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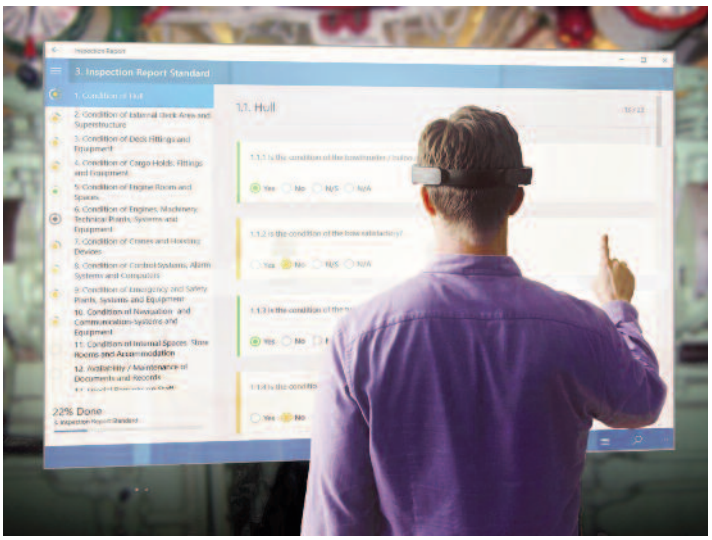

***Front cover** - Last month, Q88 opened an office in Piraeus, Greece.*

The office further increases the company's presence in Europe and serves as a key hub for client relations and business development.

It is headed by Fotis Georgakopoulos, Client Services Director who has significant client relations and business development experience in the region.

Athina Lekkou has also joined the Q88 Hellas team serving as Client Services Director, and brings with her nine years of industry experience with companies like Maran Tankers Management and Tsakos Columbia Ship Management.

The Piraeus office will only be a short-term location for the company, as Q88 will be looking for a permanent office location in the southern end of Athens over the next few months.

LNG as a fuel- Good or bad?

We have given this Comment page over to Ian Adams, the former IBIA secretary general and now an independent consultant*, who airs his views on LNG as a fuel (see Bunker Feature on page 34).

In 2007, I attended a conference where the possibility of using Liquefied Natural Gas (LNG) as a fuel for international shipping was raised.

At the time, a cruise ship company's representative said that he could not see how this would be a viable option unless the fuel was towed behind the ship in a separate vessel. This was greeted with great hilarity among the audience and among the panellists.

Ten years on and we are now awaiting the delivery of the first cruise ships to be LNG powered along with Ro-Ro ferries, containerships, platform support vessels, dredgers and drillships to name but a few, either under construction or indeed delivered and operating.

Why? Is this fuel the panacea for all our emissions issues?

Let's look at the reasons why LNG has become for many the fuel of the future.

MARPOL Annex VI when it was revised in 2008 had set targets for ships emissions. The sulfur content of fuel oil globally has been reduced to 3.5% m/m and the fuel used in Emission Control Areas (ECA's) to 0.1% m/m.

Previous experience gained when MARPOL Annex VI first entered into force in 2005 had enabled both sides to prepare for the subsequent transitions well with minimal disruption. In 2020, the global sulfur cap will reduce to 0.5% m/m.

Except for a very small number of crudes residual fuel from the refineries of the world will not comply with this limit. Instead, we will have to find an alternative source of energy. The simplest solution is to switch to distillate fuels - marine diesel oil (MDO) or marine gas oil (MGO) but both MDO/MGO are expensive.

LNG on the other hand is plentiful and cheap. It also has the added attraction that when burnt it produces no Sulfur Oxides (SOx) and it reduces Nitrogen Oxides (NOx) by about 85%. In addition, by switching from heavy fuel oil (HFO) to LNG, we will produce around 20% less carbon dioxide (CO_2).

The international code of safety for ships using gases or other low-flashpoint fuels (IGF Code) was developed and adopted at the IMO through the Maritime Safety Committee (MSC) on 11th June, 2015.

During the revision of Annex VI there was another parallel working group (WG) at IMO discussing Greenhouse Gas (GHG) emissions from ships. Whilst there has been no progress currently, IMO is coming under increased pressure to take action. The Paris agreement failed to include international shipping, but it is only a matter of time before attention will turn to our industry. Shipping contributes around 2% of global CO_2 emissions (796 mill tonnes in 2012).

As mentioned above, by switching to LNG, we will reduce the amount of CO_2 produced by around 20%. LNG is predominantly methane. Methane is identified as a GHG and is rated at 28 times more harmful over 100 years and 84 times more harmful over 20 years than CO_2.

A catastrophic release would undo all the good that burning it has done. An EC report produced in 2016 indicated that although improvements have been made there is still 'methane slip' through engines, around 7 g per kg at high loads, increasing to 23-36 g at lower loads. We should also look at the whole supply chain from well to consumer and consider all the methane slip in the system.

The report acknowledged the reduction in the headline gases but also identified the fact that burning LNG generated more ultrafine particulates. These ultrafine particulates can penetrate the respiratory system and get transported to all parts of the human body via the bloodstream.

LNG shipping has a fantastic safety record. Again, why is this? The crews on LNGCs are the highest trained in the fleet. Are we going to train all our crews to this level? Then there is a question of infrastructure. We do not have the facilities for delivering this fuel. You cannot use a standard bunker barge to deliver it. Will LNG terminals be keen to welcome all comers to their berths?

In conclusion, LNG is a distraction, at best it is an interim solution to a larger problem. The sooner shipping grasps the nettle of the bigger picture the sooner we will have a truly sustainable solution for an industry that is vital for international trade.

There are many lobby groups that are calling for a zero-carbon world. One where fossil fuels are eliminated from the energy market. LNG will not fit with that idyll. TO

**IMA Marine is a consultancy specialising in bunker fuels. Services offered include advising on purchasing policy, training, and provision of expert witness. Adams was the secretary general/CEO of the International Bunker Industry Association (IBIA) between 2001-11. He holds the Cardiff University Bond Solon Civil Expert Certificate.*

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Overcapacity remains an issue

Oil traders are resorting to storing more oil at sea amid swelling output in the Atlantic region.

In his regular look at the tanker markets, BIMCO's analyst Peter Sand said the global stocks of crude oil and products were being drawn down slowly, as OPEC-led adjustments to global oil supply affected less than one-third of global production.

This still leaves two-thirds of the rebalancing efforts out of OPEC-control, including members, such as Nigeria and Libya, that increased their output this year. Another significant producer to have scaled up production is the US. By mid-October, OPEC had called upon US shale oil producers to help reduce the supply glut, as they reacted to the slow oil market rebalancing.

Global oil demand is heading for a new record at 98.7 mill barrels per day in 4Q17 - a rise of 1.9% from 4Q16. Out of the 1.87 mill barrels per day growth, 1.06 mill (57%) is coming from Asia, which is good for shipping, particularly, if that demand is met by oil from African producers and not the relatively short-haul producers in the Middle East. Another 0.35 mill (19%) comes from the Americas – which may impact shipping slightly, whereas a further 0.23 mill (12%) comes from the Middle East with no expected effects on shipping.

The immediate effects of the major hurricanes were refinery outages, and disruption to the Colonial pipeline, which provides large parts of the ECUS with gasoline, jet fuel and other refined oil products. International shipping assisted to ensure mainland US continued to receive supplies of oil products and the US Jones act was suspended for two weeks.

In addition, the prolonged downtime at Gulf Coast refineries reduced crude oil throughput in the US. A knock-on effect was a large increase in seaborne US crude oil exports, judging by the spot fixtures (source: Charles R Weber). More than 3 mill dwt of crude oil tanker capacity was fixed in September, surpassing the previous high in May, that saw 2.2 mill dwt taken.

During the first nine months of 2017, China imported 33 mill tonnes more of crude than the same period last year. BIMCO estimated that this equals a tonne/mile growth rate of 18% for these imports alone.

As for demolition, focusing on product tanker, recycling in August reached a five-year-high at 472,000 dwt. The demolition of two LR2s and five MRs/Handysizes accounted for the majority of tonnage removed.

For crude oil tankers, increased demolition was seen between July and September. August was particularly strong, with a level not seen since 2003. Amongst the recycled ships were four VLCCs, three Suezmaxes and four Aframaxes.

Newbuildings

Owners shied away from the demolition market in the earlier part of this year and were attracted to the newbuilding market instead, as optimism still abound. Ordering of crude oil tanker tonnage was particularly high. September proved that the second half of this year surprisingly reflected the first half. No less than nine VLCCs were ordered that month for delivery in 2019 and 2020, bringing the total number of new VLCC orders for 2017 up to 41 units by the end of September.

BIMCO forecast that the loss making freight rate levels seen during October, due to oil field and refinery maintenance, will be somewhat reversed, as we enter the peak season for tankers, which runs from November to January. This should benefit both oil product tankers and crude oil tankers.

Rates are expected to go up, but not to the highs of the previous peak season in 2016/17. The market instruments are too weak, as despite seeing the highest oil demand ever, the fleet growth is almost 5%.

The immediate future of Kurdistan Regional Government (KRG) sour crude oil exports – to several European refiners via the Kirkuk-Ceyhan pipeline – is uncertain. Before the current conflict, KRG exported 600,000 barrels per day to Italy, Greece, Israel, Croatia, Spain and Sweden. At the end of October, exports amounted to just 200,000 barrels per day.

The likely alternative to this source, would be Russian exports out of the Black Sea. But Iraqi Arabian Gulf exports could also step in, as the oil grade is similar.

In total, US crude oil exports were up 59% year- on- year, for the first seven months of 2017. This equated to more than 900,000 barrels per day being exported, up by 340,000. While the main receiver, Canada, dropped its imports by 60,000 barrels per day seaborne transport increased. Exports during the first seven months to China were up by 168,000, exports to Japan up by 19,000, South Korea up by 30,000 and Singapore up by 31,000 barrels per day. In addition, the shorter transatlantic destinations like the UK, saw an increase of 52,000 barrels per day, Netherlands increased by 34,000 and Italy increased by 18,000 barrels per day.

Longer sailing distances are always welcome, but what the tanker market needs is more floating storage. With Brent and Dubai crude futures pricing being in backwardation and the West Texas Intermediate (WTI) crude in a slim contango for the next 12 months, a comeback for floating storage seemed far fetched for the the time being.

****With the US accounting for 80% of the increase in global oil supply to 2025 and maintaining near-term downward pressure on prices, the world's consumers are not yet ready to say goodbye to the era of oil, the IEA said in its latest global energy outlook.

Powerful impetus from other sectors than cars is enough to keep oil demand on a rising trajectory to 105 mill barrels per day by 2040: oil use to produce petrochemicals will be the largest source of growth, closely followed by rising consumption for trucks (fuel-efficiency policies cover 80% of global car sales today, but only 50% of global truck sales), for aviation and for shipping.

Once US tight oil plateaus in the late 2020s and non-OPEC production falls back, the market becomes increasingly reliant on the Middle East to balance the shortfalls. There is a continued large-scale need for investment to develop a total of 670 bill barrels of new resources to 2040, mostly to make up for declines at existing fields rather than to meet the increase in demand, the IEA said.

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Shuttle tankers – safe, flexible, efficient

DNV GL has taken a look at the shuttle tanker and in particular hybrid battery powered dynamic positioning (DP) systems.*

The global fleet has been growing steadily for decades, comprising 88 ships by the end of 2016, varying in size between 95,000 dwt and 155,000 dwt. The larger sizes typically operate offshore Brazil and the smaller in the North Sea.

Two owners, Teekay and Knutsen NYK, account for 62% of the fleet, and 64% of all shuttle tankers are DNV GL-classed.

Nine newbuilds are scheduled for delivery in 2017/2018, and on average, one vessel is scrapped annually. Some 32 vessels are over 16 years old and will require replacement soon.

To increase the regularity during loading operations and for collision avoidance, shuttle tankers are equipped with DP systems, which typically includes azimuth and tunnel thrusters fitted both forward and aft.

North Sea shuttles typically have twin-screw propulsion systems for redundancy and DP purposes. To improve the position-keeping and manoeuvring capability in ballast condition, it is not uncommon that shuttle tankers have an increased ballast tank capacity, compared to standard crude oil tankers.

Shuttle tankers operating on the Norwegian Continental Shelf may need to comply with Norwegian regulations for emissions of non-methane volatile organic compounds (NMVOC) and install complex vapour recovery process systems.

Developments are ongoing regarding the use of VOC as a fuel for eg, power generation purposes. Recent North Sea shuttle tankers use electrical rather than steam-driven cargo pumps and as a result, they typically have larger auxiliary engines, smaller boilers and inert-gas generators, as opposed to flue gas systems.

Loading time from FPSOs/FSOs or various types of offshore loading systems/buoys, may vary from 24 hours to more than a week, while the voyage itself is typically short. Therefore, the loading and discharging frequency is comparatively high, with up to 50 cycles a year per ship.

Some shuttle tankers spend 25- 50% of their operating life in loading mode at the field. The North Sea is a harsh environment where significant wave heights up to 5.5 m, wave periods of 12 secs, wind speeds up to 19.7 m per sec and current speed of 0.5 to 1 m per sec, can occur.

In Brazil, the weather conditions are generally less harsh, however, current speed is generally higher in this area than in the North Sea.

Loading systems

Today's shuttle tankers are either equipped with a bow loading system (BLS) or a submerged turret loading system (STL). STL loading is currently used at very few offshore installations, notwithstanding the fact that it allows loading in more severe weather conditions than BLS, supporting a significant wave height (Hs) of 16 m.

As for DP, most cargo owners specify that new shuttle tankers should satisfy IMO DP Class 2 requirements.

New shuttle tankers operating in both the North Sea and Brazil appear to have adopted the DNV GL's class notation DYNPOS(AUTR) as the required minimum. Historically, requirements have gradually become more stringent, a development that is likely to continue and may lead to frequent use of more advanced notations, such as DYNPOS(E) and DYNPOS(ER).

These notations ensure reliable and robust yet flexible DP systems, which can be run in more cost-efficient modes with a smaller environmental footprint, compared to traditional redundant DP systems.

DNV GL has also issued rules for the use of batteries in hybrid DP systems to further support industry efforts to deliver efficient, eco-friendly and incident-free DP operations.

In a recent joint industry project, four ship types with selected operational profiles were analysed to quantify the fuel, emissions and reliability benefits of using hybrid power for DP, drilling, propulsion and backup power.

The study found that hybrid power systems were technically feasible, with a viable return on investment (ROI) and payback periods of zero engine hours for shuttle tankers.

Olav Tveit, DNV GL's senior principal engineer and ship type expert.

In the case of the shuttle tanker selected for this study, using battery power increased efficiency by 38%. The result is a multi-faceted value proposition: operational efficiency is improved by balancing diesel engine loads and avoiding wasteful idling periods; reducing engine running time also cuts CO2 and other noxious emissions.

Redundant engines may be dispensable if the battery system functions as a spinning reserve. Avoiding cycles of extreme engine loads reduces engine wear and maintenance costs and may allow maintenance cycles to be extended. In addition, the ability to close the tie switch between buses can greatly improve the hybrid value proposition. Batteries can be optimised either for fuel efficiency or for backup power, depending on the given application.

In hybrid DP operations, batteries can supply load for about one third of the operating time, reducing generator cycles and responding faster than a generator set. As for backup power applications, economic feasibility depends on the ratio of investment cost versus the desired duration of backup power availability.

Fire safety is a key concern for battery rooms. These rooms must be designed with fully independent ventilation, cooling and fire suppression systems and a sophisticated, integrated control system. TO

**This article is a taken from a paper produced by Olav Tveit, DNV GL's senior principal engineer and ship type expert.*

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China's evolving oil demand to drive tonne/mile ratio

The potential for China to increase its oil consumption in future is huge.*

Even though China is the second largest oil consuming nation in the world, consumption per capita is still at the low end of the scale and it will need to increase by 1.5 times the current level of per capita consumption to even reach the world average.

US Energy Information Administration (EIA) data indicated that in 2016, Chinese oil consumption stood at 12.53 mill barrels per day. This demand stemmed largely from the transportation sector, which was the biggest contributor to oil demand growth in China in recent years, and in 2016, gasoline and diesel accounted for over half of China's crude consumption.

To put things into perspective, EIA's Annual Energy Outlook predicts that China's oil consumption will continue to grow in the next 10 years to reach 15.3 mill barrels per day. In a bid to meet the increased demand, China has made a strategic plan to diversify its sources of crude oil so that it will be less reliant on Middle Eastern crude. Instead imports are coming increasing from South America and Russia.

This is good news for the tonne/mile demand for tankers, as over 90% of Chinese crude oil imports are currently seaborne. China's domestic crude oil production dropped off significantly last year, despite having grown through 2012-2015. Much of this initial growth was driven by expensive drilling and production techniques and, as oil prices fell in 2016, in turn investments in developing new reserves also declined.

Over the last few years, there has also been considerable expansion in independent Chinese refineries - 'teapot' refineries. 'Teapot' refineries have contributed significantly to the development in domestic crude refining capacity and by the end of 2016, there was a surge in China's product supplies. This led to an increase in exports to other Asian markets.

Alongside the additional demand for crude imports, is of course the expansive infrastructural and economic Belt and Road Initiative (BRI), which will accelerate economic growth on a global scale by bridging the infrastructural gap from Asia all the way to Europe. In order for initiatives that increase imports to China to be successful however, the ability to maintain and enhance the efficiency and cost effectiveness of supply chains is of paramount importance.

At Waterfront Maritime Services (Waterfront), a ship agency network specialising in the handling of liquid and drybulk cargoes, we know that changes in demand do not always bring immediate returns across the supply chain. As a port agent, we play an important role in ensuring the need to respond quickly to new opportunities and to operate with optimum efficiency in order to mitigate risk across every voyage.

Through our shareholders Ben Line Agencies and Sharaf Shipping Agency, two major names in the maritime services sector, and our carefully selected and vetted network partners, we have a global network of 413 offices in over 66 countries, and are well equipped to deal with the increasing demand for bulk liquid cargoes into China.

In the short-term, we can already see fluctuations in demand for cargoes and how they can be transported; a scenario that will increase exponentially, as more BRI projects are realised, and developed.

From a Waterfront perspective, we are able to access local data in terminals and ports worldwide; to see first-hand how numbers and data translate on the ground. This results in our ability to deliver an immediate competitive advantage to our clients.

For tanker owners and operators, it is important to consider how the BRI will impact upon both shuttle and spot business in the longer term, as well as the ability to compete and make a profit as a number of new ports, terminals, pipelines and railways have already been earmarked for development across BRI's sea, land and air corridors.

Waterfront's Terry Gidlow.

A data-driven approach to understanding current and future demand will be an increasingly useful tool to owners and operators, and will ensure that they have complete visibility over the many factors that influence their operations and supply chain capabilities.

As these projects come online, owners and operators will face a host of logistical hurdles in getting their cargo from the point of origin through roads, railways, pipelines or barges into storage facilities in ports, onto vessels and out of the ports, and then a reverse process in the discharge port. TO

**This article was written by Terry Gidlow, Waterfront Maritime Services CEO.*

US Coast Guard continues to receive BWTS applications

Last month, the US Coast Guard received its eighth application for Ballast Water Management System type approval.

This was for the Electro-Cleen system from Techcross.

Also last month, ERMA FIRST became the first full flow electrolysis ballast water treatment system (BWTS) manufacturer to receive USCG Type Approval (see feature starting on page 17).

Following a long testing regime, ERMA FIRST concluded its tests for the USCG Type Approval at the end of 2016 and gained full type approval on 18th October this year, following the application made in May.

"With the Convention ratified and entering into force last September and the USCG BWM implementation in place, the installation of a BWTS is essential for the protection of the marine environment from invasive species. ERMA FIRST proves its leading position in the BWTS Industry both in the newbuilding and retrofit markets and its capability to undertake and successfully complete challenging projects, such as obtaining the Type Approval by the USCG," claimed Konstantinos Stampedakis, ERMA FIRST managing director.

ERMA FIRST BWTS FIT is a modular system developed to exceed all special installation requirements, either for newbuildings or retrofit projects. Covering a capacity range of 50-3,740 cu m per hour, it is suitable for all types and sizes of vessels.

Testing system

The company has also partnered with Bactest, which is claimed to be the producer of the only fully integrated ballast water testing solution. This agreement enables ERMA FIRST to sell Bactest's rapid IMO-D2 compliance testing toolkit 'Speedy Breedy SeaSure' along with its BWTS.

Unlike other testing solutions, Speedy Breedy SeaSure is claimed to be suitable for on board testing and tests to the IMO-D2 standard bacteria, phytoplankton, residual chemicals and salinity.

These results, together with vessel data, as per IMO requirements, are integrated into a secure report called Ballast Log, which can be stored electronically creating a secure audit trail or e-mailed to relevant parties, such as shipowners and port state authorities in advance of the ships' arrival in port.

"ERMA FIRST has always been committed to deliver total ballast water solutions for all types and sizes of vessels. In an effort to satisfy our customers' needs, we established this co-operation with Bactest. The implementation of the IMO BWMC is an important milestone for the environment and such co-operations will promote sustainable development," the company's head of R&D, Dr Efi Tsolaki, said.

Bactest CEO Prof Annie Brooking, added "We are delighted to be working with ERMA FIRST to provide their customers with a secure system that will enable them to track the results of their ballast water testing by way of our secure fully integrated ballast water testing solution, Speedy Breedy SeaSure. "

Hellespont in for the long haul

In conversation with Hamburg-based Hellespont, *Tanker Operator* was told that shipowning remains the company's core business.

However, in 2012 Hellespont decided to diversify into third party shipmanagement and has since developed a strong in-house management and crewing team for third-party business.

The hallmark of the service is a personalised approach, based on the company's shipowning background. "We manage vessels as if they are our own," the company said. "We bring an owner's intense scrutiny of shipyard workmanship and adherence to specifications to the table, and we have won several construction supervision contracts from third-party owners."

The company said that it also benefited from a global presence. Hellespont Ship Management GmbH & Co KG is the principal shipmanagement entity, supported by a technical support group in Athens, plus a manning and training office in the Philippines, with support for the offshore fleet coming from Singapore.

As of today, Hellespont manages 26 vessels (10 tankers, nine bulkers and seven OSVs) for both stock-listed (blue-chip) companies and private companies - the latter still includes four KG-financed ships.

The company said it was still considering how to grow its third-party managed fleet but preferred to be selective. "This is in line with the emphasis on quality rather than quantity, and with our principle that if we can't dedicate time to a project, we will not take it on," Hellespont said.

"As far as shipowning is concerned, we are currently looking for the right project and newbuildings are not excluded from our thinking. We see several unique investment opportunities based on currently depressed S&P and newbuilding markets; ship finance remains challenging, but we see opportunities coming from distressed assets and the yard problems in Asia. We are waiting and observing the markets and are ready to act when the moment is right," the company added.

The company claimed it had also access to sources of financing but for the long run, the goal was always to have access to the capital market for both public debt and equity.

As for crewing and training, Hellespont said that it had been offering crew management and manning services out of Manila since 1988. "Our services build on our strong background in the tanker sector, where manning standards are at their highest," the company stressed, adding; "We provide premium and personal attention to owners of ships ranging from crude, product and chemical tankers, bulk carriers and platform supply vessels.

"When offering crew management and manning services, we do not pursue quantity for its own sake because our business is built on reputation, although our global presence means that we offer our clients all the characteristics of larger crewing agencies. We provide full technical training and information technology support services to our shipowner clients," the company said.

Hellespont's services were among the first in the country to be declared as MLC compliant by the Philippine Overseas Employment Agency (POEA), and 1994, its trading entity was the first crew management and manning agency in the Philippines to have been ISO certified.

In 2016, the company became affiliated to a new training centre in Manila having its own simulator, and its services now include a syllabus of 20 training units, with more continuously being added. In the first instance, courses involving a high degree of computer content have been focused upon.

Talking of its continuing involvement in Hamburg, the company said that the city was the core unit of the shipmanagement activities. Hellespont claimed that it had weathered the KG storm and achieved a full turnaround. The group is free of any debt or residual obligations and is profitable. It is still 100% privately owned by the Papachristidis family and has no reliance on any other investors, the company explained.

While a revival of the KG market is not foreseen, Hamburg is the company's largest centre for technical staff and the city is a one of the world's shipping hubs. The Group employs 150 shore-based staff in Hamburg, supported by operations in Athens, Singapore and Manila.

"Our presence in these other major maritime cities means that we can follow opportunities as they arise, but we believe the 'Hanseatic' character of our Hamburg organisation blends remarkably well with the Greek and Canadian culture that has influenced the Group over its 71-year history," the company explained.

"Hamburg is also a very entrepreneurial city, benefits from a reasonable tax regime, is a centre for shipping knowledge and is close to London and Oslo, while being less expensive than either. Germany will remain a vibrant country for shipping, but it is fair to say that the 'shipping landscape' will be different in the future," concluded Hellespont.

Hellespont's LR1 'Hellespont Promise'.

Gibraltar Port expands through increased efficiency

Bunkering is by far the largest activity within Gibraltar Port Authority (GPA) area.

Most of the activity is concentrated in the Western Anchorage where there are around 14 deep-water anchorage slots available.

Capt Manuel Tirado, Gibraltar Port Authority's (GPA) Acting CEO and Port Captain, explained; "The Western Anchorage is the anchorage we will continue to use for bunkering activities. At present, we do not have any plans to consider using the Eastern Anchorage for bunkering activities.

"However, we do not believe there is a drastic need for increasing anchorage slots, as over the past few years, we have increased the efficiency with which we use the present anchorage and this increased efficiency, coupled with the fact that the local players have moved away from floating storage vessels in this anchorage, has dramatically increased capacity," he said, adding that as a result, the Western Anchorage now has about 25% more capacity than at its historical peak traffic of 2009.

This, coupled with a greater availability of bunker barges, means that the anchorage has very few instances of physical congestion. "It is important to differentiate between physical congestion and over-commitment from a specific supplier (or suppliers), which is the scenario we see more frequently at our port," he stressed.

Down the years, there has been talk of setting up land-based storage facilities on the 'Rock'. Capt Tirado said that while HMGoG continues to look at this project, there is also the question of how best to cater for flexibility in meeting Gibraltar's service requirements, particularly given that there is ample storage capacity available in very close proximity to the port.

This regional storage capacity led to HMGoG considering the development of land-based storage as only one option, however, it is not the only one for port development currently being considered.

As for the type of fuel bunkered, he explained that demand for high sulfur fuel remains stable and he didn't foresee any change until close to the 2020 change to 0.5% sulfur. At the same time, however, there has been a noticeable increase in distillate supply.

Turning to the use of mass flow meters (MFMs) fitted on board bunker barges/tankers seen in other bunkering centres, Capt Tirado said: "At present the GPA sees no pressing need for the mandatory implementation of mass flow meters, even though one local supplier is delivering product by use of an MFM.

"The key to Gibraltar's success is the responsiveness to the customer's requirements by our bunker suppliers, and given the current demand and our own direct engagement with vessel operators who make use of Gibraltar to take bunkers, we do not believe the market currently demands this in Gibraltar.

"We are also privileged that we have consistently enjoyed a very good perception of regulatory measures, which also seems to dampen any urgency for considering mass flow meters as a requirement," he said.

To cater for the increase in bunker stem sizes, a couple of barges/tankers have been employed by the suppliers of around 10,000 tonnes capacity, as against the average barge size of 5,000 tonnes.

STS market

Having dramatically developed the efficiency by which the Western Anchorage is managed, ship-to-ship transfer (STS) operations can be catered for any size of vessels in the area, provided the required safety considerations are accounted for - such as tug availability and capacity. He gave an example of recently attending a distressed VLCC to conduct a number of STS lightering operations.

There are currently two locally licensed STS service providers in Gibraltar, namely Fendercare and Teekay. They both have STS equipment (fenders and hoses) stored locally at Gibraltar.

It is up to the vessels' charterer(s) to engage either of these companies, he explained. As well as being regulated internationally, STS activity is further regulated by a locally produced STS Code of Practice, compliance with which is mandatory for these licence holders.

This code of practice includes a number of requirements for the Person in Overall Advisory Control (POAC) and each POAC is specifically approved for each individual operation by the GPA, as part the port's control of this activity in its waters.

A few years ago, the GPA introduced a short stay incentive scheme for the Eastern Anchorage.

Capt Tirado explained that vessels can use the Eastern Anchorage for ancillary services, such as crew changes, waiting orders, etc and discounted rates are offered for vessels undertaking such activities. Discounts can range up to 75%, depending on the activity and are issued at the GPA's discretion.

Bunkering is still not allowed in the Eastern Anchorage. However, this is not solely due to prevailing winds, as there are a number of other issues, which has led to the decision not to carry out this activity in this anchorage, among which is the fact that this anchorage is not as sheltered as the Western Anchorage, Capt Tirado explained.

Nevertheless, the number of vessels using this anchorage for other (non-bunkering) activities has seen an increase recently and this helps the GPA to better manage the use of the Western Anchorage slots.

Shipping vital for the 'Rock's' economy

Shipping has always been a vital component of Gibraltar's economy ever since it became a British Overseas Territory, due to its geographic location overlooking the entrance to the Mediterranean.

Due to the amount of passing traffic, around 60,000, the ports of Gibraltar, Algeciras, Ceuta and TangierMed (Morocco) are all marketing themselves as shipping service hubs.

Bunkering is one of main activities undertaken on both sides of the Strait with Gibraltar being the largest. There are five bunker suppliers based on the 'Rock' - Aegean Bunkering Gibraltar, Gib Oil, Cepsa (Gibraltar), Peninsula Petroleum and Vemaoil.

Supplies come in by ship to the area to be transhipped to the many bunker barges/tankers operating in the region. At Gibraltar, the 1999-built SKS Tanker owned, Macoil operated Aframax OBO 'SKS Tanaro' is currently lying alongside the detached mole acting as a supply vessel. Macoil has a license to offer bunkers at Gibraltar through Vemaoil.

According to the Gibraltar government's statistics, supplied by the Gibraltar Port Authority, some 542 vessels called for bunkers in September, giving a total of 4,648 for the year up to the end of last month.

Off Gibraltar, there is also the option of 'Off Port Limits' whereby a ship is allowed to steam slowly off Europa Point to be met by a launch, which will supply the vessel with whatever she needs in a very short space of time.

Shiprepair

Among the important shipping services currently available on the 'Rock' is shiprepair.

Gibdock has been offering drydockings and afloat repairs in various guises for decades, as the yard was formerly owned by the British Government as a naval repair facility, being adjacent to the former navy base.

The yard boasts three drydocks of up to Panamax size and 1,000 m of afloat repair quays in a deepwater sheltered harbour behind the South Mole.

Last year, the yard completed the installation of exhaust gas scrubber (EGS) systems on board five Handysize tankers operated by Vroon and managed by Norbulk, while the vessels also undertook their special surveys in the Panamax dimensioned drydock.

Each vessel was retrofitted with an Alfa Laval PureSOx system installed in the main engines, auxiliaries and boilers. The work entailed 90 tonnes of steelwork, 12.4 km of electrical cabling and 1.1 km of GRE pipes, which involved 800 flanges and elbows per vessel.

All five tankers also underwent hull washing, spot grit blasting and coating, plus the overhaul of the sea valves, propeller withdrawal, stern seals bonding, rudder clearances,bow thruster overhauls, windlass winch bearing renewal, boiler safety valves overhaul, pipe work, insulation work and various other tasks, as part of their special survey.

Gibdock's operations director, John Taylor told *Tanker Operator* that this project was a very rewarding contract as it was a great learning curve for the yard. By the time the fifth tanker had been docked, the time scale for the work had fallen to around 17-19 days, compared with 21 days needed for the first ship.

The amount of equipment necessary to complete the retrofits also vindicated Gibdock's recent investment in an assembly area, adjacent to the Panamax dock, known as PAD 1. This area was used for the fabrication of the funnel cases for the scrubbers and as a holding bay for all of the equipment needed.

PAD 1 enables Gibdock to offer turnkey

projects with manufacturers, including ballast water system installations, which the yard's management is looking into, Taylor said. He also said that the yard would sub-contract in for specialist work for clients as needed, including electrical repairs and installations but preferred to keep the local work force employed.

Taylor explained that the yard was marketing its facilities both for conversion projects, as well as the more traditional 'haircut and shave' dockings.

Steel is imported from Spain and other European countries and can be trucked to the yard in 24-36 hours. There are specialist workshops in the area that cater for turbocharger, hydraulic works, etc, while support is available from other industry sectors, such as Indasa for internal tank coatings.

The three docks offer deepwater of around 10-11 m above the blocks, while the yard also has 1,000 m of deepwater quays for afloat repairs, able to accommodate deep draught vessels.

Gibdock is only about an hour's deviation time from the main shipping channels and only has a tidal rise and fall of 1 m. It has an almost captive market with the local bunker barges, tugs and ferries.

The local ferry market tends to be seasonal with vessels docked in the winter, while Aegean tankers and other bunker barges/tankers operating in and around the Bay are regular visitors to the yard.

Taylor explained that the yard's 'bread and butter' work is commercial shipping but the yard also handles UK Royal Fleet Auxiliaries (RFAs), offshore support vessels and smaller cruise ships.

He said that he had also noticed a slight pickup in offshore work and a new project was scheduled to start in November. He explained that quality standards had grown in the offshore market, leading to the yard upgrading its standards and efficiency, etc.

Gibdock also has an arrangement with the government whereby six to eight apprentices are trained at the yard in various engineering skills per year. An increasingly important skill today at shipyards is the use of IT, including scanning. To help cater for this need, a couple of internships are offered to IT students each summer.

The shiprepairer relies on clarity and transparency when dealing with clients, Taylor claimed. For example, when quoting on a job spec, a price will be agreed before the work commences. He said that Gibdock currently has more than 60% of repeat customers.

In April of this year, Gibdock was successfully audited for the new ISO 2015 standards - ISO 9001 for quality and ISO 14001 for the environment. New health and safety standards - ISO 45001 - are due to be published next year and Taylor explained that the company is already working towards its application with LRQA.

Shipboard electronics

Electronics equipment supplier and service provider, Sandvik Marine recently added Motorola to its service and supply portfolio in the light of new regulations on marine approved portable radio equipment for engine rooms.

Portable radios used on board ship are now subject to a new Solas Chapter II-2 regulation 10.10.4.

A new paragraph - 10.4 - regarding fire fighters' communications, was recently added. It reads- 'For ships constructed on or after 1st July, 2014, a minimum of two two-way portable radio telephone apparatus for each fire party for firefighter's communication shall be carried on board.'

These two-way portable radio-telephone apparatus must now be of an explosion-proof type or intrinsically safe.

The company recently added ClassNK to its list of class society approved equipment surveys, joining ABS, LR, DNV GL and BV.

Sandvik has also seen an uptake in its shore-based maintenance (SBM) and fleet maintenance contracts and is now marketing its services to capture local markets, having concentrated on the major owners and managers in the past. At present the SBM/fleet

maintenance market accounts for 80% of its business.

The company has offices in Algeciras, Gibraltar and Singapore and is looking to open another office in Valencia.

World service manager John King said that most of the ECDIS regulation upgrades have now been undertaken but said that there were still a few FSRUs earmarked for upgrades. ECDIS are normally monitored remotely, he explained.

Sandvik also trains and updates its engineers equipment knowledge in manufacturers' offices. The company carries out radar, VDR, GMDSS, Satcoms, gyro and autopilot installations and servicing worldwide, either in port, drydock or at sea. The company also has a network of service agents worldwide and keeps a large stock of spares at its premises.

King said that primarily the company acts as a consultant and by doing so saves its regular clients thousands of dollars per year. The engineers prefer to work directly with owners and managers superintendents, rather than go through third party concerns, thus cutting out the threat of misinformation and conflicts of interest, plus added costs.

Thenamaris Handysize tanker 'Seaexplorer' bunkering in the Western Anchorage.

Sandvik has recently taken on a couple more engineers and today is a distributor and an approved service provider for most mainstream bridge electronics products, and employs qualified and manufacturer approved personnel. TO

VTS upgrade

To enhance the navigational safety aspect of the Bay, anchorages and the Strait, Gibraltar is upgrading its VTS system by replacing older equipment with a Kongsberg Norcontrol (KNC) systems, which should be operational by early December housed in a new purpose-built operations centre at Windmill Hill Signal Station, commonly known as Windy Hill.

VTS operator training has already been undertaken.

The contract award was announced in August of last year and the VTS will control an area of around 60 nautical miles. In addition, due to the centre's location, a visual watch will also be maintained.

As well as enhancing navigational safety standards in and around Gibraltar and the Strait, the VTS will also be used by local port users to plan vessel arrivals and departures, thus enabling a more efficient port call.

For example, in line with international requirements, vessels are required to provide pre-arrival notification, which gives VTS operators the opportunity to organise vessel movements in advance with local agents, pilots, tugs, ship suppliers, etc to ensure maximum efficiency and minimum waiting times. Real-time movement information on vessel activity in and around the port is already available to shipping agents, pilots and other service providers.

A VTS, operated by the Gibraltar Port Authority's team, has been in operation since 2011 and allows for constant monitoring of all vessel movements both within and outside territorial waters. It operates as an Information Service (INS), Traffic Organisation Service (TOS), and when required a Navigational Assistance Service (NAS), co-ordinating all ship movements in Gibraltar waters from the operations room.

VTS operators can also use CCTV cameras with night-time thermal imaging capability and a radio direction finding facility to accurately pinpoint the source of VHF transmissions.

Data relating to vessel traffic is administered electronically and used for both billing and information purposes for port stakeholders. This information is also fed automatically and directly into the European SafeSeaNet database allowing EU member states to monitor vessel operations around European countries' coasts.

The VTS system also supports Gibraltar enforcement agencies to maintain the integrity of the territory, as well as providing an essential Search and Rescue (SAR) capability and help in the fight against drug trafficking from North Africa. ■

Ince warns of growing shipping cyber threats

Law firm Ince & Co has advised shipping and transportation companies to prepare for more cyber-attacks in the wake of recent high-profile incidents.

Following the widespread impact and disruption caused by the WannaCry and NotPetya attacks earlier this year, plus a spate of incidents in recent weeks, the evolving threat to not only shipping companies, but also to other parts of the supply chain has been highlighted

BW Group revealed last month that it was hacked in July, causing its computer systems to go offline. In addition, so called ethical hackers claimed to identify security flaws in the on board satcom boxes of satellite communications company KVH, whilst a cyber-security specialist reported on vulnerabilities in Inmarsat's shipboard communications platform. Both KVH and Inmarsat have since responded to these claims.

According to Ince & Co, the causes are increasing digitalisation, advances in satcoms and a drive towards greater technological efficiencies, which all increase the risks for owners and operators rushing for the benefits, without considering the side effects.

Rory Macfarlane, Partner, Ince & Co Hong Kong, explained:"Throughout 2017, we have seen headline-worthy cyber-attacks occur with growing frequency and severity. A number of high-profile companies have already fallen foul of the risks posed by the increasing digitalisation of our industry. As new technologies emerge to streamline operations, cut costs and increase efficiencies, evolving and expanding cyber-threats also emerge.

"It is imperative that shipping companies act to mitigate their cyber-risk now, before they become the next victim of a major breach.

"The effects of the NotPetya and WannaCry ransomware attacks proved a potent example of how costly a large scale, sophisticated cyber-attack can be, but for those working within cyber-security, these attacks did not come as a surprise.

"With operations impacted, there was an obvious financial cost to these incidents. But the reputational damage could prove more serious. We have seen hard-earned track records for compliance and operational excellence all but evaporate in the event of a public breach. While the costs of this type of damage are hard to quantify, it adds yet another reason to invest in appropriate cyber-security systems and employee education," he said.

Cyber-breach

Macfarlane also highlighted the difference between 'cyber-attack' and 'cyber-breach': "Businesses must recognise a simple fact: there will be - or has already been - a cyber-attack on your business. But a cyber-attack being inevitable does not mean a 'company-ending' cyber-breach will be.

"What we see now is the tip of the iceberg. The size of the threat is underplayed, due to a reluctance within the industry for victims of a breach to share their experiences for the collective good. Moreover, as it is common for cyber-criminals to remain in a company's system for up to six months after an initial breach, waiting for the most appropriate moment to strike, there will be businesses that are about to suffer a loss and do not realise it.

"To be sure in the security of their systems, companies must begin to develop comprehensive security and response plans as soon as they can. The response plans should outline the steps to take in the minutes, hours, days and weeks after a breach. We also recommend that companies engage with a multi-disciplinary team that is ready to step into action, including IT teams, compliance experts, fleet managers and shoreside staff," he said.

Macfarlane also advocated a proactive approach for concerned owners and operators: "Board members should be aware that an unprevented cyber-breach could constitute an abdication of fiduciary duty, if mitigating measures were ignored or not put in place.

"Ince & Co is working with the leading cyber-security team at Navigant to offer a cyber 'health-check'. In this health-check, we work with companies to create a written assessment of IT policies and procedures, employee protocols, regulatory and contractual obligations, insurance cover against losses following a cyber-attack, and evaluate cyber-response plans. This is not a 'one-size-fits-all process' – a bespoke approach is needed for each company as they continue to digitalise their operations.

Modest investment

"The message is simple: improving your cyber protection need not be costly. Significant improvements can be made for a modest investment. But prevention is always better than a cure, and the creation of a culture of cyber-security is essential.

"It may be time for the focus of the debate to shift from cyber-security to cyber-preparedness. As the amount and sophistication of attacks increase, and the digital and human attack surface expands, the chances of permanently keeping threat actors out of our businesses is diminishing month on month.

"Even a cursory glance at the list of blue-chip businesses, both within and outside shipping, who have suffered huge losses from significant cyber-events should dispel the myth that seems to remain in the boardroom that 'this could not happen to us'. Implementing measures that will minimise the harm that can be done once your systems are hacked is crucial," he concluded. TO

Force Majeure?

Another article in a series on legal matters, supplied by C Demurrage, a London arbitration award considered common force majeure wording.

The arbitrators rejected an attempt to turn amended safe berth provisions into a 'reachable on arrival' warranty. Some think force majeure exists as a settled and distinct part of English law, which can be used to avoid difficulty when external factors impede or prevent contract performance, with a vague and indefinable tradition as part of its attraction.

However, force majeure is not an English legal concept. It is simply a label for something, or more usually one or more of various things, which the parties have agreed will excuse performance or lessen liability. It is a creature of contract, and its application depends on whether the events come within its precise terms. 'London Arbitration 23/17 [(2017) 986 LMLN 1]' is a good example of this.

Under a recap with amended BPVOY3 terms, a vessel's berthing was delayed for eight days because a loading hose on the previous vessel (X) had ruptured, causing a spill for which the authorities had arrested the vessel.

Charterers cited clause 21, headed 'Laytime/Demurrage Force Majeure' and halving demurrage for delays arising from, among other things -

"…. breakdown or failure of equipment, plant or machinery in or about ports or places of loading … or arrest or restraint of princes, rulers or peoples … provided always that the cause of the delay(s) was not within the reasonable control of Charterers or … their … servants or agents …".

Owners argued that the delay was due to an oil spill from X, and that the clause did not cover those, or resulting suspension of loading or shippers' inability to provide cargo for X or any other vessel.

The Tribunal agreed, though the effect of that is not clear, and anyway charterers' success would depend on their identifying a provision that applied, not on owners listing some that did not.

Charterers could not persuade the Tribunal to attribute the delay to "breakdown or failure of equipment, plant or machinery in or about ports or places of loading ….". This was because the hose could have been replaced before the arrival of the subject vessel, and was thus perhaps on a causation basis, rather than because loading hose rupture falls outside this wording. It may have been argued, also, that while the rupture caused the spill, the resulting arrest caused the delay.

On that issue owners urged that (i) arrest did not refer to some other vessel, but applied only to that under the subject fixture, and it must also be (ii) forcible interference and (iii) of state origin - not merely court action - and alternatively (iv) the arrest was during the loading of X, for which charterers were responsible, so it was within their reasonable control.

The Tribunal rejected (ii) and (iii) as neither required by the wording nor supported by authority. As to (i), this could include another vessel whose arrest delayed the relevant one, but the arrest must not be caused by an event for which the charterers were responsible, which in this case was the loading of X.

Citing a prior decision where the charterers (as FOB chain buyers) were held responsible for the terminal operators' default, owners here established that as charterers were responsible* for the loading of X they could not rely on the clause.

By such a clause charterers confirm that on arrival the vessel can reach the relevant place. As cited in this Award, an example is clause 9 of Part II of Asbatankvoy - "The vessel shall load and discharge at any safe place or wharf, or alongside vessels or lighters reachable on her arrival."

Many fixtures contain familiar wording by which charterers can order the vessel to loading and discharging locations, and generally limiting any 'safe port' warranty. Here a recap amendment, as set below in italics, referred to charterers exercising due diligence, as regards any such place, "to ascertain that the Vessel can always proceed thereto lie safely afloat and depart …."

Owners had further argued that these changes meant that the vessel had to be able to reach the berth, so charterers were liable for the delay, as she could not. The Tribunal rejected that. It was simply part of charterers' safety obligations, and did not create a reachable on arrival provision.

TO

Aiming at the large vessel market

There is a lot of misinformation given about ballast water treatment systems (BWTS), Andrew Marshall, CEO of Coldharbour Marine, claimed at a recent company presentation.

While there are several good UV and electrochlorination systems on the market, there were also many that are simply not up to the job, he said.

Due to faulty equipment and lack of investment, he predicted that only around 15 manufacturers would be left in the market out of the many that have advertised BWTS to owners and shipyards in the past few years.

He stressed that owners must do their homework when selecting a suitable system for their vessels' needs, as many BWTS fitted on large ships were not fit for purpose and simply do not work, as outlined in several reports, including a recent study by ABS.

The operating parameters of the vessels need to be taken into consideration, such as vessel type, voyages to be made, the types of water to be encountered, ie warm or cold or both, etc.

A selection made simply on price and a Type Approval certificate will almost certainly guarantee failure, he said, warning that owners faced a perfect storm of delays, disruptions, additional costs, significant losses, large fines (up to $100,000 at each de-ballasting) and loss of reputation, should a BWTS be found to be faulty during a Port State Control inspection.

Owners will have no recourse to BWTS manufacturers or shipyards should a failure or detention occur, he said, adding that P&I Clubs have also warned that they will not cover losses incurred as a result of improper equipment selection by owners. Badly fitted systems will also cause a malfunction, which could result in a PSC detention and or fine.

Coldharbour started work on a BWTS some 10 years ago, basing it on the company's marine inert gas systems. It became an independent company in 2010. Apart from inert gas systems, in its 35 years of existence, the company has also produced land-base water treatment systems and flue gas technology.

Sea Guardian Inert Gas Generators' gas output is linked to specially designed Gas Lift Diffusion (GLD) pipe assemblies mounted inside the ships ballast tanks.

Early on in the BWTS development, a decision was taken to concentrate on the larger vessel size ranges, of around Aframax and Capesize bulkers and upward, including LNG carriers. This only gives Coldharbour around 15% of the market, Marshall explained.

These types of vessels normally have specific operating requirements, such as long ballast voyages, a large ballast intake and high pumping capacities. Marshall explained that Colharbour's BWTS needs a ballast voyage of more than five days to operate correctly in killing off all of the organisms to be found in ballast water.

For example, a VLCC will take on around 100,000 tonnes of ballast and have a maximum pumping capacity of 6,000 cu m per hour, taking around 18 hours to ballast at a terminal. Usually the timing is critical while alongside a terminal, so any malfunctioning equipment could have severe consequences. In addition, the crew are usually at saturation point with work while the vessel is alongside.

Down the years, investors have come on board and are reported to be happy with the progress made, thus far. Marshall explained that Coldharbour doesn't expect to see a return on investment for another five years, as the Nottinghamshire plant's business plan is to produce around 50 systems a year.

He claimed that Coldharbour was only the second company to be UK Maritime & Coastguard Agency (MCA) type approved, through Lloyd's Register. The company was also the first to fit a BWTS on board a VLCC.

USCG stance

As for the US Coast Guard (USCG) Type Approval, Marshall said that the only real difference between that and the IMO Type Approval was a more stringent laboratory test.

For the USCG, Coldharbour is to undergo laboratory testing in tanks at NEA, Holland next year with the aim of becoming Type Approved during the first quarter of 2019. It already has Alternate Management Systems (AMS) status approval.

To help gain USCG Type Approval, Coldharbour is to install a BWTS on board the TMS Tankers managed 2013-built Suezmax 'Bordeira' in early 2018. The on board test will also be supervised by LR, which has Independent Laboratory Approval status with the USCG.

The IMO's revised G8 certification tests agreed at MEPC last year will be undertaken simultaneously.

Evangelos Sfakiotakis, TMS Tankers' Technical Manager, explained at the time of the announcement: "We have carried out a careful assessment of the available technologies for our large tankers and have satisfied ourselves with Coldharbour's inert gas-based system. There are several reasons for this, but the two main ones are; firstly, that the Coldharbour technology featuring the combination of no filters plus in-voyage treatment process guarantees that our ballasting operations will never be disrupted, and secondly, that the treatment during voyage avoids the potential risk of regrowth during a long ballast voyage.

"This ensures that not only will our tankers be able to meet required discharge standards at all times, but also that we can be absolutely certain that the commercial availability of the vessel will never be adversely affected by BWTS issues," he said.

As for the ease of installation, Marshall said that the system was ideal either for newbuildings or retrofits, as it offers flexibility in its location on board ship and is immune to space constraints being modular.

In addition there are no additional power requirements to operate the system, no filters, no pressure drop and no connections to ballast lines.

For newbuilds, there is no change needed to the existing pump room design, while for retrofits the systems is claimed to be easy to install in a 15-day window. The primary drivers for newbuildings are the shipyards equipment suppliers lists, which are often 'set in stone' by the yard, the ease of installation, the impact on other equipment choices and the vessel's design and the equipment's cost.

Retrofit considerations

As for retrofits, the owners take over the equipment suppliers lists. The main drivers are - the installation time required, impact on existing equipment on board, installation costs and the cost of the BWTS itself.

When considering an installation, as well as using computer aided drawings of the ballast tanks, a model of the actual ship's internal tank layout will be constructed by way of a comparison.

Treatment at any stage during a ballast voyage means that the risk of regrowth is eliminated. The costs associated with regrowth, resulting in non-compliance are very significant and the ramifications are far-reaching, as mentioned above.

Marshall explained the re-growth in a ballast tank will occur. In the winter months the chances of regrowth were low but in the Spring and Summer it was high, he said. Corrosion in the ballast tanks will be

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eliminated, due to the lack of oxidisation.

Coldharbour is expanding its engineering teams and has signed agreements with two service providers, thus far.

For example, in May of this year, Coldharbour signed an agreement with Sembcorp Marine.

As a result, the latter will offer the GLD BWTS as part of the Sembcorp Marine Green Technology Retrofit (GTR) solutions for shipowners.

GTR provides carefully evaluated BWTS from a select group of equipment manufacturers with whom Sembcorp Marine is working closely.

To help cover the Chinese market Coldharbour also signed an agreement with Hansun (Shanghai) Marine Technology. This agreement covers the marketing and distribution of Coldharbour products in mainland China.

At the time of the agreement signing earlier this year, Hansun Chairman, Simon Gu, said: "Our existing products are already well-known for their reliability and operational advantages for shipowners. Adding the Coldharbour's inert gas, flue gas, BWTS and domestic water module product lines means that we now have a comprehensive catalogue of products for our customers, from incinerators to the latest IGG units, from ultra-violet BWTS for small and medium sized ships, to the Coldharbour GLD inert gas-based in-tank BWTS for the largest vessels. We believe that this places Hansun in a unique position to supply the needs of our Chinese customers."

This agreement is the first step in a plan that will eventually see Hansun manufacture Coldharbour units at its facilities in Qi Dong, with Coldharbour in turn offering Hansun products to its customers outside China. Training of Hansun sales engineers and project engineers is ongoing.

Inert gas

As mentioned, Coldharbour's BWTS is based on an inert gas system with the company's patented third generation Sea Guardian being an integral part of the ballast water equipment.

GLD is claimed to be unique in that it is an in tank and in voyage system using the gas output from Sea Guardian, which is linked via a specially designed Gas Lift Diffusion (GLD) pipe assemblies inside the water ballast tanks.

As the inert gas diffuses into the ballast water, oxygen is stripped from the water, whilst the elevated CO2 in the inert gas temporarily reduces the pH level. This induces Hypoxia and Hypercapnia, which is fatal to both aerobic and anaerobic organisms, Coldharbour explained.

Bacteria, for example E.coli, are killed in side the GLD by a patented method of gas-induced ultrasonic shock waves, which cause cellular destruction. The ultrasonic generators do not require power and have no moving parts.

They have been designed to operate inside the ballast tank's harsh environment for many years.

When combined with a GLD BWTS, Sea Guardian provides clean low oxygen (0.2%) inert gas to operate the ballast water treatment system, while still having sufficient capacity for the bulk inerting of cargo tanks when required.

The IGG is capable of operating efficiently

at 50% of maximum capacity for BWTS operation using pre-programmed automated settings protocols. Coldharbour claimed that compared to a more traditional BWTS solution, the combined system has a much smaller footprint with the added advantage of the units located downstream of the IGG being less bulky.

In addition, there is an added operational bonus in that the IGG has been designed without a burner cone, no separate scrubber tower unit and no demister pads, resulting in very low maintenance costs and little downtime, the company claimed.

Sea Guardian can be configured to use low sulfur MDO/MGO and LNG, including boil-off-gas. This multi-fuel capability further enhances the system's efficiency and reduces operating costs, Coldharbour said.

Combined solution benefits include-

- One IGG unit provides inert gas for both bulk inerting and ballast water treatment.
- Units downstream of the IGG are compact, compared with traditional systems.
- The IGG is a multi-fuel system, running off LSMDO/MGO and LNG, including boil-off-gas.
- Used on each ballast leg for BWTS duty, the IGG is protected against maintenance and downtime issues caused by long periods of inactivity.

TO

Coldharbour Marine CEO Andrew Marshall.

Advantages of an 'in tank' solution

Essentially, Coldharbour's patented inert gas generator-based GLD BWTS is an 'in tank' solution. Being 'in tank' rather than 'in line', it offers the following solutions and advantages, the company claimed:

- Maintaining uninterrupted ballast flow on a terminal and very high ballast pumping rates (>5,000 cu m per hour)
- A combination of no connection to ballast lines and no in line filtration requirement equals no risk of disruption to ballasting operations, regardless of ballast flow rates.
- Highly challenging and variable ballast water characteristics (salinity, temperature, suspended solids levels, biota)
- Unique, patented Inert gas and gas ultrasonic disruption 'kill' technology is immune to variations in temperature, salinity, suspended solids or organism types.
- A 100% kill guarantee is not possible with any BWTS technology, as long ballast voyages offer significant opportunities for organism regrowth.
- Treatment during a voyage eliminates risk of organism regrowth, even on the longest ballast legs, as the organisms do not get the opportunity.
- Use of Inert gas as an enabling technology means that tanker crews are already familiar with the basic principles of this equipment.
- Existing 'fixed' architecture and linked equipment (space, power, pressure).
- Modular construction, plus no requirement for connections to the ships ballast systems means that installation locations are not constrained and existing ships systems will not require expensive upgrades.
- Treatment during 'off peak' vessel operations ensures that crew are able to cope with the new BWTS demands.
- Scaling of other technologies is challenging (in some cases impossible). The GLD system has already demonstrated full capabilities on a VLCC of 308,000 dwt.
- 'Absolute' nature of the legislation that requires compliance at all times. GLD is claimed to be the only system to offer the owner absolute assurance of compliance.
- Automatic tank monitoring and simple user interface ensures error free operation.
- Future proof to all foreseeable BWT standards by simple variation of treatment times during voyage.
- Individual tanks can be treated in isolation and at times best suited to ship operations.
- Re-oxygenation of water prior to discharge is quick and easy. This also restores the waters natural pH balance, ensuring zero environmental impact. ■

Owners need compliance strategy

In contemplating the current status of ballast water treatment (BWT) in the tanker market, it would be easy for manufacturers to skip over the significant challenges posed to owners and operators by the ballast water management convention (BWMC)*.

Owners/operators could jump straight into timelines and technical details. However, this overlooks much of what is driving the decisions being made in the tanker market and the concerns that as manufacturers we need to work with owners to overcome.

The decisions owners need to take about BWTS are far from simple, and are compounded by the market challenges facing tanker owners driven by low freight rates, overcapacity and the knowledge of increased fuel costs post-2020.

The challenge for owners is to put in place a compliance strategy that is the right long term investment for their business and enables them to reliably meet compliance with minimal impact on already stretched crew time and resources.

Primary operational considerations for owners are compliance, safety, reliability and lifecycle costs. Technical considerations related to vessel type, such as vessel size, ballast flow rate, ease of retrofit, voyage length, power consumption, safety, reliability and system footprint are also key.

Given recent developments in the BWTS market, owners should also assess manufacturers on their capacity, financial stability, commitment to the market and long term record of customer service.

After decisions made at MEPC71 on the compliance timeline, owners also have to consider when to invest, whether to renew their five-year International Oil Pollution Prevention Certificate (IOPPC) on the cusp of entry into force to buy more time, or whether installing BWTS at a time of peak demand could have unforeseen consequences.

De-harmonising may seem the easy solution now, but the industry is likely to see a peak requirement for BWTS installation between 2022 and 2024, which will influence drydock capacity and the manufacturer's ability to supply. During this time BWTS manufacturers, class societies and dockyards are likely to be operating at full capacity.

Under current market conditions a BWTS retrofit project could have up to 12 months lead time from project launch to completion. Adding in peak demand and long waiting lists for BWTS installation and there is the potential that owners may have to accept a sub-standard solution to avoid non-compliance.

It is vital that owners get the correct technology for their vessel type and are able to work with a reliable supplier. As we saw in the recent ABS survey on ballast water, 57% of BWTS already installed on vessels are operating. This means that for most of the industry, the experience of BWTS so-far has been positive. But it shows a real divergence of experiences, and getting the right system type, supplier, crew training and proper installation will determine whether the process is achieved smoothly and successfully.

Filter challenges

There are also potential challenges to the market around filter manufacturing capacity and availability. This is likely to be a pinch point as the market grows, as most systems applying for USCG Type Approval require a filter to achieve D-2 standards. This is why De Nora is working with filters from multiple manufacturers in securing USCG approval, to maintain supply for when demand grows.

Different vessel types, sizes and routes all have differing demands and requirements from a BWTS. However, some BWTS types are accepted as the clear choice for certain vessel types - like electrochlorination systems for ships with large tanks and high pumping rates.

But owners need to be confident that their choice meets their exact requirements. For example, on tankers this means ensuring that the system is safe for any hazardous areas, or has a flexible footprint so that the major equipment can be installed in the engine room away from the ballast lines.

Don Stephen.

There is no clear path, and no 'one size fits all' solution, but most reputable companies like De Nora will discuss suitability and effectiveness with owners to ensure their system is the right fit.

De Nora is committed to working with shipowners to understand which system is best suited to their vessels, but owners still need to be doing their research ahead of the peak period by investigating which BWTS is most suited for their vessels and the availability of those systems.

In the next two years, owners and operators must take the necessary steps toward compliance.

Given the complex landscape we find ourselves in, although the installation timeline may not be for several years, that decision should be taken actively and plans to enact it should be in place now. TO

This article was written by Don Stephen, managing director, BALPURE® systems, De Nora Water Technologies.

Compliance before regulations

Following last July's MEPC meeting, tanker owners and operators now have clear timelines regarding the installation of ballast water treatment systems (BWTS), following the ratification of the Ballast Water Convention (BWC).*

Some owners may choose to take advantage of the extended deadline and delay installation. However, the short-term financial saving may be offset by a longer-term, negative impact on commercial opportunities and reputation if the spirit and principle of the Convention is not upheld.

The Convention introduced two standards for the handling of discharged ballast water -

D-1 standard requires ships to ensure that 95% of ballast water by volume is exchanged well away from the shoreline where coastal organisms will not survive in deep oceans or open seas due to different temperatures and salinity.

2) The D-2 standard requires vessels to manage their ballast water to restrict the concentration of viable organisms in the water, and to limit the discharge of specified indicator microbes that are known to be harmful to human health and the local marine environment.

Tankers under construction where the keels were laid on or after 8th September, 2017 must conduct ballast water management that at least meets the D-2 standard from the date they enter into service.

Existing vessels have far greater flexibility, as the date for compliance with the D-2 standard is linked with the renewal of the ship's International Oil Pollution Prevention Certificate (IOPP) after September, 2019.

To facilitate a smooth compliance process, minimise the strain on drydocking capacity and lead times, as well as allow shipowners to demonstrate a commitment to driving improvements in the environmental sustainability of their operations, it is strongly recommended that the harmonisation of all statutory certification is maintained.

Two leading maritime nations have chosen to enforce strict ballast water regulations ahead of the required IMO compliance timelines.

Since 21st June, 2012, the United States Coast Guard (USCG) ballast water regulations have required vessels to either install a treatment system, or manage their ballast water in another approved way in US waters. Failure to comply has financial consequences, as in August, 2017 when the USCG issued a $5,000 fine to the operator of a vessel for the unauthorised discharge of ballast water in the Willamette River in Portland, Oreg.

Enforcing ballast water regulation compliance is also being championed by Saudi Arabia, since the world's largest oil producer, Saudi Aramco, announced that all vessels calling at its ports from 16th August, 2017 will be required to provide a ballast water sample and report.

In 2016, there were more than 3,200 ship visits to Saudi Aramco ports; it is among the highest receivers of ballast water from ships with over 180 mill tonnes of ballast water discharged during cargo operations every year. All vessels using these ports are now required to demonstrate compliance with the Convention, with failure likely to result in fines and detentions.

Some operators have already expressed concern about the reliability of BWTS. At a recent conference in China, one representative reported unsatisfactory performance based on experience with the BWTS fitted on 36% of his fleet. These issues have caused many in the industry to lose confidence in treatment systems, and this brings a commercial risk to tanker owners.

To ensure ships are monitoring accurately, and can prove beyond doubt that they are compliant with regulations, Saudi Aramco conducted a detailed technical review by comparing monitoring systems, resulting in the selection of Chelsea Technologies Group's (CTG) FastBallast Compliance Monitoring System as its choice.

CTG is a provider of highly advanced sensors and systems for the maritime sector, providing operators and regulators with confidence in the integrity of compliance monitoring. FastBallast was identified as the most accurate solution in the market for the sampling of ballast water by Saudi Aramco's in-house marine biology experts, and CTG's testing devices will be used to conduct spot checks on sampling undertaken by third-party sampling companies.

FastBallast is capable of determining the phytoplankton cell density of ballast water to IMO D2 & USCG Discharge Standards (10-50 µm range). It is the only technology that can provide a high degree of accuracy as both an integrated flow through system and as a portable compliance tool, with a higher degree of confidence that laboratory analysis. Its straightforward sampling and analysis techniques are being successfully applied to negate disputes and reduce the risk of non-compliance worldwide.

Together with Global Strategic Alliance Saudi Arabia (GSA), its agent for Saudi Arabia and Bahrain, CTG has provided expert consultancy and guidance to Saudi Aramco's in-house experts on testing and sampling standards, and the processes that should be put in place. In addition, GSA continues to work closely with the Saudi Arabia authorities to employ FastBallast as the national benchmark for ballast water sampling.

Port State Control authorities have a significant responsibility to ensure that ballast water monitoring is accurate and reliable, and CTG facilitated a week-long training workshop for GSA's ballast water technicians, to ensure that a thorough understanding of compliance methodology and analysis was held by all.

**This article was written by Dr Brian Phillips, Managing Director, Chelsea Technologies Group.*

Five year guarantee offered by Optimarin

Norwegian-based ballast water treatment system (BWTS) supplier Optimarin has claimed to become the manufacturer to offer a five year guarantee with orders.

This guarantee includes spare parts and consumables, with a two and half year service agreement. It applies to customers signing fleet contracts or multiple vessel installations.

Optimarin was the first to install a BWTS back in 2000 and was also the first to attain USCG Type Approval. Today the company uses the same system, which was IMO Type Approved in 2009 and thus far, more than 330 units have been installed, of which over 150 are retrofits and the company has taken more than 520 confirmed orders.

"No other manufacturer offers a guarantee of this nature, but we can," said CEO Tore Andersen. "So, if a shipowner signs a framework agreement with Optimarin for installation on multiple vessels, we will provide them with a five-year contract that covers all parts and servicing, worldwide. This is our promise of reliable, safe and effective operations and, with our total regulatory compliance, complete piece of mind.

"It also comes down to delivering the best value. We know our system is significantly cheaper to design for vessels than competing technology. Similarly, due to its simplicity, there are minimal maintenance requirements and it is considerably cheaper to install- full stop. We have fast track deliveries available for many sizes, meaning reduced waiting time and we can't be beaten in terms of global compliance," he added.

Andersen claimed that the premium for the guarantee comes at around 6-8% but this depends on the fleet size.

He also quoted the recent ABS survey report, which said that 47% of the systems installed on board ship do not work. Today, owners are talking more about costs, rather than the environment, Andersen said.

Optimarin now has more than 30 dedicated service engineers worldwide and the company uses two engineering partners- Goltens and Zeppelin. Spare parts are strategically located at five main shipping hubs and Andersen said that vessels also keep spares on board.

The company can also use the Internet to look at problems through its portal - Optilink.

Training is of paramount importance, Andersen said and to help with this, an Optimarin BWTS has been installed at Anglo-Eastern's academies in India and the Philippines.

As for manufacturing capacity, Andersen explained that the company policy is to have two suppliers for each component and he was confident that Optimarin could scale up its supply capacity to 1,000 BWTS per year, but at a later date. The company can supply BWTS having a capacity of between 50 and 3,000 cu m.

By offering UV systems, these have found favour with vessels of up to Aframax size where two units of 2,000 cu m each can be installed and for chemical tankers, which are usually fitted with many tanks, smaller units could be used, as the operator might not need BWTS operations for every tank simultaneously.

Optimarin's fast track service was developed in June of this year whereby the company has systems of up to 1,400 cu m capacity stored in warehouses ready to be installed in about four weeks.

During the past two or three months, major owners have started to look at systems to increase their preparedness. He cited the case of MOL, which is talking with four or five different technologies to serve its huge diverse fleet. He thought next year would be a watershed for orders in time for the 2019 enforcement.

To keep the company lean, there are only 27 employees and the majority have shares in the company. Andersen claimed that the main investors are happy with the situation and are in it for the long term and the company will make a profit this year for the first time.

He said he had ambitious growth plans to gain around 9-10% of market share and also said that several major fleet owners/operators were currently negotiating their BWTS equipment with Optimarin.

Earlier this month, the USCG Marine Safety Center issued an updated type approval certificate to Optimarin for its OBS/OBS Ex BWTS. The updated certificate was issued to authorise the OBS Ex model for installation in hazardous locations on US (Jones Act) vessels, based on demonstrated compliance with 46 CFR 111.105.

A complete list of ballast water treatment systems that have been approved or have type approval applications currently under review can be found on the centres web page.

USCG's ballast water portal provides information on BWM compliance date extensions. The site also provides access to regulations, policy letters, informational bulletins, and extension application status to help the maritime industry comply with the BWM requirements, the Coast Guard said. TO

CEO Tore Andersen.

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KVH Videotel urges maritime industry to aim for excellence

Shipowners, managers, and operators should aim for training excellence, rather than just attaining the minimum standards required.

Training should be used as a key tool for attracting and retaining high-calibre seafarers in a competitive market, according to Mark Woodhead, KVH Videotel senior vice president EMEA, speaking at the recent CrewConnect Global forum, in Manila.

"Training needs to be part of a shipping company's DNA," Woodhead said, "and as our seafarers embrace the shift towards continuous learning, we need to develop cultures that support and demand it."

In the ever-changing and highly regulated shipping industry, continuous learning is needed to avoid incidents and accidents that could lead to costly delays, fines for non-compliance, asset damage, or, more seriously, loss of life. "Talk is cheap but accidents aren't," Woodhead warned. "With new training techniques and technologies, seafarers are engaged and motivated to learn."

Quality training programmes

He said that one of the key ways to build loyalty amongst crew is offering quality training programmes to incentivise and motivate personnel and attract the younger generation to consider a career in the maritime industry.

Shipping offers a structured career path, unlike many jobs available today, and continuous training and development are integral to improving skills and standards. He also urged shipowners and managers to take advantage of the international standards of the highly regulated shipping industry to provide the training that can drive up performance and reduce accidents and claims.

The demands levied on the industry by charterers is also another consideration for operators, as the analysis of vessel performance becomes more accessible through improved data analytics. He expected performance and crew competence to become increasingly transparent, bringing high-quality training into the spotlight.

KVH Videotel offers training courses and modules available on board, onshore, and online so they can be accessed anywhere at any time to suit the needs of the trainee. TO

Classroom versus CBT

The benefits of classroom based learning versus online training are clear - hands on experience, one-to one-learning, peer lead learning and a general sense of professionalism and quality.

However, online training (or CBT) is equally as valid in the right context. For example, refresher training is an ideal scenario where online CBT comes into its own, ECDIS Ltd's George Ward said.

Shipowners are under increasing pressure to ensure all crew are safe and up to date with their training, this can be executed by a number of means including the illusive, and sometimes dreaded, 'Continuous Personal Development'(CPD), which is seen by some as an additional cost and hindrance to their day-to-day job.

Online training can help this by being a fully student-lead experience, allowing for workload management and completion of the course during downtime or shore leave.

One such online refresher training solution, the ECDIS Annual Competency Assurance Training (ACAT) not only meets the above criteria but is also low cost which should encourage even the most cost conscious to try and keep on top of navigational and training knowledge.

It is by no means a replacement for the globally recognised and indeed required ECDIS generic and type specific training, but is one of many ways to ensure crew are up-to-date and knowledgeable on the systems.

Reference cards are fast becoming an important tool in increasing knowledge of navigation systems on board ship.

Despite crew members attending ECDIS training courses and refreshing their knowledge by various means, there's a lot to remember. Many groundings have occurred as a result of this lapse (not lack) of knowledge.

One method of refreshing knowledge of important ECDIS menu systems recently has been by the use of ECDIS reference cards, essentially a reduced user manual usually usually by training companies looking to extend their training beyond the classroom. They are written from the perspective of the seafarer by only including the practical necessities needed to operate the equipment. Some are even customised to fit with company policies and procedures.

The proof of whether they will directly affect ship safety has yet to be seen, but they are certainly a step in the right direction, the company said.

Elsewhere, Mitsui OSK Lines (MOL has developed a seafarer safety education tool goggle, which uses virtual reality (VR) technology created by Tsumiki Seisaku.

The tool relies on VR technology to replicate various training scenarios and work operations, which until now was a difficult task, offering a new level of realism and immersion.

It works on portable VR goggles, which make it possible for seafarers to train safely regardless of location, on board or in an office or training centre.

MOL said that this tool will increase seafarers' safety awareness and contribute to the elimination of on board industrial accidents caused by unsafe behaviour in operations by using VR technology and defining safety measures.

Initially the training content focuses on preventing accidental falls, a major cause of injuries, and will be expanded to cover other training needs.

The Japanese giant will introduce the tool to more vessels while expanding the range of simulated experiences to provide more training in on board safety.

TO

Bridge operations changing

The Nautical Institute (NI) expands its offering through seminars and co-operative ventures aimed at eliminating human error in navigation.

The Nautical Institute's (NI) series of Command Seminars this year not only focused on navigation accidents and their causes, but also looked beyond to wider issues affecting the future development of the shipping industry.

"Human factors are the real cause of many accidents. We can't get rid of human error so it is important to put up defences against those mistakes by establishing good practice," said past president Captain Robert McCabe FNI in his opening address at an NI October seminar held in Cork.

While human error has been a major focus for the NI for many years, there is increasing concern about the possibility for accidents caused by interaction between seafarers and the autonomous vessels with which they are likely to soon be sharing sealanes.

"There is pressure from autonomous ship development to remove ambiguity in Colregs. But this is not likely to happen," said Hill Dickinson's Donal Keaney AFNI at the seminar. This view was backed by Professor Andy Norris FNI, speaking on the 'do's and don'ts' of electronics at sea: "There should be very little change in the Colregs to take into account autonomous vessel operation. They will have to learn to operate within existing Colregs otherwise every mariner will have to be retrained," he warned.

The seminar also looked at some of the many issues seafarers continue to face, calling in particular for a worldwide regulatory regime.

Another initiative underway at the NI is linking up with Trafalgar Navigation, headed

by Mark Bull to offer navigational assessor courses. The intention is that Bull will lecture on the navigational issues, which in turn will be marketed by the NI through their branches and contacts network.

Despite calls for navigation assessments and an increase in training tools and academies down the years, collisions and other incidents continue unabated. Bull explained that the entire bridge concept on board is changing with the old tried and trusted methods going out of the window.

"We need to motivate and support the crew on board" he said, adding that several shipowners and operators are now realising this. Bull is a practising navigator assessor and lecturer, having spent many years at sea rising to Master. Probably just as importantly for the job in hand, he also qualified as a teacher and has worked for a leading P&I club's loss prevention department since coming ashore.

As an assessor, Bull visits vessels on a regular basis to look at how navigators are going about their duties. He explained that this was not a 'tick box' exercise but rather helping navigators get the best out of the equipment available on the bridge and also listening and advising on any problems they have.

He uses short YouTube type video clips on I-phones to illustrate points and has corresponding screen shots from the radar and ECDIS to point out how navigation could be improved by following some basic first principles.

Different approach

Bull said that he likes to undertake the assessment using a different approach on a one-to-one basis, thus allowing the navigator the freedom to be proactive in the assessment by asking questions and raising any problems he or she has privately.

As for the navigation courses, these are held at academies, shipping company premises or hotel function rooms, as necessary. The course standard was set by the NI and it has already received approval from both the Hong Kong and Singapore Governments.

He stressed he would not give up his on board assessor role and would try to undertake a shipboard assessment about once a quarter in order to keep tabs on the latest equipment and problems that may afflict today's navigator. This will also help keep the courses 'fresh'.

He said he would like to see the profession itself take charge of its own destination and thought that the situation was improving, as the bridge teams were becoming more proactive and thus motivated to undertake their tasks to the best of their ability and not to be afraid of questioning certain actions.

These audits and assessments are not new, but neither are they very common. Only certain tanker operators and some owners with mixed fleets currently undertake them. There is no standard for such audits nor how they should be conducted. This poses a dilemma for any owner who wishes to carry out an audit using a third party company.

Who is qualified to carry out navigational audits whilst a ship is underway - a Master Mariner - a former shipmaster - an auditor - or a vetting inspector?

He said that Trafalgar believed that to have the minimum credibility on board ship, Masters and officers want to see a former Master who not only has other qualifications and skills such as auditing, but also knows how to interact with the bridge team.

In addition, the company's auditors should be familiar with new technology, such as ECDIS and they should hold all of the requisite training certificates, he said. TO

Can shipping benefit from Augmented Reality technology?

There is growing excitement around Augmented Reality (AR) and how this new technology could be used within the shipping industry to improve processes and employee performance.*

Last year, The Pokémon Company brought AR technology into the mainstream with the launch of the AR game Pokémon Go. This is one of the most downloaded games ever and analysts predict that AR has the potential to have a similarly dramatic impact on businesses.

Three UK airports are using AR technologyi - the latest being London's Heathrow[i] that is using Mr Men and Little Miss book characters to improve the airport experience for children. Many more companies are exploring how it could be used in their businesses.

According to PwC's 2017 Global Digital IQ survey[ii], 24% of executives will make a significant investment in AR in the next three years. PwC said the benefits to be derived are the real-time delivery of relevant information to employees regardless of location, the fact it will enable greater flexibility, increased operational mobility and improved efficiencies.

AR has multiple uses for businesses across virtually any industry. These include the ability to connect employees in different global locations, deliver training and education or for companies to use the technology to increase the efficiency of product repairs or do demonstrations.

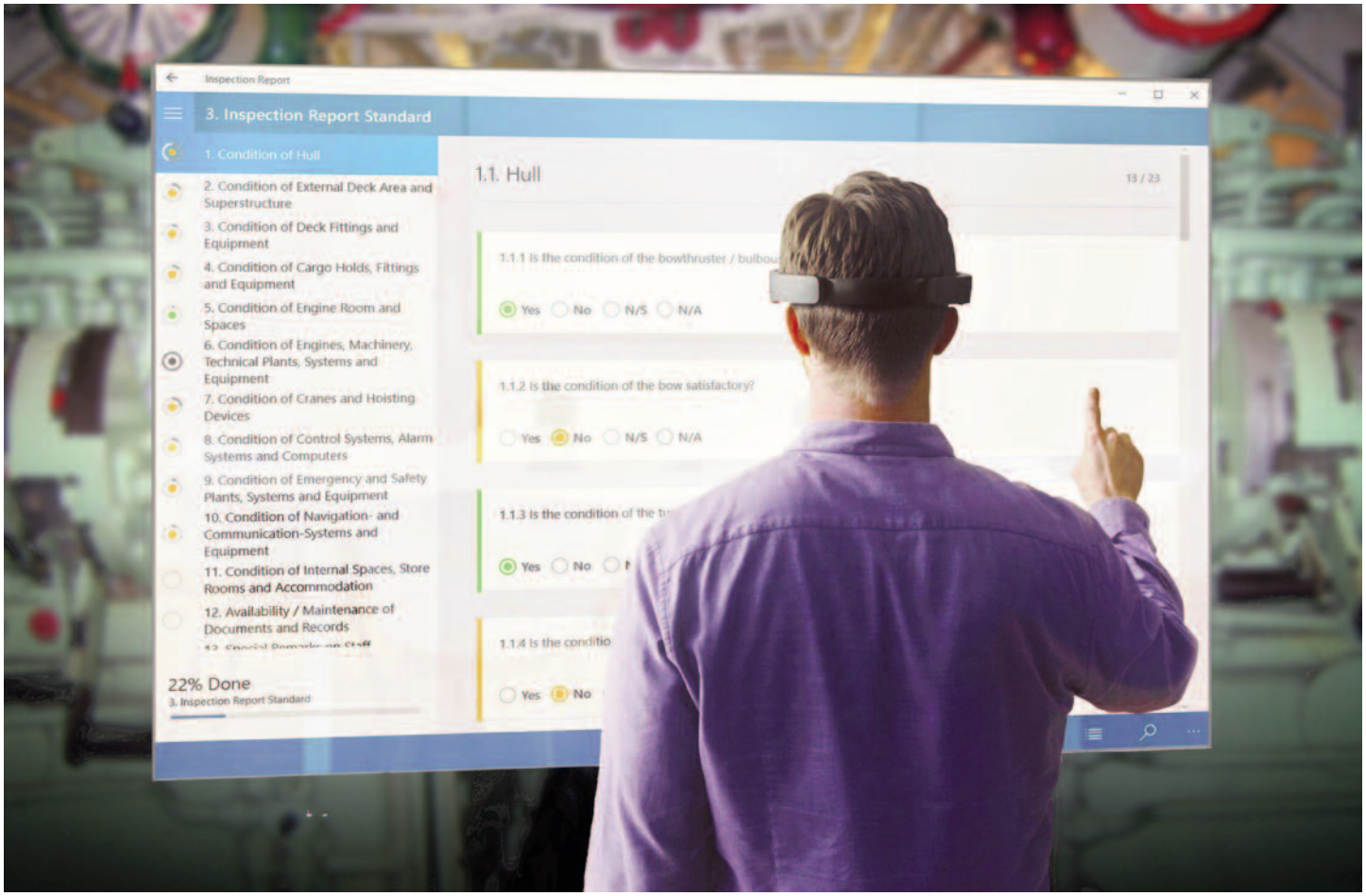
We believe its impact on the shipping industry will be revolutionary. At a time when the industry is already using technology to optimise fleet management, automate processes and improve communication between staff on ships and on shore, AR is the next step on the digitalisation journey.

Whilst AR can seem too futurist for some, for those with vision it has huge potential to help shipping companies accelerate and simplify their processes. It is comparable to switching from pen and paper to a computer and will provide new tools to execute tasks faster and more intelligently.

AR can also improve the performance of workers. For example, in the aviation industry it was reported[iii] that the use of an AR headset to help a technician wire a wind turbine's control box improved a worker's performance by 34% on first use.

Rather than immersing us in an alternate universe as Virtual Reality does, devices that use AR enhance our actual surroundings by adding holograms into our field of vision to

Alexander Buchmann.



Engine room AR screen.

interact with. AR makes it possible to merge the real and the digital world, creating a mixed reality.

As the technology develops, there are many possibilities for its use within shipping. For example, instead of looking at a GA plan on a screen, an entire ship could be examined in 3D on a table. Interested parties could look at it from all angles, virtually highlight certain areas or display the main engine, making the interaction feel more natural instead of looking at a screen.

Cloud-based data

Using AR-devices means that screens and monitors could also become obsolete, with employees able to access cloud-based data wherever they are working. Additionally, it will render a lot of hardware redundant. Just as the smartphone included the functionality of gadgets, such as a camera, telephone, calendar or calculator, AR devices are one more step forward.

For ship inspections for example, inspectors will no longer need to take additional equipment with them because the questionnaire could be displayed directly in the room and pictures could be taken with the camera within the device.

There are also communication benefits. The industry is already working on projects that make it possible to have virtual meetings. Holoportation is a new type of 3D capture technology that allows high-quality 3D models of people to be reconstructed, compressed and transmitted anywhere in the world in real time.

Interaction

When combined with mixed reality displays, such as HoloLens, this technology allows users to see, hear, and interact with remote participants in 3D as if they are in the room. Communicating and interacting with remote users will become as natural as face-to-face communication.

The further the technology advances, the more areas of application will be found. Of course, there are also a few concerns companies may have, mainly around how complicated AR is to use and whether staff will require extensive training to use it.

Our experience tells us this isn't necessarily the case. Younger generations especially tend to be digitally savvy and are unlikely to have any difficulties getting started. Other users might need an introduction to get used to the headset.

Apart from the headset, the technology relies on software – so it's simply a question of understanding how it works and getting used to wearing it.

We have been working with Microsoft HoloLens to make this a reality for the shipping industry and we already implemented ways to visualise data from our software using this device.

While it's likely to be two to five years until AR devices are rolled out across the shipping industry, we believe this technology will transform how the industry operates and will be a real game-changer in improving efficiency, processes and performance. TO

Footnote-
(i)https://www.vrfocus.com/2017/07/heathrow-airport-introduces-ar-technology/

(ii)http://usblogs.pwc.com/emerging-technology/ar-infographic/

(iii)https://hbr.org/2017/03/augmented-reality-is-already-improving-worker-performance

**This article was written by Hanseaticsoft's Alexander Buchmann.*

Comprehensive service offering

A strengthened portfolio of digital services offers MacGregor customers a one-stop-shop for hardware, software and servicing, easing maintenance burdens and enhancing efficiency.

As part of its strategic aim to lead the market in intelligent cargo handling, in 2016 MacGregor's parent company, Cargotec, acquired the German maritime software specialist, Interschalt. As part of its integration, this year Interschalt's service business became part of MacGregor Global Lifecycle Support.

"Our service and equipment portfolio will save our customers time and money," explained Rainer Twisterling, Interschalt managing director. "We offer a comprehensive range of advanced services for bridge equipment navigation and communication equipment. Theses services are offered on a on call basis or in form of a service contract. The contracts range from mandatory annual surveys to full maintenance contracts covering all maintenance and repair needs of navigation and communication equipment. The major benefit to the shipowner is a condition-based flat rate for its fleet."

The company's VDR G4e and S-VDR G4e models are claimed to be more than just data recorders. "VDRs have been mandatory since 2002," Twisterling explained. "However, through a series of developments, these simple data collectors have been transformed into smart data providers with additional tracking and monitoring features.

The demand for utilisation of vessels' data did increase significantly within the last few years. The MacGregor/Interschalt maritime data engine (MDE) is a software application that standardises vessel data, which is collected from VDRs and other ship systems. It makes vessel data available via the standardised OPC-UA interface enabling its real-time use.

"Each ship has a unique equipment configuration, posing the challenge of having

to standardise data for general and system-independent use and to optimise it for further use," Twisterling continued. "This applies both to an individual ship and to an entire fleet. In many cases, each supplier installs its own system on board, resulting in enormous quantities of disparate data, which our MDE makes available in a uniform structure.

"Our MDE delivers two advances not found in traditional on board data-collection systems. The first is that all data from one or more ships in a fleet with different data structures, independent of the data source and deployed platform, can be standardised and made accessible in the same structure. The second is that the MDE is an Industry 4.0 compatible network solution that makes real-time data available through a standard interface for third-party system integration, making it a very cost-effective solution," he concluded.

The company told *Tanker Operator* that of the 900 systems in the market, roughly 20% are installed on tankers. TO

Sirius Shipping opts for online monitoring

To increase control of rotating machinery on board, Sirius Shipping has selected SKF's online monitoring system on board its fleet.

"We want to receive signals before anything happens so that we are better prepared to launch measures in plenty of time," explained Stefan Johansson, Sirius Shipping's technical superintendent.

With 10 vessels, Sirius Shipping transports oil and chemicals in Northern Europe, mainly in Denmark, Norway, Finland and Sweden.

"Maintenance work is a continuous process on board. We go into the shipyard for planned stoppages, roughly once every 30 months. There we review everything that we can't when the ship is in operation, such as inspecting the bottom, rudder, propeller, machine parts in the engine and gearbox," Johansson explained.

A recurring challenge facing the maintenance department is to increase the reliability of critical rotating equipment on board. Monitoring the reduction gearbox, which drives the propeller shaft, and the generator, which is also driven by the reduction gearbox, increases the safety of the system.

"Fortunately, we have done fairly well in avoiding major breakdowns. It is very costly if something happens, so we want to prevent the risks as much as we can," Johansson said.

If an unplanned stoppage was to occur, the length of the stoppage would depend on where the ship was located at that time, the accessibility of a shipyard, and whether it was necessary to move the ship from a harbour to the yard. If a major breakdown occurs, the repairs can take several months, and that is something to be avoided, according to Johansson.

"Usually the components need to be specially ordered. You can't get hold of large gear wheels or bearings straight away, so it is important that we have a longer planning horizon in order to be able to order parts and reduce the length of maintenance stoppages," Johansson said.

To increase control of rotating equipment, Sirius has chosen to install online status monitoring with measurement sensors for selected machine components. The tankers 'Nimbus' and 'Marinus' were the first to have this installed. Soon IMx-8 will also have been installed on board the 'Neptunus' and 'Scorpius'.

SKF's IMx-8 is the latest addition to the IMx range and is a compact system that offers the functions taken from its bigger brothers, IMx-16 and IMx-32. The easy-to-assemble and compact system fits into Sirius Shipping's maintenance system. Sensors detect machine parts and transmit signals online to SKF's certified remote diagnostic Centre in Hamburg, where specialists report machinery deviations.

"They are aware of deviations and can see immediately if we have gone in to carry out any service measures on the machinery. That is a great help to us along the way. I see it as a good step in the right direction in order to achieve greater predictability, which feels good," Johansson concluded. TO

Stefan Johansson, Sirius Shipping's technical superintendent.

Striving for Cleaner Fuels

A major challenge for shipping is the move toward cleaner fuels, underwritten by a compelling alignment between regulatory and commercial drivers.

Last year, the IMO announced MARPOL Annex VI that calls for ships to cap their sulphur emissions at a 0.5% by 1st January, 2020, explained Angus Campbell, corporate director, energy projects, Bernhard Schulte Shipmanagement (BSM).

In addition, European Commission regulation 2015/757, (EU MRV Regulation), which was enacted on 1st July, 2015 calls for ships to report carbon dioxide emissions for their entire voyage from 1st January, 2018.

The MRV regulations will be enforced by Port State Control (PSC) and are phase one in a three-stage process. The second phase is to cap allowable emissions and the third phase is to draw shipping into carbon taxation territory.

This means all shipping companies must submit a monitoring plan outlining the methodologies chosen to monitor and report emissions and other relevant information for all their ships above 5,000 gt entering European ports to an approved verification organisation. The deadline for contracting with and registering an approved verifier was 31st August, 2017.

In January, 2018 shipping companies must monitor fuel consumption, calculate carbon emissions and other relevant information for each ship on a per voyage and an annual basis in accordance with the approved monitoring plan.

From April, 2019 onwards, each shipping company must submit an audited electronic report on carbon emissions and other relevant information during the 2018 monitoring period for each ship under their responsibility.

This report must have been approved by the accredited verifier for the company. A document of compliance will be issued to acknowledge that the requirements have been followed.

The introduction of MARPOL Annex VI regulating sulfur content will trigger rapid change. The options available to the existing fleet differ significantly from those available to new ships. Viable solutions exist, which will allow the industry to transition towards cleaner fuel choices.

Campbell explained that BSM is developing a solution by promoting the use of LNG as an alternative cleaner fuel for the shipping industry. In conjunction with its partner, Babcock International, BSM has developed a gas supply vessel, (GSV), to provide safe, efficient and environmentally friendly delivery of LNG to ships.

BSM's Angus Campbell.

Natural gas is available globally and reserves are predicted to last about 200 years, based on current consumption. The challenge facing the shipping using LNG as a fuel, is the lack of bunkering infrastructure for the cryogenic fuel. However, this is changing rapidly, as major bunkering hubs adapt to the new opportunities that this cleaner fuel will provide.

Investment in new bunkering infrastructure is nothing new and previous evolutionary changes have shown that shipping companies react to the advantages of investing in the right technology and infrastructure to protect business continuity. The operational efficiency gained from utilising cleaner fuels such a LNG improves the bottom-line, Campbell concluded.

Meanwhile, ahead of the LNG Bunkering Summit 2018 to be held in Amsterdam in January, organiser IQPC surveyed over 500 specialists involved in the LNG bunkering supply chain.

Taking the results over three annual surveys, it was found that there was a distinct increase in the number of respondents who thought that in general, LNG bunkering would increase.

For example, in 2016, 68% thought it would increase, for 2017 this figure had risen to 79% and for next year, it had gone up slightly again to 80%. For deepsea vessel, the percentages were 64%, 64% and 69%, respectively, while for the short-sea fleet the 2018 figure was 85%.

As to the question of the current low oil price affecting LNG bunkering expansion plans, in 2016 some 69% agreed, climbing to 83% for this year but interestingly, dropping to 59% in 2018.

The greatest hurdles were seen as initial costs for around 22% of the respondents for 2018, while infrastructure fell from 73%, to 56% to 46% in 2018. LNG pricing went up from 4% in 2016 to 13% in 2018, while funding was only a concern for 4%, having been at 25% in 2016.

Answering the question of what were the most important aspects, regulatory compliance came out on top at 37%, followed by profitability at 31%. Operational efficiency was next at 21%, followed by social responsibilities at 8%.

Respondents were then asked what would help accelerate growth. Lower costs came out on top at 37%, followed by technological advances at 25%, partnerships 20% and funding at 18%.

As for tankers in the vessel type category, around 14% thought that this type of ship would benefit in 2018, down from 19% in 2017.

Around 49% of the respondents thought that Europe would continue to drive LNG bunkering going forward next year.

IQPC said that these results demonstrated that the LNG market continued to mature and had adjusted well to the continuing low oil price. TO

Sulfur cap compliance route unclear

A recent survey conducted by ExxonMobil found that the route to compliance with the IMO's 2020 0.5% global sulfur cap was still unclear for many vessel operators.

Some 70% of respondents said that the industry was ready for the deadline. Around 32% of those surveyed predicted that a combination of heavy fuel oil, marine gas oil and fuels and blends will be used, while 69% believed the cap will lead to the development of new low sulfur fuels.

"At ExxonMobil we expect that new 0.5% fuel formulations will emerge, based on low sulphur refinery streams, in addition to novel fuel blends," said Iain White, ExxonMobil's global marine marketing manager. "As a result, it's likely we will see increased compatibility and stability problems, which will make purchasing fuels from a trusted supplier more important than ever."

Cost implications were also a cause for concern with 53% of respondents predicting an increase in the amount spent on fuel.

As for the possible use of LNG going forward, 31% of respondents believed this fuel source will grow as a marine fuel. These findings were born out by ExxonMobil's 2017 Outlook for Energy: A View to 2040, which forecast that by 2040, global LNG consumption will rise to more than two and a half times the 2015 level.

Around 45% of respondents thought there would be an increased in abatement technologies (scrubbers) investment. However, only 11% said they were actively looking to install a scrubber before 2020, with 40% citing a lack of economic clarity as a reason for holding back.

"The results of this survey show that we are heading to a multi-fuel future and that there is not one obvious fuel solution that will apply to all vessels," said White. "To avoid the pitfalls that may lie ahead, it's vital that operators work closely with trusted fuel suppliers to ensure that they select the best route to compliance for their vessel's needs."

In September, ExxonMobil launched its patented Mobil Serv, a new service brand to help marine operators optimise maintenance programmes, vessel reliability and operating costs. ExxonMobil is to roll out a range of services under this brand name.

The combination of Mobil Serv and ExxonMobil's portfolio of lubricants will provide an end-to-end solution for marine operators, the company claimed.

Some of the services under the Mobil Serv brand will now use cloud computing technology and big data to provide customers with a platform to deliver information and trend analysis.

"The industry is facing a number of challenges, and Mobil Serv can help our customers respond," said White. "Many of our next-generation services build on new technology with an easy-to-use platform that will enable operators to gain deeper insights and help drive crucial efficiencies within their business."

Services in the Mobil Serv brand will include the patented Mobil Serv Lubricant Analysis, which will replace the Signum Oil Analysis programme.

****Overall Singapore bunker sales slid to a three-month low of 4.34 mill tonnes in September, due to higher prices putting owners off, Ocean Freight Exchange (OFE) reported.

For example, average Singapore 380cst prices were 8% higher in September, compared to the previous month.

Year-on-year growth for the first nine months of this year was 4.2% after the introduction of mass flow meters earlier in the year, OFE said. Higher barging costs and lower margins made suppliers more keen to sell larger stems.

Average September stem size rose to 1,315 tonnes during the month, up by 14% from 2016.

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IMO to discuss banning high sulfur fuel

From 2020, a ship will have no reason to bunker fuel with more than 0.5% sulfur.

That is unless it has approved abatement technology or a valid exemption to trial such technology or the ship could not obtain marine fuel with less than 0.5% sulfur because there was no availability in its bunkering port at the time, IBIA's Unni Einemo said in an industry note.

But MARPOL Annex VI does not ban a ship from carrying high sulfur fuel oil (HSFO); it only regulates sulphur oxide (SOx) emissions, which has to be met either through using low sulfur fuel or cleaning SOx out of the exhaust gas.

As discussed at a recent IBIA forum, this leaves some doubts about how effectively MARPOL Annex VI can be enforced.

Signatories to MARPOL Annex VI can only take enforcement actions for non-compliance occurring within their territorial waters.

In February, 2018, the fifth session of the IMO's Sub-Committee on Pollution Prevention and Response (PPR 5) is to discuss measures to 'promote consistent implementation of the 0.5% global sulphur limit'. There are plans to build on proposals, already discussed briefly at PPR 4 in January this year, to make enforcement simpler by introducing a ban on the carriage of HSFO as bunkers on ships without scrubbers.

IBIA's submission to PPR 4 included this paragraph: "It is already within the powers of PSCOs to enforce compliance within their coastal waters to ensure the coastal state is reaping the air quality benefits of the regulation. Should evidence emerge that implementation is uneven, measures to enhance more universal compliance may be considered, for example by making it an offence under the regulation for a ship to carry fuels above 0.5% sulfur unless that ship has approved alternative compliance methods installed, or a valid exemption."

Norway suggested that the sub-committee should consider "a specific prohibition" to carry bunkers exceeding 0.5% sulphur immediately, and intends to bring a more detailed proposal to PPR 5 in the hope of introducing a carriage-ban, as soon as possible.

Concrete suggestions were not discussed in great detail at PPR 4 as the main task delegated by MEPC 70 was to identify 'justification and scope for a new output on what additional measures may be developed to promote consistent implementation of the 0.5% global sulfur limit.'

This would mean adding a new work item to the IMO's agenda, and can only be approved by the its main committees. PPR 4 developed the new output proposal and it was approved by MEPC 71 in July, meaning PPR can now discuss and make recommendations to MEPC on concrete proposals.

A carriage ban on HSFO without valid exemptions could make it easier to enforce the global sulfur cap, as this can be detected in port, either by document check or by sampling and analysis of the fuel oil.

During PPR 4, a suggestion took that idea a step further, namely to implement a ban both on the carriage and sales of HSFO to ships. TO

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