MEM

MARINE ENGINEERS MESSENGER

MEM Issue 8
6 June 2016

INSIDE THIS EDITION:

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Telegraph

A number of studies have found that nanoplastics and the breakdown of plastic materials in the oceans is having a negative effect on marine life.

Micro-plastic molecules are being consumed by fish when they tuck in to Daphnia, a zooplankton found to contain high levels of nanoplastics, resulting in changes to their predatory behaviour, appetite and, possibly, ability to reproduce.

It is estimated that plastic accounts for nearly eighty per cent of all waste found in our oceans. What is of equal concern is this week's United Nations Environment Programme (UNEP) revelation that 30% of all fish have plastic in them.

In truth, this is likely to be much more as it is thought the UNEP study refers only to visible plastic. Nevertheless, its a startling statistic that is going to get much worse, with the volume of plastic in our oceans set to exceed the number of fish by 2050.

While some have in the past mooted the development of a fleet of garbage ships to clear the ocean of its rubbish, the costs and negligible commercial benefits have been a deterrent. According to a 2012 NOAA study, clearing just 1% of the Pacific flotsam - a 1,000,000km^2 area - would need at least 67 vessels with a 5.5m beam and take a year to clean up. At a cost of US$5,000-20,000 per day, it would cost between $122 million and $489 million just to charter the vessels. And that's for just 1% of the garbage area, remember.

So what can be done? As you will read in this issue, The Ocean Cleanup system is one solution gaining considerable attention, but there are others, such as Bluebird Marine Systems' SeaNet and SeaVax robotic vacuum ship (see www.bluebird-electric.net). However, as the UK-based company attests, the SeaVax and SeaNet alone would not be enough to do the job: bulk transportation and collection facilities on land would be required. But maybe this is where a commercial angle can be found for a new and potentially large shipping market.

According to Bluebird Marine Systems: "On average over a year one SeaVax ship should generate enough energy to treat 89.9 million litres of seawater, which at 25% in a rich soup [of plastic] could equal 22,400,000kg of plastic. Dependent on the going open market rate, that could be between £6,720,000 (at 0.30p/kg) and £15,680.000 (at £0.70p/kg). This optimistic example includes the harvesting of surface solid plastics. "

The company is looking for industry assistance to proceed with Phase II of the SeaVax concept - a full size 44m prototype ship, the *Manta Ray.*

FIRST CAT MARINE HYBRID THRUSTER DELIVERED TO SINGAPORE YARD

Caterpillar Marine's first Cat Marine Hybrid Thruster has been delivered to an undisclosed Singapore-based shipyard for installation and commissioning later this year. It is widely thought that the first reference will be an Offshore Support Vessel.

In a press statement, Caterpillar's new Marine Solutions Centre, which will oversee the delivery, claimed the new thruster outperforms diesel mechanical systems in all partial load conditions, and offers improved fuel economy and substantial through-life savings for a variety of offshore support vessels (OSV).

For vessels spending a high amount of time in standby or dynamic positioning service, the annual fuel savings can be as high as 35% - calculated across the entire operating profile of the vessel, said the manufacturer.

Typically, the Cat Marine Hybrid Thruster system could be used to downsize a vessel's main engine so that engine load is optimised, while also allowing the vessel to switch to diesel electric mode for low DP operations or in standby.

One example Caterpillar cited is a standard 7000hp standby support vessel featuring two MaK 8M25C main engines rated at 2666kW at 750rev/min and a pair of cat C18 gensets. With the new Cat hybrid thruster system the same vessel could instead use smaller 6M25C main engines rated at 2000kW at 750 rev/min, and two booster motors mounted on the back of the Cat MTA730CP azimuth thrusters powered by twin Cat C32 generator sets.

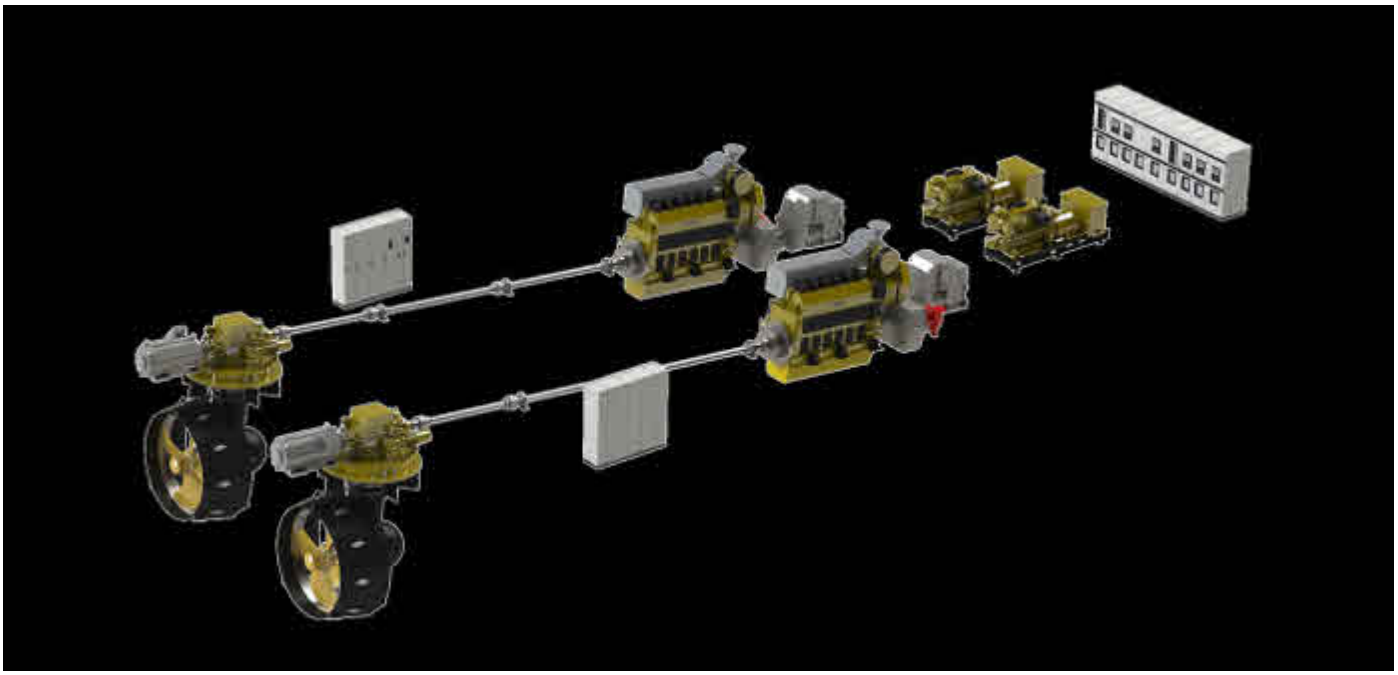
The booster motors and drives are controlled directly from a Caterpillar MPC 800A control system which also performs all mode selections, interfaces with the vessel's PMS and provides a single point interface for the operator.

Commenting on the development, Jonas Granath, Manager Electrical Design, Caterpillar Marine Solution Centre, said: "The efficiency gains are remarkable. Of course, they differ from ship to ship depending on the ship service and OSVs come in a wide range of types and sizes. Typically, though, OSVs with DP capability spend a considerable amount of time in standby or in various levels of DP. With this new system, they will be able to use the diesel electric mode and run off the smaller gensets with the propellers operating economically at a very low rpm. It is in exactly these conditions where our new Marine Hybrid Thruster system offers the greatest benefits.

Caterpillar Marine believes that the Cat Marine Hybrid Thruster represents a significant new market contender, either for retrofit or installation at newbuild stage. In transit operations and in diesel-mechanical mode, the smaller engines run at higher loads, consuming less fuel.

In low-speed transit, either one or two gensets can power the main azimuth thruster in diesel-electric mode giving typical fuel savings of 10-15% at speeds in the 7-9kts range, depending on hull profile. However, the biggest savings are made during standby and DP operations where the vessel would operate in diesel electric mode with the main azimuth propellers running in the most efficient variable speed mode.

Jonas Nyberg, Caterpillar Marine's Regional Sales Manager South East Asia, said. "We see significant market potential for the new set-up onboard both existing and new ships to meet the increasing need for operational efficiency and reduced operating costs."



SCHOTTEL DEVELOPS NEW NOZZLE FOR ITS RUDDERPROPELLER RANGE

Germany's Schottel has introduced a new high-performance nozzle for its established Rudderpropeller range. The development follows increased market demand for higher efficiency nozzels at open-water speed combined with very good bollard pull values.

The Schottel VarioDuct SDV45 features optimally designed propeller geometries for "outstanding performance characteristics". Given the same propulsive power, Schottel claims it has a greater bollard pull than the thrust of previous nozzles and, at the same time, offers considerably greater efficiency in the medium and high speed range.

Unlike other nozzles, the VarioDuct SDV45 can be adapted to different vessel designs and applications. The small outer diameter also makes the nozzle ideally suited to shallow-water operation.

During the development phase, CFD calculations were used to investigate hundreds of geometry variants. Geometries were then model tested to demonstrate the operating characteristics.

PROPELLERS

DANAOS BOX SHIPS RETROFITTED WITH KAPPEL SCREWS TO SAVE ON FUEL

Kappel propellers, the unique screws that feature sweeping propeller blade tips to reduce vortex and blade drag, have been specified by Danaos Shipping for two 85000TEU containerships, undergoing upgrade work at an undisclosed shipyard.

With a 9m diameter, the five-bladed propellers will be the largest fixed pitch Kappel propellers delivered to date. MAN Diesel & Turbo will supply the novel propellers in a propulsion upgrade package that includes MAN B&W 12K98MC-C main engines, rated at 68,520kW at 104rev/min.

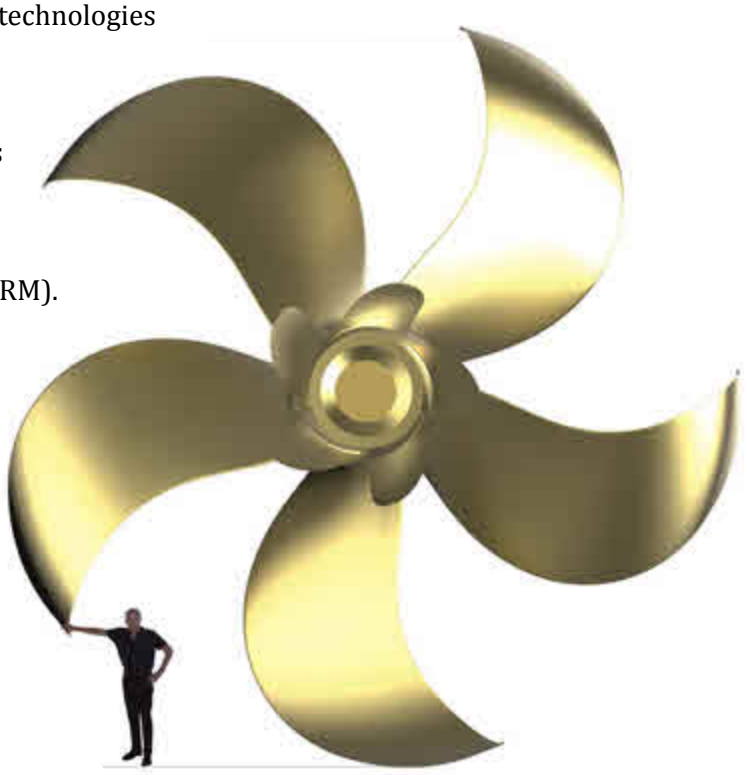
CSCL Europe and *CSCL America* will also be retrofitted with a new bulbous bow as part of a tranche of measures to reduce fuel consumption by 15% at the new optimisation speed of 18kts. MAN Diesel & Turbo has already retrofitted its Turbcharger Cut Out system to the vessels prior to their drydocking.

Dimitrios Vastarouchas, Danaos' Technical Director and Deputy Chief Operating Officer, said: "We look forward to have the vessels upgraded. Our R&D Department has conducted very thorough investigations before concluding what the right upgrade solutions for these vessels are and we are confident that the vessels will be highly competitive in the market once upgraded."

Most mid-size container vessels were often originally designed and build to operate at much higher speeds than it is the case today and accordingly, their propulsion characteristics can be optimised.

To this end, MAN PrimeServ's Retrofit & Upgrade Departments in Copenhagen and Frederikshavn started up a 'Vessel & Engine Specific Study' in 2015. The project researched 12 different potential solutions for optimising propulsion using diverse MAN Diesel & Turbo technologies and products individually and in various combinations.

Danaos also carried out concept studies on the optimisation of its vessels at their in-house R&D department before concluding on how to proceed. Besides verifying the performance of the new Kappel propellers and the new bulbous bow design a primary reason for carrying out model tests was also to ensure that the new propellers would have the correct light running margin (LRM).



According to the enginebuilder, a temptation with optimisation projects can be to deliberately reduce the LRM below the optimal in order to give the propellers a slightly higher efficiency. Ultimately, a propeller layout with a reduced LRM will however be at the expense of the engine's specific fuel oil consumption whereas the full potential of the propulsion upgrade will not be exploited in full scale.

Instead, the philosophy at MAN Diesel & Turbo is to avoid looking at individual components alone and to look at the complete propulsion drive train in a holistic fashion were components are viewed in terms of the mutual influence they have on each other.

The propellers and boss caps with fins – a 6% efficiency improving device for reducing the hub vortex and drag behind the propeller hub – will be manufactured under license by China's Zhenjiang Tongzhou Propeller Co. Ltd. Installation is scheduled for July and September 2016.

EMISSIONS

BREAKTHROUGH ORDER FOR ALFA LAVAL'S PURENOX PRIME

Five very large ethance carriers (VLEC) under construction at the Dalian Shipyard for United Ethane Carriers, a joint venture between Jaccar Holdings and Hartmann Group, will provide a first reference for Alfa Laval's PureNOx Prime, its new solution for water treatment in exhaust gas recirculation (EGR) systems.

PureNox Prime was selected by MAN Diesel & Turbo for integration into the engines' EGR system, which will be built under licence at Hyundai Heavy Industries Engine & Machinery Division (HHI-EMD).

"Receiving this breakthrough order so soon after the introduction of Alfa Laval PureNOx Prime confirms that we've succeeded in our goals," said Kristina Effler, Alfa Laval Global Business Manager, Water Treatment Exhaust Gas Emissions. "PureNOx Prime retains the proven PureNOx performance, but its smaller footprint, leaner design and lower investment cost are all adapted to market demands. Clearly, the market is responding."

Each vessel will be served by a PureNOx Prime 100 system, which is the smallest of the three PureNOx Prime capacities and comprises one centrifugal separator.

All ships built as of January 2016 will be required to meet stringent Tier III NOx limits when operating in the Emission Control Area (ECA) off the North American coast.

APL SLASHES FLEET EMISSIONS BY 45%

Singapore-based shipowner APL has reduced carbon dioxide emissions across its fleet by 45.5% last year, compared to emissions levels recorded in 2009.

Emissions data was verified by Lloyd's Register according to the CCWG verification protocol and ISO14064-3:2006 standard.

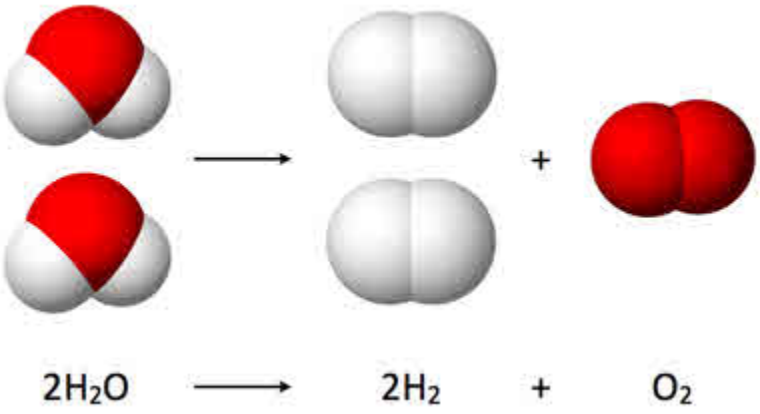
The liner company attributes the reduction to improvements in operational efficiency, fleet and voyage optimisation, technical improvements, as well as a more fuel-efficient and environmentally-friendly fleet of vessels. Through data collection and analysis, APL implemented a dedicated programme that upkeeps its vessel fleet for optimal ship performance and minimal environmental impact. Monitoring tools are used to track and benchmark performance.

"APL has steadily reduced its year-on-year carbon emissions and this demonstrates the company's unyielding focus on sustainable shipping," said Kenneth Glenn, APL President. "APL is dedicated to sound environmental stewardship and will persevere in our efforts to live out our commitments to protecting the environment."

FUEL

CRANN RESEARCHERS FIND AN ECONOMICAL WAY OF SPLITTING WATER

Researchers at CRANN, the Nanoscience Institute based at Trinity College Dublin, have found a way of producing pure hydrogen using renewable energy sources, in a development that could accelerate the adoption of hydrogen as a fuel across all transport sectors.



The ground-breaking achievement, published in the prestigious international journal *ACS Catalysis*, centres on a new material which enhances the splitting of water using abundant raw materials – manganese oxide. CRANN says this performs as well as the current most effective material for water splitting – ruthenium oxide – but is much less expensive.

Professor Mike Lyons, Principal Investigator at CRANN and School of Chemistry, said: "We are very excited about this very significant breakthrough. The adoption of this material will mean that electrochemical hydrogen generation using electrolysis is now far more economically viable and will hasten adoption of hydrogen as a fuel in energy efficient transportation."

Hydrogen has been described as the ultimate clean energy source, as it is a pollution-free fuel and energy carrier which would satisfy much of the world's energy requirements.

Hydrogen is prepared by splitting water electrically into its component parts hydrogen and oxygen (a process called electrolysis). However, this process requires a significant energy input. The widespread uptake of hydrogen as a fuel has been hampered by the lack of low cost, earth abundant materials which can accomplish the splitting of water, with minimal energy input, in an economically efficient manner using renewable energy sources.

"Our disruptive materials breakthrough is momentous as it means much more energetically efficient and more economical hydrogen energy. This means that the cost of producing hydrogen via water electrolysis will be significantly reduced," added Lyons.

WASTEWATER

SHARC ATTACKS THE SEWAGE FOR THERMAL ENERGY

Gaining considerable attention shoreside is a waste heat recovery system that recovers thermal energy from raw sewage.

Wastewater captured in sewage treatment tanks is pumped to International Wastewater Systems' SHARC system, where solids are macerated and temporarily separated by the company's patented clog-proof filtration technology. The energy-rich water is then screened and passed through a heat exchanger to generate hot water, creating a limitless supply of thermal energy for water heating.

Once energy is pulled from the dirty water, the colder wastewater joins the separated solids and continues on its way through the sewage treatment process.

According to IWS, the SHARC can be used to provide space heating and cooling for machinery by simply reversing the process so that thermal energy is dumped into the sewage water.

Although the SHARC technology has to-date found application only in municipal and residential buildings shoreside, the US-based company says the technology can be adapted for marine application.

In an email exchange, Cam Whitelaw, International Wastewater Systems' Marketing Co-ordinator, told *MEM*: "Our technology certainly could be marinised, and that is something we have considered. At this point we don't offer any products that treat wastewater. We simply exchange thermal energy for potable water heating and space conditioning. Once the energy is extracted we discard the dirty water.

"However, one of our R&D projects is to develop a water recycling system that could be packaged with our heat recovery systems. As far as capacity [is concerned], as long as we have a minimum wastewater flow available, we can supply a heat recovery solution. Our systems can be scaled up all the way to a city wide district energy system."

HULL FORM

ØSTENSJØ REDERI SOVS WILL BE BASED ON A ROLLS-ROYCE UT540 WP DESIGN

Rolls-Royce has signed a contract with Spain's Astilleros Gondan shipyard to design and equip a second Service Operation Vessel (SOV) for shipowner Østensjø Rederi. The vessel will support wind farm operations for DONG Energy.

The repeat order is for a ship design based on the UT540 WP design (above) developed in close cooperation with Østensjø Rederi to support operations in shallow waters at offshore windfarms. The new design has a high focus on seakeeping capability, station keeping performance, improved safety and comfort, and reduced fuel consumption.

Helge Gjerde, Rolls-Royce, Director Offshore & Merchant Solutions, said: "We are delighted that Østensjø Rederi and DONG Energy have chosen to exercise an option with Astilleros Gondan for a second vessel of our new concept. Developing advanced vessels for the renewable energy sector is a perfect way to make use of our vast offshore experience and diversify our marine business."

The first wind farm vessel contract to Astilleros Gondan was announced in October 2015 and both vessels will serve as the base for wind turbine technicians while they perform maintenance work on offshore wind farms.

A motion compensated gangway system with an adjustable pedestal will be installed to ensure safe operations and optimal uptime. The first vessel ordered will work on Race Bank Offshore Wind Farm, while the second will work on the Hornsea Project One wind farm, both off the UK coast.

Rolls-Royce will also supply a diesel-electric machinery package, consisting of frequency controlled electric driven azimuth thrusters, super silent mounted transverse thrusters, DP2 dynamic positioning system, power electrical system, deck machinery, and the latest generation Acon automation and control system.

OSD UNVEILS A POWERFUL E-TUG DESIGN

Offshore Ship Designers (OSD) has designed a powerful, low-emission compact e-tug to further augment its Azistern series of vessels.

OSD Managing Director Michiel Wijsmuller said: "The Azistern-e has the typical low resistance stable hull and all-round visibility that is associated with all Azistern designs. What makes this particular Azistern tug different is that it is driven by a revolutionary podded drive and that it has a flexible and green electro/diesel-electric configuration."

The hybrid power of the 22m LOA 50t bollard pull Azistern-e is generated by two 970kW variable speed gensets and is supported by two 400kWh lithium battery packs. The low-emission tug can be delivered compliant with IMO Tier III requirements with an after-treatment system suitable for emissions control areas, and is also equipped with an innovative energy management system.

The Azistern-e is highly manoeuvrable, and the vessel's power train has a remarkably short reaction time. By using the batteries as a booster, maximum bollard pull can be achieved within seconds. The relatively small size of the engines and the shaftless configuration frees up more space below deck, providing optimum flexibility in respect of the division of space and piping.

As a result of its podded drive and the double elastic mounting of its gensets, the MLC- compliant vessel will also provide the highest comfort level for its four-man crew.

SHIPREPAIR

QM2 DRYDOCKS AT B+V FOR FUTURE-PROOFING REFIT

Queen Mary 2 drydocked at Hamburg's Blohm+Voss yard last month for its largest refit programme since the 148,528gt vessel was delivered in 2004.

Cunard's flagship will undergo an extensive work scope that includes new cabins, modifications to the bridge wing, the installation of new bulkheads for improved damage stability as well as modifications to the vessel's tanks.

The transatlantic liner's environmental protection systems will also be upgraded, with the installation of four new exhaust scrubbers. Additionally, the maintenance of four pod drives, four stabilising systems as well as the removal and maintenance of three bow thrusters are on the task list. The hull and superstructure will also be recoated with new, environmentally-friendly coatings.

Blohm+Voss has prefabricated several steel deck sections with a total weight of about 200t. These will be installed on deck 13 as part of the programme to modernise hotel, entertainment and dining areas.

Fred van Beers, Chief Executive Officer at Blohm+Voss, said: "We are proud to carry out such an extensive master refit on the *Queen Mary 2*. In the past years, we have managed to gain a good international reputation with orders from the cruise liner industry. In this area, we are especially known for our performance during complex remodelling and modernisations with ambitious deadlines. In 2015, we prepared 10 cruise liners for the future this way."

COATINGS

eSHaRk FUNDING PAVES WAY FOR NEW HULL COATING APPLICATION

A project that aims to produce a new fouling-protection system for commercial vessels has received funding from the European Union.

The aim of the eSHaRk project, whose partners included PPG Marine Coatings, MACtac, Meyer Werft/ND Coatings, VertiDrive and the Hamburg Ship Model Basin (HSVA), is to establish an automatic application process enabling the application of an innovative self-adhesive/fouling-release film. The process will allow shipowners to benefit from the fouling-release properties and drag-reduction capabilities of PPG's Sigmaglide self-adhesive film.

"The eSHaRk (eco-friendly ship hull film system with fouling Release and fuel-saving properties) project aims to bring to the market a fouling-protection technology that not only maintains the current state-of-the-art fouling-protection standards but is superior to existing paint-based solutions in terms of eco-friendliness, ease of application, robustness and drag-reduction, all of which will lead to fuel savings and the reduction of greenhouse gas emissions," said PPG Product Manager Christophe Cheikh.

The system incorporates a fine-tuned fouling-release system based on PPG's silicone binder technology and a self-adhesive film designed by MACtac for underwater use.

As part of the eSHaRk project, new, robotic application technology is being developed by

VertiDrive that will be used to automate application of the film on large commercial vessels. Furthermore, the surface morphology of the film will be optimised to enhance drag-reduction, fuel-savings and emissions-reduction benefits to previously unattainable levels.

After extensive laboratory testing, including flow-channel drag-reduction experiments conducted in a state-of-the-art flow channel at HSVA, several small-scale in-practice applications have been conducted successfully, and PPG is now looking for full-scale testing and validation in operational conditions before market entry with the support of ND Coatings/Meyer Werft.

The number of trial applications is growing, and the advantages of the system are being demonstrated. Tests to-date show the film system can offer clear advantages at the vessel newbuild stage, in terms of application, zero volatile organic compounds, reduced waste and impact on the environment.

The number of trials and the size of trial vessels will be increased in order to validate the system thoroughly prior to full-scale commercial launch. A validation phase will confirm the benefits for the ship operator in terms of fuel consumption and greenhouse gas emissions reduction.

“Fouling is a constant challenge for the shipping industry. A number of fouling-protection technologies currently exist, the most widely-used being spray-on antifouling and fouling-release coatings," Cheikh said, adding that these solutions face challenges regarding their environmental impact, the efficiency of their application on ship hulls, and their effectiveness in protecting vessels against fouling.

The SIGMAGLIDE fouling-release film solution under development within the eSHaRk project has a targeted launch date of 2018.

CONDITION MONITORING

COLTRACO ADDS TO ITS PORTASCANNER BEARING MONITOR RANGE

Coltraco Ultrasonics has added to its Portascanner range with the smaller Portamonitor Bearing Indicator, developed to test bearings and rotating machinery onboard ships. Trials are currently being carried out a naval vessel.

Designed to identify mechanically deteriorated bearings and bearings with inadequate or contaminated lubricant, Portamonitor detects high frequency (ultrasonic) stress waves associated with friction and other faults with machinery in poor condition. It can be used to monitor bearings in motors, pumps, fans, gearboxes and other rotating machinery applications. It has two outputs – a decibel reading and a ‘distress’ level, both of which are measured and displayed simultaneously.

LOAD TESTING

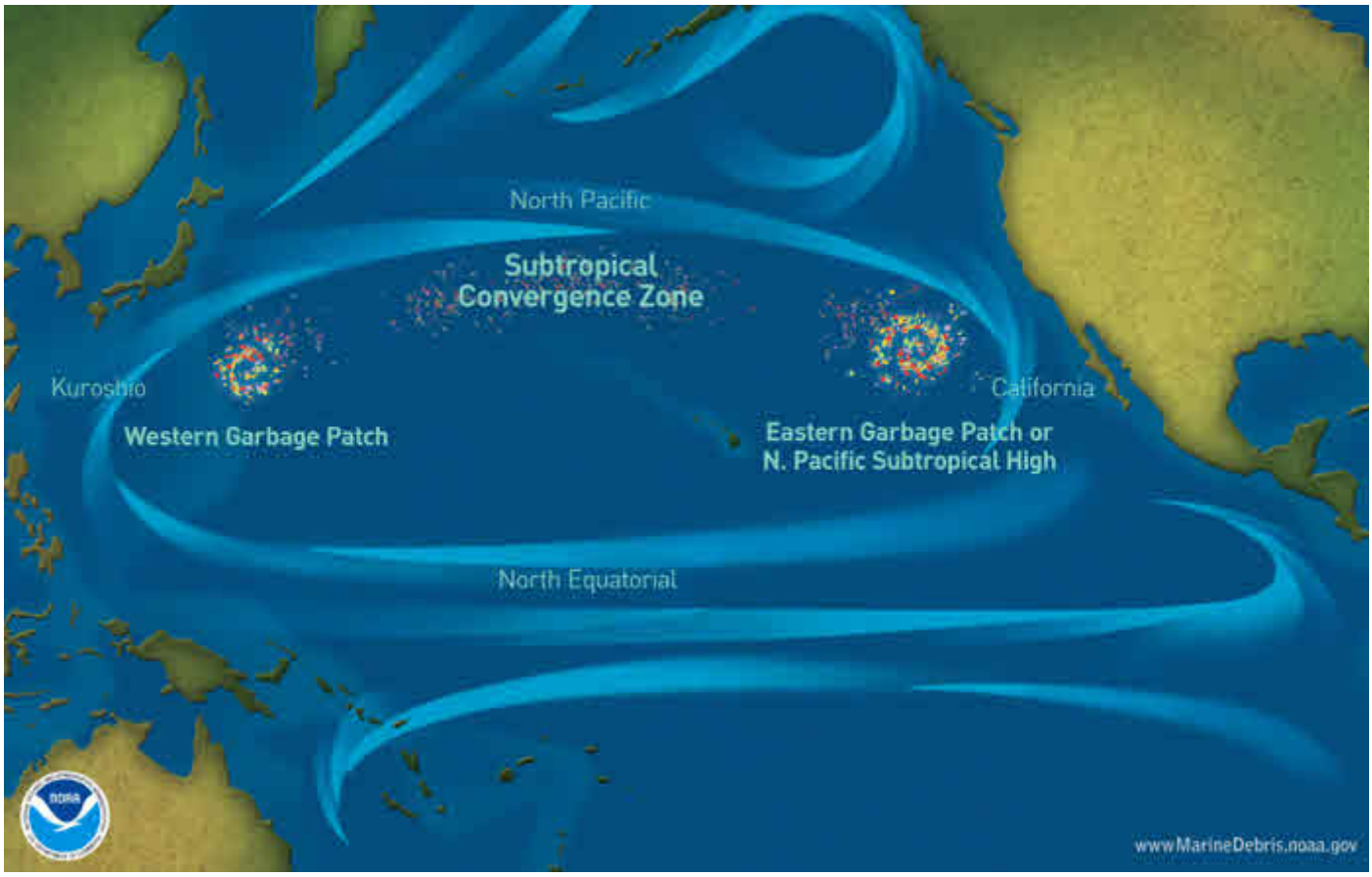
AKF’S RECALIBRATED LOAD TEST APPROVED BY LR

Lloyd’s Register has approved the successful recalibration of Damen Anchor & Chain Factory’s (AKF) load testing facilities. With the certification, the company can continue to offer proof load testing of lifting and towing gear to supplement its supply of anchors, chains and towing equipment.

The annual calibration involved AKF’s four testing benches: with capacities of 100, 300, 900 and 2,000t. All four test benches maintained their Class-1 certification.

AKF General Manager Laurens van Gelder said: “Our independent Lloyd’s Register-approved testing facilities are a perfect complement to offshore service suppliers in their search for a competitive pricing strategy. Many companies bought brand new lifting and towing equipment for projects that have now been completed. Inspection and testing of such equipment is a very cost effective way to see if they can still be utilised for future projects.”

AKF is now preparing for approval tests to achieve EKH certification.



ENVIRONMENT

THE OCEAN CLEANUP WINS KATERVA AWARD WITH PLAN TO CLEAR PACIFIC GARBAGE

The Ocean Cleanup won this year's presigious Katerva Award - considered the Nobel prize for sustainability - for tackling the vast sea of plastic rubbish that has amassed in five ocean gyres around the world. According to research, it these areas are not contained, cleaning the hazardous detritus could take 79,000 years.

Founded in 2013 by the then 19-year-old Boyan Slat, The Ocean Cleanup system is essentially a massive wave-powered sieve that passively scoops up the plastic rubbish from 3m below the surface. Once retrieved, the plastic can then be recycled. Feasibility studies indicate that clearing up just one 100km stretch could remove 42 per cent of the Great Pacific garbage patch in only 10 years.

In May last year, Slat announced that the world's first system could be deployed later this year, possibly off the coast of Tsushima, an island located between Japan and South Korea. The system will be operational for at least two years, catching plastic pollution before it reaches the shores of the proposed deployment location of Tsushima Island. Tsushima Island is currently evaluating whether the plastic can be used as an alternative energy source.

The scale of the plastic pollution problem around Tsushima Island results in about one cubic metre of plastic pollution per person washed up each year. Within five years, after a series of deployments of increasing scale, The Ocean Cleanup plans to deploy a 100km-long system to clean up about half the "Great Pacific Garbage Patch", between Hawaii and California.

Feasibility studies have already been carried out. In August 2015, a series of measurement techniques were conducted as part of "mega expedition" whereby reserachers onboard 30 vessels assessed the concentration of plastic during voyages through the Great Pacific Garbage Patch. This was in preparation for the large-scale cleanup of the area, set to begin in 2020. The mega expedition's" primary goal was to accurately determine how much plastic is floating in the area by executing the largest ocean research expedition in history. This was also the first time large pieces of plastic, such as ghost nets and Japanese tsunami debris, have been quantified.

"I've studied plastic in all the world's oceans, but never seen any area as polluted as the Great Pacific Garbage Patch," said Dr. Julia Reisser, Lead Oceanographer at The Ocean Cleanup. "With every trawl we completed, thousands of miles from land, we just found lots and lots of plastic."

Although the samples collected during the expedition still have to be analysed, preliminary findings indicate a higher-than-expected volume of large plastic objects floating in the ocean.

This underscores the urgency of The Ocean Cleanup's mission to clean it up, said CEO and founder Slat, during a press conference last August: "The vast majority of the plastic in the garbage patch is currently locked up in large pieces of debris, but UV light is breaking it down into much more dangerous microplastics, vastly

increasing the amount of microplastics over the next few decades if we don't clean it up. It really is a ticking time bomb."

The clean-up technology comprises a V-shaped array of floating barriers attached to the seabed to catch the plastic. Underneath these booms, a submerged non-permeable screen helps concentrate the plastic suspended under the surface. Most of the current will pass under these screens, preventing by-catch. The lighter-than-water plastic will collect in front of the floating barriers. The barriers funnel plastics towards the centre of the stystem, enabling a central platform to efficiently extract and store the concentrated plastic until it is transported to land for recycling. Intended for large-scale deployment, it can harvest plastic from millions of square kilometres. Readers can find out more about the technology from this YouTube video: https://youtu.be/pcXS4bTxLjI.

Speaking at lasy year's Seoul Digital Forum, in South Korea, Slat, said: "Taking care of the world's ocean garbage problem is one of the largest environmental challenges mankind faces today. Not only will this first cleanup array contribute to cleaner waters and coasts, but it simultaneously is an essential step towards our goal of cleaning up the Great Pacific Garbage Patch. This deployment will enable us to study the system's efficiency and durability over time."

DIVE SUPPORT

UDS DIVE SUPPORT VESSELS TO FEATURE CALEY OCEAN DIVE BELL HANDLING

Offshore handling systems specialist Caley Ocean Systems is supplying Singapore-based Flash Tekk Engineering with saturation dive bell handling systems for Ultra Deep Solutions' dive support and construction vessels (DSCV) *Deep Installer* and *Van Gogh*.

Deep Installer will be supplied wtih a handling system designed for the deployment and recovery of a 24-man DNV classed twin saturation dive bell, while the *Van Gogh* unit will have handling capacity with for a DNV classed 18-man bell saturation dive system for operations to 300m water depth. On each vessel, the bell will be deployed via a moonpool using a handling system that features two clump weight guide wire winches and main bell cable winch.

"We are delighted to have been selected by Flash Tekk Engineering for these high profile dive bell handling projects," said Gregor McPherson, sales director, Caley Ocean Systems. "Caley's experience in dive bell handling systems engineering gives us the edge for this kind of project; where the combination of winch technology and control elements allows us to ensure that all aspects of the dive bell system are fully optimised."

The DP3 *Deep Installer* is based on the Marin Teknikk's proprietary Red Class 6027 design. With a length of 142m, the state-of-the-art multipurpose subsea diving support construction vessel features two 250hp work class ROVs, a 400t crane wwith depth capability to 5200m single fall and 3200m dual fall. The vessel's 1500m^2 open deck space and 10tm^2 strengthend dek can facilitate a wide range of project required machinery and equipment.

The smaller Van Gough, a Marin Teknikk DP2 MT6023 DSCV vessel, has been designed for operation in unrestricted waters for subsea support works. The 111m long vessel will feature a heave compensated 150t crane and an ROV with a state-of-the art launch and recovery system. Both vessels are building at China Merchants Industry Holdings; Schenzen yard and due for delivery to in 2017 and 2018.

BALLAST WATER

PUREBALLAST NEAR TO USCG TYPE APPROVAL

Alfa Laval continues to move swiftly towards the submission of a US Coast Guard (USCG) type approval application for Alfa Laval PureBallast 3.1. The company has performed half of the required land-based tests and is set to conclude the remainder of these within the next several weeks.

Half of the required land-based procedures have now been completed using the USCG-approved CMFDA/FDA (staining) method. The tests, which have been performed at DHI in Denmark, have all returned strong biological disinfection results.

"Alfa Laval has a robust biological disinfection technology and has mobilized quickly following the USCG's rejection of most probable number method," said Stephen Westerling Greer, Global Business Manager for PureBallast. "As a dedicated supplier approaching 100 years of marine service, we have made USCG type approval a top priority."

Westerling Greer concluded: "Alfa Laval's vast experience in marine engineering, combined with specific knowledge in the design of ballast water treatment systems, is allowing us to secure a fast and positive testing outcome."

Meanwhile, Saint Lucia is the latest IMO Member State to ratify the ballast water management (BWM Convention). This brings the number of States party to the Ballast Water Management Convention to 50, representing 34.81% of the world's merchant fleet tonnage.

VOYAGE DATA

RUN OF ORDERS FOR DANELEC VDR

Danelec Marine and its distribution partner Elcome International are supplying Danelec DM100 Voyage Data Recorders for 14 ships in the Middle East.

The new VDR orders include seven new offshore support vessels (OSVs) and five tanker retrofits for one of the largest oil and gas companies based in Abu Dhabi. In addition, Elcome has recently completed the retrofit of Danelec DM100 VDRs to two tankers of a Danish shipping company.

Introduced in 2014, Danelec Marine's DM100 VDR complies with all the latest IMO and IEC performance standards, and incorporates Danelec's exclusive SoftWare Advanced Protection (SWAP) technology for ease of shipboard service as well as built-in cyber protection technology.

AUV

KONGSBERG AUVs TO AUGMENT PERU's ANTARCTIC SURVEY SHIP

BAP Carrasco building at the Construcciones Navales P. Freire shipyard in Vigo, Spain will be equipped with two HUGIN Autonomous Underwater Vehicles (AUV) from Kongsberg Maritime.

The AUVs for the Peruvian Navy's new 97m hydrographic and oceanographic research vessel (pictured) will augment research in Peruvian waters in order to fulfil Peru's commitment under the Antarctic Treaty.

In addition to the AUVs, Kongsberg will also supply the yard with deepwater multi-beam and single beam echo sounders, all of which will be fully integrated to ensure the highest level of performance. To ensure optimal performance in all conditions, Kongsberg will manage the installation of the acoustic transducers for ice water operations and the integration of various sub-systems including its K-Sync synchronisation unit, an advanced position, heading and motion reference system and a MDM500 Marine Data Management system.

FEATURED ARTICLE

WSS CALLS FOR ACTION TO CLEAN UP THE SOOT

While the shipping industry strives to curtail harmful exhaust emissions, such as CO_2, NOx and SOx, Wilhelmsen Ships Service (WSS) has now called for a "war to be waged on soot". The ship supplier says soot accumulation in a ship's exhaust gas boiler (EGB) is a serious issue, leading to reduced EGB efficiency, significant cleaning costs, corrosion, and the risk of fire.

Refined heavy marine fuels are full of contaminants, such as vanadium, sodium, aluminium, silica, and potassium, which leave deposits when burnt. This particulate passes through vessel exhaust valves and turbochargers, continuing with the flue gases until they reach the EGB. Here they stick to the boiler's heat transfer surfaces (pictured) and impair its efficiency.

Jonas Östlund, WSS Product Marketing Manager, Marine Products, Oil, says: "Just like any heat exchanger, an obstructive deposit will reduce the transfer of heat and therefore reduce the efficiency of the equipment. Soot deposits are particularly effective at reducing heat transfer as they insulate extremely well. A 1mm layer of soot can reduce EGB efficiency by 10%. Left to build up to a 3mm layer, EGB efficiency can be reduced by up to 50%.

"Obviously this calls for cleaning, with typical EGBs requiring around five hours of cleaning during port calls, usually every two to three months. This means labour, equipment, and the disposal of wash water that contains acidic soot – the latter being something currently up for regulatory discussion, with an expectation that it will have to be disposed of onshore, at extra cost. So, the cleaning task is more than a minor hassle – it's a major inefficiency, cost and labour burden for the engine room."

Cleaning and EGB inefficiency are the most obvious problems, but it doesn't stop there, Östlund states. Unburnt fuel and lubricants can also be deposited in the EGB, which can lower the ignition temperature of soot, and increase the risk of fire.

He says that cold corrosion is also a factor. Sulphur in the fuel reacts with oxygen during combustion to form sulphur dioxide and sulphur trioxide. When the temperature drops below 135°C, which occurs in EGBs operating at low velocities, sulphur trioxide reacts with the moisture in the air to form sulphuric acid. This is very corrosive to tube surfaces, and affects metal in a similar way to rust.

The problems are myriad, but the solution is simple, according to Östlund. He stresses that post-combustion fuel treatments – such as WSS' Unitor's FuelPower Soot Remover Liquid Plus – provides easy relief, adding "fuel treatment shouldn't just end in the fuel tanks."

In the case of WSS' proprietary Unitor offer, it is automatically dosed four times a day, dispensed as a fine mist that condensates onto the soot and continues to oxidize it. The result being that almost no soot is deposited in the EGB. The solution is active from 180°C, making it suitable for the low exhaust gas temperatures associated with slow steaming.

Unitor's FuelPower Soot Remover Liquid Plus has been thoroughly tested over aboard Wilh.Wilhelmsen's 76,500gt Ro-Ro *Tønsberg*.

Prior to its daily dosing, the vessel's EGB required regular cleaning every two months. However, after ten months of regular treatment, every six hours, the vessel, which has a busy trading pattern between Europe, the US and Japan, has yet to require EGB cleaning – saving time, money and a lot of work.

Tønsberg's Chief Engineer Stein Gravdal refers to the product as a "magic potion that works wonders", adding that the EGB still looks almost completely clean after the extensive test period.

According to WSS, the cost is negligible when measured against the very real efficiency gains the treatment delivers. It amounts to less than half a per cent of daily fuel cost.

"The ROI on this is, to say the least, compelling," attests Östlund.

NEWBUILDS & DELIVERIES

RO-RO: Germany's Flensburger Schiffbau-Gesellschaft (FSG) has signed a shipbuilding contract for the construction of two Ro-Ro vessels. The 209.79m vessels will each have 4100m lane capacity and be operated by Alternative Tasimacilik, the shipping arm of Istanbul's Ekol Logistik. *Meleq* and *Fadiq* will be delivered in 2017 and 2018, respectively.

FERRY: Gondan Shipyard and Naviera Nabia have signed a newbuilding contract with Naviera Nabia, part of Acuña Group, for a catamaran passenger ferry. The 24m vessel will be fully built using glass reinforced polyester (GRP) and will have capacity for 250 passengers at maximum speed at 20kts.

WFSV: French shipbuilder Piriou's Vietnamese yard has delivered its second wind farm support vessel (WFSVs) to Rix Sea Shuttle. The 27.4-metre *Rix Leopard* will transfer service crews to and from Statoil's 402MW Dudgeon offshore wind farm currently under construction off the coast of Norfolk. The BMT Nigel Gee designed vessel is the largest in Rix Sea Shuttle's fleet, and is specifically designed to operate in shallow waters surrounding many UK and European wind farms.

PROJECT RESOLVE: Canada's Davie Shipbuilding has cut first steel for the interim Resolve Class Auxiliary Oiler Replenishment vessel. Davie is converting a containership into an Auxiliary Oiler Replenishment (AOR) ship in order to support the operations of the Royal Canadian Navy.

FERRY: The first of Scandlines' two new hybrid passenger ferries was named *Berlin* at a ceremony in Rostock, Germany, last month. The vessel, destined for Scandlines' Rostock-Gedser route completed sea trials during the voyage to Rostock from shipbuilder Fayard's facility in Munkebo. Sister vessel *Copenhagen* will follow later this summer.

FERRY: Estonia's Baltic Workboats Shipyard received an order to build an 80-vehicle road ferry for Trafikverket Färjerederiet. The 99.7m vessel with capacity for 297 passengers will be designed by FKAB in cooperation with the shipyard. Delivery is scheduled for mid-2017.

BULK: Mitsui Engineering & Shipbuilding (MES) has delivered the 66,000dwt bulk carrier *Zita* to Aquasol Shipmanagement. *Zita* is the 13th ship built to MES' neo66BC, design, the wide beam, shallow draught version of its "neo" range.

CRUISE: STX France has signed a letter of intent with Royal Caribbean Cruises for three new cruiseships, following the successful delivery of *Harmony of the Seas* . Two Edge-class vessels will operate under Celebrity Cruises brand, the other is an Oasis-class ship for Royal Caribbean International.

TANKER: Nevsky Shipyard has launched its largest vessel to date. Academician Pashin, a 9000dwt tanker with a length of 130m and 21m beam. The tanker is be built for Spetssudoproect.

ROPAX: *Losna*, pictured above, one of two double-ended ferries building for Norway's Fjord 1, has been launched by ADA Shipyard. Designed to carry 60 cars/195 passengers, the vessels are each powered by two Caterpillar C32 main engines rated at 746 kW at 1800rev/ming. Propulsion is provided by twin Rolls-Royce AZP085 CP azipull thrusters. The vessels will be delivered in July 2016 and September 2016.

NIPPON PAINT AND WILCKENS FARBEN TO INCREASE EUROPEAN PAINT SALES

Nippon Paint Marine Coatings and Germany's Wilckens Farben have established a joint venture, Nippon Paint Marine (Europe) GmbH, to focus on Nippon Paint's marine sales activity in Europe and Turkey.

The new company, based in Glückstadt/Elbe near Hamburg, has been established to strengthen both companies' track record, technical innovation and service in the region.

"Our unique and advanced coating systems have already been used to satisfy some of the world's most reputable and well known customers. Now, as we have joined our forces in Europe, we are sure that we can expand our activities and become a major marine paint supplier also in Europe," said Michel Wilckens, the new Managing Director of the company.

"Our customers in Europe can only benefit from this new set-up and from the strengthening of our position within the Nippon Paint Marine network."

Yoshiaki Kuroda, President of Nippon Paint Marine added: "We look forward to welcoming new European customers to discover the technical advantages of Nippon Paint's world-leading technology."

FIRST LNG BUNKER BARGE TRAINING UNDERWAY

GTT North America and GTT Training, subsidiaries of the France-headquartered LNG containment specialist, has received the first contract of its kind for the development and implementation of a comprehensive LNG training programme for a the crew of TOTE's 2200m^3 LNG bunker barge currently under construction at Conrad Industries Shipyard in Texas, U.S.

Hitherto there had been no LNG specific competency and training standards for LNG barges that can serve as the basis to establish crew credentials and qualifications by the Flag authorities. GTT North America will collaborate with its sister company, GTT Training, STAR Centre, an internationally recognised and USCG-accredited LNG training centre and TOTE to fully develop the training programme and obtain the necessary approval from USCG.

KEPPEL AND ROSNEFT COLLABORATE ON MODU DESIGNS

Keppel Offshore & Marine, Russia's state-owned oil company, Rosneft, and Norwegian drilling equipment firm MHWirth have set up a Singapore incorporated Joint Venture Company to facilitate the design and engineering of mobile offshore drilling units (MODUs) for the shallow waters offshore Russia.

The JVCO will establish a wholly-owned Design and Engineering Centre (DEC) in the Russian Federation. The initial projects undertaken by the DEC will be from Rosneft for design and engineering work related to shallow water platforms. It will also look to take on work from other Russian and international customers.

PALFINGER TO ACQUIRE HARDING GROUP

The Palfinger Group last month announced its intention to acquire 100 per cent stake in Norway's Harding Group, the supplier of ship lifesaving equipment and services.

"Both the portfolio and the service network offer numerous synergies and there is hardly any overlapping. Together, we will become the market leader in lifesaving equipment. Due to the excellent structure of Harding's service business, PALFINGER MARINE will be less dependent on the oil price and investment propensity of the oil industry," commented Herbert Ortner, CEO of Palfinger, on the significance of this acquisition.

Palfinger Marine is a leading supplier of deck equipment and handling solutions. Should the acquisition be approved – the largest acquisition carried out in Palfinger's history – it will be a huge step closer to its strategic aim of becoming an integrated supplier of marine deck equipment with global service locations.

Following the acquisition, Palfinger aims to add new products and an international service network to its marine business.

GUIDELINES

CLASSNK UPDATES TWO IMPORTANT GUIDELINES

ClassNK has released new editions of its guidelines on ship noise and ship survey and construction.

The Japanese classification society released the first edition of the Guideline for the Mandatory Code on Noise Levels on Board Ships in July 2014 to provide the industry with a summarised outline of the revised mandatory requirments. The latest Guideline builds on the first edition and takes into consideration recent R&D results as well as the results of discussions held at the 95th Session of the Maritime Safety Committee (MSC95).

Based on R&D outcomes from a project carried out through ClassNK's Joint R&D for Industry Programme, ClassNK now treats bulkheads and decks including steel plates of a thickness of ≥6mm as having a weighted sound reduction index (Rw) of 35dB, the level required between cabin to cabin by the Code, which will streamline the design and construction process.

The revise guidelines for reducing ship noise preceded the release of a printed version of its 2016 Rules and Guidance for the Survey and Construction of Steel Ships.The 2016 edition contains requirement amendments made between 1 January 2015 and 31 December 2015 related to:

- Structural strength of container carriers
- Fire safety measures for vehicle carriers transporting motor vehicles powered by compressed hydrogen or compressed natural gas
- Welding procedures and related specifications
- Material factors of rolled stainless steel and stainless clad steel plates
- Propeller shaft and stern tube shaft surveys
- Propeller shaft condition monitoring systems
- Means of escape from machinery control rooms and main workshops
- Scope of application of fire-resistant cables
- Installation positions of fixed hydrocarbon gas detection systems

Further information about both guidelines can be found on ClassNK's website www.classnk.com

TRADE SHOWS

FIRST MARITIME FUTURE SUMMIT TO PRECEDE SMM

Those looking to book flights for SMM this September would do well to arrive in Hamburg a day before the show officially opens to get a good understanding just how tomorrow's shipping world might look like.

SMM's first Maritime Future Summit, which debuts on the 5th September, one day ahead of the opening of the trade show, will see a panel of experts discuss 'Building Ships for The Future', in a day of seminars intended to helping the industry make the transition to an era in which Big Data, digitalisation and automation will be commonplace.

In his keynote address, Knut Ørbeck-Nilssen, CEO of DNV GL Maritime, will share some thoughts on the current trends that are paving the way for the future, while Paolo Tonon, the CEO of Maersk Maritime Technology will explain the 'Maersk Vision' and MMT's place in it.

Amongst a litany of industry futurists and technologists will be Matthias Schulze, chief executive of the maritime business unit of Siemens, who will explain how advanced propulsion technology can boost ship efficiency and sustainability and what systems are most likely to be successful in the future. Similarly, Willie Wagen, Director - Market Innovation, Wärtsilä, will unveil a conceptual strategy for supporting the shipping sector's transition.

SMM is offering an early bird discount on the €350 price of admission. For more information about the summit, readers can visit www.smm-hamburg.com/programm

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