissions indicator, across 54 Suezmax and Aframax tankers. The company, which has used Tekomar XPERT to monitor its vessels engines since 2015, will now be able to access deeper insights into fleet-wide engine health and performance as well as at-a-glance CO₂ emissions data.

While Tekomar XPERT monitors the engines on an individual vessel to deliver diagnostics and advisory, Tekomar XPERT for fleet includes a management tool which enables benchmarking across the fleet, highlighting further opportunities for optimising engine operations. The company will be able to access data, including fleet-wide engine health and annual CO₂ emission savings potential, through the Tekomar Fleet Portal. Information will also be integrated into Teekay's Vessel Balanced Scorecard, a proprietary tool that collects data generated by operations systems into a daily digital dashboard for each vessel.

"By proactive diagnostics and maintaining optimum engine performance across the fleet Tekomar XPERT not only enhances reliability and voyage performances but also assists meeting our emission targets. We thank ABB for developing such a pragmatic and user-friendly solution," said Manoharan Jeganathan, Vessel Manager, Teekay Marine.

"Advancing Tekomar XPERT from vessel to Tekomar XPERT for fleet will take Teekay's opportunities for engine optimisation to the next level," said Mauro De Micheli, Head of Sales, Marketing and Partnerships, ABB Turbocharging.



The ABB Tekomar XPERT system



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Tekomar XPERT deploys unique engine performance evaluation combined with turbocharger expertise, gathered through ABB's wide base of turbochargers in service across thousands of different engine installations. The software empowers ship operators with key engine indicators provided via intuitive dashboards, allowing them to monitor, optimise and benchmark engine performance while giving early warning of potential engine problems. It is built on ABB's Ability platform, with the highest standards of cyber security.

P&S Automation wins commercial and naval contracts

During this year (2021), UK's P&S Automation, headquartered in Maldon and started in 2003,

has been involved in the scheduled repair of the two 140,000 m³ LNG tankers – the *Arctic Discoverer* (March) and *Arctic Voyager* (May), while the ships were in Spain's Navantia Repairs – Ferrol Estuary Shipyard. Both ships are technically managed out of London by K Line LNG (UK) Ltd.

P&S was involved in servicing the engine room control and monitoring systems as well as the installation of an upgraded control system for the N2 Generator. A team of four technicians from P&S was on-site during each repair operation.

Also during March this year, P&S was involved in the repair of Hansen Aggregates Marine's 2,739 m³ TSHD *Arco Beck*, while she was in drydock in Turks Shipyard, Chatham, on the River Medway. Work on this ship involved the supply and installation of their clutch control panel, which replaces the original wholly pneumatic systems with a much more reliable combination of Power Pneumatics, solenoid valves, electrical relays and timers.

Another recent client has been UK's Gard Line, involving the supply a new DP alert system,



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on-board the 1,599 gt seismic research vessel *Horizon Discoverer*. This equipment is a proven product line for P&S Automation.

The company is well experienced at offering programmable logic controller (PLC) based systems to retrofit obsolete ship control systems for all types of equipment on-board from windscreen wipers to ramp controls.

The major client of P&S Automation is MoD's RFA, RN & SERCO ships, which are normally repaired by Cammell Laird, Birkenhead and the Falmouth yard of the A&P Group. The P&S HarbourWatch system has been installed on-board all the RN's P2000 training vessels and several other ships that are not manned 24/7. This system allows for alarm messages to be sent through to the mobile telephones of the duty officer.

Work on-board two RFA vessels, the helicopter-support vessel *Argus* and the MARS tanker *Tideforce* have recently been underway, work including the upgrade of oil mist detection equipment on the ships' generators and the bow thruster control system. The *Argus* has been in A&P's Falmouth shipyard and the *Tideforce* in Cammell Laird.

A former Bay Class RFA vessel, the *Largs Bay*, which was sold to the Royal Australian Navy and renamed HMAS *Choules*, will have a Mexifloat winch control system installed by P&S during 2022, the same system already installed on-board three Bay Class vessels, which are still part of the RFA.

One of the largest projects recently undertaken by P&S involved the RN Survey Vessel *HMS Scott*, work including the installation of a new Machinery Control & Surveillance System (MCAS) to replace the aging Decca Isis system, along with a new Power Management System (PMS) to replace the obsolete Megacon equipment.

P&S is UK agent for Sweden's Brannstrom Elektronik AB, manufacturers of the well-known Oil Discharge Monitoring Equipment (ODME) and 15 ppm alarms, among various other products. Brannstrom are the first company to have the ODME approved for bio-fuel blends, and P&S' engineers are trained to service and maintain its equipment. P&S works very closely with Brannstrom to ensure that our customers receive the best advice and assistance when working with their products.

P & S are also UK agent for Denmark's Green Instruments A/S, who are a market leader in the manufacture and sale of cost effective analysis, monitoring and protection equipment for marine and land based industries. Green Instruments products cover emission control,

atmospheric oil mist, water and gas analysis, hazard detection and machinery protection.

P & S Automation Limited specialises in instrumentation, control and automation systems for marine and land based industries, in the UK, Europe and World-wide. P&S is accredited to ISO9001:2015 and Safe Contractor Approved

The company services include:

- Planned Maintenance
- Repairs to our and third party equipment
- PLC systems design and modification
- Diagnostics and trouble-shooting of complex issues
- Calibration of field devices
- Software writing, adaptation, and back-up protocols
- Repairs to PC work stations
- UPS Supply and Installation
- Design & replacement of obsolete equipment & systems.
- Power management systems, generator sets, drives
- Design & customisation of display panels
- Pneumatic & hydraulic controls and instrumentation
- Remote-controlled systems
- Supply of spares

CCG chooses Thordon Bearings

Thordon Bearings and Heddle Shipyards have successfully completed a retrofit project to replace the shaft seals and bearings on-board the Canadian Coast Guard (CCG) icebreakers *CCGS Caribou Isle* and *CCGS Ile St. Ours*. The vessels represent not only the first reference for Thordon's TG100 SRTP shaft seal on-board a CCG vessel, but also the growing importance of Ontario's promising maritime partnership in facilitating CCG requirements.

"Our larger bearings and seals are commonplace across the CCG fleet, with almost every icebreaking vessel using Thordon tailshaft bearings," said Scott Groves, Thordon's VP- Sales, "but this is the first time the smaller TG100 shaft seal has been installed."

Each Near Coastal Class 1 specialty vessel was fitted with a pair of water lubricated XL propeller shaft bearings and a TG100 forward shaft seal. With a history of collaboration with local manufacturers, Heddle Shipyards, one of the largest operators of ship building yards and drydocks in Canada, was surprised that CCG was considering non-native seals for these federal vessels.



A new electrical system being tested in Maldon prior being installed on HMS Scott in A&P Falmouth

"When *CCGS Caribou Isle* entered drydock early last year, Heddle Shipyards recommended getting seals from a local supplier," said Groves.

Ted Kirkpatrick, Business Development Director, Heddle Shipyards, explained, "It seemed logical. We were fitting Thordon's XL bearings anyway, so we mentioned the TG100 seal from a manufacturer with whom they already have an established relationship."

After successfully operating the TG100 on-board *CCGS Caribou Isle* for most of 2020, to roll out supply to sistership *CCGS Ile St. Ours* – which left Heddle's Hamilton drydock in March 2021 – was a logical choice.

"Heddle's experience servicing and installing Thordon equipment is one of the reasons the CCG continues to trust the Thordon/Heddle team," said Kirkpatrick. "They know they will receive a quality product and quality workmanship that will stand the test of time."

Heddle, which operates three shipyards in Ontario, and Thordon, one of the province's largest marine equipment manufacturers, form a strategic maritime partnership that Groves has dubbed 'Team Ontario'.

Ontario is one of the biggest economies in Canada. There is such a vibrant marine industry in this province, and here is two Ontario companies working together to get a good result for the Federal government and taxpayer.

Heddle Shipyards, which also has shipbuilding and repair capability in Newfoundland and Nova Scotia, relies heavily on local material suppliers and subcontractors. "Locally sourced equipment affords both the shipyard and the end user with greater access to the manufacturers' support," Kirkpatrick said.

Both Groves and Kirkpatrick believe that Team Ontario is well placed to facilitate federal procurement requirements relating to the government's CAN\$100bn fleet renewal programme.

"Companies like Thordon and Heddle have

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The two CCG vessels in Heddle Shipyard

proven time and again that Ontario shipyards and marine equipment manufacturers are second to none when it comes to performance, reliability and quality of workmanship," said Kirkpatrick. "Team Ontario stands ready to support the Canadian Coast Guard's newbuild and vessel life extension programmes with quality products and services over the life of the vessels."

Meanwhile, the 34,864 dwt dry bulk carrier *Captain Henry Jackman*, which China's Jiangsu Yangzi-Mitsui shipyard delivered to Algoma Central Corporation in April, will begin trading on the Great Lakes-St. Lawrence Seaway in June with a water lubricated shaft arrangement from Thordon Bearings. The state-of-the-art vessel, Algoma's fifth Equinox Class of gearless bulkers and tenth Equinox design to enter service, is the 38th Algoma vessel to which Thordon has fitted its zero pollution bearings.

Thordon's scope of supply to the new Equinox includes a COMPAC water lubricated stern tube bearing and ThorShield anti-corrosion coating for a 630 mm (24.8 in) diameter, 1,045 mm (41.1 in) long section of the tail shaft, a Thordon Water Quality Package and the company's new Bearing Condition Monitoring (BCMv2) system. Thordon's distributor and engineering partner in China, CY Engineering, supplied and machined the bearing and oversaw system installation and commissioning.

TED completes *Pride of Kent* project

Tyneside-based Tyne Electro Diesel (TED) has recently completed a repair project on the main propulsion system on-board P&O Ferries' 30,365 gt ro/pax ferry *Pride of Kent*, while she was under repair in A&P Tyne.

The main propulsion system on-board this ship comprises four Sulzer ZA40S diesel engines. TED was asked to conduct operations on the fuel pumps on the port inner and port outer main engines. A total of 16 fuel pumps were overhauled using genuine components, which were dynamically tested on TED's OEM standard bench. TED also worked on 16 fuel injectors, which were also overhauled using genuine components and tested to OEM specifications. All the high-pressure fuel pipes and fuel tubes were overhauled including reworking high pressure faces and pressure testing.

TED has recently completed a move to a 1,858 m² (20,000 ft²) premises on Walker Riverside by the Offshore Technology Park. Earlier this year, TED took delivery of a new Merlin S9000 fuel injection test bench, which increased the offer for off-highway and plant sectors with the addition of Perkins/Caterpillar

applications C7, C9 & Navistar.

Established over 25 years ago, the company has built its global reputation for diesel fuel injection engineering in the marine, offshore, power and rail sectors. It is now expanding to provide its services to the 'off highway' sector including earth movers, diggers, generators and any diesel plant as well as truck and bus engines.

TED utilises OEM standard fuel injection test equipment, which is manufactured in the UK by our sister company, Merlin Diesel Systems. Before any fully reconditioned products are released, it is ensured that the most comprehensive static and dynamic test procedures for fuel pumps and injectors of all major engine manufacturers are carried out.

Tyne Electro Diesel business development manager Gerry Mulholland said, "We have a long-standing reputation in our core sectors but saw an opening in the market to offer the latest diesel fuel injection technology testing solutions to other industry sectors thereby making energy efficiency savings. There is so much opportunity and now we have the capacity to deliver our services on a much larger scale.

"We have invested heavily to ensure our new facility which has state of the art equipment to service our clients to the best possible standards. As part of this expansion we now have five different production cells specifically designed for different usages/sectors."



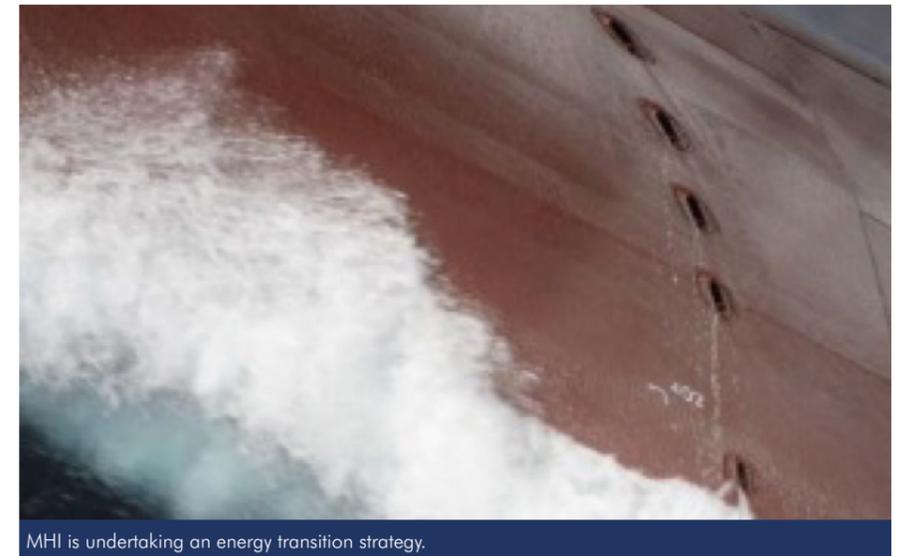
Dynamic testing of fuel injection equipment at Tyne Electro Diesel

Ammonia project by MHI

As part of its Group energy transition strategy, Japan's Mitsubishi Heavy Industries (MHI) is set to participate in a newly launching project to develop guidelines for the safe usage of ammonia (NH₃) as a shipping fuel. The project is led by The Mærsk Mc-Kinney Møller Centre for Zero Carbon Shipping 1, a research institute created to promote decarbonisation of the maritime shipping industry.

MHI will participate as a founding partner of the centre, mainly through two Group companies - Mitsubishi Shipbuilding and Mitsubishi Heavy Industries Marine Machinery & Equipment. Project collaboration will also include Lloyd's Register Group Limited (LR) 2, the ultimate aim being to decarbonise the maritime shipping industry through safe usage of ammonia as a shipping fuel.

Use of ammonia as a shipping fuel is eagerly embraced as a potential long-term solution for marine logistics amid the transition to a zero-carbon value chain in the maritime



MHI is undertaking an energy transition strategy.

industry. Green ammonia is created by water electrolysis using a carbon-free production process employing renewable energy. Although green ammonia results in zero carbon emissions, it is highly toxic. In order to introduce

green ammonia as a safe and sustainable marine fuel, it is therefore vital to draw up safety guidelines for its usage, including implementation of specific assessments of its safety for humans, ship assets and the

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environment.

Currently, the marine transport industry accounts for roughly 3% of the world's carbon emissions, and as other industries progressively decarbonise, this percentage is quite likely to increase over the next several decades. Going forward, MHI Group, by integrating its own experience with ammonia carriers and ammonia production plants together with the knowledge and problem-solving experience to be accrued through its participation in the new project, will contribute to accelerating the safe adoption of ammonia as an alternative shipping fuel, to the further expansion of marine logistics, and to mitigating environmental impact, a global challenge.

Höegh Autoliners chooses Kongsberg/MAN digital solution

Norway's Höegh Autoliners has elected to install on-board four additional vessels, a joint digital solution combining Kongsberg's Vessel Insight and MAN Energy Solutions' PrimeServ Assist. Following the signing of a digitalisation partnership between Kongsberg Digital and MAN Energy Solutions in May 2020, the combined infrastructure was initially trialled by Höegh in a two-vessel pilot project, which has now successfully completed.

The agreement between MAN Energy Solutions and Kongsberg Digital came about as the companies realised that their separate efforts in the maritime digitalisation space were complementary. Kongsberg Digital's Vessel Insight – a cost efficient data infrastructure solution for the maritime market – is a natural match with MAN PrimeServ Assist digital solution for optimisation of engine use and maintenance. After entering a strategic digitalisation partnership, they undertook the delivery of a joint digital infrastructure to Höegh Autoliner's Horizon class sister-vessels *Höegh Trotter* and *Höegh Traveller*. The pilot completion is formalised, and the project has been successful.

"We are very pleased with the results of the pilot project with Höegh and MAN Energy Solutions," says Andreas Jagtøyen, EVP Digital Ocean, Kongsberg Digital. "The joint digital infrastructure allows the operator to monitor vessel assets and check the running conditions of the engines remotely from shore, in order to give decision-making support to the ship's crew. Also, the Vessel Performance application from

the Kognifai Marketplace gives Höegh tools for reducing fuel consumption and unnecessary running of equipment, as well as benchmarking performance between vessels. We are happy that Höegh has decided to roll Vessel Insight, MAN PrimeServ Assist and Vessel Performance out on several additional vessels."

These benefits are particularly important to Höegh, who is now installing Vessel Insight, the MAN PrimeServ Assist app and Vessel Performance on four additional vessels. Getting access to complete and contextualised high-quality data from several vessels allows fleet benchmarking and is a significant step towards digitalising its fleet operations.

"Our purpose is to provide greener and more sustainable deep-sea transportation and we are working closely with suppliers to achieve this," says Andreas Enger, CEO, Höegh Autoliners.

"The collaboration with MAN Energy Solutions and Kongsberg Digital has accelerated the digitalisation of our vessel's operations and is an important step in improving our operational efficiency. Building on the success of the pilot project, we are pleased to continue the partnership with the addition of four vessels in our fleet."

When developing Vessel Insight, KONGSBERG focused on making it a low-cost, easy-to-implement data infrastructure solution for a broad market. An important aspect of this is that installation can be carried out by vessel crews while at sea. The Vessel Insight hardware is sent to the vessel and the crew connects it. Immediately, all data is sent to the Kognifai cloud and contextualised. Using learnings from the first installation, the installation time was



The FuelOpt system

drastically reduced on the second Höegh vessel, taking only a day. Following the successful project, Höegh Autoliners decided to install Vessel Insight on an additional four sister-vessels in their Horizon class fleet.

Stig Holm, Digital Business lead Two-Stroke at MAN Energy Solutions, explains, "With the connecting of four more vessels, Höegh is a good example of the potential that the Kongsberg-MAN partnership delivers. Digitalisation allows our customers to fully leverage MAN's expertise on engine as well as on maritime customer needs."

Gregory Puckett, Head of Group Digital at MAN Energy Solutions continues, "Our open and scalable platform allows us to connect a variety of partners and platforms – providing new opportunities for connectivity as well as insights into engine optimisation potentials for our customers."

MAN Energy Solutions and KONGSBERG will begin delivery of Vessel Insight and MAN PrimeServ Assist to the additional vessels immediately.

Ardmore chooses Lean Marine FuelOpt system

Sweden's Lean Marine has signed a contract with Ardmore Shipping Corp, to install its FuelOpt propulsion optimisation technology across its fleet of tankers. This new agreement follows on the heels of the success of the FuelOpt installation on-board the 49,999 dwt MR tanker Ardmore Sealion in 2020.

Lean Marine and Ardmore will also collaborate closely to enhance the overall performance of the Ardmore fleet and help these vessels achieve more sustainable ship operations.

Lean Marine will install its green technology on-board the additional vessels over the course of 2021.

Commenting on the partnership, Mark Cameron, Executive Vice President and COO at Ardmore Shipping said, "Lean Marine has great experience with enhancing vessel efficiency and has been supporting us in identifying key achievable means for further saving fuel and reducing emissions on the already efficient and modern Ardmore Sealion.

"Through this close collaboration, we will continue to exploit the potential of the FuelOpt system and explore the integration of other vessel systems to maximise the overall operational efficiency of our fleet. Ardmore Shipping's energy transition is underway and our collaboration with Lean Marine will play an important role in the delivery of Ardmore's Energy Transition Plan."

Lean Marine's FuelOpt technology is designed to ease the technical burden of greener ship operations as it automates propulsion control, thereby replacing the need for constant monitoring and manual adjustments. When using FuelOpt on the bridge, the crew gets full, automated control of vessel speed, fuel consumption and/or engine power, and are thus able to avoid potential overconsumption of fuel in harsh conditions such as high swells and winds.

Garry Noonan, Head of Energy Transition Technologies at Ardmore shipping, added, "We are confident that we can achieve great results by working together with Lean Marine. When working to increase the vessel efficiency of Ardmore Sealion, we achieved significant results in a very short time, as we were able to take vital actions such as controlling the vessel's fuel consumption using the FuelOpt system. We look forward to greener operations across our fleet once the systems are installed in 2021."

FuelOpt is exceptionally user-friendly and activation by the bridge crew can be

achieved with the push of a single button from the intuitive panel on the bridge once the command on engine power, fuel consumption, speed or a combination thereof is set.

Upon activation, the system dynamically controls vessel propulsion based on the set commands, matching the vessel's propulsion power to the changing environmental conditions. This stabilises the shaft power required, removing costly variations in speed and output caused by human operational factors. The use of the system ensures maximum power optimisation, minimum fuel consumption and reduced emissions in real-time.

Mikael Laurin, CEO at Lean Marine says, "Ardmore Shipping's decision to expand our collaboration shows their commitment to greener operations and their confidence in the results that our FuelOpt system delivers. We are looking forward to working with their team not only to achieve substantial fuel savings but also unlock further potential for greener operations through integration with other systems on-board the Ardmore fleet." **SORJ**



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Newport Shipping's managing director Lianghui Xia Lianghui Xia with the AiP from DNV

voyage prior to refuelling.

Conversion of the existing global merchant shipping fleet of around 100,000 vessels for use of alternative fuels is no longer an option, but an economic necessity for shipowners as reducing emissions will be a rite of passage for trading in a low-carbon shipping future.

IMO has set a goal to halve GHG emissions from international shipping of nearly 1bn tonnes/annum, and reduce carbon intensity towards 70% of 2008 levels, by 2050. The new Energy Efficiency Existing Ship Index (EEXI) will require all existing cargo vessels to meet stricter class limits on emissions for annual surveys performed from the start of January 2023.

In addition to global and regional regulations, there is increasing market pressure from charterers and banks for decarbonisation as a condition of cargo contracts and ship finance. Xia believes Newport Shipping's concept offers "a practical and cost-efficient solution" to cut fleet emissions in the near term pending adoption of technologies for carbon-neutral fuels such as ammonia and hydrogen, as well as battery technology that are still some way off commercial realisation.

A long-term payment plan over five to seven years on 60% of the total cost is offered to clients for its LNG retrofit solution. This is considered the main selling point for such projects.

Newport Shipping, with a global network of 15 partner yards spanning international trade routes in the Atlantic and Pacific regions that offers guaranteed drydock slots and fast turnaround, is now poised to bring this LNG retrofit solution to the global shipping market. Most probably, the largest shipyard group partnering Newport Shipping is the PaxOcean Group, with yards in Singapore, Batam and mainland China. Newport Shipping has increased the number of partner shipyards over the past two months with agreements with Ship Repair & Marine Services (Tampa FL), BLTR - Lithuania (Baltic), Zamakona (Spain) and Navalink-Midia (Romania).

Wärtsilä signs OMA with Latsco

Wärtsilä has signed a five-year Optimised Maintenance Agreement (OMA) with Greece's Latsco LNG Marine Management. The agreement covers the main engines for two large LNG tankers *Hellas Diana* and the *Hellas Athina*.



The *Hellas Diana*

OMAs are a key element within Wärtsilä's Lifecycle Solutions offering and are designed to ensure operational certainty with maintenance cost predictability. In addition to asset diagnostics, maintenance planning, annual audits and spare parts, Wärtsilä will also provide the vessels with remote support and condition monitoring systems, including the company's predictive maintenance service Expert Insight.

Expert Insight is an innovative service that leverages artificial intelligence (AI) and advanced diagnostics to monitor equipment and systems in real-time, spot anomalies, foresee potential problems, and enable rapid reaction accordingly. Should anomalous behaviour be detected, it is flagged to specialists at Wärtsilä Expertise Centres, allowing them to support the customer proactively with an appropriate resolution to the issue. The combination of AI, advanced diagnostics, and the company's extensive equipment expertise greatly enhances the reliability, efficiency, and safety of the installed equipment.

The two vessels were built at South Korea's Hyundai Heavy Industries (HHI) and are 297 m in length and have a cargo capacity of 174,000 m³. The *Hellas Diana* entered service at the end of March this year, and the *Hellas Athina* is scheduled to enter service in September. Both operate with WinGD X-DF dual-fuel engines. In August 2020, Wärtsilä signed similar Optimised Maintenance agreements with Latsco Marine Management for two of their large LPG vessels. Wärtsilä currently has more than 700 vessels under maintenance agreements.

Høglund supplies equipment to Oslo Tank

Høglund Marine Solutions has supplied systems and supported during the commissioning of what is now Norway's first LNG bunkering unit



Høglund's LNG Cargo System on-board the *Bergen LNG*

following successful gas and sea trials. Once a conventional bunkering tanker known as *Oslo Tank*, the Bergen Tankers-owned vessel has been renamed *Bergen LNG* and will play a major role in setting the standard and

establishing the infrastructure for Norway's LNG shipping sector.

Høglund was responsible for the supply of the LNG Gas Handling System and the vessel's Integrated Automation System (IAS), which includes essential Gas Control and Safety System. Høglund's participation in the project involved the supply of an LNG Cargo System incorporating a single Shell type-C tank with a capacity of 850 m³ and a bunkering rate of 500 m³/hr. Other hardware and automation solutions that were provided by Høglund to ensure safe and efficient vessel operations include cargo pumps, bunker manifolds, custody transfer system, a ship-to-ship transfer system, a cargo control and emergency shutdown (ESD) system, and ship-to-shore/ship-to-ship link systems to create the Automation System.

As part of this ambitious project, Høglund worked closely with its partners HB Hunte Engineering - which provided a 3D detail design of the Gas Piping System - and LNG Cargo Tank manufacturer Gas & Heat Spa.

Westcon Shipyards, which was contracted by Bergen Tankers, carried out the conversion of the vessel, including the installation of the LNG Cargo System supplied by Høglund.

Closer to the completion of the project, Høglund's team of highly skilled field service engineering professionals carried out a series of rigorous sea and gas trials of the installed equipment, collaborating with project partners Gasnor and Bureau Veritas. The trials lasted for four consecutive days with hardly any downtime. After having been given the green light on both its mechanical and control equipment system, as well as its flow meters, the vessel is now already in operation.

BV classes LBV

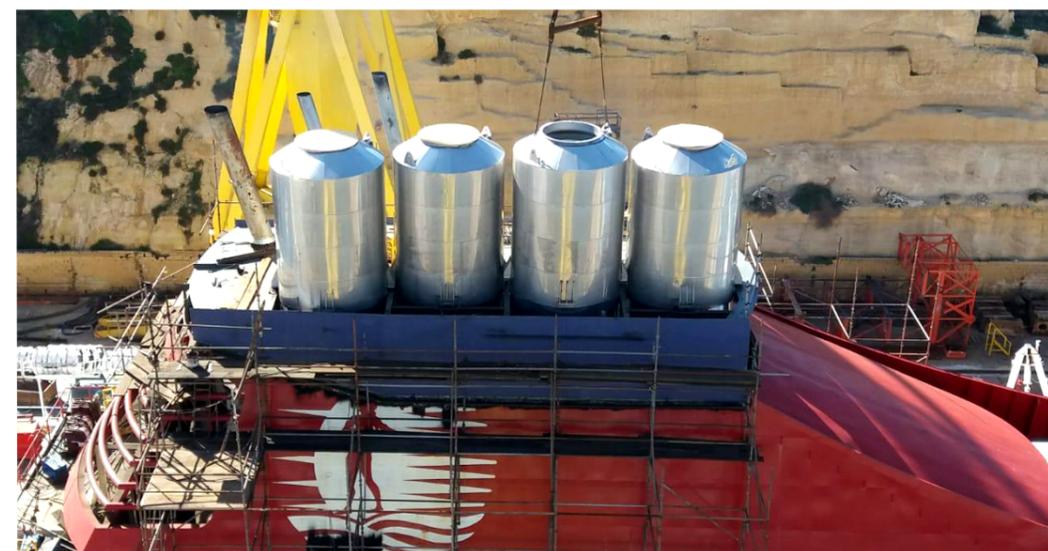
France's Bureau Veritas (BV) has awarded classification to Bergen Tankers' *Bergen LNG*, the first LNG bunkering vessel (LBV) operating in Norway. The vessel was born from the conversion of the 2010 built oil tanker *Oslo*



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The Bergen LNG

Tank to carry LNG instead of conventional liquid marine fuels. *Bergen LNG* will be operated by Gasnor (Shell) in the Bergen area and on the Norwegian west coast to supply the LNG fuelled passenger ships operated by Hurtigruten and Kyststruten.

The conversion took place at Westcon Shipyards in Florø. BV has supported the owners and designer from the beginning of the project to ensure that the conversion could be performed in compliance with the requirements of the International Gas Carrier Code (IGC Code), notably with regard to stability and navigational safety. BV has also played an important role in the involvement of the flag state. In order to support an efficient conversion process, the Nordic plan approval team fast-tracked the design review process of time critical parts and ensured quick communication of findings.

Alfa Laval LFSS to LPG tankers

Alfa Laval has received an order for three units of the Alfa Laval FCM LPG, the low-flashpoint fuel supply system (LFSS) developed in partnership with MAN Energy Solutions. By selecting the FCM LPG, owners of LPG tankers can combine their cargo handling system of choice with an LFSS built on fuel treatment

expertise and proven experience with engine applications.

The LFSS order was signed with IMEX Co Ltd, which builds MAN Energy Solutions licenced engines in Japan as a subsidiary company of Hitachi Zosen Corporation. The order comprises three Alfa Laval FCM LPG systems that will be installed on three Japanese LPG tankers.

Using LPG cargo as fuel is an attractive solution on such vessels, since it reduces SOx emissions to near zero and provides easy compliance with the global sulphur cap. The LFSS will be integrated in the cargo handling system with significant advantages that come from relying on an experienced fuel treatment supplier.

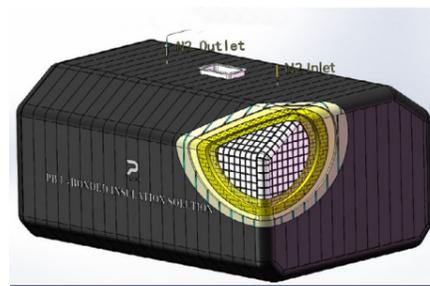
The flexibility of the FCM LPG comes from its smart design. Essentially, the LFSS core developed by Alfa Laval and tested with MAN Energy Solutions is placed within an adaptable system framework. This makes it easy to match both the available space and the cargo handling equipment.

The three FCM LPG modules will be delivered to IMEX beginning in the fourth quarter of 2021. After each engine is tested, it will be moved with the FCM LPG system to Sasaki Shipbuilding for installation.

As emission limits and climate goals cause marine fuels to diversify, Alfa Laval is supporting a wide variety of fuel choices under the FCM concept. Alfa Laval FCM Methanol systems, for example, are now approaching 100,000 running hours. LPG is an important fuel in its own right, but it also represents an important step on the path to ammonia. "Ammonia is widely seen as the ideal fuel for tomorrow's zero-carbon operations," says Friberg.

DNV AiP for Passer Marine

DNV has granted an AiP to Passer Marine for the development of a new LNG fuel tank insulation system. The new concept is



3D model of the tank system

designed for prismatic 'type B' LNG tanks - which according to IMO rules require a partial secondary barrier - and includes a leakage detection system capable of safely managing and containing fuel leaks.

"The system we have developed is cost-effective and production-friendly," said Svein Konradsen, COO of Passer Marine AS. "The pandemic has been challenging for many companies and for the development of this particular design. The required testing has been difficult to finalise due to testing interruptions and limited possibilities to travel, but finally we have been able to submit the necessary documentation which I am very pleased to say was accepted by DNV."

As LNG fuelled vessels are increasingly being deployed for deep-sea shipping, fuel tank sizes need to increase from 300-1,000 m³ fuel capacity to up to 10,000-20,000 m³ which leaves less room for cargo. As such, there is increased industry interest in alternative fuel tanks - known as 'type B' - which are prismatic in shape and more volume efficient than traditional cylindrical 'type C' tanks. Between 95 and 99% of LNG-fuelled ships contain type C fuel tanks, but many newbuilds on order contain 'type B' specifications.

Kongsberg, BW LNG and Alfa Ori sign agreement

Kongsberg Digital, BW LNG and Alfa Ori Technologies have signed a strategic digitalisation partnership to realise digital capabilities that enhance efficiency and reduce the environmental footprint of LNG tankers and FRSUs. The agreement encompasses several projects, including utilising a common data management platform and developing a maritime digital twin and digital processing models to facilitate operational excellence.

The aim of the partnership is to enable the



The Alfa Laval FCM system

acceleration of technologies needed for future-ready LNG tankers and FSRUs by leveraging Kongsberg Digital's data infrastructure technology, Vessel Insight, together with Alfa Ori's SMARTShip digital applications and BW's operational expertise and assets for piloting a maritime digital twin and a real time decision support system.

A pilot project has been established to develop and test a maritime digital twin, aimed at promoting operational excellence, reducing emissions and costs, and increasing safety. The maritime digital twin will be developed for the



(Left to right) Yngvil Åsheim (BW LNG), Captain Rajesh Unni (Alpha Ori Group) and Hege Skryseth (Kongsberg Digital)

BW Magna FSRU, utilising the Vessel Insight data infrastructure, Kognifai digital platform and maritime simulators from Kongsberg Digital, as well as value-adding expert applications from Alfa Ori. The pilot will aim to illustrate an example of the benefits of digitalisation for the industry.

GTT wins CMA CGM design contract

France's GTT has been chosen to design the cryogenic fuel tanks of 12 new LNG-fuelled containerships for the CMA CGM group, a pioneer in the energy transition with a fleet of 44 LNG-fuelled container ships by 2024.

The LNG tanks will be fitted with the Mark III membrane containment technology, developed by GTT, and will be able to load 14,000 m³ of LNG. The 12 vessels will be delivered between the last quarter of 2023 and the third quarter of 2024.

The construction of these containerships

has been entrusted to the China's Hudong-Zhonghua Shipbuilding and Jiangnan Shipyard, who will each build six vessels, able to carry 13,000 and 15,000 teu respectively. The order of the six 15,000 teu vessels completes the order of five similar container vessels signed in June 2019 with Jiangnan Shipyard.

Philippe Berterottière, Chairman and CEO of GTT, declared, "After nine containerships ordered in 2017 and five in 2019, the choice of GTT technology is confirmed by CMA CGM for the LNG propulsion of its vessels. Used as a marine fuel, LNG significantly reduces ship emissions, reducing CO₂ emissions by 20% compared to traditional marine fuel, and eliminating sulphur oxides and fine particles, as well as almost all nitrogen oxides.

Participating in the decarbonisation of maritime transport alongside the CMA CGM Group and our partners Hudong-Zhonghua Shipbuilding and Jiangnan Shipyard are a source of great pride for GTT and its teams, and offer further proof of the efficiency and safety of our technological solutions to support the energy transition of ship-owners." **SORJ**

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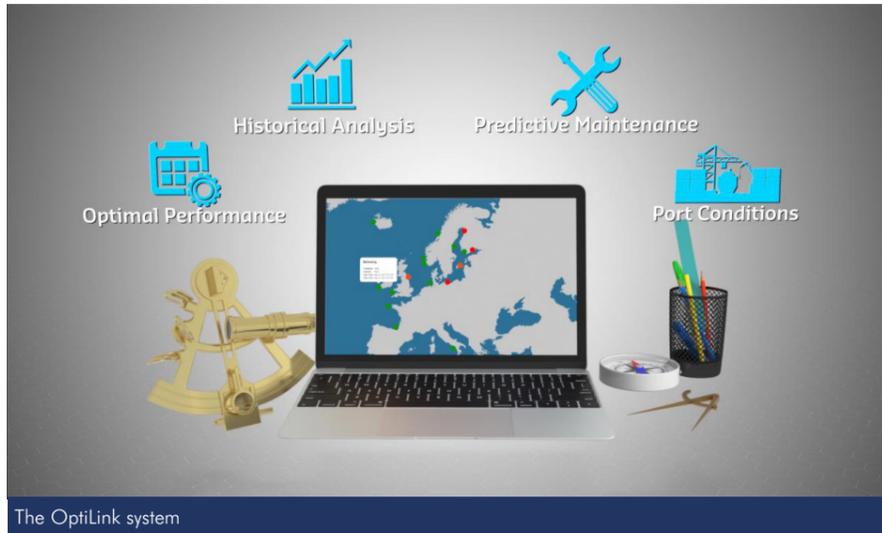
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Ballast Water Management



Optimarin increases its offer with a digital tool - OptiLink

Norway's Optimarin is believed to be the first to offer the digitalisation of its BWM system with the launch, this week, of OptiLink, an innovative system for ship-to-shore data-sharing in this critical area of ship operations.

The OptiLink system has been tested on-board Utkilen Shipping's 9,960 dwt chemical tanker *Latana* for the past few months, the owner already talking about placing the system on-board at least five of its fleet of ships. Since the company's inception, Optimarin has sold some 1,200 BWM systems on a world-wide basis, a quarter of which have been for newbuildings and the remainder retrofitted on-board existing ships. In future, all orders will have the option of including the OptiLink system.

The OptiLink tool provides real-time monitoring of BWM systems, along with automated data generation and remote connectivity, and is designed to resolve the regulatory compliance headache for ship owners/managers as well as give improved customer support and service options from the Optimarin office.

OptiLink also offers significant economic spin-offs, such as fuel cost savings, optimised voyage planning and reduced port turnaround times, to boost the cost-efficiency of overall fleet operations.

"The whole aspect of BWM changes from a manual operation to a system approach

where the system and its operations become an integral part of the vessel's functions," explains Leiv Kallestad, chief executive of Optimarin. "This means the system can be managed proactively in support of reduced downtime and reduced fuel consumption, with less hassle as control over the transfer of ballast water in and out of the vessel improves greatly."

OptiLink connects the system 'to the world' either through a vessel's own communication systems, or an external link installed on-board, allowing for transfer of key operational and performance data to the OptiLink cloud. The users will subsequently be able to connect with the cloud through a secure internet connection.

This gives the vessel crew instantaneous online access to key performance indicators for the BWM system - including water quality and system functionality - through a user-friendly visual interface featuring data transmitted from the ballast water control system. OptiLink will also give the ship operator the big picture by providing a fleet-wide overview of ballast water KPIs for each vessel and fleet.

This enables interactive remote support with online software updates for troubleshooting from Optimarin to reduce the need for physical service work on the BWM system, resulting in cost and time savings. In addition, continuous condition monitoring of the system allows for proactive maintenance to ensure efficient operation of the system by alerting the crew to possible equipment malfunctions. This will obviously help with equipment servicing and software updates.

OptiLink can analyse big data both with respect to system performance and water quality at geographical locations where ballast water

operations are on-going. This enhances the predictability of ballast water operations to give the ship operator greater visibility so voyage planning can be optimised to reduce fuel consumption and downtime.

Another major benefit is that compliance data from the BWM system can be transmitted directly to statutory authorities, which can then provide guidance on corrective action in case of contamination so that, for example - a certificate of compliance can be obtained. This certification can then be communicated to the relevant port authority so that port turnarounds are shortened as the need for lab testing of water quality and on-board inspections is effectively eliminated. This can reduce time, and therefore costs, in port. According to Leiv Kallestad, "Compliance is a hot word - therefore this type of system can only benefit the ship operator."

This is particularly significant as the shipping industry faces a 2024 deadline for compliance with IMO regulations that requires all vessels to conform to a so-called D2 standard specifying the maximum volume of viable organisms in ballast water discharges.

Kallestad points out that, while operators may have a compliant system installed on their vessels, there still remain challenges in ensuring ballast water quality meets local standards that can create logistical difficulties and delays for fleet operations.

"Digitalisation is key to tackle the BWM compliance issue and Optimarin has developed the first digital solution of its kind that provides data transparency and predictability in this area, while integrating the system into a ship's control system," he says.

New Chinese facility for Alfa Laval

During spring 2021, Alfa Laval began implementing a new production line for Alfa Laval PureBallast 3 in Qingdao, China. As the line gradually expands to include the full flow range by the end of 2022, it will support and deepen regional shipyard relationships as the BWM market shifts towards Asia.

Asia is already a key market for Alfa Laval PureBallast 3, the third generation of Alfa Laval's leading BWM technology. The majority of PureBallast 3 installations occur at Asian shipyards, even when the vessels themselves are flagged in other regions. When the global wave of BWM system retrofits begins to subside in

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The Alfa Laval deck-mounted BWM system

2024, Asian shipyards will become even more dominant as the focus shifts to newbuilding. Having been present in China for more than 30 years, Alfa Laval has both a modern factory in Qingdao and a PureBallast Competence Centre in Shanghai. From the Shanghai site, Alfa Laval provides customer support, technical support and project management services. Building up PureBallast 3 production in Qingdao will add physical supply strengths to Alfa Laval's regional offering in BWM.

For vessels that continue doing business in Asia after installing PureBallast 3, Alfa Laval provides an exceptional network of support. Local spare parts hubs and training resources, combined with 24/7 service access and field service engineers dispatched from within the region, help to ensure smooth operations and on-going peace of mind.

Meanwhile, DNV has issued a Type Approval Design Certificate for Alfa Laval PureBallast 3 Ex deckhouse solutions. This is a major achievement, representing the first design approval for the installation of BWM systems on the weather deck. For customers and system integrators, it will mean time and money saved in the final approval process on-board.

Placing BWM systems in a deck-mounted enclosure is necessary on most modern tankers, which lack a pump room or other suitable internal space. While the system type approval applies to the BWM system itself, both the enclosure and the installation within it must also be approved by a classification society. The DNV Type Approval Design Certificate means PureBallast 3 Ex deckhouse deliveries will have this approval in advance.

In practice, the design approval for PureBallast 3 Ex deckhouse solutions will greatly reduce the time and effort needed from system integrators – and the implications for shipowners. For the final on-board approval, only the mounting of the enclosure on deck and its interconnections with the vessel will need to be evaluated by the classification society.

Alfa Laval's approved design includes the deckhouse enclosure itself, as well as the system's internal installation on fixed rails and all of the internal piping and electrical connections. Its specifications go far beyond those of standard containers, which lack the protective features and longevity needed to ensure performance over the vessel lifetime.

Design and engineering consultancy, Houlder, has been appointed as an authorised engineering partner by Alfa Laval, a leading global supplier of products and solutions for heat transfer, separation and fluid handling.

Alfa Laval UK has listed Houlder as one of its authorised engineering partners, ensuring ship owners and operators have a complete, high-quality package for BWM system design and installation contracts. Alfa Laval supplies PureBallast, its IMO & USCG approved BWM system and can subcontract Houlder's independent engineering experts to integrate the equipment on-board the vessel.

When fitting vessels with new technology, the industry needs a solution that is time-efficient, cost-effective and reliable. This agreement enables ship owners to benefit from industry collaboration via three thorough steps to the design process - an on-board survey with 3D scanning, concept engineering, and detailed engineering. Arrangement drawings, followed by detailed production, reduce the risk of costly challenges later in the process. A clear end-to-end solution protects ship owners from delays and costly installation errors.

DESMI introduces two new BWM systems

In order to meet market and customer demand, Denmark's DESMI has developed two new BWM systems covering bulker solutions and ships sailing in IMO waters only or primarily - CompactClean Bulker and CompactClean OptIMO. These new systems join the DESMI portfolio of BWM systems alongside the well-known CompactClean BWM system.

With the CompactClean OptIMO BWM system, DESMI provides the customers with an opportunity to select a system, which is carefully optimised to the needs of the vessel and its operation. If max flow rate treatment is required globally, including US waters, then the market leading CompactClean BWM system, the only UV system available that does not employ special flow reduction when operated in US compliance mode, is the right choice.

If there is no need to operate the BWM system at max flow rate in US compliance mode, either because US waters are never entered or because the vessel's operation profile allows the discharge of ballast water at a reduced flow rate when in US waters, then OptIMO is the right choice as it provides both CAPEX and OPEX savings.

Meanwhile, DESMI has opened a new office in Italy. The new office, which is legally a representative office of DESMI Pumping Technology A/S, will be headed by Simone Carluccio, as of June 1st 2021. Simone Carluccio has previous experience from the marine business and comes from a position at DESMI's Italian agent, FGS (Fluid Global Solutions). This means Simone Carluccio is already familiar with DESMI's products in the marine segment, such as DESMI BWM systems, engine room pumps, scrubber pumps, automation solutions, and much more, which makes him a perfect match for DESMI on the Italian market.

De Nora acquires UV Technologies

De Nora has announced its acquisition of the UV Technologies Division from Calgon Carbon Corporation. The deal includes the products, brands and assets of Hyde Marine, a world leader in UV BWM systems, as well as municipal and industrial water treatment brands RAYOX, SENTINEL and C3 SERIES UV.

The acquisition brings together the strong delivery track record, marine expertise and capabilities of De Nora and Hyde Marine. It



The DESMI CompactClean BWM system

accelerates worldwide efforts to combat the spread of invasive species through the provision of reliable, high performing, BWM systems suitable for all vessel types and sizes.

By combining De Nora BALPURE electrolytic disinfection (EC) BWM system and the Hyde Marine ultra-violet (UV) Hyde GUARDIAN BWM system, De Nora will become one of the few global enterprises offering both UV and EC BWM system over a full range of flows. This capability is key at a time when the industry faces exponential demand for high-quality water treatment technologies required to meet IMO's BWM Convention.

Both BALPURE and Hyde GUARDIAN systems have been extensively installed across the global maritime industry and approved to meet IMO and USCG requirements. The Hyde GUARDIAN is ideally suited to vessels with lower ballast flow rates, whereas BALPURE systems have generally been installed on vessels with high ballast flow rates, such as LNG, tankers and bulk carriers.

Commenting on the acquisition, Matt

Granitto, General Manager at De Nora Marine Technologies, said, "The requirements to treat ballast water and marine wastewater have never been more stringent, with advanced water treatment technologies including BWM systems critical to both compliance and the preservation of marine ecosystems across the globe. With thousands of ships still lacking suitable and the industry heading for a peak in demand in 2022, the acquisition of Calgon Carbon's UV Technologies Division, including its Hyde Marine product line, is both timely and important. It enables us to leverage the respective strengths of De Nora and Hyde Marine's products, sales channels and manufacturing facilities and to be a true partner to the ship owners and operators by helping them meet regulatory deadlines and supporting them after the sale.

Until and after transaction closing, CCUV will continue to maintain normal operations towards customers and suppliers. In case of questions or concerns, please reach out directly to your normal business contacts. **SORJ**



The DeNora BWM system

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Wind Power

Rotor sails installation by Norsepower

Finland's Norsepower Oy has successfully installed two 35 m tall rotor sails for SEA-CARGO, a leading logistics provider in the North Sea market. This installation heralds the world's first tiltable rotor sail, showcasing that vessels that need to negotiate height restricted routes can benefit from this fuel and emissions-saving solution.

According to the analysis conducted by Norsepower and SEA-CARGO, the installation – on-board the 12,251 gt side-door ro/ro vessel *SC Connector* can achieve a fuel consumption, fuel cost and carbon emissions reduction of up to 25%. In good wind conditions, the sailing vessel will maintain regular service speed by sail alone.

As shipping transitions towards decarbonisation and meeting IMO's targets of 2030 and 2050, the maritime transport industry is looking for proven solutions to ensure emissions reductions. Harnessing wind is a natural step to reducing emissions and fuel consumption. Norsepower's rotor sail solution is a modernised version of the Flettner rotor, a spinning cylinder that uses the Magnus effect to harness wind power to thrust a ship.

The *SC Connector*, which sails between Western Norway, Denmark, the Netherlands and Sweden and Poland, transits under multiple bridges and powerlines, requiring adaptation of the rotor sails to tilt to almost horizontal when required.

The Norsepower rotor sail solution is the first third-party verified and commercially operational auxiliary wind propulsion technology for the global maritime industry. The solution is fully automated and detects whenever the wind is strong enough to deliver fuel and emission savings, at which point the Rotor Sails start automatically.

Meanwhile, Norsepower Oy has announced the installation of five tilting Rotor Sails on-board a newbuild VLOC chartered by Brazil's Vale. The first installation of Norsepower's innovative Rotor Sails on a bulk carrier demonstrates the adaptability of the technology to reduce fuel consumption, fuel costs and reduce emissions across a variety of vessel types.

The new vessel, a 325,000 dwt VLOC is owned by Pan Ocean Ship Management and will be chartered by Vale after construction is completed in China's New Times Shipbuilding. To enable efficient cargo operations, the five 24



The VLOC *Sea Zhoushan* in New Times Shipbuilding

m high and 4 m diameter Rotor Sails can be tilted by using hydraulic cylinders.

Boomsma and Schram install eConowind systems

Some eight months after signing the contract, Holland's Boomsma Shipping has now installed its first two eConowind VentiFoil wind-assisted propulsion units. Even with the restrictions imposed by the pandemic, both companies worked closely together to manage the installation during a port call in Harlingen.

The 6,477 dwt general cargo vessel *Frisian Sea*, has made its maiden voyage to Vasteras, Sweden with the VentiFoil in operation, during which eConowind has been conducting the start-up tests. The coming month will be used to optimise the system and operations and train the crew.

The VentiFoil (Wind Assisted Ship Propulsion Units) by eConowind are designed as optimal compact (non-rotating) wing profiles, creating superior thrust by means of the principle of boundary-layer-suction, for which ventilators are mounted inside the VentiFoil. Due to the generated thrust by the eConowind unit, the thrust of the propeller can be reduced to maintain the same speed leading to fuel savings and emission reductions. The new Flatrack

design has the flexibility of a container, being movable by the hatch crane, needs limited installation time and has possibility for use on several vessels. With this system the units can be positioned just in front of the superstructure during loading etc.

The WASP (Wind Assisted Ship Propulsion) project is funded by the Interreg North Sea Europe programme, part of the European Regional Development Fund (ERDF) and brings together universities and wind-assist technology providers with ship owners to research, trial and validate the operational performance of a selection of wind propulsion solutions.

The new Flatrack design based on Boomsma's concept will now be added to our product portfolio as a standard product and has the possibility for use on several vessels."

Meanwhile, eConowind and Schram have announced their collaboration with eConowind to participate in research to optimise wind assisted propulsion and install two of their 16 m tall wind-assist VentiFoil units by the end of 2021. These will be retrofitted on the 89.9 m x14 m, 5,097 dwt general cargo vessel *Anna*, built in 2008.

"When we realised the possibility of retrofitting a wind assist unit and how we can save CO₂ emissions on our current ship, I was very enthusiastic right away - working with the wind instead of fighting the wind all the time. We always want to be innovative with our currently running vessels. The installation is relatively simple and operations are hardly

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The maiden trip of *Frisian Sea* with Ventifoils deployed and the first loading while Ventifoils in storage position

impacted at all, so we just want to do this now, joining the research," states Gerrit Schram, co-owner of Schram shipping. "We will make this move as a 'natural following step' in being a cost effective operator."

Gerrit Schram also involved his Commercial Manager - Vertom, Thomas van Meerkerk, to see how this project could support the whole group in which he operates. He said, "We are very happy Schram Shipping, who has been sailing for Vertom for over 20 years now, signed this agreement for this Ventifoil project as the first ship of the almost 100 ships in our operations. We will follow the process closely and will study the results of the research to see what it can bring us in the future."

continues the development and industrial process of their system with the AiP from DNV. After a review of the main plans and documents of the Oceanwings 3.6.3 system against the relevant DNV rules for the classification of ships, DNV was able to issue an AiP statement confirming that no significant obstacles exist to prevent the concept from being realised.

As incoming maritime regulations are ramping up, the pressure to improve sustainability and reduce emissions is increasing. The Oceanwings system enables the maritime stakeholders to significantly reduce their GHG emissions and improve their EEDI or EEXI efficiency index, as part of efforts to comply with

AYRO achieves DNV approval

US-based AYRO was recently awarded an Approval in Principle (AiP) for its Oceanwings 3.6.3 wind assisted propulsion system for ships from DNV. The Oceanwings 3.6.3 system is designed to enable ship owners and operators to leverage wind energy to improve the energy balance of individual vessels and fleets, thereby significantly reducing carbon emissions.

Following 10 years of research, a first prototype in 2017, and the industrial demonstrator Energy Observer in 2019, AYRO



The Yara Marine wind power solution

IMO's 2030 GHG strategy.

The wind propulsion system is a 363 m² two-element wingsail several of which can be installed on-board cargo vessels. AYRO is now manufacturing four Oceanwings to be fitted on-board the *Canopée*, a ro/ro vessel under construction. This hybridisation system for the propulsion of ships is applicable for both newbuildings and in the retrofit of existing ships.

Yara Marine joins IWSA

After partnering with BAR Technologies to bring WindWings to the global shipping industry, Yara Marine Technologies is now entering the International Windship Association (IWSA) to join their mission of promoting the use of wind propulsion to reduce fuel consumption and cut CO₂ emissions.

The immense savings gained by modern wind propulsion really caught the interest of both Yara Marine and our established network of ship-owners. BAR Technologies' bespoke naval architecture gave us the perfect entry point, bringing WindWings to the maritime sector. Simulations demonstrate that WindWings save 30% fuel and CO₂ emissions on average trading patterns. Wind technology is finally mature and can achieve significant benefits for both ship-owners and the environment. We already experience massive interest in the market, and are ready for orders, said Aleksander Askeland, CSO of Yara Marine Technologies.

Many still perceive commercial wind propulsion to be at an early stage, but rapid development over the past two years has changed the game. It is quickly becoming a topic of great interest for the shipping industry.

To keep building this momentum, the IWSA seeks to promote the economic value of wind propulsion and function as an information hub for emerging technologies. It is also determined to create strong collaborative networks, facilitate common approaches, and assist maritime stakeholders in securing funding for wind propulsion projects.

The eSAIL system on-board fishing vessel

bound4blue has installed its eSAIL system on the 593 gt fishing vessel *Balveiro Segundo*, the first such vessel in the world to sail with wind-assisted propulsion technology. Orpagu's vessel will start sailing with the eSAIL system in the coming weeks. The project, the first of its kind, aims to achieve greater energy efficiency, promoting the use of wind power to reduce fuel consumption and pollutant emissions.

The manufacturing and commissioning

of bound4blue's technology and Kyma's monitoring system are co-funded by the EU in the framework of the Aspiring Wingsails project, while Organización de Palangreros de A Guarda (ORPAGU) has received institutional support from the European and Maritime Fisheries Fund and the Spanish Ministry of Agriculture, Fisheries and Food.

bound4blue, together with Kyma and ORPAGU, the most important in its sector in Europe, has successfully installed the eSAIL rigid sail system on the *Balveiro Segundo* vessel, a clear joint commitment towards innovation and sustainability.

The rigid 12 m-high sail, equipped with an autonomous control system, looks majestic on the vessel in Panamanian waters. The entire assembly process of the sail has been recorded down to the smallest detail, as all the key players are aware of the milestone this initiative represents. A process, which began almost a month ago with the rigid sail's transportation by sea, left Vigo (Spain) and travelled 4,200 nm to reach the ship.

With the stability test successfully performed and commissioning already carried out by bound4blue, the vessel will start sailing this week. A trip that will make the *Balveiro Segundo* the first fishing vessel in the world to be equipped with an auxiliary wind-assisted propulsion technology and the first vessel to install bound4blue's eSAIL technology. The system uses the wind to propel the ship, thereby reducing fuel consumption and pollutant emissions released into the environment. Within the framework of the Aspiring Wingsails project, co-funded by the European Union, the Norwegian company Kyma, a leading company worldwide in maritime efficiency monitoring, will be responsible for monitoring and validating fuel savings and reductions in emissions during the sea trials in the Pacific Ocean.

Despite being an innovative system, the rigid sail offers all the necessary guarantees with regard to security and safety in accordance with the current maritime standards, as well as the approval of the installation by Bureau Veritas and the Dirección General de la Marina



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The fishing vessel with the eSAIL installed

Mercante (Spain). The eSAIL is a lightweight, compact technology with low maintenance costs that can be installed on both existing and new build ships, and with a clear focus on the cargo fleet.

As part of the transition towards a more sustainable energy model, while being fully aligned with the objectives of IMO, the maritime industry is looking for innovative solutions that allow these new sustainability goals to be attained, while reducing operational costs. The use of wind power as an auxiliary propulsion method is a natural step in this transition, and that's why bound4blue is strongly committed to its development and commercialisation, with Orpagu, as an early adopter, being an example for the sector to follow.

This project, which started in 2018 due to the participation of both companies in Kaleido's Fishing Accelerator, was made possible thanks to the clear vision of a group of people and the financial support of several institutions. The manufacturing and commissioning of bound4blue's technology and Kyma's monitoring system are co-funded by the European Union, in the framework of the Aspiring Wingsails project, while ORPAGU has received institutional support from the European and Maritime Fisheries Fund and the Spanish Ministry of Agriculture, Fisheries and Food. A joint initiative between private companies and public institutions has allowed the Balueiro Segundo to go down in history as the first fishing vessel in the world to sail with this technology.

Namura Shipbuilding and NS United in partnership

Japan's Namura Shipbuilding and NS United Kaiun Kaisha, have partnered in a joint research project aimed at developing a wind-powered system for an 183,000 dwt capesize bulk carrier.

International ambitions to reduce GHG so as to mitigate climate change have meant numerous targets are being set by international organisations and nation states. IMO's decarbonisation targets of reducing carbon

emissions by 40% by 2030 from 2008 levels and cut at least 50% of the shipping industry's total GHG by 2050 are being exceeded in some cases. As an initiative to reduce GHG at domestic shipyards, the Japanese government has set a target of 46% reduction by 2030 which will require development of new fuel efficient technology.

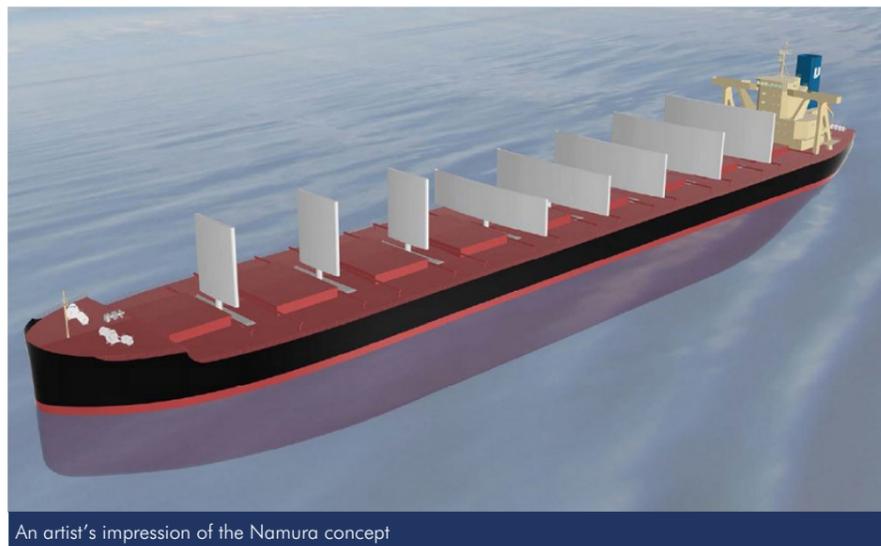
Namura believes that fuel-efficient technology using wind power will become an indispensable technology in the future. In the joint project with NS United Kaiun, the two partners are aiming to develop fuel-efficient technology using sails to make use of wind power.

Namura has applied for a patent on a sail system in which extending sails are located under deck between the holds of a ship and employed whenever wind conditions are able to aid propulsion and so reduce fuel use.

In use, the sails are elevated above deck and can also be extended laterally to increase the sail surface and hence the propulsion effect.

The sails can also be rotated so as to take better advantage of wind direction and gain maximum propulsion effect. When wind conditions are not favourable, or when the ship is conducting cargo operations, the sails are retracted and stored below deck.

The initial intention is to install the system on an 183,000 dwt bulk carrier. In order to preserve the SOLAS mandatory line of sight requirements from the bridge on such a long vessel, the size and height of the sails will be optimised. This involves the height of the sails reducing from the wheelhouse towards the bows. Nearer the bows, the height can be increased but the width narrowed allowing vision from the bridge to remain unobstructed. **SORJ**



An artist's impression of the Namura concept

Huarun Dadong completes LNG conversion

During early June, the 15,000 teu containership Brussels Express sailed into its home port of Hamburg for the first time. It is the first large containership in the world to have been converted to LNG propulsion. In September 2020, when she was still named the Sajir, the ship arrived in China's Huarun Dadong Dockyard, Shanghai. There, all the preparations had already been made to have a floating crane hoist the 1,300-tonne LNG tank into the belly of the ship as well as to carry out other work related to the conversion.

"The fact that a retrofitting of this scale had never been done before meant that we faced numerous challenges – from the planning to the implementation. We have broken new ground with the conversion, and we will now be testing it very precisely in real-world operation," says Richard von Berlepsch, Managing Director Fleet Management at Hapag-Lloyd. "Fossil LNG is currently the most promising fuel on the path towards zero emissions. The medium-term goal is to have CO2-neutral shipping operations using synthetic natural gas (SNG)."

In a nod to the European Green Deal, Hapag-Lloyd has renamed the ship the Brussels Express. In addition, the phrase 'Shipping for a cleaner future!' adorns the breakwater on the forecastle.

The ship is not yet operating exclusively with LNG, as the final guarantee works will be performed at the end of this round voyage. The first complete LNG bunkering will then take place in Singapore on the next round voyage. In the future, the ship, which is currently operating in the Far East 4 service between Asia and North Europe, will bunker twice/round voyage - in Singapore and in Rotterdam.

The international client base of ships repairing at this shipyard has been seen recently with a number of ships from the Norwegian market – the 72,562 dwt 2001-built cabu carrier Barcarena, owned by Norway's Klavness Combination Carriers and managed by Klavness Shipmanagement, Oslo (Cabu Carriers transport caustic soda solutions, floating fertiliser, molasses and all types of dry bulk cargo), the 229,456 dwt 2011-built VLCC SKS Donggang, owned by Norway's SKS Tankers (KGJ OBO & Tankers Management), The Brussels Express arrives in Hamburg



The Brussels Express arrives in Hamburg

Bergen, and the 56,164 dwt 1995-built 6,500 ceu capacity PCTC Hoegh Trooper, owned by Norway's Hoegh Autoliners and managed by Hoegh Fleet Services, Oslo.

Japan is another successful market for Huarun Dadong – recent drydockings have included the 38,046 dwt 2013-built bulk carrier Locomotion, owned by Marine Ace, Tokyo and managed by Hong Kong's Far East Shipmanagement, the 71,283 dwt 2006-built 5,642 teu capacity containership RDO Endeavour, owned by Shunzan Kaiun, Imabari, and the 10,005 dwt 1999-built 855 teu capacity containership Resolution, owned by Kotuku Kaiun, Imabari.

The German market is also a regular user of this yard's facilities – recent visitors include the 21,773 dwt 2013-built 1,700 teu capacity containership Oceana, owned by Oceana Schifffahrt and managed by Buss Schifffahrt, Hamburg, the 56,859 dwt 2011-built bulk carrier Alrayan, owned by Transeste Schifffahrt, Jork, and the 146,114 dwt 2011-built 12,600 teu capacity containership CMA CGM Alaska, owned by Offen Reederei, Hamburg.

Other international visitors have included the 60,475 dwt built 2016 bulk carrier IVS North Berwick, owned by the UK's Grindrod Shipping, London, the 33,402 dwt 2011-built general cargo vessel AAL Jupiter, owned by Singapore's AAL Shipping and the 66,818 dwt 2000-built 4,843 teu capacity containership Wan Hai 529, owned by Taiwan's Wan Hai Lines Ltd, Taipei.

Cruiseship and LPG tanker repairs Yiu Lian

The former Princess Cruises-owned Sea Princess recently sailed from China's Yiu Lian Dockyard, Shekou, after completing drydocking and repairs for her new Chinese owners – she has been

renamed Charming. The 77,500 gt 1998-built vessel has been bought by Sanyo International Cruises and will operate for its brand Forsee Cruise from May this year. The vessel is being managed by Monaco's VShips Leisure.

Recently undergoing conversion to LPG power at this leading Chinese yard was the first of three LPG tankers owned by Singapore-based BW LPG – the 84,000 m3 capacity sisterships BW Balder, BW Var and BW Volans, all built in 2016, to be converted this year (2021). These three ships follow the successful completion of a similar conversion, involving the BW Gemini, during 2020.

During December 2020, BW LPG announced that a further three LPG tankers were to be converted during 2021 – each ship's main propulsion system - MAN B&W 6G60ME-C9.2 type engines to be replaced

by MAN B&W 6G60ME-C9.5-LGIP dual-fuel types, capable of operating on fuel oil and LPG.

Meanwhile, a total of 15 vessels were undergoing repair at China's Yiu Lian Dockyard's Mazhou Island facility during mid-June, including:

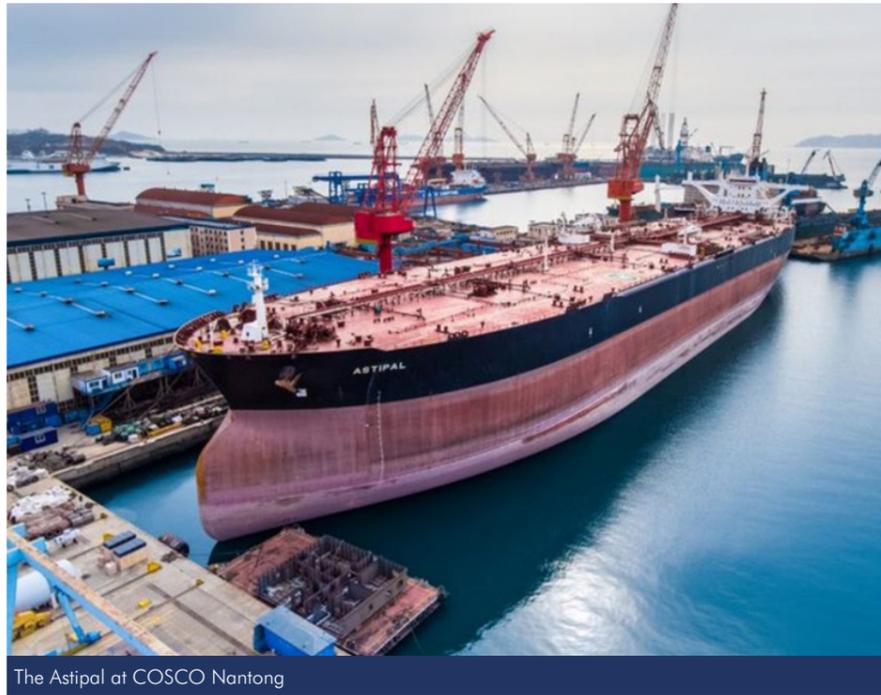
- Eugen Maersk – 174,239 dwt 2008-built 11,000 teu capacity containership, owned by Denmark's Maersk Line, Copenhagen
- BW Confidence – 81,605 m3 capacity 2006-built LPG tanker, owned by Norway's BW Gas, Oslo
- London Spirit – 155,510 dwt 2011-built tanker, owned by US operator Principal Marine Management, Southport, CT
- FPMC C Noble – 297,258 dwt 2012-built tanker, owned by Taiwan's Formosa Plastics Marine, Taipei
- Navig8 Turquoise – 49,676 dwt 2016-built chemical tanker, owned by Denmark's Navig8 Chemical Tankers Inc, Hellerup
- Unikum Spirit – 11,782 m3 capacity 2011-built LNG tanker, owned by Singapore's Norgas Carriers
- Sea Victoria – 324,268 dwt



Yiu Lian Dockyard will convert three LPG tankers this year

2021-built ore carrier

- Tian Kun Hao – 6,600 kW 2018-built cutter suction dredger, owned by China's China Communications Construction Co Ltd and managed by Tianjin Dredging
- New Joviality – 318,218 dwt 2011-built tanker, owned by China's Nanjing Tankers
- Montreal Spirit – 149,997 dwt 2006-built tanker, owned by Teekay Shipping
- Cap Charles – 158,880 dwt 2006-built, owned by Belgium's Euronav NV, Antwerp
- Maersk Cameroun – 61,614 dwt 2011-built 4,500 teu capacity container vessel, owned by Maersk Singapore
- Kan Tan IV – 1983-built semi-submersible drilling rig, owned by China's SINOPEC Shengli Oilfield Co and managed by Cyprus-based Frigstad Offshore Drilling, Limassol
- BW Njord – 54,446 dwt 2016-built LPG tanker, owned by Norway's BW Gas, Oslo
- Oriental Jubilee – 54,520 dwt 2016-built LPG tanker, owned by Hong Kong's Unique Shipping Group



The Astipal at COSCO Nantong

MISC to convert VLCC at CIMC Raffles

During February this year (2021), Malaysia's national shipping group Malaysia International Shipping Co (MISC) contracted China's CIMC Raffles to convert its 300,500 dwt VLCC Bunga Kasturi Dua into an FPSO – Mero 3. CIMC Raffles will also be responsible for the fabrication of the FPSO's topside modules. This is the Chinese yard's first FPSO conversion contract and following the successful completion the The Astipal at COSCO Nantong Malaysian FPSO will operate in the Nero oilfield offshore Brazil.

Under the agreement, CIMC Raffles will convert the 2005-built 300,500 dwt VLCC Bunga Kasturi Dua into an FPSO and will also be responsible for the construction of FPSO modules. MISC currently has six FPSO tankers in its fleet.

Upon conversion, the Mero 3 FPSO will measure 330 m in length, 70 m in width and 30 m in depth. The floater will be designed to process 180,000 bbls/day of oil and 12 MMscm/day of gas. This is the third unit to be installed at Petrobras-operated Mero field in Libra Block in the pre-salt Santos Basin offshore Brazil. First oil is scheduled for the first half of 2024.



The CIMC Raffles facility

Start of VLCC conversion underway at COSCO Nantong

The conversion of the VLCC Astipal into the FPSO Léopold Sédar Senghor has started at China's COSCO Nantong Shipyard and will be completed by other Chinese yards. The conversion is being undertaken for Japan's MODEC with the vessel destined to operate for Australia's Woodside Petroleum in the Sangomar field offshore Senegal, West Africa. The 306,000 dwt Astipal was bought by MODEC from Greece's Aeolos Management for US\$26.5m.

The VLCC arrived at the COSCO shipyard in Dalian during mid-February 2021, "This is a major milestone for the project and Woodside," says Woodside's Shipyard Manager Paul Moscardini, who has mobilised to China to oversee the conversion. "Our Woodside team based at the Dalian shipyard is looking forward to working with our contractor, MODEC, and getting to know the facility." Before it departed Indonesia for China the vessel had to be cleaned of residual hydrocarbons, and its tank bulkhead thickness inspected to confirm the hull's structural integrity and aid development of the refurbishment scope.



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Other shipyards in China will be used to complete the work necessary for the vessel's conversion to an FPSO and Woodsiders will be working in four yards. In parallel, Woodside has mobilised an engineering and project management team to MODEC's office in Singapore.

The Sangomar field, containing both oil and gas, is located 100 kms south of Dakar, Senegal's capital, and will be the country's first offshore oil development. First oil production from the FPSO Léopold Sédar Senghor is targeted in 2023, with the Sangomar Field Development Phase 1 targeting approximately 230m bbls of crude oil, at an initial peak rate of 100,000 bbls/day.

Ro/Pax conversion completed at Keppel Batangas

Recently completed of her sale docking and refit was the 13,350 gt 2003-built ro/pax 2GO Maligaya bought by Philippines-based company Chelsea Logistics Holdings Co from Stena RoRo. The ferry, which can carry 667 passengers, 2,450 lanemetres of freight and 48 cars on a separate car deck, had been bought in 2020 from Japanese operator Hankyu Ferry and had been renamed Stena Nova from her original name of Yamoto and was to undergo a major conversion and upgrade in Greece before being either sold or chartered out.

The initial work was not undertaken at the Philippines shipyard. The 2GO Maligaya will be operated by one of Chelsea Logistics three ferry subsidiaries – 2GO on domestic services.

DNV awards AiP to Keppel

DNV has awarded an Approval in Principle (AiP) to Singapore's Keppel Offshore & Marine for its proprietary AssetCare system, a suite of digital services to support an asset's lifecycle needs. The AiP award follows the signing of a Memorandum of Understanding (MOU) between DNV and Keppel in April 2020 to further contribute to the marine industry's on-going digital transformation.

As part of the MOU, the two companies have been collaborating to develop digital

transformation projects. The aim of the collaboration is to improve overall efficiency of the design and construction process, and of the asset lifecycle support services for projects in the offshore and marine industry.

Tan Leong Peng, Managing Director (New Builds) Keppel O&M, said, "As a world leader in providing sustainable solutions to the offshore, marine and energy industries, we are at the forefront of harnessing technologies to support our customers in meeting their assets' lifecycle needs. Our AssetCare system will be a key enabler in the digitalisation of assets and processes that can improve efficiency and advance the energy transition in support of Keppel's Vision 2030. We are delighted to partner with DNV to spearhead digital solutions for greater sustainability."

Cristina Saenz de Santa Maria, Regional Manager for Maritime, South East Asia, Pacific and India at DNV Maritime, commented on the AiP award, "We are pleased to partner with Keppel to leverage on the opportunities that digitalisation creates to enhance quality and unlock efficiencies in the maritime industry. At DNV, we are committed to offering innovative solutions and new ways of working to help our customers in their digital transformation journeys. As the industry pushes forward with the adoption of new technologies, it is important for cross-sector collaboration to ensure safe and sustainable operations."

The AssetCare system was assessed by DNV and found to comply with the principles described in DNV rules for fleet in service as well as for service suppliers engaged in condition

monitoring of machinery on-board ships and mobile offshore units.

The AiP verified the AssetCare solution and validated that the data collection infrastructure complies with the general principles of DNV's class notation D-INF, qualifying Keppel O&M as a service supplier. The AiP also concluded that the services provided by the AssetCare solution can be used to qualify both in-service and newbuild vessels for the new DNV Smart notation, with the D-INF notation as basis.

The D-INF (Data Collection Infrastructure and Vessel Connectivity) notation sets out the requirements for the complete data collection infrastructure, including an on-board data server, a data relay component and remote data server, as well as the connection to shore. This applies to on-board equipment delivered by both the yard and the owner.

The MOU has led to the establishment of various joint development projects (JDPs) to promote the use of new digital technologies in the next two years. In addition to the DNV approval of the AssetCare digital solution both parties will also explore:

- Process Digitalisation, specifically looking into construction and inspection processes to develop a more efficient and productive yard facility
- Digital Class for Offshore and Marine, using DNV's Open Class 3D Model Exchange, an open industry standard for the exchange of design information between designer/yards and classification societies to explore ways to improve the process for future newbuild projects.

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DNV has awarded Keppel Offshore & Marine an approval in principle for their digital lifecycle solution AssetCare

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Offshore - Floating Units

FPSO sector to suffer continuing COVID disruption

The long-term implications of the world's hastening decarbonisation journey on the world's floating hydrocarbon energy sector may not yet be clear, but the short-term impact of the pandemic is clearly evident. A recent report on the FPSO sector, produced by International Maritime Associates and World Energy Reports, indicated that the repercussions of Covid-19, and living with it in the future, are likely to disrupt FPSO-related business for at least two years.

According to the report, there are 220 FPSOs in operation, on order, or available (see Table) accounting for more than two thirds of the total oil and gas floating production inventory. And, apart from the established regions of oil production ashore, tomorrow's oil generally lies in smaller quantities in more remote locations, often at sea. FPSOs will be essential in the exploitation of such reserves.

Floating production units are designed to fit the profile of a specific field, and although they are nominally mobile assets, their transfer from one field to another is a complex, time-consuming and expensive business. However, they do allow access to locations where waters are too deep or difficult for pipelines and water depth is not a constraint. They can also operate in difficult environments, where temperatures are sometime very low – such as the Barents Sea – or conditions very harsh, such as the North Sea or the waters off Brazil, for example.

According to the IMA/WER report, more than 90% of FPSOs currently in service are located in six regions – Brazil is the most important (29%), followed by West Africa (24%), South East Asia (15%), Northern Europe (13%), China (7%), and Australia (5%). Petrobras is the world's largest FPSO operator – including owned and leased units, it has 49 units under its control, equivalent to 22% of the world total. Other major field operators with FPSOs, according to the report, are CNOOC (13 units), ExxonMobil (12), Total (nine) and Shell (eight).

For shiprepair yards, future demand for FPSOs is the key metric, both in terms of conversions from existing hulls, or the modifications required for redeployment of an existing unit. According to the report, there were 110 projects at the planning stage in January this year that could require a floating production system. Nearly 40% of FPSO projects in the planning stage are located in Brazil and some of them may require several units. Almost a quarter are in Africa, with Nigeria and Angola accounting for most of these.

Based on a number of assumptions, the partners provided projections on the likely number of new FPSO orders. Depending on future business conditions, between 23 and 48 FPSOs may be required over the next five years, with 37 being the most likely number. The impact of the pandemic is likely to mean that contracts will be skewed towards the end of the five-year period. Brazil and Guyana/Suriname are expected to account for close to two-thirds of the FPSO contracts awarded between now and 2025.

There are about 25 FPSOs currently in lay-up, of which IMA/WER believe that some 14 units may be suitable for redeployment. However, based on past experience, the partners anticipate that around 20% of future FPSO projects could involve the use of a redeployed unit, although on the basis of its most likely market scenario, this would create demand for only eight FPSO redeployments over the period. Together with the FPSOs that will probably cease operations by the end of 2025, there could be as many as three times the number of units available compared with

Floating Oil/Gas Production Units Installed, On Order, and Available
(As of November 2020 – excludes floating LNG and storage units)

Type Unit	Total	Installed	On Order	Available
FPSO	220	175	20	25
Barge	9	9	0	0
Semi	46	37	6	3
Spar	21	21	0	0
TLP	28	28	0	0
All Oil/Gas Units	324	270	26	28

Source: WER Database

The FPSO market has had a long tradition of using existing tankers to convert to FPSOs

redemption opportunities.

Johan Castberg FPSO now a year behind schedule

The *Johan Castberg* FPSO, originally destined to be deployed in the Barents Sea, some 240 kms northwest of Hammerfest, in the fourth quarter of 2022, is now running about a year behind schedule. Norwegian state energy firm, The impact of COVID-19 and issues relating to weld quality are now set to delay completion.

Norway's Petroleum Safety Authority (PSA) had first become aware of problems with weld quality on the FPSO's hull early in 2020 and it launched an investigation in September of that year. Meanwhile, the impact of the pandemic had meant that some parts of the construction process were transferred between facilities in Singapore.

Although Equinor has its own team of investigators examining the welding defects, the company was criticised by the PSA for not tackling the quality issues early enough. Now, the energy company is conducting extensive quality assurance checks on welds to ensure that the unit is fit for purpose before it leaves Singapore. In April this year, Equinor said that the hull was due to be shipped to Stord in Norway on-board the heavy-lift vessel, *Boka Vanguard*, later this year. However, timeframes have been disrupted by the pandemic and these plans are likely to have changed.

Meanwhile the PSA identified four non-conformities relating to risk reduction, management of project execution, qualification and follow-up of the contractor and application of experience in dimensioning own



An artist's impression of the *Johan Castberg* FPSO



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Offshore - Floating Units

follow-up. The PSA is understood to have issued Equinor with an order to review its systems and procedures and to comply with the order by October 2021.

Geir Tungesvik, Equinor's Senior Vice President for Project Development, said, "Safety is Equinor's top priority. We are currently carrying out extensive cross-checking and repair of welds to ensure that the *Johan Castberg* FPSO meets the safety and integrity requirements. When *Johan Castberg* comes on stream, there should be no doubt that the vessel is safe."

Petrobras moves ahead to develop Búzios field

A joint venture between Saipem and South Korea's Daewoo Shipbuilding & Marine Engineering (DSME) has won a US\$2.3bn contract from Brazil's Petrobras for a new FPSO for the Búzios offshore field. The two companies are working together on the engineering, procurement, fabrication and integration of the *P-79* FPSO, as well as installing the mooring systems, hook-up, commissioning and start-up work.

The *P-79*, due for delivery in 2025, will be the eighth FPSO to be deployed on the Búzios field which is located in the pre-salt Santos Basin area about 200 kms off the coast of Rio de Janeiro. It is one of the world's largest deep-water oil fields with water depths ranging from 1,600 m to 2,100 m. Some 14 wells will be connected to the FPSO – eight producers and six injectors. The unit will have capacity to process 180,000 bbls of oil and 7.2m m3 of gas/day.

Meanwhile, also in the Santos Basin, Maersk Supply Service (MSS) has been retained for what it describes as its largest project ever. The company is not disclosing its value but it involves the engineering, procurement, construction and installation preparations for the mooring of SBM Offshore's 2021-built *Setetiba*. The 250,000dwt unit is currently being completed at China Merchants Heavy Industry before commencing a 22.5-year charter. MSS will be working for the Petrobras-led Libra Consortium that controls the Libra block in the Santos Basin.

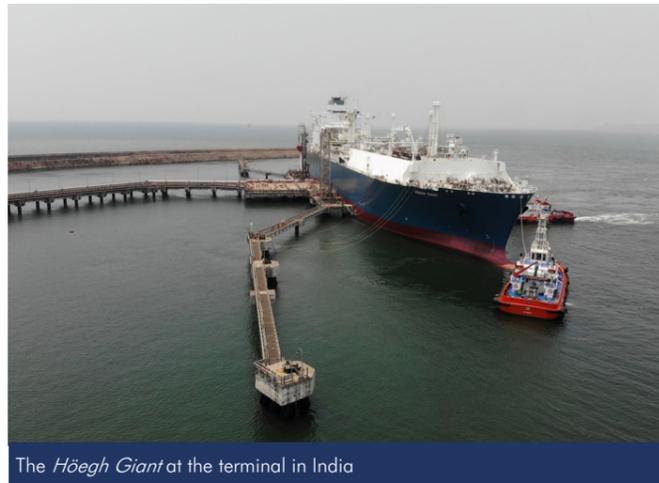
FSRU demand set to climb steadily

Though LNG, as a source of energy, has plenty of detractors, it offers a range of major benefits not available with other fuel options. Sure, it is a hydrocarbon and yes, its combustion generates methane, a gas that is many times more dangerous than carbon dioxide from a climate perspective. But on the plus side, it's cheap, plentiful, available in many locations, and far less harmful to the environment than coal or heavy fuel.

Panayiotis Mitrou is Global Gas Segment Manager at Lloyd's Register (LR). He refers to new LNG trains coming on stream in Australia, Qatar, Russia and the US. Its abundance should guarantee that it stays cheap – certainly the pandemic has failed to stop go-aheads for FEEDs and green lights for final investment decisions.

"All this gas needs to be channelled to markets," Mitrou said recently. "We see growing interest in many countries in using FSRUs for LNG imports. Gas requires more entry points, and FSRUs provide a quick and cost-effective way of providing the infrastructure that's required. We see a substantial uptake in the FSRU sector."

Mitrou drew attention to the conversion of the 2002-built LNG tanker,



The Höegh Giant at the terminal in India

Galea, at Cosco Heavy Industry in Shanghai. The 137,000 m³ vessel, originally built for Shell Singapore, is being converted into a FSRU to be located in Cyprus either later this year or early next. It will be moored alongside a purpose-built jetty in Vassilikos, feeding gas into the Cyprus grid until 2046. The island's high energy costs are expected to fall sharply.

Meanwhile, there are new FSRUs either planned or in operation across the region in Croatia, northern Greece and Turkey. What is happening in this part of the world today, Mitrou believes, sets the scene for similar developments in other regions.

Earlier this year, for example, India received its first FSRU – the 2017-built FSRU *Höegh Giant*, with a capacity of 170,000 m³. On completion of an earlier charter as a tanker, the vessel underwent minor modifications at Keppel in Singapore whilst also undertaking its first five-year survey ahead of time. The start of the 10-year Indian contract with H-Energy began in March. The unit is located at Jaigarh Port and is now providing gas for the national grid, and for local distribution by lorry and small ships. There are also plans for a local LNG bunkering setup.

With plans to raise the contribution of LNG to the country's energy mix from 6% to 15% by 2030, the FSRU is likely to be the first of many sited around the long Indian coast. However, similar arrangements are likely to develop in many other locations. Examples include Indonesia and the Philippines, for example, both populous countries with many islands and weak links across energy networks. FSRUs are far faster to deploy than land-based infrastructure and can be used in relatively small local energy markets as well as national grid networks. There are many opportunities too in Africa and South America.

In the longer term, Mitrou sees LNG as an essential transition fuel. And he pointed out that there are several important carbon-reducing options on the way ahead. There is significant scope to reduce its well-to-grid carbon intensity by adopting new ways in which to liquefy and regasify the fuel. E-LNG, for example, involves the liquefaction of gas using electricity, rather than carbon energy sources. However, this would require the integration of the power generation and LNG sectors, something that hasn't happened yet.

There is also scope to produce biogas from organic waste generated by agriculture, aquaculture and human beings. In some instances, this is already being added to LNG as a marine fuel, but in the longer term could provide a new source of gas whilst at the same time slashing natural methane emissions, particularly from the waste and agriculture sectors, direct to the atmosphere.



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Keppel Offshore & Marine

Dana Petroleum contract for KenzFige

KenzFige has secured a five-year deal to provide 'TotalCare' Lifting Services for Dana Petroleum. This contract will provide for maintenance management and the supply of expert service engineers on Dana's *Triton* and *Western Isles* FPSOs, both operational in the North Sea, directly from our office in the UK.

KenzFige has been providing equipment and services to Dana in the North Sea for many years. Since the opening of our UK office in early 2020, we have been working very closely with Dana to design the next generation TotalCare service contract. The contract will be underpinned utilising KenzFige's technology expertise together with our competent service engineers to ensure efficiency and optimum operational availability, which is in line with Dana Petroleum's needs.

"We are pleased to have the opportunity to further develop this important relationship between our companies by expanding our provision of safe, cost effective and innovative service," KenzFige Chief Executive Officer, Jan-Pieter Klaver commented. "It will further strengthen and grow KenzFige's presence in the UK market to bring our dedicated services to more UK clients."

Vice President UK Operations Barry Stewart added, "We are delighted to welcome Dana Petroleum to our service portfolio. This is a testament to our engineering expertise and ability to adapt to changing market conditions. Dana Petroleum has been great partners to work with and they have welcomed our commitment to understand their business and implement a well needed remedy for an ever-changing industry where operational strategies are geared towards business excellence."



Dana Petroleum's two FPSOs

includes main engine work on both vessels as well as on generator sets and fire pumps.

The Samsung built 103,000 dwt *Haewene Brim*, operational at Pierce field in the UK sector of the North Sea for Shell UK Exploration & Production, is powered by four Wärtsilä W46 medium speed engines. Specially designed for harsh environmental conditions, the *Aoka Mizu* is on contract to Hurricane Energy plc for production work on the Lancaster field, west of Shetland, and utilises MAN 32/40 diesel generating systems.

Royston has carried out extensive and regular main engine services on the *Haewene Brim* in recent years and has also previously completed the refurbishment and refit of essential power systems on the *Aoka Mizu*. The new agreement extends the long-standing relationship between the two companies and will establish a new partnership approach to FPSO engine maintenance.

FPSO contracts for Royston

UK's Royston Marine has signed a framework agreement for the supply of engine overhaul, repair and associated services with leading FPSO operator Bluewater Services. Under the agreement, Royston will carry out planned engine maintenance and emergency repairs on the *Haewene Brim* and *Aoka Mizu* FPSOs operating in the North Sea. The framework



The *Haewene Brim*

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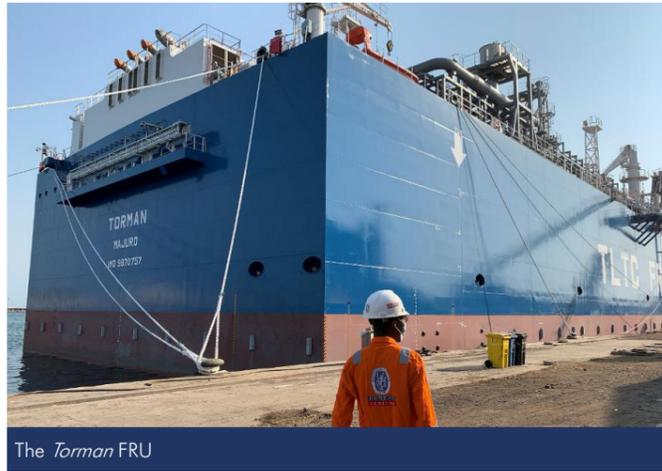
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The *Torman* FRU

While their FPSOs are in operation, Bluewater is responsible for the overall provision of engineering support on the vessels. Having a formal agreement in place with independent diesel engines specialist Royston for engine service and repair work forms part of an approach that helps to effectively manage some of the risks associated with FPSO operations.

BV completes FRU project

France's Bureau Veritas (BV) has announced the completion of the classification of the *Torman* LNG floating regasification unit (FRU) at Tema port, Ghana in sheltered waters. The unit is combined with a floating storage unit (FSU) for the delivery of gas to onshore consumers.

This exciting development of Gasfin's facility – involving the *Torman* LNG FRU and a Moss-type LNG FSU, both classed by BV – paves the way for the first deliveries of LNG to a terminal in sub-Saharan Africa and will contribute to meeting Ghana's growing cleaner energy demand. The volume that Ghana National Petroleum Corporation (GNPC) will be taking is equivalent to circa 1,300 MW of combined cycle power plant capacity.

The 95-m length, newly built FRU was constructed at China's CSSC Jiangnan Shipyard and fitted with two IMO type-C tanks, and has a storage capacity of 28,000 m³. The LNG FRU is designed for a regasification capacity of around 1.7m tonnes of LNG/year and will be in operation for approximately 20 years.



The *BW Opportunity* in Keppel's Tuas shipyard

The classification and certification scope, successfully conducted by BV, included the design, review, approval, material certification, and construction surveys of the LNG FRU at Jiangnan shipyard, as well as Tema port. Additionally, BV Solutions Marine & Offshore – the consultative arm of BV Marine & Offshore – ensured verification and surveys associated with the design, fabrication, and incorporation of the natural gas send-out heater skid system onto the *Torman* LNG FRU. During the unit's service years, BV will be supporting Gasfin's management, reassuring stakeholders of the structural soundness of the unit and its safety, through regular conformity checks to BV's classification rules and international standards.

Keppel busy with conversions

Keppel O&M currently has a total of six vessel conversion projects underway – four FPSOs, two FSRUs and one FLNG. The FPSO projects include two for SBM Offshore – the *Liza Unity* and the *Prosperity*.

During March this year, the topsides lifting campaign for the *Liza Unity* FPSO was completed and a major project milestone was achieved. Over 26,000 tonnes of topsides were safely lifted in position at Keppel O&M, since the vessel came out of drydock in October of last year (2020).

The FPSO *Liza Unity* represents SBM Offshore's first Fast4Ward design, benefitting from standardisation of the project's execution plan and using a fully completed and commissioned MPF hull, which sets the benchmark for future FPSO projects. The project continues to target first oil in 2022 in line with client planning. The unit is due for delivery in June this year (2021).

The second SBM Offshore project involves topsides and integration work on the *Prosperity* FPSO for end-client ExxonMobil. She will be stationed offshore Guyana as part of the Payara development. The FPSO will utilise a design that largely replicates the design of the *Liza Unity* FPSO.

The other two FPSO projects involve contracts from BW Offshore and Modec – the *BW Opportunity* and the *Miamte (MV34)*. The *BW Opportunity* is the former Petrobras FPSO *Cidade de Sao Mateus*, which suffered extensive fire damage a few years ago. Keppel is rebuilding the FPSO, which includes a new aft section and superstructure.

Meanwhile, the *Miamte (MV34)* will be deployed in the Offshore Area 1 some 10 kms offshore Mexico at a water depth approximately 32 m. The project involves the conversion of a suezmax tanker to FPSO, the initial work carried out at China's Cosco Shipyard. The unit then arrived in Keppel during January this year for completion and testing. This project is expected to be completed in the third quarter of 2021.

The FPSO will be capable of processing 90,000 bbls of crude oil/day, 75m ft³ of gas/day, 120,000 bbls of water injection per day and have a storage capacity of 900,000 bbls of crude oil. The first oil production by the FPSO is planned for later in 2021.

The two FSRU projects involve BW Offshore – the *BW Tatiana*, the former Shell-owned LNG tanker *Galliana*, and an upgrade and repair of a FSRU from Japan's Mitsui OSK. The *BW Tatiana* will be used on a LNG to power project in El Salvador and the Mitsui OSK project is for the Hong Kong Offshore LNG Terminal Project, which will be located in the southern waters of Hong Kong and to the east of the Soko Islands.

The FLNG project involves Golar's LNG tanker *Gimi*, which has already been in the shipyard for a number of months. This conversion is very similar to Keppel previous project for this owner involving the LNG tanker Hilli. The unit, which will be utilised offshore Mauritania, is expected to be delivered during 2023. **SORJ**

Uncertain outlook for OSV sector

Rystad Energy was broadly positive in January but an early June, a report from Braemar ACM Shipbroking and Westwood Global Energy was more cautious

Two years ago, OSV owners were facing a positive future. The world's offshore oil and gas business was recovering steadily and demand for conventional OSVs was rising amid growing offshore upstream activity. As Oslo-based Rystad Energy noted early this year, both rates and utilisation levels were expected to continue to climb.

However, as COVID-19's grip on the world economy tightened during the first quarter of last year, energy markets were thrown into deep disarray. Oil demand crashed, prices plunged, even turning negative for a brief spell in March 2020. Yet 15 months later, the picture has changed yet again. The two key benchmark crude oils – Brent and West Texas Intermediate – were both trading around the mid US\$70/ bbls as June drew to a close, enabling some players in the stricken offshore sector to breathe a sigh of relief, cautiously at least.

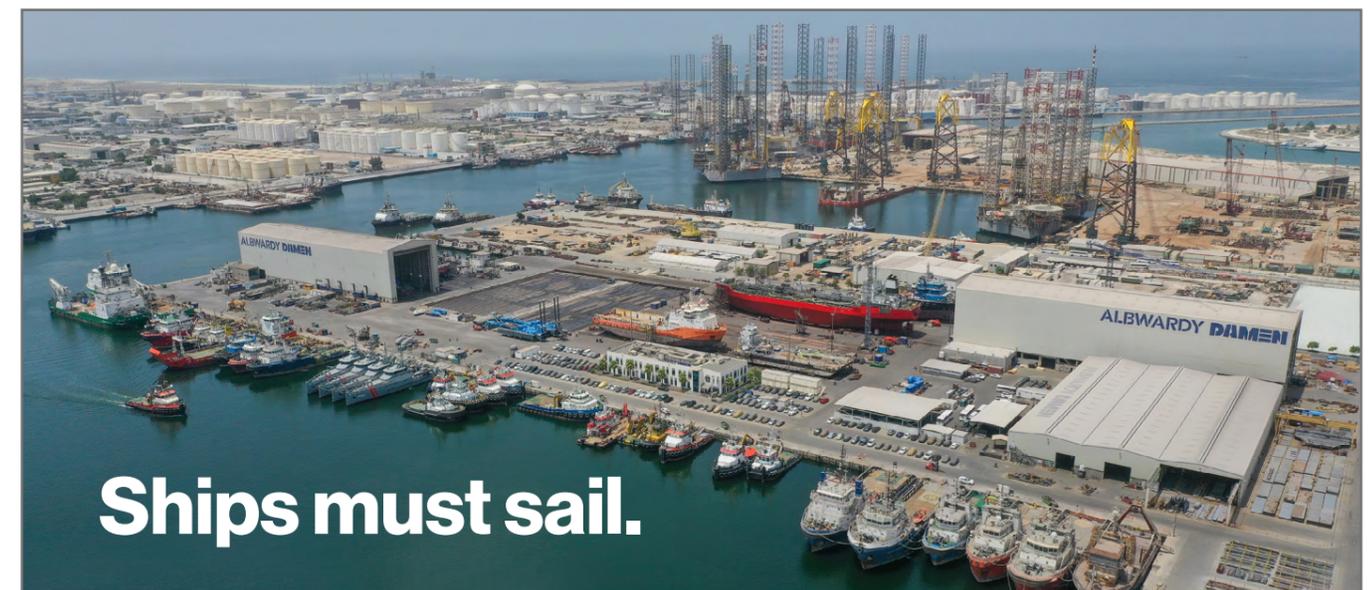
In its analysis, Rystad suggested that there could be reasons for optimism in the OSV market. This was partly because the oil and gas sector had undergone a period of substantial cost reductions, with a positive impact on the number of viable offshore projects demonstrating favourable economics, the firm said. "We expect that

many of these greenfield projects will be sanctioned over the next few years, supplemented by incremental activity stemming from brownfield work."

The first noted the substantial hit taken by exploration and production companies in the oil and gas sector, warning that it will take time for them to nurse their balance sheets back to health. However, the company predicted that overall demand for drilling rigs is expected to increase by a compound annual growth rate of 5% between 2021 and 2025. "This sets the scene for a much-needed boost for the AHTS segment, which we also believe will see brighter days in the years to come," the analysts noted. For the moment though, rig-related employment opportunities were still lagging behind platform-focused operations by a significant margin, Rystad said (see Figure 1).

In a more recent report at the beginning of June, Braemar ACM Shipbroking and Westwood Global Energy Group, an energy market research and consultancy firm, predicted that the OSV sector would continue to face an utilisation challenge. During 2000, the firms noted that total utilisation for the global OSV market fell from 55% in the first quarter to a low point of 49% in the third quarter (see Figure 2). This followed a sharp decline in rig activity, the companies noted, final investment decision deferrals and cancellations, and major logistical challenges posed by the global pandemic.

A significant number of vessels were laid up, as owners sought to cut operating costs. Global lay-ups have accounted for as much



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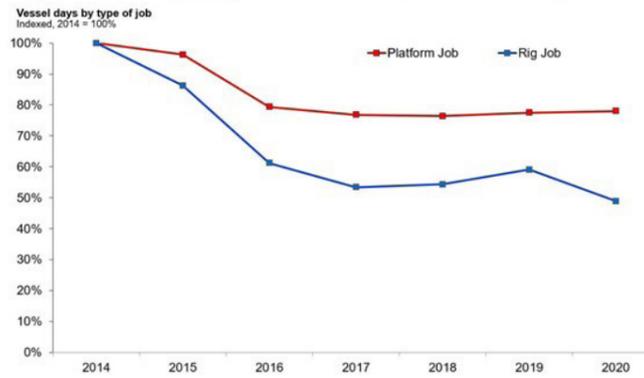
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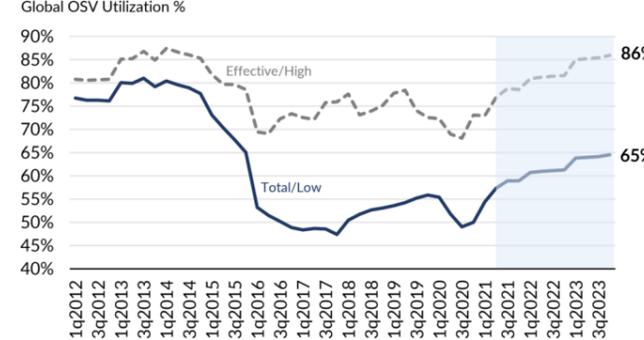
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Figure 1: Offshore rig activity the main driver for a decline in vessel days demand



Source: Rystad Energy OSVCube

Utilization improved in 1Q21 and on track for 5-year highs by 2022



as a third of total capacity. Of vessels that were not laid up, effective utilisation during the first quarter of this year was estimated at 73%, but the analysts warned that owners and operators who wish to remain competitive should consider strategies for fleet rationalisation. They should take into account ageing fleets, together with the financial and environmental costs associated with scrapping.

Offshore winds blow fair

Rystad Energy, an Oslo-based energy consultancy, has identified the offshore wind sector as offering a range of exciting opportunities for OSV operators. This could open doors for the operators of existing OSVs, the firm said, although older vessels could face competitive challenges compared with purpose-designed and built ships.

The Norwegian firm identified the need for accommodation and walk-to-work services at offshore wind projects, which has led to the enhancement of class notation of some units through increased cabin capacity and heavier cranes, it said. Furthermore, Rystad noted plans for larger wind farms in more remote locations, some of them featuring the largest turbines yet and requiring significant support from high-spec vessels, partly for installation but also for operational services.

At the time of the Rystad analysis, the potential of offshore wind

in the US had not become clear. Since then, however, the President Biden's Administration has given the country's offshore wind sector a big boost, with developments likely in both the relatively shallow waters off the country's north east coast, and the far deeper waters of the Pacific to the west.

However, since the Jones Act will apply to the construction, installation, commissioning and service of offshore wind farms in the US, the opportunities will not be as wide as they might otherwise have been. But there is potential for joint ventures in the design, construction and operation of vessels which will, of course, have to be built in US yards, fly the US flag, and be manned by US seafarers.

Some joint ventures have already been established. Lloyd's Register (LR) has signed an agreement with Northeast Technical Services while the first Jones Act-compliant offshore wind farm installation vessel is now being built at Keppel AmFELS in Brownsville, Texas. Similar arrangements are thought to be under negotiation by US energy firms keen to cash in on the offshore wind potential. For the moment, though, they will have to rely on much of the engineering and energy expertise that has been developed by leaders in the sector in Europe and Asia.

With only one wind farm operating in US waters, off Rhode Island, the country has no service vessels for a sector that could have some very significant requirements pretty soon. There are challenges, however. The cost and speed of construction at US yards is daunting, and some of these support vessels are needed in a hurry.

LR has been quick off the mark with the signing of an agreement on a joint development project with Northeast Technical Services (NETSCo) to design and develop a Jones Act-compliant wind turbine installation vessel (WTIV). NETSCo engineers and naval architects will be responsible for the ship's concept design, which will be based on requirements for potential wind farm developments on the US east coast and in the US Great Lakes.

Crane capacity and deck space will be key design aspects but hull lines are also an important feature, the companies said. They will adopt hull shapes that are common in the US shipbuilding market, thereby ensuring that it can be built efficiently in US yards. LR will then review and evaluate NETSCo's concept design to ensure that the ship complies with existing rules and regulations. The classification society's team will also evaluate the design against international codes and standards and the USCG's Code of Federal Regulations.

Meanwhile, Danish energy multinational, Ørsted, and US energy company, Eversource, have committed to charter Dominion Energy's Charybdis, the first Jones Act-compliant wind farm vessel in the US, currently under construction at Keppel AmFELS in Texas. The vessel, which is due for delivery in 2023, will be hired for the construction of two offshore wind farms off the north-east coast – Revolution Wind and Sunrise Wind – which are being developed jointly by the Danish company and Eversource.

It is understood that terms of the charter will allow the vessel to support construction of Dominion Energy's 2.6GW Coastal Virginia Offshore Wind project, off the coast of Virginia Beach. This expected to be completed in 2026. Dominion Energy is heading a consortium of naval engineering and fabrication firms engaged on the vessel's construction.

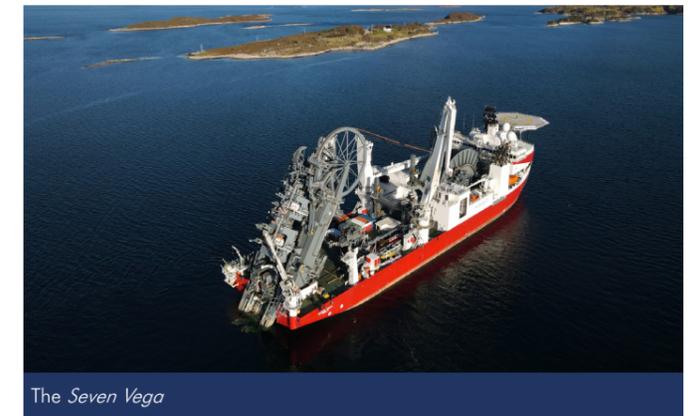
The vessel will incorporate a range of technologies developed by Kongsberg. For example Charybdis will have a Kongsberg Maritime

Integrated Solution for wind turbine installation vessels, which combines motion control, propulsion and dynamic positioning functionalities to ensure an ability to operate effectively in all conditions. Kongsberg thrusters will provide optimised performance for transit, manoeuvring and dynamic positioning, with power supplied by six Bergen diesel engines.

David Hardy, Ørsted Offshore North America's Chief Executive, commented, "A Jones Act-qualified installation vessel is a game-changer for the development of the US offshore wind industry. This investment will enable us to unlock the economic benefits of offshore wind, not just for the Northeast, but for the Southern states as well. We're proud to partner with Dominion Energy and Eversource on this historic milestone."

Subsea 7 continues its partnership with IoM flag

The Isle of Man Ship Registry is hailing the continuation of a successful 15-year partnership with Subsea 7 following registration of the offshore energy services firm's newest vessel, *Seven Vega*. It is the 11th OSV built for Subsea 7 to be flagged with the Registry. She has been designed to install economical flowline technologies



The Seven Vega

that address the growing market trend towards longer tie-back developments and sets a new standard for offshore pipe-lay.

Chris Martin, a Senior Surveyor at the Isle of Man Ship Registry, has been involved in nine Subsea 7 projects, starting with the pipe-lay vessel *Seven Oceans* in 2006. He said, "Our partnership with Subsea 7 has been in place for almost 15 years and the Registry is proud to have been part of yet another successful project. The majority are fully certified as Special Purpose Ships, predominantly designed for cable and pipe-laying. They are fantastic vessels equipped with amazing

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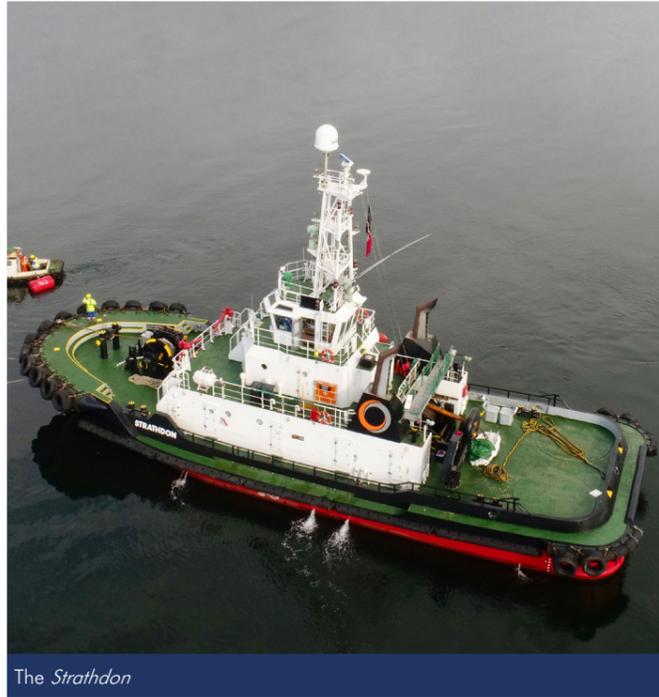
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The Strathdon

Seven Vega is and the level of technology incorporated into the build.”

The Isle of Man Ship Registry is a Category One member of Red Ensign Group with a network of surveyors in key locations around the world. Its team will now carry out a post-registration inspection of *Seven Vega*, followed by general inspections approximately every two-and-a-half years.

The Registry recently began offering remote general inspections to its clients where appropriate, a service that has proved popular with shipowners forced to contend with travel restrictions imposed due to the COVID-19 pandemic.

Engine overhaul by Royston

UK’s Royston Marine has recently completed the extensive inspection, overhaul and service of the main and auxiliary engines and associated components, as well as both azimuth propulsion units, on two tugs operated by Caledonian Towing in the Cromarty Firth

A special survey was carried out on both the *Strathdon* and *Strathdee* coastal and harbour towage vessels. The scope of work involved the full overhaul and inspection of the main Niigata propulsion engines and the Yanmar auxiliary and harbour generators. Work was also carried out on the fuel injection systems and Z-Peller propulsion units.

As an authorised agent for both Niigata and Yanmar, Royston was able to provide a highly effective single source solution to meet the needs of these overhauls through a combination of specialist on-board marine engineering teams and the ability to utilise its fully equipped engineering facilities for the fast turnaround of those engine parts requiring workshop-based cleaning, repair and maintenance.

Royston utilised OEM trained teams on each vessel whilst they were docked at Peterhead to successfully carry out the extensive range of dismantling, inspection and engine refurbishment tasks involved. The range of work included unit inspection of main engines, top end overhaul of the auxiliary engines and a complete overhaul of the harbour set.



The launch of the Edda Breeze

technology and I feel fortunate to have played a role in so many of the builds.”

The design of *Seven Vega* is particularly innovative. While most Subsea 7 vessels store piping and cabling in large carousel holds under deck, this vessel stows the product on external vertically mounted reels recessed into the deck with an open-top configuration. The design of the reel-lay system was focused on crew safety, total product capacity, operational efficiency and flexibility. The twin tensioner pipe-lay tower tilts to allow pipeline installation from shallow waters to depths of up to 3,000 m. The large multi-level workstation optimises the efficiency of operations in and around the firing line, while the creative positioning of the main and auxiliary reels – recessed into the main deck – offers payload flexibility.

Once drawings were in place, Mr Martin and fellow Senior Surveyor Carlo Vinelli analysed the proposal against statutory regulations to ensure the design of *Seven Vega* was safe and met relevant regulatory requirements. The ship’s unconventional design also required a close co-operation between Class and Flag to identify and achieve an equivalent standard of quality and safety compared to a traditional vessel.

Mr Martin added, “It was quite a challenging design and naval architects undertook a lot of work well before the keel was laid to help get the novel design through the various regulations. Proving the design of the main reel holder was a particular challenge, requiring a number of tank modelling tests to ensure compliance. Model sea-keeping trials were carried out at MARIN’s facilities in The Netherlands to understand exactly how the vessel would perform in extreme operational sea conditions.

“It was an exciting project to be part of – completely different, for example, to the construction of a standard bulk carrier that in some cases might be turned around in just three months. It took three years to get from kick-off to registration, which underlines just how specialist

The Z-Peller propulsion units were also overhauled in line with the OEM guidelines, with works also including the inspection and renewal of the propeller shaft seals and the inspection and measurement of clearances for both gearboxes.

In support of the on-board engineering works, in the Royston workshop, cylinder heads, fuel injectors and fuel pumps from the vessels were dismantled, cleaned and inspected for any signs of wear or damage. Where necessary repairs were made, and parts replaced.

With the completion of the works as scheduled, and after satisfactory sea trials, both tugs were able to resume their usual work providing harbour towage and support services to North Sea coastal offshore operators.

Caledonian Towing is a long-established fleet operator in the Cromarty Firth and surrounding North Sea areas providing towage and oilfield support services, principally to the Nigg Oil Terminal and Beatrice offshore platform, and also supporting offshore wind farm construction.

Dogger Bank contract for Edda Wind

Norway’s Edda Wind has announced that it has been awarded a new contract to enable the commissioning and construction of the first two phases of Dogger Bank Wind Farm. Edda Wind and Dogger Bank Wind Farm have agreed on a new contract for the CSOV *Edda Breeze*, currently under construction at Spain’s Astilleros Gondon.

The vessel will operate in the Dogger Bank Wind Farm located off the northeast coast of England. The new contract will commence shortly after delivery of the vessel in the second quarter of 2023, with a firm period of two years and an additional option of one year. The vessel will have 100 % utilisation during the two-year period, being the only CSOV engaged all year round in the commissioning phase of Dogger Bank.

The vessel will function as a mother ship for wind turbine technicians as they perform commissioning and installation work on the wind turbines. Dogger Bank, being the worlds largest offshore wind farm will have a total installed capacity of 3.6GW and will be capable of powering 6m homes.

Dogger Bank is being built in three equal phases of 1.2 (GW) each. The first two phases, Dogger Bank A and B, are a joint venture between Equinor (40%) SSE Renewables (40%) and Eni (20%). The third phase, Dogger Bank C, is being developed on a different timescale and is owned by Equinor (50%) and SSE Renewables (50%).

Edda Wind’s CSOV will enable utilisation of the world’s largest turbines, the first time they will be installed anywhere in the world. **SORJ**

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Allseas completes Morecombe demolition

The 403,352 gt offshore demolition vessel *Pioneering Spirit* has successfully executed the single-lift removal of the former DP3 gas production topsides from Spirit Energy's Morecambe Bay development in the East Irish Sea. This follows the removal of the DP4 topsides and subsequent transport to the UK in April.

The vessel's motion-compensated lift technology proved hugely effective in the shallow waters of Morecambe Bay, renowned for strong currents and challenging tidal conditions. For both the DP3 and DP4 operations, it was a matter of hours between arrival in the field and safe execution of the topsides' lifts.

The *Pioneering Spirit* delivered the 5,450 tonne DP3 installation to a new disposal and recycling facility at the Fife Energy Park, Scotland, where it will be reunited with the Allseas' scope covers engineering, preparation, removal and disposal of two 11,000 tonne normally unmanned installations (NUMIs) and 1,000 tonnes of connected subsea infrastructure.

The latter, including wellheads, pipelines and umbilicals, was removed by Allseas' 12,397 gt construction support vessel *Oceanic* in a complicated sequence of approximately 180 lifts. *Pioneering Spirit* will return to Morecambe Bay to remove the DP3 and DP4 supporting jackets in 2023. Operational since 2016, the DP3 and DP4 topsides removals for Spirit Energy is the vessel's first heavy lift assignment outside the North Sea.

Still a relative newcomer to the offshore heavy lift market, *Pioneering Spirit* has already installed and removed over 200,000 tonnes of platform weight, moving the work onshore where it is safer and quicker.

Equipped with motion compensation technology and capable of lifting entire offshore structures up to 48,000 tonnes in just a few hours, *Pioneering Spirit* spends significantly less time in the field compared to conventional heavy lift barges, which results in drastically reduced emissions footprint.

Earlier this year Allseas completed the Tyra Redevelopment for Total Denmark, also using the *Pioneering Spirit* carried out in the North Sea at a depth of 42 m. The scope of work comprised:

- Engineering, preparation, removal, transport and load-in of: 14,000 tonne Tyra East Alpha and 7,800 t Tyra West Alpha platform topsides
- 5,000 tonne Tyra East Alpha and 2,900 t Tyra West Alpha platform jackets
- 1,200 tonne Tyra West Delta and 900 t Tyra East Delta flare jackets
- 1,400 tonne K and 1,000 t IPF modules
- Pre-lift preparation work including removal and separation of under-deck caissons
- Design, fabrication and installation of bearing blocks to accommodate "horseshoe" lifting tools
- Leg cutting
- Transfer of topsides and modules from *Pioneering Spirit* to the offshore barge *Iron Lady* and load-in to M.A.R.S. recycling yard at Frederikshavn, Denmark
- Transfer of flare jackets from *Pioneering Spirit* to *Iron Lady* and load-in to Sagro recycling yard at Vlissingen, the Netherlands



The *Pioneering Spirit* removing the Morecombe Field structure

Nerida removes the Hutton tension leg

The giant Hutton tension leg platform, a landmark in the North Sea oil industry, has made her final journey. Hutton was the world's first tension leg platform (TLP) permanently moored to the sea bed, a design that offers good vertical stability and greater control over production. The 30,000 tonne platform, 48 m high, was towed 5 miles (8 kms) across the Cromarty Firth to Queen's Dock in Invergordon where she will be recycled over the next 12 months. The Hutton was in operation for 20 years in the Hutton oilfield between Shetland and Norway, before being decommissioned and returning to the Cromarty Firth in 2009.

Nerida, an offshore oil and gas transport specialist, along with its partner Messiah Decommissioning acquired the Hutton from its previous owners in 2021. The purchase was brokered by Simon Worden at Offshore Shipbrokers.

Jon Townley, Managing Director of Nerida, said, "We are delighted to have cleared all the regulatory hurdles and to move ahead with the dismantling of the structure. Queen's Dock was the natural choice because of its outstanding facilities and experience in this field. One of our key priorities was to ensure the jobs created from this process would remain in the UK.

"This is a good example of the circular economy as the hull was built at Highland Fabricators in Nigg and the deck section was built at the McDermott yard in Ardersier. The two sections were assembled in the Moray firth off Findhorn, so it is fitting that the platform should finish its life in Invergordon."

The Hutton platform was in operation for 20 years in the Hutton oilfield between Shetland and Norway, before being decommissioned and returning to the Cromarty Firth in 2009. Hutton was the world's first tension leg platform (TLP) permanently moored to the sea bed, a design that offers good vertical stability and greater control over production.

The process of lifting the 500 tonnes of chains and anchors and towing the platform 5 miles to Invergordon took 36 hours and involved six tugs accompanied by a rescue boat. Nerida arranged the tow to the dock and have now handed the rig over Messiah whose directors, Tony O'Sullivan and Steven Regan have mobilised their extensive array of specialised equipment and highly experienced management team to handle the decommissioning and recycling.

Bob Buskie, Chief Executive of the Port of Cromarty Firth, said,

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The Hutton being towed by a Maersk anchor-handler

“This is a memorable time for everyone at the Port as the Hutton TLP – known as the Pillars of Cromarty Firth – prepares for the final leg of its journey after being a unique fixture of our landscape for the past 12 years.

“Since 2009 the legs have been safely and securely anchored here, becoming a distinctive part of the Cromarty Firth. Now its life has come full circle as it will be transferred to the Port’s Queens Dock where Messiah Decommissioning can begin decom operations onsite. The Port continues to hold all the relevant decommissioning and waste management licences to ensure the project is completed to the highest and safest standard by Messiah.”

Ninian platform undergoes controlled explosion at Shetland base

Veolia and Peterson have successfully collapsed the decommissioned Ninian North platform using explosives at its Dales Voe decommissioning facility in Shetland. The structure, which had served the CNR-operated Ninian field in the UK northern North Sea, arrived at Dales Voe last August (2020) following removal by Allseas’ specialised offshore vessel *Pioneering Spirit*.

Veolia’s decommissioning team then decontaminated the

structure, removing all hazardous materials to facilitate a future, ‘environmentally friendly’ demolition. The platform comprised a 14,200 tonnes steel structure delivered on eight legs, each around 30 m (98 ft) tall.

To safeguard personnel working at height and to allow for remote demolition via specialist excavators, planning operations allowed the explosive collapse of the platform legs to bring the structure much closer to the ground. The demolition phase now begins, with a recycling target of 97%. **SORJ**



The Ninian platform being demolished



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The *BGP Prospector* in drydock in Palumbo Malta

OSV repairs by Palumbo

Earlier this year, Palumbo Shipyards Malta successfully completed the drydocking of the 10,732 gt seismic research vessel *BGP Prospector*, one of the most advanced and environment-friendly seismographic research vessel in the industry. She is owned by BGP Inc, a subsidiary of China's Chinese National Petroleum Corporation and managed by Singapore's Thome Offshore Management.

During her 30 day stay in the yard, the Malta team carried out the assistance for the 10 yearly service of the two Rolls Royce Marine Bergen main engines, each with an output of 4,000 kW capacity, 10 year bow thruster inspection and refit, extensive overhaul on the steering gear, the 2.5 year service of the main propulsion gearbox and the complete overhauling of rudder and rudder stock.

The vessel is 100 m long and a complete execution of the full hydro jetting of the entire hull, following by three to four full coats for the required protection. The ballast water tanks were fully cleaned, washed and painted and treated to the highest standard available.

The vessel is equipped with four top deck cranes up to 15 tons SWL, lifeboats, work boats and fast rescue boat. All of this equipment were overhauled, wires replaced, the hydraulic hoses and were load-tested following Class instructions.

The *BGP Prospector* also mounts a streamer winch and a cable lift on deck, which were tested as per the instructions of Bahama Flag authorities – and hundreds of lifting points were hydraulically tested to the load charters provided. Several jobs were carried out in the accommodation area in order to facilitate and improve the life of the crew on-board.

Special mention of the specific works for the 250 m² of stainless steel plates installed and welded on the gun deck in order to improve the conditions of the Deck 3 during the normal operations of the gun arrays, needed to conduct the 3D seismic data.

Following the successful redelivery of the *BGP Prospector*, Palumbo was awarded the repair contract involving the 1,736 gt research vessel *Geo Service 1*, from the same company.

During recent months, Palumbo has been involved in the offshore repair market, in particular repairs top offshore support vessels. Italy's Augusta Offshore, Naples has been the most regular client with a total of four ships repaired by Palumbo – the two anchor-handlers - 2,469 gt *Asso Ventiquattro*, and the 2,554 gt *Asso Ventinove*, the 1,065 dwt tug *Gagliardo* and the 1,383 dwt OSV *Hamal* – Augusta Offshore. Other offshore vessels repaired recently by Palumbo include SeaBird Exploration's 7,969 gt seismic research vessel *Eagle Explorer*, Bourbon

Offshore's 4,293 gt OSV *Bourbon Diamond*, Tidewater Marine's 5,135 dwt OSV *Handin Tide*, and Vroon Offshore's 1,678 gt OSV *Vos Thetys*.

Palumbo Malta has also carried out general repairs to a fleet of tugs owned and operated by Tug Malta - *Lieni*, *Pawlina*, *St.Elmo* and *Wenzina*.

Albwardy Damen wins award

UAE's Albwardy Damen has been recognised as the Best New Building Yard at the 14th edition of the ShipTek International Awards 2021, held in Dusit Thani Hotel, Dubai, on June 7th, 2021. The award was received by Willem Moelker, sales & marketing director, Albwardy Damen.

The ShipTek International Maritime Awards has established itself as one of the most distinguished events in the maritime, offshore and oil & gas sectors. The 14th edition of the awards recognised significant industry players who contributed to the sector's growth, particularly during the COVID-19 pandemic and the resulting market disruption.

Albwardy Damen aims to improve the efficiency of its operations and develop strong client relationships by providing high safety standards and excellent services in line with its promise and commitment to its customers. Its services include newbuilding of steel and aluminium vessels, as well as marine, and oil & gas asset maintenance and servicing. Its services are offered in all of the UAE's major ports and anchorages, as well as in the Sultanate of Oman. Moreover, it provides its clients all around the world with docking services, ship repair, conversion services, afloat and voyage repairs, 3D scanning, and new building. Furthermore, the company's diving services and anchor recoveries division in Fujairah serves ports and anchorages across the UAE and provides services such as underwater hull cleaning.

Albwardy Damen has state-of-the-art facilities for the construction of all types of modern and complex vessels. Damen Shipyards Group has built over 200 vessels for the Middle Eastern Market since 1969, many of which are still in service. The company employs over 1,300 highly experienced and skilled professionals from 26 different nationalities and has an extensive engineering section devoted to repairing and construction of vessels to the highest technical and environmental standards. It is also certified by LRQA for ISO 9001:2015, ISO 14001, OHSAS 18001 as well as API Q1.

SORJ



Albwardy Damen's Sharjah facility

No fuel like an old fuel



Michael Grey

The shipping industry's march towards a zero-carbon future is gradually increasing its pace, and against a background of environmental activism, is unlikely to slow down, even if it wanted to. The great Glasgow environmental fest scheduled for the end of the year will be unsparing of any 'special case' treatment for shipping, with its activists already proposing a slew of measures that will go far and beyond anything that might feature on IMO's list of

practical steps that would not seriously damage world trade. Green politics, in an age now dominated by agendas dictated by teenagers and millennial activists, are becoming mainstream and gradualism is unfashionable. And whatever practical engineers might suggest, it won't ever be enough – environmental interests will always want more, and faster.

All of which makes life extraordinarily hard for anyone who might be considering serious investment in new tonnage. Against such uncertainties, how might you work out how on earth such ships should be propelled and how they might be fuelled? These will be ships that if ordered today and delivered two years from now, could be still trading a quarter of a century from now. Will they be permitted, in a climate which is already proposing the outlawing of gas fired domestic boilers within a decade and making it illegal (or at least impractical) to sell diesel or petrol fuelled vehicles?

The green zealots who are forcing governments down this road don't care about practical difficulties and the interests of the shipping industry, which they believe is significant only by virtue of its role as a polluter, will be brushed aside. We can probably forget the traditional 'grandfather' clauses to protect the economics of existing ships – the activists are now working on the financiers and users of shipping to ramp up their objections to the 'old and polluting', no matter how many useful years it might have in it.

The giant corporates, which shift vast quantities of goods around the world, earn valuable public relations Brownie-points when they insist that their transportation is greener than green and that they won't charter ships that don't match this colour. It is, for them cheap, and burnishes their reputation. 'Zero carbon!' – bellow the demonstrators – "When do we want it – now!" And regrettably, this is the message that is resonating with the political class – this is where the votes are to be mined.

Does the owner contemplating a newbuilding programme hold fire, and see what emerges from COP 26 after the dust has died down and the 40,000 delegates have jetted off from Glasgow to their home countries (their emissions suitably offset, of course)? Does such an owner look around the market, and opt for ships that have incorporated in their design as many possibilities for different

fuel options and are replete with the best current thinking on sustainability? Does an owner just hope for the best and buy what is cheapest, following tradition, in the knowledge that such a ship may lose any value it has, with years of usage in it, as the greens accelerate their demands?

Does the owner join the growing number programming LNG into their future thinking, considering its not unreasonable cost, a spreading worldwide infrastructure and the fact that it actually has been proven to work?

But then that owner also has to consider the possible downside in the army of nay-sayers who say LNG, while clean-ish, does nothing in the long term for the environment and is, at best, just a 'bridging' fuel. This is the message that resonates where green activists gather together. It doesn't help the cause of LNG that the World Bank (whatever its technical credentials might be) has issued a decidedly negative report about its use, despite some record ordering of LNG-fuelled tonnage.

It is interesting that pretty well all the new fuels attempting to make their mark have associations and organisations representing their interests and promulgating their supposed advantages. So there is no shortage of advice, although how objective it might be will be open to question. This is probably just as well as there never seems to be any shortage of activists keen to emphasise the negative aspects of any proposal. LNG, Methanol, Ammonia and Hydrogen all have keen supporters, while scarcely a day goes by without an enthusiastic message from the International Windship Association, urging us all to stop being so 'fuel-centric' in our thinking.

There is no real argument – wind is the one energy source powering ships that doesn't have environmental activists demanding that it is stopped in its tracks. It may be a long shot for our owner looking for newbuilding solutions, but there are already all manner of amazing designs for wind assisted ships. This itself places the owner in a desperate conundrum, as worries pile in about the advantages of rotors over fixed wing sails, whether aerofoils (as proved by America Cup yachts) are a better prospect than a 21st century derivation of the sails on Chinese junks, or whether to go for an enormous kite.



It doesn't help the cause of LNG that the World Bank (whatever its technical credentials might be) has issued a decidedly negative report about its use, despite some record ordering of LNG-fuelled tonnage

Not a yacht

It is probably true that rejoicing is mixed with scepticism over an announcement from the British government that tenders for a 'sort of replacement' for the Royal Yacht Britannia will be called for in the near future. The ship, more a 'Sea Force One' than a yacht will be ready for service in 2025, although experience has demonstrated that this is perhaps an aspiration than a firm delivery date.

The ship will be employed for trade promotion purposes and as a floating location for diplomacy. It is reported that it will be crewed by the Royal Navy, which may cause Admirals some concern, as naval seafarers are in short supply at present.

It seems to be a very different proposal to a current and very practical plan for a multi-role ship that would have combined an ability to provide aid in emergencies such as weather events, with an important training mission for seafarers. Details of the government plan remain sketchy, but it would appear that 'showing the flag' might have assumed a greater importance in post Brexit Britain than 'hearts and minds' and a pragmatic need to provide sea time to future generations.

There is probably plenty of time for endless argument about where the ship will be built, if the delays over the RFA's solid store ships to supply the carrier force are anything to go by. After hawking about whether tenders should be 'international', then delays about the proportion of domestic content in the ships, the MoD has required the tendering process to begin again. Endlessly kicking the ball down the road doesn't sit too comfortably with Sir John Parker's proposals to have a smooth stream of orders keeping what shipyard capacity remains in the UK reasonably active. But it puts off the day when the ships have to be paid for, which may be the government's rationale.

Meanwhile the HMS *Queen Elizabeth* task force is off to the Far East, assisted by the ageing RFA *Fort Victoria*, which optimists hope will be eventually replaced by the new ships. It is worth perhaps

remembering the Canadian problems which were caused when one of their two fleet auxiliaries was wrecked by a fire, causing all sorts of chaos in naval circles and the conversion of a container ship, in double quick time and the value of always having something in reserve.

Posher paint

Keen students of the marine coatings world will have been interested to learn that the 'posh people's paint company' Farrow and Ball has been acquired by that aristocrat of the paint world Hempel. Hitherto in the hands of a hedge fund, the British brand, which has made something of a reputation in the country-house set where they don't mind paying £90.00 for a small pot of paint, now finds itself owned by a Danish firm that has been making marine coatings for more than a century.

I still have a small volume on anti-fouling written by Hempel's Iver Lunn in 1974, which is admittedly a bit out of date, but full of fascinating historical facts, involving 'breaming' and 'careening' and about how the dreaded teredo worm and barnacles could be dealt with in the 16th century.

It is a curious acquisition for Hempel and may well lead to questions about whether it will be possible in the future to purchase anti-fouling which is the colour of 'dead salmon'. Maybe you could paint your hatchcovers in the startling shade of 'pale hound'. F&B has made something of a reputation in the strange names it chooses for what might otherwise appear to be a readily identifiable colour of its adventurously priced coatings.

We have come a long way since a question I was asked in my *Mates'* orals about how to mix your own paint from various cheap constituents. There were still Tyneside tramps which made their paint in such a fashion, when Mr Farrow and Mr Ball started out making their paint in the 1940s. Poshness came later. **SORJ**



An artist's impression of the new 'Royal Yacht'



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Seaspan (Victoria)
US EASTCOAST -
Detyens
Grand Bahama Shipyards(Bahamas)
PERSIAN GULF:
NKOM - Nakilat Keppel Offshore Marine (Oman)
AFRICA:
Namibia -
NAMDOCK (Walvis bay)
SOUTH AFRICA:
Dormac (Capetown)
Dormac (Durban)
Dormac(Saldanha)
ASIA:
Korea/Orient Shipyard (Busan)
Indonesia: ASL Marine(Batam)
AUSTRALIA:
Thales (NS Wales)



ESMA MARINE AGENCIES B.V.

Kuiperbergweg 35, 1101 AE Amsterdam, The Netherlands
Tel: +31 20 3121350
Email: shiprepair@esma.nl
Web: www.esma.nl

Contact: Marcus Weggeman
Direct: +31 20 3121353
Mobile: +31 6 51408082
Contact: Atie Witte
Direct: +31 20 3121366
Companies Exclusively Represented

- EUROPE
Lisnave – Setubal – Portugal
Gemak Group – Istanbul - Turkey
Netaman-Riga-Latvia
Netaman-Tallinn-Estonia
West Sea Viano Shipyard – Viano do Castelo – Portugal
MIDDLE EAST
Drydocks World – Dubai – UAE
Drydocks World Global Offshore Services
DMC Dubai Maritime City, Shiplift
FAR EAST
PaxOcean Asia
• PaxOcean Singapore
• PaxOcean Pertamina – Batam – Indonesia
• PaxOcean Graha – Batam – Indonesia
• PaxOcean Nanindah – Batam – Indonesia
CHINA
Cosco Shipyard Group
• Cosco Dalian Shipyard
• Cosco Nantong Shipyard
• Cosco Qidong Shipyard
• Cosco Shanghai Shipyard
• Cosco Zhoushan Shipyard
• Cosco Guangdong Shipyard
PaxOcean Asia
• PaxOcean Zhoushan
WEST AFRICA
Dakamave – Dakar- Senegal
CNIC – Douala – Cameroon
SOUTH AMERICA
S.P.I. – Mar del Plata – Argentina



AIMSS V.O.F

Jan van Palmenkade 3, 4811 KM, Breda, The Netherlands
Tel: +31 76 737 0002
Email: sales@aimss.nl
Web: aimss.nl

Shipyards

- ASI (Indonesia)
- Asmar (Chile)
- A&P (UK)
- NASCO Group (China)
- Oman Drydock (Oman)
- SAS (South Africa)
- Tersan (Turkey)
- TNG (Mexico)
- Unithai (Thailand)

Marine Services

- Diamond Ship (Taiwan)
- Shop Stores Supply
- Crosscarmer (Spain)
- Afloat repairs
- General Shipping (Greece)
- Tank Coating, Docking Services & Turnkey Projects
- Hai Ha M&S (Vietnam)

Afloat, Underwater & Voyage Repairs

- Index-Cool (Singapore)
- A/C & Refrigeration Plants & HVAC Turnkey Solutions
- Nico International (UAE)

Afloat, Underwater & Voyage Repairs

- PBM (Croatia)

Governors & ME Services, Woodward Parts & Services

- PMS (Panama)

Afloat, Underwater & Voyage Repairs

- PolyFlake (The Netherlands)

Anti-Corrosion & Anti-Marine Growth Technology, Pipeline

- Coating & Lining System

Riding Team (Romania & Bulgaria)

Supply of Qualified Welders, Fitters, Technicians, Electricians etc.

- WAROM (China)

Marine & Offshore Lighting Products

- Winkong (China)

Afloat, Underwater & Voyage Repairs

- Zebec Marine (India)

Design, Engineering & Consulting Solution

Cyprus



WSR SERVICES LTD

MEMBER The International Association of Shiprepair Agents Ltd

234 Ayias Fylaxeos, CY 3082 Limassol, Cyprus
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Web: www.umarwsr.com

Companies Represented – Shipyards

- AASRY - Bahrain
- Caribbean Drydock - Trinidad & Tobago
- Chengxi Shipyard - Shanghai, China
- Cramar - Dominican Republic
- Colombo Drydock Ltd - Sri Lanka
- Dakamave - Dakar, Senegal
- Delyens Shipyards - Charleston, South Carolina, USA
- Dormac Marine & Engineering - Capetown/Durban, South Africa
- EDR Antwerp - Belgium
- Fayard A/S - Munkebo, Denmark
- Gemak Shipyard - Turkey
- German Dry Docks - Bremerhaven, Germany
- Guangzhou Wenchong - South China
- Harland and Wolff Heavy Industries - Belfast, N. Ireland
- HRDD Drydock - Shanghai, China
- Hutchison Ports TNG (Talleres Navales del Golfo S.A.) - Vera Cruz, Mexico
- International Ship Repair - Tampa, Florida, USA
- Lisnave Estaleiros Navais - Setubal, Portugal
- Loyd Werft - Bremerhaven, Germany
- Marina Barcelona 92 - Spain
- MTG Dolphin - Varna, Bulgaria
- Netaman Repair Group - Tallinn, Estonia
- Papua New Guinea Drydock - Papua New Guinea
- Sembcorp Marine Repairs & Upgrades - Singapore
- Sociber - Valparaiso, Chile
- Zhoushan IMC YY - China
- Zhoushan Nanyang Star Shipbuilding - China
- Shanhaiguan Shipyard - North China
- Dalian Shipbuilding Industry Marine Services (DSIC) - North China

Underwater and Afloat

- Avalontec Engineering - Singapore
- Zener Maritime - India, Singapore
- Subsea Global Solutions - Brazil, Caracas, Los Angeles, Miami, Panama, Trinidad
- LongKong Marine Eng. Co, Ltd - China
- Technovide Ltd - Greece
- Trident BV - The Netherlands, Las Palmas, Italy
- ROG Ship Repair - Rotterdam
- Atlantis Marine Services LLC - Fujairah, UAE
- Underwater Contractors PTE-Singapore
- Underwater Contractors -Spain
- RIMS BV
- Argus Marine Services - Columbia

Underwater and Afloat

- Avalontec Engineering - Singapore
- Zener Maritime - India, Singapore
- Subsea Global Solutions - Brazil, Caracas, Los Angeles, Miami, Panama, Trinidad
- LongKong Marine Eng. Co, Ltd - China
- Technovide Ltd - Greece
- Trident BV - The Netherlands, Las Palmas, Italy
- ROG Ship Repair - Rotterdam
- Atlantis Marine Services LLC - Fujairah, UAE
- Underwater Contractors PTE-Singapore
- Underwater Contractors -Spain
- RIMS BV
- Argus Marine Services - Columbia

Denmark / Finland



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Contact: Tomas Järund, Business Development Manager
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Email: tomas.jarund@jmlshipyardagency.com
Web: www.jmlshipyardagency.com
Shipyards Represented

Europe

- Astander, Santander, Spain
- Astican, Las Palmas, Spain
- Lloyd Werft, Bremerhaven, Germany
- MSR Gryfia Shipyard, Szczecin, Polen
- Sefine Shipyard, Tuzla, Turkey
- San Giorgio del Porto, Genoa, Italy
- Chantier Naval de Marseille, France

Middle East

- Drydocks World, Dubai

Far East

- PaxOcean, Singapore & Batam
- Chengxi Shipyard, Jiangyin, China
- Guangzhou Wenchong Shipyard, China
- PaxOcean, Zhoushan, China
- DSIC Marine Services, Dalian, China
- Changhong International Shipyard, Zhoushan, China

US, Canada & Caribbean

- Talleres Navales del Golfo, Veracruz, Mexico
- Cramar Shipyard, Dominican Republic
- Chantier Davie, Quebec, Canada
- Caribbean Drydock, Trinidad & Tobago
- Afloat Repair
- Global Offshore Service, Dubai UAE
- Offshore Inland, US Gulf/Mexico

Germany



COMBITRADE GMBH

MEMBER The International Association of Shiprepair Agents Ltd

Caffamocherreihe 7, 20355 Hamburg, Germany

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Fax: +49 40 80 80 110 699

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Contact:

Andreas Schou (+49 172 453 5135)

Eike Lohmann (+49 151 742 30009)

Shipyards Represented

EUROPE

- A&P Tyne (UK)
- A&P Tees (UK)
- A&P Falmouth (UK)
- Aviles Shipyard (North of Spain)
- Desan Shipyard (Turkey)
- Eiffel Industries Marine (France Atlantic Side)
- Gibdock (Gibraltar)
- La Nuova Meccanica Navale Srl (Italy)
- MTG Dolphin (Bulgaria)
- Nauta Shipyard (Poland)

MIDDLE EAST

- Heisco (Kuwait)

AFRICA

- Elgin Brown & Hamer Pty. Ltd. - Walvis Bay (Namibia)
- Elgin Brown & Hamer Pty. Ltd. (Elgin Brown & Hamer Group) - (Durban - Capetown - East London) (South Africa)

SINGAPORE

- ST Engineering Marine (Singapore)

INDIAN OCEAN

- Colomba Drydock (Sri Lanka)

FAR EAST

- CHI Dalian (China)
- CHI Nantong (China)
- CHI Shanghai (Hangxing + Huajing + Donggou) (China)
- CHI Zhoushan (China)
- CHI Guangdong (China)
- CSSC Guangzhou Huangpu Shipyard (China)
- Zhoushan Xinya Shipyard, Zhoushan (China)
- Jinhai Shipyard, Zhoushan (China)
- Fujian Huadong Shipyard, Fuzhou (China)
- Beihai Shipyard, Qingdao (China)

- CUD, Weihai (China)
- CSSV Guangxi Shipbuilding, Qingdao (China)
- CSBC Koahsiung (Taiwan)
- CSBC Keelung (Taiwan)
- Mitsubishi Heavy Industries (Japan)
- Hyundai Mipo Drydock (Korea)
- ORIENT SHIPYARD CO. LTD (HQ) Busan & Gwangyang Shipyard (Korea)
- Sam Kang Shipbuilding & Conversion (Korea)

CENTRAL AMERICA

- Caribbean Drydock (Cuba)
- Caribbean Drydock (Trinidad & Tobago)

SOUTH AMERICA

- SIMA, Callao (PERU)
- Cotecmar, Mamonal (Colombia)
- Tsakas Industrias Navales (Uruguay)
- Special Services
- Edicom Ou - worldwide (Thickness Measurement, Flying Squad), Entirely Shipping & Trading - Romania (afloat voyage repair/main engine overhaul), Marine Technical Services (MTS) - worldwide (Port Repair, Voyage Repair), Marcontrol - worldwide (Port Repair, Voyage Repair and Electric Cargo Crane Automation), Marship (afloat repair with own berth/voyage repair in European ports/yards), STEP Consolidated - workshops in Brazil, Portugal and South Africa (Port Repair, Voyage Repair incl Flying Squads) M.M. Shipping - Whole Indian Coast (port/voyage repair/spares supply) Seagull Marine - SE Asia (Port Repair, Voyage Repair, specialised in PBCT propeller), Kwang-Youn-Gi Engineering Co. Ltd - Taiwan (Repair workshop with flying squad), Almaritec (Aluminium-Workboats), Port Marine Contractors (PTY) LTD - South Africa (Port Repair, Voyage Repair), Pasras - Balboa (port repair, specialised in ship's automation / main engine remote & safety) Pro Nautas. Leer (Germany) (nautical equipment, SAT communication & IT on board) Loewe Marine, Bremen (Germany) (newbuilding & repair, rudder & steering gear, ECO design) Bacviet, Haiphong (Taiwan) (port and voyage repair incl spare parts) New Hai An Marine Engineering, Shenzhen (China) (port repair, afloat incl steel renewal, piping & electrical repairs & tank cleaning) Shanghai Marine Technology (China) (specialized in port repair, voyage repair) Hathtec Marine Service, Shanghai (China) (specialized in hatch cover/deck crane/windless/winch/rota/grab) Boilerman International Service, Shanghai (China) (boiler repair/heat exchangers) Kingfisher Marine Service, Shanghai (China) (supply & general service, supervision & engineering) Seatec Ship Service, Shanghai (China) (3d-scan, project design, service repair, maintenance, supervision, engines, boilers worldwide diver support and port repairs)



GERMANIA SHIPYARD AGENCY GMBH

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Web: www.shipyard-agency.com

Contacts: Christof Gross, Eliane Tietz, Oliver Kirms

Shipyards

- North America/Central America/Caribbean
- Chantier Davie Canada Inc. Quebec, Canada
- Delyens Shipyard Charleston, USA
- MEC Repairs, S.A., Panama
- Seaspan Vancouver Drydock, Canada

- Seaspan Victoria Shipyards Company Ltd, Canada
- TNG Talleres Navales del Golfo, Veracruz Mexico

South America

- SPI Astilleros S.A., Argentina
- Far East
- DSIC Changxingdao Shipyard Co., Ltd. Dalian
- Huarun Dadong Drydock Co., Ltd, China
- PaxOcean Engineering Zhoushan Co Ltd, China
- PaxOcean Shipyard Pte. Ltd, Singapore
- PaxOcean Asia - Pertamina, Indonesia
- Qingdao Beihai Shipbuilding Heavy Industry Co. Ltd, China
- Shanhaiguan Shipbuilding Industry
- Yiu Lian Dockyards Limited, Hongkong
- Yiu Lian Dockyards (Shekou) Limited, China
- Yiu Lian Dockyards (Weihai) Limited, China
- Zhoushan IMC YY Shipyard

Persian Gulf

- Drydocks World - Dubai LLC, UAE

Med/Black Sea

- Bulyard Shipbuilding Industry EAD, Bulgaria
- Carrell S.A., Greece
- Chantier Naval de Marseille, France
- San Giorgio del Porto Genoa, Italy
- Sefine Shipyard, Turkey
- Europe Atlantic/Baltic
- Astander, Santander, Spain
- Astican, Gran Canaria, Spain
- Balyard, Gdynia
- BREDO Dry Docks GmbH, Germany
- Blohm + Voss B.V. & Co. KG
- Harland&Wolff HL Belfast, UK
- HSOG LTD. UK
- Oresund Drydocks, Sweden
- Pregal Shipyard Kaliningrad

Afloat Companies

- Bludworth Marine, USA
- BMT Repairs, Spain
- Drydocks World Global Offshore Services, UAE
- DSK Co., Ltd Korea, afloat repairs, engine service, drydocking
- Greentec Marine Engineering Co., Ltd, Turkey installation, design or supervision for BWTS and Scrubber
- HON Marine, Malaysia
- Longkong Marine Services Co., Ltd, China
- Oceantrans Marine Engineering Co. Ltd, China
- Offshore Inland Marine & Oilfield, LLC, USA
- On Site Alignment, Supervision for Alignment and shaft works
- MarineService Hirthals A.S., Denmark
- Metalock Brasil
- ROG Rotterdam Offshore Group, Netherlands
- Subsea Global Solutions Halifax, Canada
- Subsea Global Solutions Vancouver, Canada
- Subsea Global Solutions Miami, USA
- Subsea Global Solutions Los Angeles, USA
- Subsea Global Solutions Seattle, USA
- Subsea Global Solutions Tampa, USA
- Subsea Global Solutions Houston, USA
- Subsea Global Solutions Panama
- Subsea Global Solutions Curacao Netherlands Antilles
- Subsea Global Solutions, Trinidad and Tobago
- Trident BV, Netherlands
- Trident Italia
- Trident Malta
- Trident Spain
- Trident UAE
- UMA Marine Group, India

Spare and Equipment

- Brightsun Marine Pte. Ltd, Singapore
- Greentec Marine Engineering Co., Ltd
- IHB ShipDesign AD
- LAB S.A., scrubber maker
- SunRui Marine Environment Engineering Company, China
- Senda Shipping Engineering & Service Ltd, China
- VICUS Desarrollos Tecnológicos S.L

AFRICA

- Elgin Brown & Hamer Pty. Ltd. - Durban (South Africa)
- Elgin Brown & Hamer Pty. Ltd. - Capetown (South Africa)
- Namibia Drydock & Ship Repair (Pty.) Ltd. - Walvis Bay (Namibia)

AMERICAS

- Breakwater International (U.S.A.)
- Delyens Shipyard (U.S.A)
- Offshore Inland (U.S.A.)
- Marine Hydraulics International (U.S.A.)
- Talleres Industriales S.A. (Panama)
- Proios S.A. (Argentina)
- Tandonor Shipyard (Argentina)
- Vancouver Drydock Co. - SEASPAN GROUP (Canada)
- Vancouver Shipyards Co. Ltd. - SEASPAN GROUP (Canada)
- Victoria Shipyards Co. Ltd. - SEASPAN GROUP (Canada)

ASIA

- Cosco Shipping Heavy Industry Group (China)
- Cosco Shipping Heavy Industry Dalian Shipyard
- Cosco Shipping Heavy Industry Zhoushan Shipyard

ASIA

- Cosco Shipping Heavy Industry Group (China)
- Cosco Shipping Heavy Industry Dalian Shipyard
- Cosco Shipping Heavy Industry Zhoushan Shipyard

ASIA

- Cosco Shipping Heavy Industry Group (China)
- Cosco Shipping Heavy Industry Dalian Shipyard
- Cosco Shipping Heavy Industry Zhoushan Shipyard

A. P. & A. LTD (GREECE)

Bona Vista Plaza, 3 Xanthou Street, 166 74 Glyfada, Athens, Greece
Tel: +30 210 8983 463
Fax: +30 210 8983 434
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Contact: Andreas Papadakis, Ingrid Papadakis

China

- Cosco Group
- Qingdao Beihai Shipbuilding Heavy Industry
- DSIC Changxingdao ex DSIC Marine
- Shanhaiguan Shipbuilding Industry
- CUD Weihai
- Huarun Dadong Drydock
- Zhoushan Xinya Shipyard
- Zhoushan IMC-Yongtue Shipyard
- Paxocean Zhoushan
- Zhoushan Huafeng Shipyard
- Zhoushan Nanyang Star Shipbuilding ex Nasco
- Chengxi Shipyard (China)
- Yiu Lian Dockyards - Zhoushan
- Yiu Lian Dockyards - Shekou
- Yiu Lian Dockyards - Hong Kong
- Guangzhou Wenchong Drydock
- Fujian Huadong Shipyard

South East Asia

- Sembcorp Marine Repairs - Singapore (case by case)
- Paxocean Singapore
- Paxocean Indonesia - Batam Island
- ASL Shipyard - Batam Island
- Turkey - Black Sea
- Sefine Shipyard
- TK Tuzla Shipyard
- Besiktas Shipyard
- Odessos Shiprepair Yard - Bulgaria
- Bulyard Shipbuilding - Bulgaria

Africa

- Namibia Drydock - Namibia
- Dormac Marine & Engineering - South Africa
- Caribbean Area
- Caribbean Drydock & Engineering Services

Africa

- Namibia Drydock - Namibia
- Dormac Marine & Engineering - South Africa
- Caribbean Area
- Caribbean Drydock & Engineering Services



T.J. GIAVRIDIS
MARINE SERVICES CO. LTD.

MEMBER The International Association of Shiprepair Agents Ltd

T J GIAVRIDIS MARINE SERVICES CO LTD

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Web: www.tjgiavidisgroup.gr

Contact: Mr John Giavidis

Mobile: +00306936201988

Contact: Mr Nikolaos Giavidis

Mobile: +00306936766165

List of Shipyards and Ship Repairers Represented

- AFRICA**
- Elgin Brown & Hamer Pty. Ltd. - Durban (South Africa)
- Elgin Brown & Hamer Pty. Ltd. - Capetown (South Africa)
- Namibia Drydock & Ship Repair (Pty.) Ltd. - Walvis Bay (Namibia)

AMERICAS

- Breakwater International (U.S.A.)
- Delyens Shipyard (U.S.A)
- Offshore Inland (U.S.A.)
- Marine Hydraulics International (U.S.A.)
- Talleres Industriales S.A. (Panama)
- Proios S.A. (Argentina)
- Tandonor Shipyard (Argentina)
- Vancouver Drydock Co. - SEASPAN GROUP (Canada)
- Vancouver Shipyards Co. Ltd. - SEASPAN GROUP (Canada)
- Victoria Shipyards Co. Ltd. - SEASPAN GROUP (Canada)

ASIA

- Cosco Shipping Heavy Industry Group (China)
- Cosco Shipping Heavy Industry Dalian Shipyard
- Cosco Shipping Heavy Industry Zhoushan Shipyard

- Cosco Shipping Heavy Industry Shanghai Shipyard
- Cosco Shipping Heavy Industry Nantong Shipyard
- Cosco Shipping Heavy Industry Guangdong Shipyard
- Cosco Total Automation Co. Ltd.

Keppel Offshore & Marine Group (Singapore)

- Keppel Shipyard Ltd. - Benoi (Singapore)
- Keppel Shipyard Ltd. - Gul (Singapore)
- Keppel Shipyard Ltd. - Tuas (Singapore)
- Keppel Philippines Marine Inc.
- Keppel Subic Shipyard & Engineering (Philippines)
- Keppel Batangas Shipyard (Philippines)
- Nakilat Keppel Offshore & Marine Shipyard - Keppel Group (Qatar)

Sasebo Heavy Industries Co. Ltd. (Japan)

- Orient Shipyard Co. Ltd. (South Korea)
- Shanhaiguan Shipyard (China)
- Yiulian Dockyards Shekou, Weihai & Zhoushan (China)
- Huarun Dadong Shipyard (China)
- Qingdao Beihai Shipyard (China)
- Fujian Huadong Shipyard (China)
- EDR Antwerp - Belgium
- Fayard A/S - Munkebo, Denmark
- German Dry Docks - Bremerhaven, Germany
- Guangzhou Wenchong - South China
- Harland and Wolff Heavy Industries - Belfast, N. Ireland
- HRDD Drydock - Shanghai, China
- International Ship Repair - Tampa, Florida, USA
- Loyd Werft - Bremerhaven, Germany
- MTG Dolphin - Varna, Bulgaria
- Netaman Repair Group - Tallinn, Estonia
- Papua New Guinea Drydock - Papua New Guinea
- Zhoushan IMC YY - China
- Zhoushan Nanyang Star Shipbuilding - China
- Shanhaiguan Shipyard - North China
- Dalian Shipbuilding Industry Marine Services (DSIC) - North China

Underwater and Afloat

- Avalontec Engineering - Singapore
- Atlantis Marine Services LLC - Fujairah, UAE
- Zener Maritime - India, Singapore
- Subsea Global Solutions - Brazil, Curacao, Los Angeles, Miami, Panama, Trinidad
- Technovide Ltd - Greece
- Trident BV - The Netherlands, Las Palmas

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CAMBIASO RISSO SERVICES SAM

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 Contact: Giovanni Palumbo
 Direct Line: + 377 98801362
 Mobile: + 33 640616602
 Contact: Nicolò Iguera
 Direct Line: + 377 98801364
 Mobile: + 33 640623184

- Companies Represented
- Ardent Salvage (The Netherlands)
 - Asaba shipyard (Equatorial Guinea)
 - Astilleros Cernaval, Algeciras (Spain)
 - Astilleros Mario Lopez, Malaga (Spain)
 - Chengxi Shipyard (China)
 - CMR Tunisie (Tunisia)
 - Colombo Dockyard (Sri Lanka)
 - Cromwell & C. (Argentina)
 - Damen Shiprepair & Conversion
 - Damen Shiprepair Amsterdam (The Netherlands)
 - Damen Shiprepair Oranjerwerf, Amsterdam (The Netherlands)
 - Damen Shiprepair Brest (France)
 - Damen Shipyards Den Helder (The Netherlands)
 - Damen Shiprepair Dunkerque (France)
 - Damen Shiprepair Harlingen (The Netherlands)
 - Damen Oskarshamnsvarvet (Sweden)
 - Damen Shiprepair Van Brink Rotterdam (The Netherlands)
 - Damen Shiprepair Rotterdam (The Netherlands)
 - Damen Shiprepair Vlissingen (The Netherlands)
 - Damen Shipyards Sharjah-Albwardy Marine Engineering (UAE)
 - Damen Curacao shipyard
 - Damen Mangalia (former Daewoo Mangalia)
 - Damen Verolme (former Keppel Verolme)
 - DIANCA Astilleros (Venezuela)
 - EST Engineering Ship Technology (Singapore)
 - Gemak Shipyard (Turkey)
 - General Naval Control (Italy)
 - Guangzhou Dengtai Shipyard (China)
 - Hyundai Mipo Dockyard (South Korea)
 - Hyundai Vinashin Shipyard (Vietnam)
 - Iberisca (Spanish winches and deck machinery producer)
 - Komas-Korean Maritime Repairs Service (South Korea)
 - Malaysia Marine & Heavy Engineering (Malaysia)
 - MSR Gryfa Shiprepair Yard (Poland)
 - Pregal Shiprepair Yard - Kaliningrad (Russian Federation)
 - Qingdao Beihai Shipyard (China)
 - Riga Shipyard (Latvia)
 - Sasebo Heavy Industries (Japan)
 - Shanghai Shipyard (China)
 - Sociber (Chile)
 - SYM (Barcelona, Spain - Santo Domingo, Dominican Republic)
 - ST Marine
 - Underwater Shipcare, Singapore
 - Zhoushan Xinya Shipyard (China)

StudioTecnicoLonoce

STUDIO TECNICO LONOCE

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 Mobile: + 33 640 615643
 Email: info@gme.mc
 Companies Represented
 Keppel Shipyard
 Keppel Philippines
 • Batangas Yard
 • Subic Shipyard
 N-Kom
 Paxocean Engineering Zhoushan

Monaco



CAMBIASO RISSO SERVICES SAM

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 Direct Line: + 377 98 801361
 Mobile: + 33 640616602
 Private email: max@cariservice.com
 Contact: Giovanni Palumbo
 Direct Line: + 377 98801362
 Mobile: + 33 640623184

- Companies Represented
- ASMAR, Chile
 - China Shipbuilding Corporation (Taiwan)
 - Kahosung Shipyard
 - Keelung Shipyard
 - Cosco Shipping Heavy Industry
 - Cosco Dalian Shipyard
 - Cosco Guangdong Shipyard
 - Cosco Nantong Shipyard
 - Cosco Shanghai Shipyard
 - Cosco Zhoushan Shipyard
 - Cosco Qidong Offshore
 - Cosco Boluomiao Shipyard
 - Cic Changxing Shipyard
 - Cic Boluomiao Shipyard
 - Nacks
 - Dacks
 - Cic Jiangsu
 - Dakamave (Senegal)
 - Detyens Shipyard (USA)
 - DDW Shipyard Paxocean Batam
 - DDW Paxocean Shipyard Singapore
 - Elefsis Shipyards and Neonion Shipyard (Greece)
 - Elgin Brown & Hamer (South Africa)
 - Elgin Brown & Hamer Walvis Bay (Namibia)
 - Enavi (Brasil)
 - Fincantieri Group (Italy)
 - Gdansk Shiprepair Yard (Poland)
 - GMD SHIPYARD (New York)
 - Grand Bahama Shipyard (Bahamas)
 - Halifax Shipyard
 - Hong Kong United Dockyard (HK)
 - IMC – Yy Zhoushan (Zhoushan, China)
 - IMC – Yy Zhoushan (Zhoushan, China)
 - Lisnave Estaleiros Navais SA (Portugal)
 - MEC Panama
 - Odessa Shiprepair Yard (Bulgaria)
 - Qingdao Beihai Shipyard (China)
 - Santierul Naval Costanta (Romania)
 - Scamp Network Ltd (Gibraltar)
 - Smit International (Rotterdam)
 - Sefine Shipyard (Turkey)
 - Tersan Shipyard (Turkey)
 - Todd Pacific Shipyard (Seattle)
 - TSKOS Industrias Navales (Montevideo, Uruguay)
 - Tuzla Shipyard (Turkey)
 - Unithai Shipyard & Engineering (Thailand)
 - Western India Shipyard (India)

Keppel Verolme (The Netherlands)
 Lisnave Estaleiros Navais SA (Portugal)
 MEC Panama
 Odessa Shiprepair Yard (Bulgaria)
 Qingdao Beihai Shipyard (China)
 Santierul Naval Costanta (Romania)
 Scamp Network Ltd (Gibraltar)
 Smit International (Rotterdam)
 Sefine Shipyard (Turkey)
 Tersan Shipyard (Turkey)
 Todd Pacific Shipyard (Seattle)
 TSKOS Industrias Navales (Montevideo, Uruguay)
 Tuzla Shipyard (Turkey)
 Unithai Shipyard & Engineering (Thailand)
 Western India Shipyard (India)

Italy / Monaco / Switzerland



VICTORIA MARITIME SERVICES



7 Avenue des Papealins, MC 98000, Monaco
 Tel: + 377 99995160
 Email: shiprepair@victoriamaritime.com
 Web: www.victoriamaritime.com
 Contact: Luca Spinelli-Donati,
 Julia Sandmann,
 Carlo Spinelli-Donati,
 Maurizio Taviani

- Shipyards Represented
- Art Shipyard (Turkey)
 - ASRY (Bahrain)
 - ASTANDER (Spain)
 - ASTICAN (Spain)
 - Besiktas Shipyard (Turkey)
 - BLRT Group:
 - Tallinn Shipyard (Estonia)
 - Turku Repair Yard (Finland)
 - Western Shipyard (Lithuania)
 - Cammell Laird (UK)
 - Carrell (Greece)
 - Chantier Naval de Marseille (France)
 - Dangsung Engineering & Shiprepair (Korea)
 - Dormac (South Africa and Namibia)
 - Fujian Huadong Shipyard (China)
 - Huarun Dadong Dockyard (China)
 - International Ship Repair & Marine Services (USA)
 - Multimarine Services (Cyprus)
 - Oresund Drydocks (Sweden)
 - Rosetti Marino YSV (Italy)
 - San Giorgio del Porto (Italy)
 - SEMBICORP MARINE REPAIRS & UPGRADES (Singapore):
 - Sembcorp Marine Admiralty Yard
 - Sembcorp Marine Tuas Boulevard Yard
 - Estaleiro Jurong Aracruz (Brazil)
 - Shanhaiguan Shipyard (China)
 - Talleres Navales del Golfo (Mexico)
 - TANDANOR (Argentina)
 - Yu Lian Dockyards (Hong Kong)
 - Zhoushan Xinya Shipyard (China)
- Maine Service Companies Represented
- Elettrotek Kabel (Italy)
 - Harris Pye Group (UK)
 - PBM (Croatia)
 - SES Marine Services (Singapore)
 - Turbo-Technik Repair Yard (Germany)

The Netherlands



ESMA MARINE AGENCIES B.V.

Kuiperbergweg 35, 1101 AE Amsterdam, The Netherlands
 Tel: + 31 20 3121350
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 Web: www.esma.nl
 Contact: Marcus Weggeman
 Direct: + 31 20 3121353
 Mobile: + 31 6 51408082
 Contact: Arie Witte
 Direct: + 31 20 3121366
 Companies Exclusively Represented

- EUROPE
- Lisnave – Setubal – Portugal
 - Gemak Group – Istanbul – Turkey
 - Netaman-Riga-Latvia
 - Netaman-Tallinn-Estonia
 - West Sea Viano Shipyard – Viana do Castelo – Portugal
- MIDDLE EAST
- Drydocks World – Dubai – UAE
 - Drydocks World Global Offshore Services
 - DMC Dubai Maritime City, Shiplift
- FAR EAST
- PaxOcean Asia
 - PaxOcean Singapore
 - PaxOcean Pertamina – Batam – Indonesia
 - PaxOcean Graha – Batam – Indonesia
 - PaxOcean Nanindah – Batam – Indonesia
- CHINA
- Cosco Shipyard Group
 - Cosco Dalian Shipyard
 - Cosco Nantong Shipyard
 - Cosco Qidong Shipyard
 - Cosco Shanghai Shipyard
 - Cosco Zhoushan Shipyard
 - Cosco Guangdong SHIPYARD
- PaxOcean Asia
- PaxOcean Zhoushan
- WEST AFRICA
- Dakamave – Dakar- Senegal
 - CNIC – Douala – Cameroon
- SOUTH AMERICA
- S.P.I. – Mar del Plata – Argentina



AIMSS V.O.F

Jan van Polanenkade 3, 4811 KM, Breda, The Netherlands
 Tel: + 31 76 737 0002
 Email: sales@aimss.nl
 Web: aimss.nl

- Shipyards
- ASL (Indonesia)
 - Asmar (Chile)
 - A&P (UK)
 - NASCO Group (China)
 - Oman Drydock (Oman)
 - SAS (South Africa)
 - Tersan (Turkey)
 - TNG (Mexico)
 - Unithai (Thailand)
- Maine Services
- Diamond Ship (Taiwan)
 - Shop Stores Supply
 - Crosscomar (Spain)
- Afloat repairs
- General Shipping (Greece)
 - Tank Coating, Docking Services & Turnkey Projects
 - Hai Ha M&S (Vietnam)



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SHIPYARDS:

- Afloat, Underwater & Voyage Repairs
- Index-Cool (Singapore)
 - Shipyards Represented
 - Sembcorp Marine Ltd Repairs & Upgrade, Singapore
 - Admiralty Yard
 - Tuas Boulevard Yard
 - Benoi Yard
 - Tuas Road Yard
 - Sembcorp Marine Kakinada, India
 - Fincantieri, Italy
 - Oceanus Marine, Malta
- Anti-Corrosion & Anti-Marine Growth Technology, Pipeline Coating & Lining System
- Riding Team (Romania & Bulgaria)
 - Supply of Qualified Welders, Fitters, Technicians, Electricians etc.
 - WAROM (China)
 - Marine & Offshore Lighting Products
 - Winkong (China)
- Afloat, Underwater & Voyage Repairs
- PolyFlake (The Netherlands)
 - Zebec Marine (India)
- Design, Engineering & Consulting Solution

Norway



JML SHIPYARD AGENCY

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 457 40 Fjällbacka, Sweden
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 Mobile: + 46 702 20 37 41
 Email: jens@jmlshipyardagency.com
 Contact: Markus Larsson, Partner
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 Email: markus@jmlshipyardagency.com
 Contact: Tomas Järund, Business Development Manager
 Mobile: + 46 704 45 50 87
 Email: tomas.jarund@jmlshipyardagency.com
 Web: www.jmlshipyardagency.com
 Shipyards Represented

Europe

- Lloyd Werft, Bremerhaven, Germany
- Sefine Shipyard, Tuzla, Turkey
- San Giorgio del Porto, Genoa, Italy
- Chantier Naval de Marseille, France

Middle East

- Drydocks World, Dubai

Far East

- PaxOcean, Singapore & Batam
- Chengxi Shipyard, Jiangyin, China
- Guangzhou Wenchong Shipyard, China
- PaxOcean, Zhoushan, China
- DSIC Marine Services, Dalian, China
- Changhong International Shipyard, Zhoushan, China

US, Canada & Caribbean

- Talleres Navales del Golfo, Veracruz, Mexico
- Gramar Shipyard, Dominican Republic
- Chantier Davie, Quebec, Canada
- Caribbean Dockyard, Trinidad & Tobago

Afloat Repair

- Global Offshore Service, Dubai UAE
- Offshore Inland, US Gulf/Mexico



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 Shipyards Represented



ULRIK QVALE & PARTNERS AS

Høffsveien 13, 0275 Oslo
 Tel: + 47 22511616
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 Web: www.uqp.no
 Contact: Øvind Qvale or Kjell Jacobsen
 Shipyards Represented:

Europe:

- A&P Falmouth (UK)
- A&P NorthEast – Tees & Tyne (UK)
- Breda Drydocks (Germany)
- Gemak (Turkey)
- Lisnave (Portugal)
- Nauta Shipyard (Poland)

Africa:

- Dakamave (Senegal)
- Dormac Marine & Engineering (South Africa)

Americas:

- Asmar (Chile)
- Grand Bahama Shipyard (Bahamas)
- Renave Industrial Group (Brazil)
- Seaspan Vancouver Shipyard (Canada)

Asia:

- ARAB Shipbuilding and Repair Yard (ASRY)
- CHI Dalian Shipyard (China)
- CHI Guangzhou Shipyard (China)
- COSCO Shipping Shipyard (NANTONG) CO Ltd (China)
- CHI Shanghai Shipyard (China)
- CHI Xidong (China)
- CHI Zhoushan Shipyard (China)
- HSD Marine (Singapore)
- Japan Marine United Corp (Japan)

Australia:

- Forgacs Henderson Dockyard (Australia)

Poland



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 Fax: + 48 58 345 4801
 Email: apapal@apaltd.com.pl
 Contact: Kostas Miltonis

Companies Represented

- COSCO Shipyard Group (China)
- Dalian
- Guandong
- Lianyungang
- Nantong
- Shanghai
- Zhoushan
- Chengxi Shipyard (Guangzhou) (China)
- Pallion Shipyard (UK)
- Shanhaiguan Shipyard (China)



LITHUANIA, LATVIA, ESTONIA, POLAND, RUSSIA, UKRAINE
ORCA MARINE UAB
MEMBER The International Association of Shiprepair Agents Ltd

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 Web: www.orca-marine.eu
 Contact: Viktoras Cemusevicius
 Shipyards:

- ASABA Shipyard (Malabo, Equatorial Guinea);
 - ASMAR Shipyard (Chile);
 - BRODOTROGIR D.D. Shipyard Trogir (Croatia);
 - CARENA (Abidjan, Ivory Coast);
 - CHANTIER NAVAL de MARSEILLE (France);
 - COLOMBO Dockyards (Sri Lanka);
 - COSCO Shipyards Group:
 - COSCO Dalian (China);
 - COSCO Nantong (China);
 - COSCO Shanghai (China);
 - COSCO Zhoushan (China);
 - COSCO Guangdong (China);
 - COSCO Lianyungang (China);
 - DAVIE (Quebec, Canada);
 - DEYENS Shipyard (N. Charleston, USA);
 - DONG SUNG Engineering & Shiprepair (S.Korea);
 - DAMEN Shiprepair Group:
 - DAMEN Shiprepair Dunkeque (France);
 - DAMEN Shiprepair Oranjewerf Amsterdam (Netherlands);
 - DAMEN Shiprepair Brest (France);
 - DAMEN Shiprepair Den Helder (Netherlands);
 - DAMEN Shiprepair & Conversion Rotterdam (Netherlands);
 - DAMEN Shiprepair Vlissingen (Netherlands);
 - DAMEN Shiprepair Amsterdam (Netherlands);
 - DAMEN Shiprepair Harlingen (Netherlands);
 - DAMEN Oskashamsvarvet (Sweden);
 - DAMEN Shiprepair Van Brink Rotterdam (Netherlands);
 - DAMEN Shiprepair Curacao (Curacao, Dutch Antilles).
 - ENAVI Reparas Navais (Rio de Janeiro, Brazil);
 - EBH NAMIBIA (Walvis Bay, Namibia);
 - FAMA Group (Cyprus);
 - GIBDOCK (Gibraltar);
 - HARLAND & WOLFF (Belfast, UK);
 - SEMBORP (Singapore);
 - MCC Shipyards (Panama);
 - NARP Shiprepair:
 - Hidrodinamik Shipyard (Tuzla, Turkey)
 - Kiran/Erkal Shipyard (Tuzla, Turkey)
 - Hat-San Shipyard (Yalova, Turkey)
 - Tersan Shipyard (Yalova, Turkey)
 - Sefine Shipyard (Yalova, Turkey)OMAN DRYDOCK (Oman);
 - SIMA (Peru);
 - SAN GIORGIO del PORTO (Genova, Italy);
 - TANDANOR (Buenos Aires, Argentina);
 - TSAKOS Industrias Navales (Montevideo, Uruguay);
 - ZAMAKONA Yards:
 - Zamakona Pasaia (Spain);
 - Zamakona Las Palmas (Canary Isl., Spain);
- Marine Service Companies:
 ARGO NAVIS (Greece) - Marine consulting & engineering (BWTS, SOxNOx);
 CHINAPORT CLEANSEAS - de-slopping, cleaning (China);
 DGS Industrial & Naval (Brazil) - afloat repairs;
 ELSI - Drug & Alcohol Testing;
 ONE NET - satellite communications, bridge equipment service;
 ONE TECH - technical service;
 RANDOX - Drug & Alcohol Testing;
 SHANGHAI WILLING - repair & conversion management in China.
 SYM - afloat repairs & marine services.

Russia



WSR SERVICES LTD
MEMBER The International Association of Shiprepair Agents Ltd

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 Tel: +749 9918 4307
 Email: mail.ru@umarws.com
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- Companies Represented - Shipyards
- ASRY - Bahrain
 - Caribbean Dockyard - Trinidad & Tobago
 - Chengxi Shipyard - Shanghai, China
 - Gramar - Dominican Republic
 - Colombo Dockyard Ltd - Sri Lanka
 - Dakamave - Dakar, Senegal
 - Deyens Shipyards - Charleston, South Carolina, USA
 - Dormac Marine & Engineering - Capetown/Durban, South Africa
 - EDR Antwerp - Belgium
 - Foyard A/S - Munkbo, Denmark
 - Gemak Shipyard - Turkey
 - German Dry Docks - Bremerhaven, Germany
 - Guangzhou Wenchong - South China
 - Harland and Wolff Heavy Industries - Belfast, N. Ireland
 - HRDD Dockyard - Shanghai, China
 - Hutchison Parts TNG (Talleres Navales del Golfo S.A.) - Vera Cruz, Mexico
 - International Ship Repair - Tampa, Florida, USA
 - Lisnave Estaleiros Navais - Setubal, Portugal
 - Loyd Werft - Bremerhaven, Germany
 - MTG Dolphin - Varna, Bulgaria
 - Netaman Repair Group - Tallinn, Estonia
 - Papua New Guinea Dockyard - Papua New Guinea
 - Sembcorp Marine Repairs & Upgrades - Singapore
 - Sociber - Valparaiso, Chile
 - Zhoushan IMC YY - China
 - Zhoushan Nanyang Star Shipbuilding - China
 - Shanhaiguan Shipyard - North China
 - Dalian Shipbuilding Industry Marine Services (DSIC) - North China
- Underwater and Afloat
- Avalantec Engineering - Singapore
 - Zener Maritime - India, Singapore
 - Subsea Global Solutions - Brazil, Curacao, Los Angeles, Miami, Panama, Trinidad
 - Technodie Ltd - Greece
 - Trident BV - The Netherlands, Las Palmas, Italy
 - ROG Ship Repair - Rotterdam
 - Atlantis Marine Services LLC - Fujairah, UAE
 - Underwater Contractors PTE-Singapore
 - Underwater Contractors -Spain
 - RIMS BV
 - Argus Marine Services - Columbia

Singapore



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 Web: www.umarws.com

Companies Represented - Shipyards

- Caribbean Dockyard - Trinidad & Tobago
- Chengxi Shipyard - Shanghai, China
- Gramar - Dominican Republic
- Colombo Dockyard Ltd - Sri Lanka
- Deyens Shipyards - Charleston, South Carolina, USA
- Dormac Marine & Engineering - Capetown/Durban, South Africa
- EDR Antwerp - Belgium
- Foyard A/S - Munkbo, Denmark
- Guangzhou Wenchong - South China

Sweden

HRDD Dockyard - Shanghai, China
 Hutchison Parts TNG (Talleres Navales del Golfo S.A.) - Vera Cruz, Mexico
 International Ship Repair - Tampa, Florida, USA
 Netaman Repair Group - Tallinn, Estonia
 Zhoushan IMC YY - China
 Shanhaiguan Shipyard - North China
 Zhoushan Nanyang Star Shipbuilding - China
 Dalian Shipbuilding Industry Marine Services (DSIC) - North China

Underwater and Afloat

- Technodie Ltd - Greece
- Trident BV - The Netherlands, Las Palmas, Italy
- Atlantis Marine Services LLC - Fujairah, UAE
- Underwater Contractors -Spain
- Argus Marine Services - Columbia

Sweden



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 Contact: Markus Larsson, Partner
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 Email: markus@jmlshipyardagency.com
 Contact: Tomas Jarund, Business Development Manager
 Mobile: +46 704 45 50 87
 Email: tomas.jarund@jmlshipyardagency.com
 Web: www.jmlshipyardagency.com

- Shipyards Represented
- Europe
 - Astander, Santander, Spain
 - Astican, Las Palmas, Spain
 - Loyd Werft, Bremerhaven, Germany
 - MSR Gryfia Shipyard, Szczecin, Polen
 - Sefine Shipyard, Tuzla, Turkey
 - San Giorgio del Porto, Genoa, Italy
 - Chantier Naval de Marseille, France
 - Middle East
 - Drydocks World, Dubai
 - Far East
 - PaxOcean, Singapore & Batam
 - Chengxi Shipyard, Jiangyin, China
 - Guangzhou Wenchong Shipyard, China
 - PaxOcean, Zhoushan, China
 - DSIC Marine Services, Dalian, China
 - Changhong International Shipyard, Zhoushan, China
 - US, Canada & Caribbean
 - Talleres Navales del Golfo, Veracruz, Mexico
 - Cramar Shipyard, Dominican Republic
 - Chantier Davie, Quebec, Canada
 - Caribbean Dockyard, Trinidad & Tobago
- Afloat Repair
- Global Offshore Service, Dubai UAE
 - Offshore Inland, US Gulf/Mexico

Switzerland



ENCOMPASS MARINE LIMITED

MEMBER The International Association of Shiprepair Agents Ltd

26 Flour Square, Grimsby
 NE Lincs, DN31 3LP
 United Kingdom
 Tel: +44 (0) 1472 245500
 Fax: +44 (0) 1472 245511
 Email: services@encompassmarine.com
 Web: www.encompassmarine.com
 Contacts: David Maitland, Jon Thompson
Diving & Marine: Kath Ridley, Alan Jagger

Shipyards Represented

- ART (Tuzla, Turkey)
 - Asaba Shipyard (Malabo, Equatorial Guinea)
 - Cammell Laird Shiprepairers (Merseyside, UK)
 - Chengxi Shipyard (Jiangyin & Xinrong, China)
 - Grand Bahama Shipyard (Freeport, Bahamas)
 - Guangzhou Wenchong Dockyard (Guangzhou, China)
 - Hidramar Shipyards (Canary Isles, Spain)
 - Hidrodinamik Shipyard (Tuzla, Turkey)
 - Keppel Philippines Marine (Philippines)
 - Keppel Batangas Shipyard (Batangas)
 - Subic Shipyard (Subic)
 - Navantia (Spain)
 - Cadiz Shipyard (Cadiz)
 - Cartagena Shipyard (Cartagena)
 - Ferrol-Fene Shipyard (Ferrol)
 - San Fernando Shipyard (San Fernando)
 - Orient Shipyards (Busan/ Gwangyang, Korea)
 - Shanhaiguan Shipyard (Qinhuangdao, China)
 - Zhoushan IMC-YongYue Shipyard (Zhoushan, China)
 - Zhoushan Xinya Shipyard (Zhoushan, China)
- Diving & Marine Service Companies Represented
- Atlantis Marine Services (Fujairah, UAE)
 - Blay Marine Tech (Spain)
 - Hellenika (Bulgaria)
 - Komas (Korea)
 - KET Marine (The Netherlands)
 - Link Instrumentation (UAE & Singapore)
 - Marine Technical Services (Poland)
 - Maritime Shipcleaning Rotterdam
 - NARP Ship Repair (Turkey)
 - Rentang Marine (China)
 - South Bank Marine Charts (Grimsby, UK)
 - Underwater Shipcare (Singapore)
 - Underwater Contractors Spain (Spain)
 - Zener Maritime (Rotterdam, Mumbai, Singapore)
 - Over 200 diving stations worldwide

Turkey



TURMAR Marine Survey Consultancy and Shipping Inc.

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Contact: Burc Cango
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 Igor Sumchenko
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Companies Represented

- Goltens
- DMI
- Optimarin
- Norwater
- AMI Heat Exchangers
- Dalian Cosca Risky Ocean Engineering
- Zhejiang Energy Marine Environmental Technology

Shipyards Represented

- ART Shipyard - Turkey
- Astander Shipyard - Spain
- Astican Shipyard - Canary Islands
- Besiktas Shipyard - Turkey
- Chantier Naval De Marseille - France
- Cosca Shipyard Repair Group - China
- Heisco Shipyard - Kuwait
- Hyundai Mipo Dockyard Co. Ltd. - South Korea
- Hyundai Vinashin Shipyard - Vietnam
- MYO Shipyard - Turkey
- San Giorgio Del Porto - Italy
- Sefine Shipyard - Turkey
- Tersan Shipyard - Turkey
- Yardgem Shipyard - Turkey

Shipyards Represented (China)

- COSCO Dalian Shipyard
- DSIC Marine Services
- Shanhaiguan Shipyard
- Xiaokou Shipyard
- Qingdao Beitai Shipyard
- COSCO Shanghai Shipyard
- Huarun Dadong Dockyard
- SUD Shipyard
- CHI Nantong Shipyard
- Nantong Ruitai Shipyard
- Chengxi shipyard (Jiangyin)
- Changhong International shipyard
- Longshan shipyard
- Zhejiang Eastern Shipyard (ZESCO)
- COSCO Zhoushan Shipyard
- Fujian Huadong shipyard
- You Lian Dockyards Shekou, Guangzhou Wenchong Dockyard
- COSCO Guangdong Shipyard
- CSSC Guangxi Shipyard

U.A.E



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 Email: mail.ae@umarws.com
 Web: www.umarws.com

- Companies Represented - Shipyards
- Caribbean Dockyard - Trinidad & Tobago
 - Chengxi Shipyard - Shanghai, China
 - Gramar - Dominican Republic
 - Colombo Dockyard Ltd - Sri Lanka
 - Deyens Shipyards - Charleston, South Carolina, USA
 - Dormac Marine & Engineering - Capetown/Durban, South Africa
 - EDR Antwerp - Belgium
 - Foyard A/S - Munkbo, Denmark
 - Guangzhou Wenchong - South China
 - HRDD Dockyard - Shanghai, China
 - Hutchison Parts TNG (Talleres Navales del Golfo S.A.) - Vera Cruz, Mexico
 - International Ship Repair - Tampa, Florida, USA
 - Netaman Repair Group - Tallinn, Estonia
 - Zhoushan IMC YY - China
 - Zhoushan Nanyang Star Shipbuilding - China
 - Shanhaiguan Shipyard - North China
 - Dalian Shipbuilding Industry Marine Services (DSIC) - North China
 - Argus Marine Services - Columbia

United Kingdom



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 Web: aimss.co.uk

Shipyards:

- ASL (Indonesia)
- Cernaol (Spain)
- Kuzey Star (Turkey)
- NASCO Group (China)
- Reimerswaal (The Netherlands)

- SAS (South Africa)
 - SNC (Romania)
 - TNG (Mexico)
 - Unithai (Thailand)
- Marine Services:
- DSMS (The Netherlands)
 - Supply & Overhaul of Engine Parts, T/C, Pumps, Pneumatics & Hydraulics
 - Diamond Ship (Taiwan)
 - Ship Stores Supply
 - Hai Ha M&S (Vietnam)
 - Afloat, Underwater & Voyage Repairs
 - Index-Cool (Singapore)
 - A/C & Refrigeration Plants & HVAC Turnkey Solutions
 - MME (The Netherlands)
 - NTD, Advanced NDT, Marine Surveys & Rope Access
 - On Site Alignment (The Netherlands)
- Alignment
- PBM (Croatia)
- Governors & ME Services, Woodward Parts & Services
- PMS (Panama)
- Afloat, Underwater & Voyage Repairs
- RIMS (The Netherlands)
- Inspection with Drones
- ROG (The Netherlands)
- Afloat & Voyage Repairs
- Riding Team (Romania & Bulgaria)
- Supply of Qualified Welders, Fitters, Technicians, Electricians etc.
- WAROM (China)
- Marine & Offshore Lighting Products
- Winkong (China)
- Afloat, Underwater & Voyage Repairs
- Zebec Marine (India)
- Design, Engineering & Consulting Solution



MEMBER The International Association of Shiprepair Agents Ltd

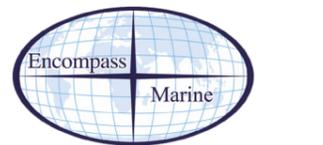
A. P. & A. Ltd
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 Tel: +44 20 8840 8845
 Fax: +44 20 8840 8843
 Email: ship@apanda.com
 Web: www.apanda.com

- Contact: Andreas Papadakis, George Papadakis
- Companies Represented (Exclusive)
- Gdansk Shiprepair Yard Remontowa (Poland)
 - Chantier Naval de Marseille
 - San Giorgio del Porto, Genoa
 - COSCO Heavy Industries Group (China)
- Dalian
 - Guangdong
 - Nantong
 - Shanghai
 - Zhoushan
- Oman Dry Dock
- Tuzla Shipyard (Turkey)
 - Coimbra Shiprepair (Brazil)
 - Odosso Shiprepair Yard (Bulgaria)
 - Unithai Shipyard (Thailand)



CALVEY MARINE LIMITED
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 Contact: Steven Black

- Mobile: +44 (0) 7885 21 7869
 Contact: Suzanne Black
 Mobile: +44 (0) 7867 785957
 Contact: Jessica Black
 Mobile: +44 (0) 7917 726274
- Companies Represented
- AMI Exchangers (Hartlepool)
 - Beihai Shipyard (Qingdao)
 - Beihai Lifeboats (Qingdao)
 - Breda Shipyards, (Germany)
 - Brightsun Group (Singapore)
 - Cassar Ship Repair (Malta)
 - Chengxi Shipyard (Jiangyin)
 - Chengxi Shipyard (Xinrong)
 - Changxing Shipyard (Shanghai)
 - CHI Shipyards (China)
 - Cramar Shipyard (Dominican Republic)
 - Davie Shipyard (Quebec)
 - Diesel Marine International (Worldwide)
 - Drydocks World Dubai (UAE)
 - Drydocks World Dubai Global Offshore Services (UAE)
 - Greens Power (UK)
 - JinHai Shipyard (Zhoushan) Co.,Ltd.China
 - Lisnave Shipyard (Portugal)
 - Naute Shiprepair (Gdynia, Poland)
 - North East Ship Repair, (Boston)
 - North East Ship Repair (Philadelphia)
 - Offshore Inland Marine & Oilfield Services (Alabama, USA)
 - Pan Asia Company Ltd, South Korea
 - PaxOcean Graha (Indonesia)
 - PaxOcean Nanindah (Indonesia)
 - PaxOcean Offshore Zhuhai
 - PaxOcean Pertamina (Indonesia)
 - PaxOcean Shipyard Zhoushan
 - PaxOcean Singapore
 - Professional Manpower Supply (Panama)
 - Shanhaiguan Shipyard (North China)
 - Seatec Repair Services - (Worldwide)
 - Tersan Shipyard - (Tuzla, Yalova)
 - UMC International, (Worldwide)
 - Vancouver Shipyard - (Vancouver)
 - Victoria Shipyard - (Victoria)
 - Viktor Lenac Shipyard (Croatia)
 - Worldwide Underwater Services
 - You Lian Dockyards (Hong Kong)
 - You Lian Dockyards (Shekou)
 - You Lian Dockyards, Zhoushan, China
 - Young & Cunningham Valves (North Shield)



ENCOMPASS MARINE LIMITED

MEMBER The International Association of Shiprepair Agents Ltd

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 Web: www.encompassmarine.com
 Contacts: David Maitland, Jon Thompson
Diving & Marine: Kathryn Ridley, Alan Jagger

Shipyards Represented

- ART (Tuzla, Turkey)
- Asaba Shipyard (Malabo, Equatorial Guinea)
- Besiktas Shipyard (Yalova, Turkey)
- BLRT Group
- Tallinn Shipyard (Tallinn, Estonia)
- Turku Repair Yard (Turku, Finland)
- Western Shipyard (Klaipeda, Lithuania)
- Cammell Laird Shiprepairers (Merseyside, UK)
- Chengxi Shipyard (Jiangyin & Xinrong, China)
- ENA Shipyard (Martinique)
- Guangzhou Wenchong Dockyard (Guangzhou, China)

- Hidramar Shipyards (Canary Isles, Spain)
 Hidrodinamik Shipyard (Tuzla, Turkey)
 ISR Repair & Marine Service (Tampa, USA)
 Keppel Shipyard (Singapore)
 Keppel Philippines Marine (Philippines)
 - Keppel Batangas Shipyard (Batangas)
 - Subic Shipyard (Subic)
 - Orient Shipyards (Busan/ Gwangyang, Korea)
 - Shanhaiguan Shipyard (Qinhuangdao, China)
 - West Sea Viana Shipyard (Viana de Castelo, Portugal)
 - Zhoushan IMC-YongYue Shipyard (Zhoushan, China)
 - Zhoushan Xinya Shipyard (Zhoushan, China)

Diving & Marine Service Companies Represented

 - Atlantis Marine Services (Fujairah, UAE)
 - Blay Marine Tech (Spain)
 - Hellenika (Bulgaria)
 - Komas (Korea)
 - KET Marine (The Netherlands)
 - Keyser Technologies (Singapore)
 - Link Instrumentation (UAE & Singapore)
 - Marine Technical Services (Poland)
 - Maritime Shipcleaning Rotterdam
 - Malin International Ship Repair (Texas, USA)
 - Metalock Brasil (Brasil)
 - Metalock Engineering DE (Germany)
 - NARP Ship Repair (Tuzla, Turkey)
 - South Bank Marine Charts (Grimsby, UK)
 - Talleres Industriales (Panama)
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 Web: www.emcs.co.im
 Contact: Steve George/Richard George
 Mobile: +44 7624 492 716
 Contact: Amanda Green (North East UK Representative)
 Tel: 0191 5160010
 Mobile: +44 77363 18126

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 - Diving Services Worldwide (For diving enquiries contact Jamie Skillen +44 7624 232916)
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 - Navicom Marine Limited - Radio/Navigation Equipment Repairs and Spares (Malta)
 - Marine Marketing Int (agent for IOM only)
- Course Managed
- Ship Superintendents' Training Course. (For all enquiries and reservations contact Cheryl Readdy)
- Sister Company
- Ramsay Shipping Services: Above and below waterline repairs at Ramsay Shipyard, Isle of Man and ship's agency services

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 Web: www.marine.marketing
 Contact: Mike McMahon, Katie Grummett, Jen Buckley, Alex Casca
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 ChengXi Shipyard (Jiangyin, China)
 CSBC Corporation (Kaohsiung, Taiwan)
 CIC Shipyards Group (China)
 CMR Tunisia (Menzel Bourguiba, Tunisia)
 Cotecmar, (Cartagena, Colombia)
 Colombo Dockyard (Colombo, Sri Lanka)
 Delyens Shipyard (Charleston, USA)
 EBH South Africa (Capetown & Durban, South Africa)
 Namdock (Walvis Bay, Namibia)
 EDR Shipyard (Antwerp, Belgium)
 Malaysia Marine & Heavy Engineering (Pasir Gudang, Malaysia)
 MTG Dolphin (Varna, Bulgaria)
 Navalrocha SA (Lisbon, Portugal)
 Oman Drydock Company, (Duqm, Oman)
 Qingdao Beihai Shipyard, (Qingdao, China)
 Shanhaiguan Shipyard (Qinghuangdao, China)
 Guangzhou Wenchong Dockyard (Guangzhou, China)
 Marine Services
 BIO-UV Ballast Water Treatment (Lune, France)
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 Kwang Youn Gi Engineering (Kaohsiung, Taiwan)
 Laser Cladding Technologies (Worksp, UK)
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 Singatoc Engineering (Singapore and Bintan, Indonesia)
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 Web: www.seadockmarine.com
 Contact: George D. Skinitis
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 Navalink Srl, (Constanta, Romania)
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 IMC YY Shipyard (Zhoushan, China)
 Stonestar Shipyard (Weihai, China)
 Hankook Made (Mokpo, Korea)
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 Contact: Jon Holloway
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 Dormac - Durban (South Africa)
 Dormac - Walvis Bay (South Africa)
 Estaleria Jurong Aracruz - Aracruz (Brazil)
 Gemak - Tuzla (Turkey)
 Grand Bahama Shipyard - Freeport (Bahamas)
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 Web: www.shiprepairers.co.uk
 Contact: Roderick Wardie
 Tel: +44 (0) 7767 690704
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 Dormac Durban (South Africa)
 Dormac Walvis Bay (Namibia)
 FAYARD (Denmark)
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 Gibdock (Gibraltar)
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 NICO International (Fujairah, Dubai & Abu Dhabi)
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 Houston, TX 77024
 USA
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 Fax: +001 713 680 9704
 Email: shipyard@lrmidland.com
 Web: www.lrmidland.com
 Contact: Tom McQuilling
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 Fax: +1-908-237-9503
 Email: shiprepair@vogler.net
 Contact: Donald W Vogler
 Shipyards Exclusively Represented
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 Email: info@simplexamericas.com
 Web: www.simplexamericas.com
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