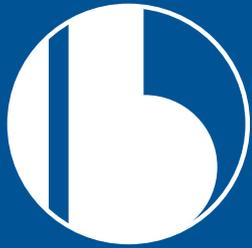


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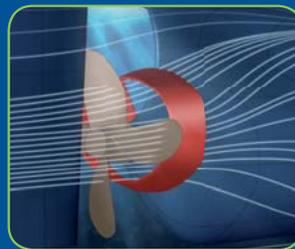
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Front cover - Despite the dramatic fall in bunker prices, Becker Marine Systems has not experienced any downturn in interest for its energy saving propulsive devices. Owners and operators are now evaluating these systems, such as the Mewis Duct, for greater propulsive efficiency leading to higher emissions control.

To date, around 1,000 Mewis Ducts have been sold and around 700 fitted, mainly to bulkers and tankers.

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Education and training more vital than ever

Last month, we celebrated World Maritime Day at which the theme was 'Education and Training'.

"Without a quality labour force, motivated, trained and skilled to the appropriate international standards, shipping cannot thrive," IMO's outgoing secretary general Koji Sekimizu said, in his annual World Maritime Day message.

"Not only that, all the many advances that have been made, in terms of safety and environmental impact, are at risk if personnel within the industry are unable to implement them properly. The importance of training and education for the maritime personnel of today and tomorrow is greater than ever before," he said.

Sekimizu also highlighted the need for greater efforts to be made to bring new generations into seafaring as a profession, noting that seafaring must be seen to appeal to new generations as a rewarding and fulfilling career. "The world depends on a safe, secure and efficient shipping industry; and the shipping industry depends on an adequate supply of seafarers to operate the ships that carry the essential cargoes we all rely on," he said.

To encourage young people into choosing further education and careers in the maritime world and to raise awareness, IMO's London Headquarters opened its doors for two days to more than 300 primary and secondary age school children, from local and international schools based in London.

The young people engaged with seafarer cadets from all over the world and representatives from maritime training institutes and international shipping organisations, who outlined the benefits and attractions of a career at sea and in the broader

maritime professions.

IMO has also established the IMO Maritime Ambassador Scheme, to promote the rich and varied career opportunities for young people, both at sea and ashore, in the multi-faceted maritime world.

Sekimizu hit the nail firmly on the head by highlighting 'education and training', as the technology is moving forward at an ever increasing pace, including in the maritime world.

We now have 'big data' to deal with, which basically means if data is available - analyse it. But what should we look out for, I hear you cry? This is where education and training comes in. It has often been said recently that will all the data potentially available emanating from the ship, proper analysis to make the vessel more efficient will be the key.

Do we have the people ashore to undertake these tasks, or will the analysis have to be done by specialists with no shipping experience? With shipowners now experiencing increasing bandwidth and more competitive satcoms costs, data transfer is no longer the problem and this data flow will only increase in the future, as vessels become 'wired up'.

Autonomous operations

This brings me neatly to the 'Autonomous' ship project- perfectly feasible in today's technological age, but is it practical? The Japanese had the same idea about 40 years ago suggesting that a large unmanned containership could cross the oceans and before reaching land, at a designated point a riding crew would be sent out to bring her into port.

We have aircraft now flying using instruments only and driverless cars being tested, but there is always a human being somewhere in the background to take control

should things go wrong.

New IACS president, ABS' Christopher Wiernicki, summed it up completely when he said at a presentation in London; "I wouldn't get on a plane without a pilot." He recognised that the pace of technological advances was increasing, but said that we need to take a step backwards to see how all this technology would fit together, both the hardware and software.

Regulatory requirements and commercial aspects of shipping are now by and large achieved by technology. Wiernicki believed that the whole regulatory process could be challenged by technology's rapid advance. We might need different types of thinking, a sort of techno-economic way of thinking going forward - a different mindset and thought process on materials, nano-technology, cyber safety, prime movers, power distribution, etc, on board ship.

Coming back to the main theme of World Maritime Day, Wiernicki said that the man/machine interface must not be ignored in this era of 'big data' technology. More training is needed, competencies will have to change, new paradigms with ship-to-shore interface and the 'drum beat' for all this is training people to handle the data.

It all hinges on knowledge competence, Wiernicki said; "You need smart, capable people in this industry with both knowledge and common sense."

Of course one of the main questions facing our industry is - how to get experienced people with knowledge and common sense when it takes 10-20 years to gain that experience and knowhow.

Anyone having an answer to that has definitely cracked it!!

TO

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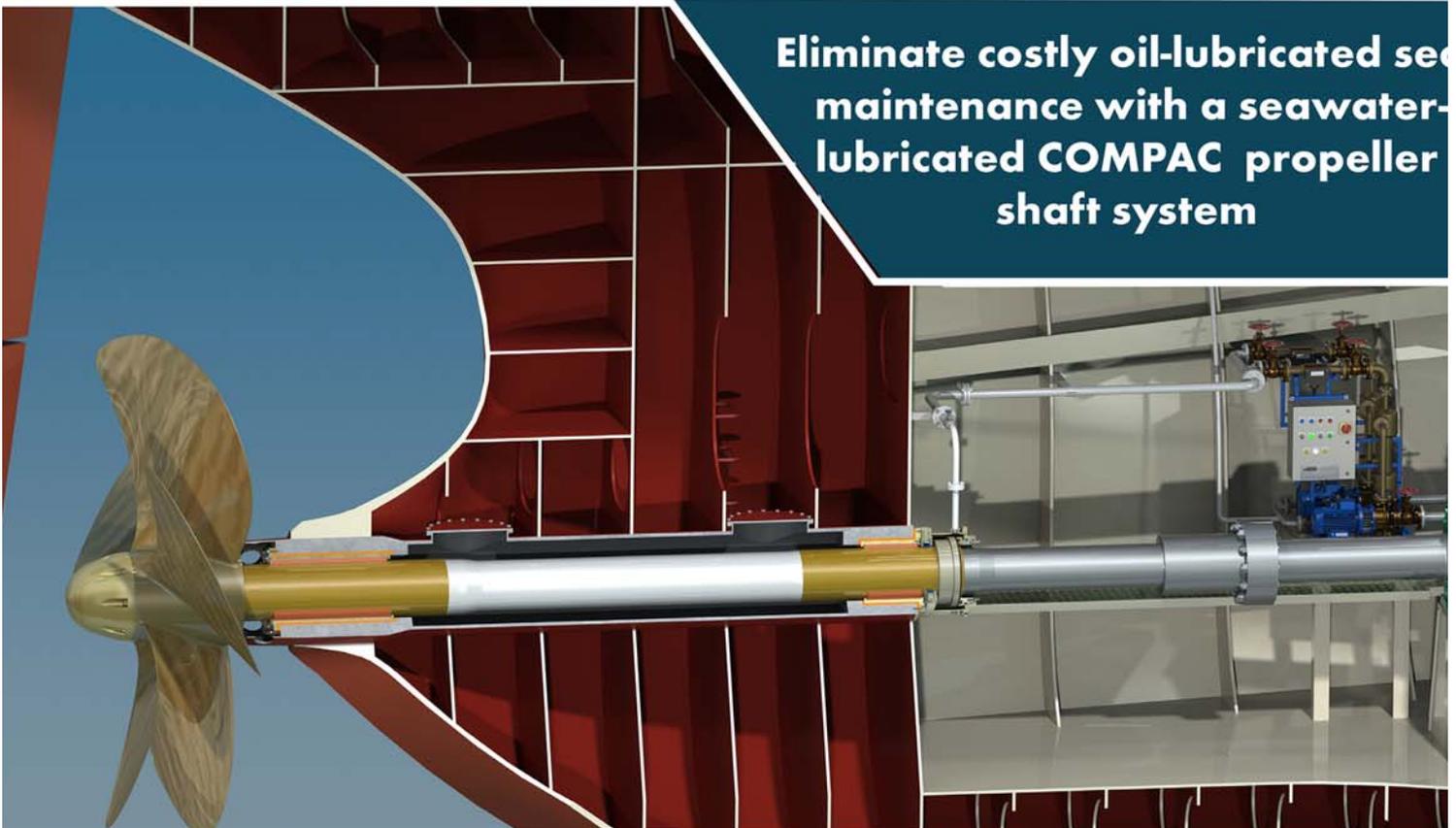
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First six months tanker fleet additions/deletions

Global tanker supply is the one of the key factors that influences the spot market.

Freight rates have been soft in recent years, due to an oversupply of tonnage relative to demand, specifically for the larger dirty tankers and MRs.

However, improved economic growth led by advanced economies and energy demand stimulated from low oil prices, has helped to absorb this excess supply.

In McQuilling Services' recently published '2015 Mid-Year Tanker Market Outlook', tanker supply was examined by looking at this year's orderbook, as well as the delivery/exit profiles for each of the eight vessel classes up to the end of July.

Additions – As of the end of July, there were 73 tanker deliveries recorded - excluding IMO I/II vessels. About 14% of the total deliveries were VLCCs as 10 newbuildings were added to the trading fleet (Figure 1).

McQuilling counted eight additions to the Suezmax fleet, in-line with its January expectations. Deliveries to this sector have picked up from last year when just four Suezmaxes were delivered through July 2014.

The number of Aframax newbuildings that have hit the water through July has outpaced last year's number by six, as 12 deliveries were recorded. Over the past two years, negative fleet growth was seen in this sector, but this year is clearly moving in the opposite direction (Figure 1). However,, no Panamax deliveries were recorded, as this class lacked any orders from 2012-2013.

LR2 deliveries outpaced McQuilling's January forecast by one, as 10 vessels were delivered through July. Meanwhile, LR1s hit the water at a slower pace, as just one vessel was delivered.

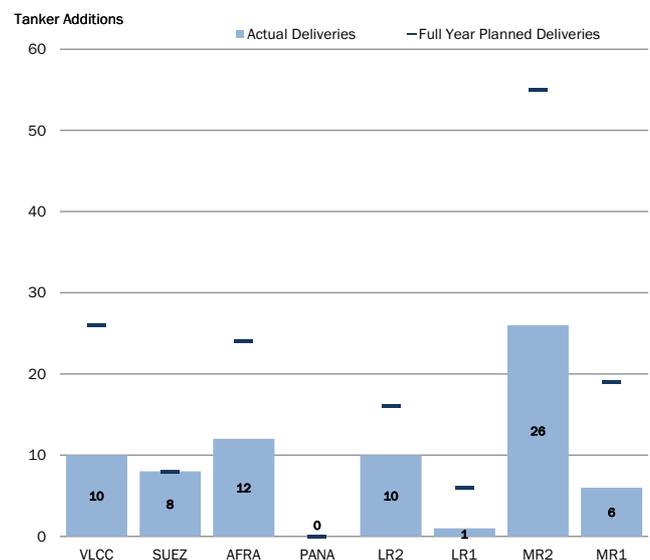
The MR2 market led the way in terms of newbuilding deliveries as 26 MR2s (IMO III) joined the fleet through July. The MR1s saw far less deliveries, as just six were recorded.

Deletions – The pace of scrapping slowed considerably year-on-year as just 18 exits were recorded through July, compared to 50 the previous year. This decline could be attributed to a stronger spot market and weaker scrap prices, which reduced owners incentive to send their vessels to the breakers.

Four vessels exited the VLCC trading fleet through July, two of which were sold for conversion. These were the *Patris* and *Universal Prime*. Conversely, no ships exited the Suezmax trading fleet thus far this year.

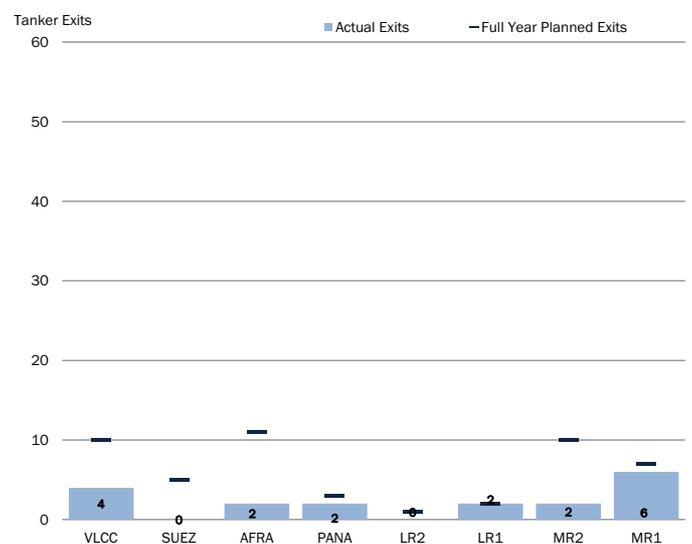
The pace of Aframax deletions slowed significantly year-on-year as just two exits were recorded through July, compared to 17 the previous year. Two Panamaxes were deleted, bringing this segment's net fleet growth to negative two (Figure 2).

Figure 1 – Tanker Deliveries: Jan-July 2015



Source: McQuilling Services.

Figure 2 – Tanker Exits: Jan-July 2015



Source: McQuilling Services.



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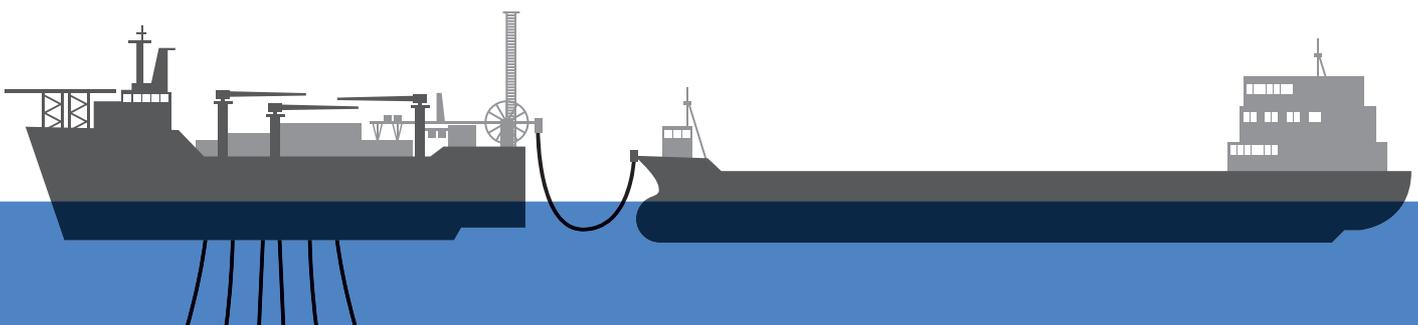
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Low bunker prices to affect 2016 WS flat rates

The principle of the Worldscale (WS) system is not an easy concept to explain to people outside the tanker market.

This task gets even more complicated as the WS flat rates are reset at the beginning of each year, explained London broking house Gibson.

The bunker element is the most critical factor that affects flat rates, which is particularly true for long haul routes, where bunker costs are by far the biggest expense for the owners during the voyage.

As such, flat rates are greatly influenced by major swings in international oil and bunker prices. Their period of stability, seen since early 2011 through to mid-2014, has come to an end.

The downward trend in oil prices started in July last year and accelerated after OPEC's decision made in November, 2014 to forego production cuts. Brent fell to as low as \$46 per barrel in January of this year.

Stronger than expected growth in world oil demand and slowing US crude oil production offered some support, with the Brent benchmark partially recovering to around \$60-65 per barrel between February and July this year.

Nonetheless, world oil supply still exceeds demand and with the growing certainty of Iran returning soon to the international crude market, oil prices fell again. In late August they were even below the levels seen at the start of 2015 and were around \$49 per barrel during the middle of September.

The anticipated increases in crude supply, once the Iranian sanctions are lifted, prompted a number of leading analysts to revise down their outlook for oil prices in 2016, to levels similar to those seen thus far this year.

This sizeable downward correction in oil and bunker prices seen during the past 12 months will be reflected in 2016 WS flat rates. The bunker component, that is taken into account in the flat rate formula, is based on prices between October and September each

year; therefore we already have nearly all the data that will go into the 2016 calculations, Gibson said.

Taking into account the latest bunker forward curve, international bunker prices between October, 2014 and September, 2015 are expected to average around 40% lower, compared to the corresponding period a year earlier.

This suggests that WS flat rates in 2016 will fall by a huge 26-29% on long haul routes and by around 15-18% on short haul trades. Moreover, if the latest oil price forecast proves to be accurate and oil prices remain low, then flat rates in 2017 could decline by another 10%.

Vessel finance methodology

A month or so earlier, Gibson took a look at the various methods of financing a ship, which must be keeping some owners awake at night.

Ship finance has undergone major changes since the 2008 financial crisis. Funding sources have become far more diverse, as the traditional shipping banks sought to reduce exposure to high risk ventures.

Increasingly, shipowners are taking advantage of a broad spectrum of funding sources, illustrated by fast growing Navig8 who has expanded remarkably in the last five years. Scorpio has also been equally resourceful, among others.

Export Credit Agency (ECA)

ECAs provide government funding for newbuilding clients. ECAs take the risk away from the exporter and move it to themselves for a premium. This method of financing is commonly used in South Korea, such as the Korea Trade Insurance Corporation (K-SURE) and the Export-Import Bank of Korea (KEXIM).

Initial Public Offerings (IPOs)

This method of financing has proved a

successful source of funding in New York and Oslo particularly with the timing of such offerings absolutely critical to capture the imagination and support of the market.

For example, Gener8 raised \$236.3 mill to fund its VLCC fleet expansion from a NY listing with an initial price of \$14 per share falling short of expectations in the \$17/19 per share range.

Similarly, a Euronav fundraiser successfully raised over \$229 mill from a secondary listing on the NYSE in January, 2015, having previously raised \$175 mill via the Brussels Stock Exchange, Euronext.

Other specific crude operators with publicly listed companies include Frontline with a market capitalisation of \$1.95 bill, Nordic American Tankers (NAT) and DHT Holdings.

The debt to asset ratio of these companies varies dramatically with recent figures showing Frontline at in excess of 90% whilst NAT were the lowest at below 25%.

Over the Counter (OTC)

This is a similar process to an IPO but is much less time consuming and shares are traded in what is called the grey market, which is decentralised and without a physical location.

Last year, Navig8 raised some \$110 mill for its chemical tanker fleet on Oslo's OTC exchange in a joint venture with Oaktree Capital.

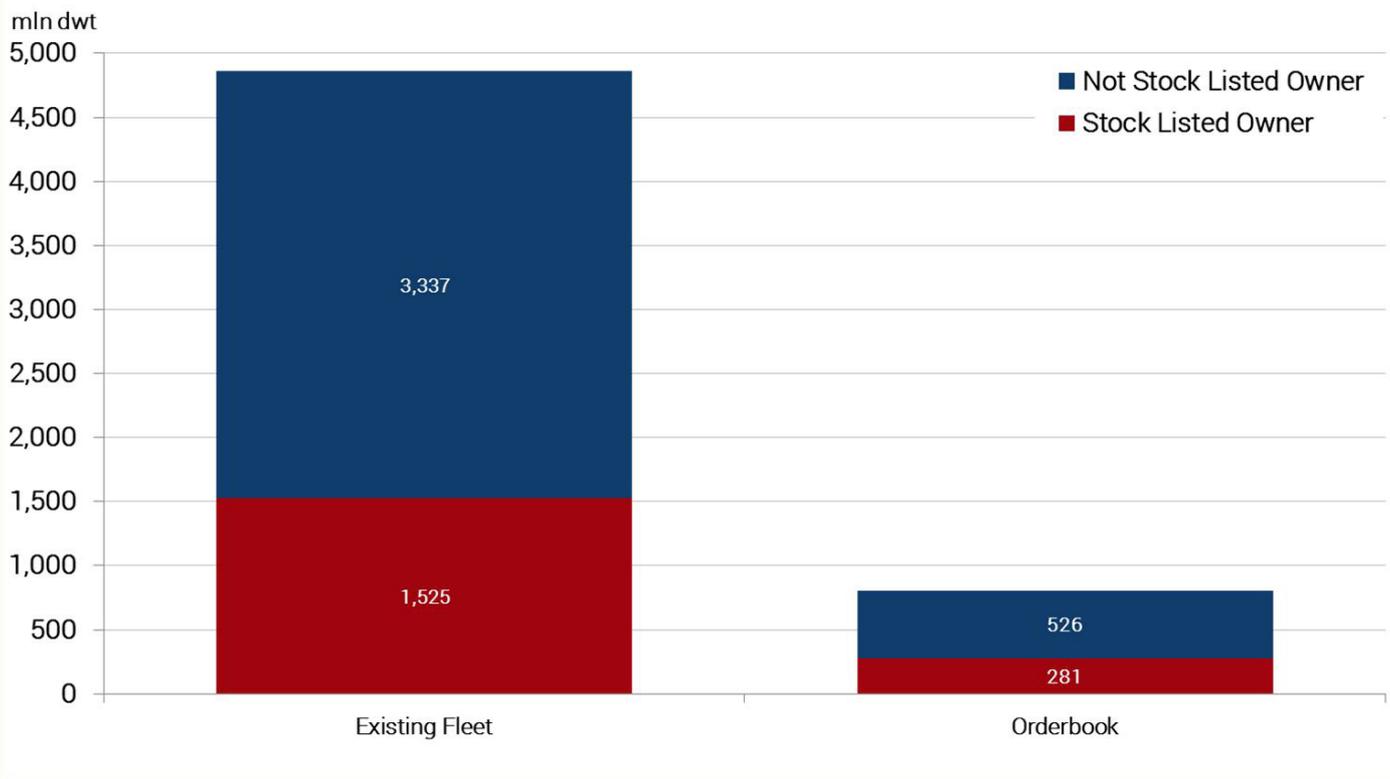
Private Equity and Hedge Funds

With interest rates remaining low in recent years, it is of no surprise that bulk shipping has attracted investment interest from Private Equity and Hedge Funds seeking for investments with a discount to net asset value (NAV).

In 2014, it was believed that in general, these parties invested some \$7 bill into shipping. Tankers were perceived to be at the bottom of their cycle and well known Wall

Crude & Product Tanker Fleet Ownership

Tankers over 25,000dwt



Source: Gibson.

Street names, such as Wilbur Ross, set up his Transportation Recovery Fund (a Division of Invesco).

Ross estimated that private equity pumped \$16 bill into shipping between 2008 and 2013, about 2.5 times more than the amount raised by IPOs over the same period.

Three major private equity groups control 17% of Euronav stock with Blue Mountain Capital Management the largest external investor with 5.57%, while York Capital Management and Golden Tree Asset Management each have smaller stakes.

Scorpio has also been a major beneficiary of such funds, which are clearly listed in the breakdown of shareholders.

International Bonds

There was a recent announcement that Indonesian based Soechi Lines had undertaken a successful US Dollar bond issue listed in Singapore for \$200 mill to be used for repayment of debt and working capital.

Deutsche Bank was the sole bookrunner for this bond.

Traditional Shipping Banks

A number of Banks remain active in this

sector and quite often work together to split their level of exposure. In February, 2013, Scorpio negotiated a \$267 mill credit line with a banking conglomerate, which included Nordea, ABN AMRO and SEB.

At the time Scorpio said that "the loan would finance a significant number of our vessels on order and will enable us to continue our growth strategy."

Sale and Leaseback

Last July it was reported that Navig8 had raised close to \$500 mill after agreeing the sale and leaseback of 12 of its LR2 newbuildings.

Navig8 advised that on eight of the vessels the company had entered into a 10-year bareboat agreement with purchase options during the charter period with the builders CSSC Offshore and Marine Engineering Co (formerly Guangzhou).

CSSC will also fund the pre-delivery instalments for the eight newbuildings. On the additional four vessels being built at Sungdong, Navig8 is working with Oslo listed Ocean Yield involving 13-year bareboat charters with purchase options being exercisable on the seventh anniversary of each

charter.

Ocean Yield will also provide financing for pre-delivery instalments.

From the above, it is evident that shipowners have a diverse range of innovative instruments, despite traditional ship finance playing a lesser role, Gibson said.

An illustration of how finance is changing was the \$429.6 mill loan-bond hybrid by Scorpio, which combined \$300 mill from Kexim in combination with DNB, who arranged the loan along with SEB and Siemens Financial, to provide the remaining \$129.6 mill.

Within this financing project, for the first time, Kexim agreed a \$125 mill, five-year amortising bond as part of the deal.

****Earlier this year, China agreed to allow several of the so called 'teapot' refineries to import crude as an alternative feedstock for the more expensive domestic crude grades.*

'Teapot' refineries include the smaller privately owned facilities with capacities typically ranging between 20,000-100,000 barrels per day.

On the beach - new rules to tighten a dangerous industry

The call to ban beaching when ship recycling/scraping has divided opinion among many of those parties involved.

At present, the IMO's Hong Kong Convention on Ship Recycling, adopted in 2009, has only received a few flag state ratifications, while the EU is ploughing ahead with its regulations and has already issued a timeline for an inventory of harmful materials (IHM) listing to be declared on board EU flagged ships and also those calling at EU ports and within EU waters.

The EU Regulation on Ship Recycling entered into force on 30th December, 2013 and is expected to be applicable by the end of this decade. The EU is also to publish a list of shipbreaking facilities worldwide that meet basic environmental and occupational health and safety standards. It has been said that none of the traditional Indian sub-continent breaking yards will meet this criteria.

Although the number of shipowners signing up to the environmentally friendly recycling movement is growing, the Indian sub-continent beach breakers still account for 70% of the world's tonnage, while another 25% goes to China and Turkey and the rest of the world makes up the remaining 5%.

In August, the Norwegian Shipowners' Association (NSA) called for an end to beaching and the NGO Shipbreaking Platform - an organisation of 19 environmental and human rights organisations - sided with the NSA.

"The European Community of Shipowners' Associations (ECSA) would be wise to recommend its members to adopt the Norwegian position. Greek and German companies sadly continue to top the list of shipowners that sell their vessels to South Asian yards where it is widely acknowledged that not even minimum environmental and workers safety standards are met," said Patrizia Heidegger executive director of the NGO Shipbreaking Platform at the time of the NSA announcement. "South Asian

governments, on the other hand, need to assist their industry to develop from one that breaks ships without necessary infrastructure to protect its workers and the surrounding environment to one that recycles ships off the beach."

One of the main arguments is that the tidal beach sites cannot support the use of heavy lifting or emergency response equipment and inadequate systems are in place to stop pollution around the coastal zone and as a result, infrastructural development is urgently needed.

The International Labour Organisation (ILO) considers shipbreaking on beaches to be among the world's most dangerous jobs. A recent study, conducted for the Indian Human Rights Commission, expressed severe concerns about the poor living conditions of shipbreaking workers in Alang, the NGO forum said.

It is also important to note, however, that more modern ship recycling facilities operating in other parts of the world may also face problems related to safety and environmental protection. Beyond technology, a hazardous industry requires expertise and training, tight controls by the authorities, transparency and traceability of waste, as well as independent trade unions, the NGO said.

At a debate held in London during the International Shipping Week, Heidegger called for independent audits, rather than self-certification and also for openness and transparency for researchers visiting the tidal beaches of Bangladesh, India and Pakistan.

Different viewpoint

However, the Danish Shipowners' Association has taken a different stance stating that ratification and compliance with the Hong Kong Convention is the best way to ensure sustainable recycling of vessels, both in terms of safety and environmental impact.



DNV GL's Gerhard Aulbert.

"But Alang is not just Alang", wrote DSA director Maria Bruun Skipper, in an article published in the Spring of this year, following a visit to the area.

"A couple of the yards we visited have invested in technology and established safety procedures to ensure that ships are recycled safely and that the environment is protected against leakage of harmful substances. It is up to the classification societies to certify that the standards are met, but in my view it would be extremely counter productive if the yards, which have made important investments, are excluded based on geography and the concept of beaching as a method.

"The DSA does not by any means accept poor standards, but we strongly recommend individual assessment of each yard. This is also what we advise our members to do. Unacceptable ship recycling can take place anywhere in the world.

"The IMO, has adopted the Hong Kong Convention, which sets requirements for safe and environmentally sound recycling. Despite the fact that Denmark has yet to ratify the convention, we do however recommend our members to follow the IMO standards and are fully in line with, for example, our Norwegian

SHIPBREAKING



The IMO and EU are introducing legislation to improve recycling centres.

colleagues as regards the convention's primacy. Norway is one of the few countries who have actually ratified the convention," she said.

The Danish position is claimed to be fully in line with the European position where the European Community Shipowners' Association (ECSA) is working on the global ratification of the Hong Kong Convention.

GMS, a buyer of ships for recycling, has come out in support of the DSA, taking the position that ship recycling choice should not be based just on geography.

The company urged the NSA to see for themselves the improvements that have been made by some of the shipyards in Alang and said it was happy to extend an open invitation to NSA members to visit these yards so they can make their own minds up about beaching at specific yards, just as the DSA had done.

GMS explained that the Hong Kong Convention is made up of technical requirements: suitable working practices; the necessary training; the appropriate handling, storage and disposal of hazardous materials; and on the necessary controls for the management of the recycling process so that safety and environmental protection are ensured.

During the development of the convention, the IMO debate concluded that beaching should not be banned, because:

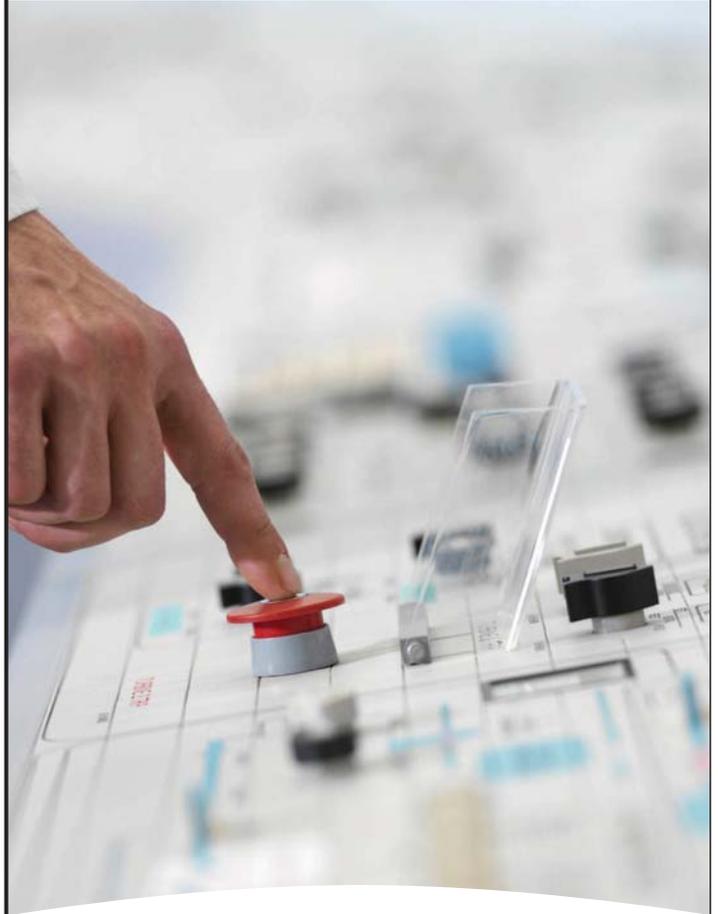
- (a) There is no evidence to suggest that ships cannot be recycled safely and cleanly on the beach.
- (b) Banning of beaching would exclude 70% of the world's recycling capacity from the scope of the Convention. The convention would thus fail from becoming a global standard.
- (c) Banning of beaching would exclude the whole of South Asia, which is the region most in need for improved standards of safety and environmental protection.

Over the last five years some improvements have taken place across the ship recycling industry in Bangladesh and also in individual recycling facilities whose owners have realised that higher standards will progressively be demanded, not only by regulations but also by shipowners selling ships to them.

A lot still needs to be done, especially in the area of hazardous waste management and disposal and also on training for safety and environmental protection. IMO together with UNEP are currently implementing a Norwegian funded project to help Bangladesh satisfy the technical requirements of Hong Kong Convention and in due time to accede to the Convention, GMS said.

India has made considerable progress, especially following the

intelligent automation



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An upgraded recycling facility. Note concrete aprons, hard hats and modern equipment.

Supreme Court's judgement in the case of the *Blue Lady* in September, 2007. Since then, the industry had to satisfy new national legislation requiring recyclers to conform to Hong Kong Convention, on matters relating to safety, training, waste management, and environmental protection (this is the Shipbreaking Code 2013).

As witnessed during two visits to Alang by GMS this year, significant improvements have taken and are taking place across the industry. Furthermore, a number of Indian recyclers are investing in safety measures, environmental protection and social welfare that are above statutory requirements.

At the London meeting, DNV GL's global head of ship recycling, Gerhard Aulbert outlined how the EU regulations will help to counter pollution, work-related casualties and health hazards in shipbreaking yards, pointing to a need for improvement in the sector's safety and sustainability record.

While there have been efforts to regulate the handling and disposal of hazardous materials (Basel Convention 1989) and improve safety and environmental standards in ship recycling facilities (Hong Kong Convention), they have proven to be difficult to enforce.

For example, the Hong Kong Convention has only been ratified by three countries and is not expected to enter into force before 2020, 11 years after it was adopted by the IMO. "Progress has been very slow until now. But the implementation of the European Ship Recycling Regulation will bring about some radical changes over the next few years. Of the roughly 60,000 ships worldwide, about two thirds are affected by it," Aulbert said.

Hazardous materials

One of the corner stones of the EU regulation is the so-called inventory of hazardous materials (IHM). Starting from December, 2015, every EU-flag newbuilding must carry an inventory of all the hazardous materials contained in its structure or equipment. The deadline for having a verified IHM with a statement of compliance is 31st December, 2020. Before a ship is recycled, its owner must provide the operator carrying out the work specific information about the vessel and prepare a ship recycling plan.

"One thing that remains poorly defined and may differ significantly from case to case is the way in which hazardous material experts develop the IHMs," claimed Thomas Nigl, who investigated IHM standards in his master's thesis at DNV GL. Nigl analysed the procedures in place to develop IHMs on different ships and surveyed those involved, including suppliers, cash buyers, shipowners, hazardous material experts, port authorities, classification societies and shipyards, among others.

The results of his study show that although IHMs can be considered as an important step towards establishing safer and more environmentally friendly methods of ship recycling, much needed to be improved in terms of procedures. "Methodological divergences in the development of IHMs between newbuilt and existing ships have led to considerable differences in the amounts of HazMats found on board," Nigl wrote.

Another vital component of the EU-regulation is a new benchmarking system. In

future, recycling will only be allowed to take place at facilities that have been approved by the EU. "This kind of ranking will change the face of ship recycling, as methods such as beaching will most likely be banned and recycling facilities will have to compete for European-flagged vessels by making it onto a kind of green list," explained Aulbert.

Waste disposal management, the facility's infrastructure, safety procedures and training are some of the key factors, which will determine whether recycling facilities make the White List. Some changes would be relatively easy to make, Aulbert claimed. In the case of asbestos, this would simply be a matter of training and equipment. The mineral is not toxic to the environment as such, but as breathing in asbestos fibres can cause respiratory illnesses, it needs to be covered up in a designated rubbish facility.

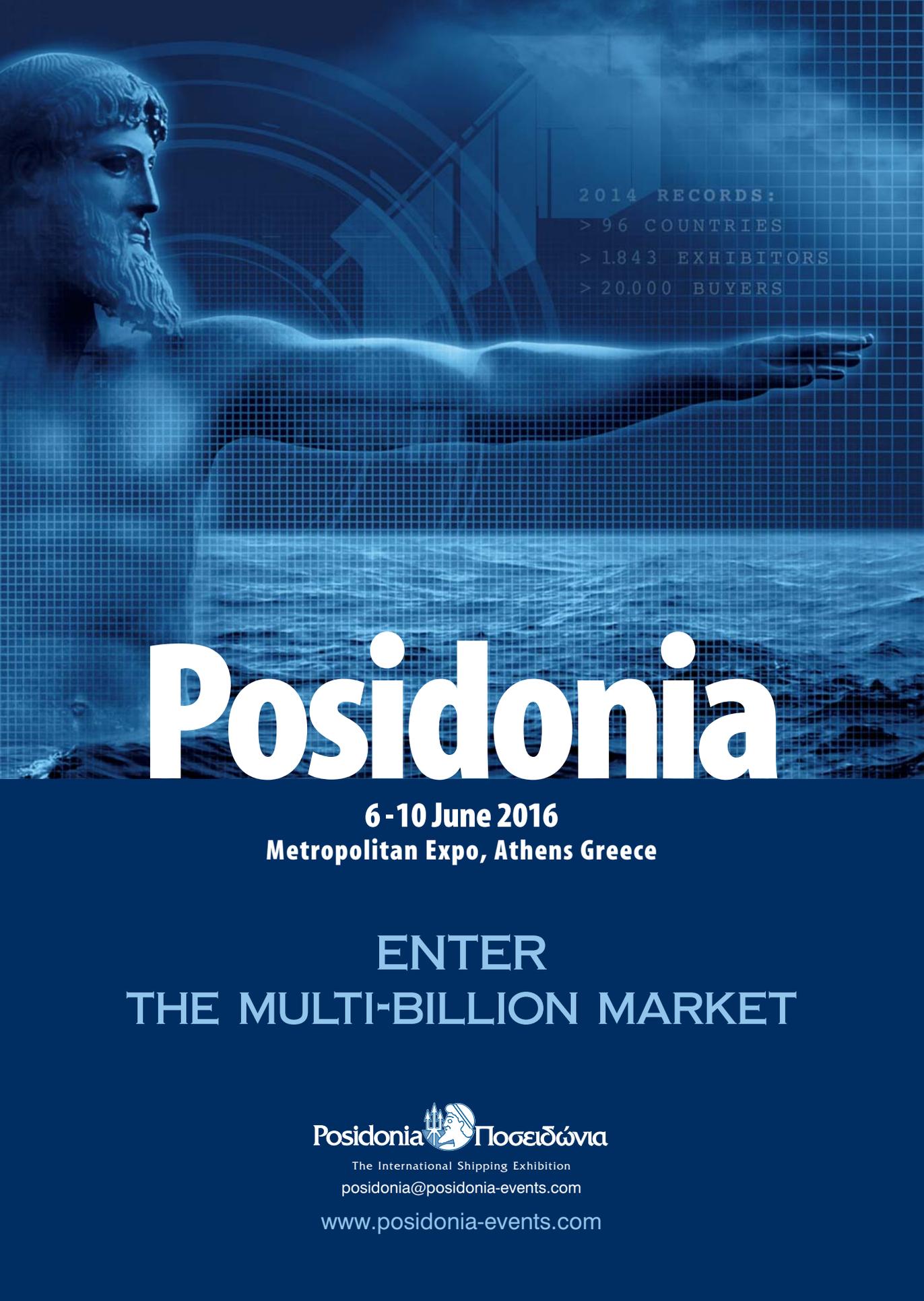
More sustainable practices are expected to increase the costs of ship recycling. Looking at an example in a Turkish yard, DNV GL estimated the average cost of breaking a ship, according to the EU regulations, at about €46 per ldt (light displacement tonne).

The most significant cost factors contributing to the price calculations include - pre-cleaning work, monitoring, IHM preparation, training, transport, storage and disposal of wastes, personal protection equipment (PPE), buildings and impermeable floor, as well as intertidal zone measurements. These result in additional costs of about €17 per ldt. In Asia, many ships are currently being recycled for as little as €20 - 30 per ldt.

Aulbert pointed out that while the number of yards are expected to decrease in the long run, shipowners could profit from the regulation. "I think we will see more of a division between the practice of recycling itself and the sale of recycled materials," said Aulbert.

At the moment, this is often still undertaken by the same facility and shipowners often choose one that will fetch them a higher price for the recycled steel. The EU regulation does allow shipowners to have a vessel recycled by one facility but sell their steel globally. "This makes owners more independent from recycling facilities regarding the profit from the ship," Aulbert added. "The list of EU-vetted facilities will help shipowners give a better basis for deciding which recycling yard to use and can ensure that their vessels are scrapped in a sustainable way."

The NGO Platform also more recently highlighted the plight of at least four workers who died and several more seriously injured following a gas cylinder explosion in a



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Bangladesh shipbreaking yard at Chittagong. This accident happened on 5th September at the Shital Ship Breaking yard, which was only established in 2011.

According to the yard's management, eight workers were hit by the cylinder blast when they were getting ready for work, reported local media.

Three of the workers only received basic care and were sent back home. Later they were admitted to the Chittagong Medical College Hospital when their condition had deteriorated. The five others were already being treated at the hospital, however, four died.

It was only after local NGOs, trade union affiliates and member organisations of the NGO Shipbreaking Platform, contacted the Bangladesh Shipbreakers Association (BSBA) that the workers received better treatment in the hospital. As a result, the Ship Breaking Workers Trade Union Forum and Platform member organisation BILS demanded proper care and treatment and reminded the yard owners about their obligation to provide compensation to the victims and their families.

On 10th September, after three of the

injured workers had already died in the hospital, activists and citizens formed a human chain in Chittagong to protest against the lack of response from the yard owners.

Even though several shipping companies have already renounced selling their old ships to the breaking beaches of Bangladesh, as the working and environmental conditions are still unacceptable, others continue doing so without any remorse, the NGO claimed.

At the time of the explosion, two ships were beached at Shital: the *Arctic*, an LNGC whose last beneficial owner was Sovcomflot; and the *Aman Trader*, which was sold for breaking by Greek Universal Shipmanagement Corp and was operated by Greek Enterprises Shipping & Trading. The latter has also sold three ships for breaking to South Asia in 2015 and had been listed by the Platform as a 'global dumper' in 2014.

"It is irresponsible of shipowners to continue to ignore what is happening in Bangladesh and to perpetuate a situation of exploitation and unsafe working conditions by choosing these yards to maximise their profits instead of demanding responsible ship recycling yards," said Heidegger.

***NGO has welcomed a new partner organisation from Turkey - Istanbul Health and Safety Labour Watch (IHSLW).

The platform first met with IHSLW in June at Izmir, when the coalition visited the ship recycling yards located at nearby Aliaga.

In 2014, 15.3% of the ships broken up worldwide were sent to Turkey for dismantling, a large portion of which (36%) were sold by European-based shipowners. With the EU considering applications from ship recycling yards worldwide to be listed as acceptable destinations for EU-flagged vessels, Turkish yards are under pressure to demonstrate they are in line with EU standards and that the working conditions reach adequate safety standards, the NGO said.

"We are particularly concerned about the health and safety rights of shipbreaking workers in Aliaga," said IHSLW's Asli Odman. "Eleven fatal accidents in the last five years are a sad proof of inadequate safety standards, which have to be improved urgently, not to mention occupational diseases, concealed at the shipbreaking yards concentrated in a heavy industry area in Aliaga."

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Hazardous material (HazMat) inventory explained

Wilhelmsen Ship Management's (WSM) Rakesh Bhargava gave an insight into what is involved in IHM and how his company fits in.

WSM is an independent third party shipmanagement concern currently with more than 450 vessels under crew and technical management. The company has seven shipmanagement and 19 crew offices worldwide.

The shipmanagement concern offers an IHM service for all types of vessels worldwide, having received class certification to be able to carry out the work.

As mentioned in the previous article, IHM is a document in which all potentially HazMat on board a vessel that can pose a risk to the health and safety of people or to the environment is identified, located and quantified.

The IMOs Hong Kong Convention (2009) will make IHM mandatory for all vessels once ratified over the next few years, while the new EU regulation, which will stipulate that IHM is compulsory for all new and vessels visiting European ports will come into effect from around 2016 – 2018.

WSM has put a team in place to handle IHM for both new and existing vessels in an efficient, flexible and economical manner, Bhargava claimed. Existing vessels require an on board inspection and laboratory analysis, which can be completed in three to six weeks, depending on the vessel's schedule and availability.

In short, a detailed document needs to be compiled listing all potentially HazMat on board a vessel. These are listed in four tables contained in an appendix to the convention.

Table A is mandatory for existing ships; Table B contains a HazMat list that is not mandatory but 'as far as practicable' for existing ships; Table C is for adoption at the end of a vessel's life and Table D lists exceptions.

The IHM itself comes in three parts. Part I is applicable to the existing vessel, while Parts II and III come into play at the recycling time.

*Part I is an inventory of hazardous materials contained in the ship's structure and equipment. This is handled either during the construction phase for new vessels or during operation for existing vessels.

*Part II is operationally generated wastes.

*Part III involves stores.

As for the four tables containing details of the HazMat, Table A is mandatory for all existing and new vessels, while table B is only compulsory for newbuildings and Tables C and D are only required for Parts II and III.

The main items to be listed (asbestos, PCBs, ODS, TBT) are contained in Table A, while others materials from Table B include heavy metals & radioactive substances.

The IMO's convention has thus far been signed by seven nations - Norway (ratified), Congo (ratified), France (ratified), Italy, The Netherlands, Saint Kitts & Nevis and Turkey.

Five-year limit

Under the terms of the convention, an IHM must be completed for all vessels within five years of ratification and immediately for all vessels going for recycling.

The EU Regulation is in line with HKC requirements with specifics for the EU region and EU-flagged vessels. It will be implemented without waiting for IMO convention ratification.

An additional two HazMat are to be sampled (PFOS – for existing ships & HBCDD – for newly built ship).

Basically, the IHM replaces the Green Passport. It focuses on 13 (plus two for EU SRR) HazMat categories and requires survey, sampling and laboratory tests.

WSM will develop the IHM based on input from the shipyard and the suppliers, including:

1. Identify all suppliers.
2. Request for and collect Suppliers Declaration of Conformity (SDoC) and Material Declaration (MD) for all products.



WSM's Rakesh Bhargava.

3. Screen the products containing HazMat above the threshold level.
4. Identify the location of these products and calculate the mass of HazMat at each location.
5. Prepare IHM in the standard format.
6. Obtain Statement of Compliance (SoC) from flag state/RO/Class.

WSM has already audited seven shipbreaking/recycling yards in China and eight in Turkey and its processes have been vetted by DNV GL. The company is a member of ISRA (International Ship Recyclers Association) and a founder member of IHMA (International Hazardous Materials Association). WSM is also part of the EC consultative group for the EU SRR.

Bhargava said that by compiling an IHM, this will aid a company's corporate social responsibility (CSR) by way of mitigating environmental risks, show care for crew and other people working with the vessel, early compliance with new regulation, avoid negative publicity and NGO attention and will be a necessary preparation for green recycling.

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High social costs hit German owners

The German shipping industry is trying to reduce the burden of social and other costs when employing domestic seafarers.

The German Shipowners' Association (VDR) and other German shipping organisations, not least the owners, are hoping that Chancellor Angela Merkel will give a clear commitment to introduce a subsidy package this month.

This would help alleviate the burden put on domestic shipowners by the high social costs of employing German seafarers.

The VDR has conducted a survey and found that the extra cost to the shipowners of employing German seafarers is more than €100,000 per vessel per year, depending on the number of German seafarers on board.

As a result, the VDR has noted a dramatic fall in the number of German seafarers from around 7,000 last year to 6,700 by the middle of this year. The numbers of vessels in the German registry is also falling- illustrated by NSB Niederelbe's decision to take a large tranche of its fleet of vessels out of the German flag.

At the end of last year, the company said in a statement that due to the economic status in the German shipping industry, it found itself forced to exit the German flag by June, 2017.

This step meant the successive 'flagging out' of the company's 38 German flagged containerships and, with that, the gradual layoff of 486 employees at sea by June, 2017. The company also manages tankers and other ship types.

In the summer of 2014, talks between the marine works council - ver.di - and NSB took place, at which it was determined that under the continuing poor market conditions, the employment and the continuation of employment of German and European seafarers was no longer economically feasible and that keeping the German flag would threaten the company's existence.

NSB CFO Lutz Weber said at the time: "We regret that, even with the involvement of politics and associations, we weren't successful in bringing the framework of support for the German flag to another level, which would ensure a European employee at

sea the long-term ability to compete internationally and secure maritime knowledge in Germany. Unfortunately, Germany, as a maritime location, offers European and German sailors no prospects."

At the end of last year, NSB operated the largest number of ships under the German flag and employed about 500 German and European seafarers.

Vessels flying the German flag usually employ around four seafarers each, which can add a significant amount to the daily operating costs. By 'flagging out', the owners can save a considerable amount of money but on the other side of the coin they will create a shortage of future German pilots, port captains, superintendents, etc, by not attracting German nationals to go to sea.

In conversation with the VDR, *Tanker Operator* was told that maritime 'knowhow' was needed in Germany being a large shipping country and a solution had to be found to enable owners to employ German seafarers without the burden of extra taxes, social costs, etc.

The VDR has looked at both the Danish and Dutch seafarer employment models, where the respective governments are more sympathetic to countering high cost regimes and indeed, the numbers of Dutch seafarers has actually increased.

The European Commission has acknowledged that there is a need of some form of subsidy for the additional costs incurred by employing northern European-based seafarers. The German Government in the form of the Ministry of Transport and the Federal States have also realised that there is a problem. For example, in August, the State of Hamburg proposed an initiative to the Second Chamber of the German Parliament on



Former VDR president - Michael Behrendt - welcomes the new president, Alfred Hartmann.

lowering seafarers' social costs.

The German seafaring unions have joined in the initiative having come to the same conclusions during an audit and with the VDR, they have produced a common paper, which is being presented to the Government. German shipowners help subsidise the maritime training academies in Germany of which there are several.

A foundation was formed to subsidise the training to the tune of around €20 mill per year. An owner who decides to 'flag out' still has to pay into the foundation for two years.

A potential German seafarer must spend three years at school and at sea to become a 'schiffsmechaniker' - and receive a nautical/technical certificate. Following this, he or she will then decide whether to enter the deck of engineering departments of a vessel.

LNG initiative

In another move, Maritime trade associations in Germany are calling on the Federal Government to put in place measures to promote the use of LNG as an alternative fuel for shipping.

A group of associations said that the country needs an 'innovation offensive' backed up by a subsidisation programme for equipping ships with LNG propulsion, as well as uniform legal standards in ports.

A joint statement has been produced by the Maritime LNG Platform, the VDR, the

German Shipbuilding and Ocean Industries Association (VSM), the Association of German Seaport Operators (ZDS) and the German Shipbrokers' Association (ZVDS).

"LNG has great potential for maritime shipping to achieve significant reductions in SOx, NOx and PM emissions in coastal regions and in the port cities. At the same time, LNG already meets emission regulations, both those currently in force and those tabled for introduction in the future," said Georg Ehrmann, managing director of the Maritime LNG Platform, a cross-sector alliance of more than 70 national and international companies, associations, and ports.

"The Federal Ministry of Transport and Digital Infrastructure and the Maritime Co-ordinator of the Federal Government have recognised the importance of LNG for cleaner transport routes, which was highlighted in the coalition agreement and in the EU Directive 'Clean Power for Transport'.

"The measures we are proposing here are key prerequisites for LNG to be able to succeed as an environmentally friendly fuel. Not only does the use of LNG offer increased protection of the environment; it also represents great opportunities for creating more added value and high-quality jobs for Germany as a business location," he said.

"The German shipbuilding industry has made a decisive contribution to the promotion of LNG as a clean alternative fuel, and it is currently in an ideal position to become a leader in the development of this technology and of this market," said Dr Ralf Sören Marquardt, VSM managing director. "With a concerted LNG initiative designed to promote the implementation of innovations and to close existing gaps in the regulatory framework, it will become feasible to achieve significant reductions in emissions in ports and

VDR's new president takes his seat

Alfred Hartmann, owner of the Hartmann Group of Companies based in Leer (East Frisia) was elected President of the VDR effective 1st January, this year.

As early as May 2014, the VDR board had elected Capt Hartmann as successor to Michael Behrendt who has been in charge of the Association since 2008. He had also been on the VDR board since 1998 and part of the Presidential Committee since December 2013.

To honour Behrendt's accomplishments as President of the Association, the VDR offered a scholarship of the International

Foundation for the Law of the Sea (IFLOS), namely the 'Michael Behrendt Scholarship'.

Since 2007, the Foundation has organised a 'Summer Academy' on issues relating to the law of the sea and maritime trade at the International Tribunal for the Law of the Sea (ITLOS) in Hamburg.

Some 35 high potential legal students from 30 countries take part in the academy annually. Starting this year, the VDR funds a full scholarship for one participant and will thus support this unique qualification programme worldwide at the seat of the International Tribunal for the Law of the Sea in Hamburg. ■

waterways."

"Without a comprehensive incentive scheme from the federal government for the construction and retrofitting of LNG-powered ships, it will not be possible to dismantle the barriers to market entry," commented Ralf Nagel, VDR CEO. "Not a single LNG-powered ship has been commissioned without government subsidies throughout Europe to date. As a leading maritime nation, Germany ought to be taking on a pioneering role."

Ships that can run on both conventional fuel and LNG cost up to 25% more because of the special engines and the additional tanks and fuel lines required.

"Sufficient numbers of LNG-powered ships can achieve a measurable reduction in air pollution in port locations," added Daniel Hosseus, senior managing director of ZDS. "The issue of LNG highlights the fact that we need a broadly based, consistent technology subsidisation scheme for maritime logistics.

For this reason the federal government ought to reinstitute the successful research programme for innovative sea port technologies (ISETEC)."

"Refuelling of LNG ships must become a commonplace occurrence in German ports, too. To ensure that the ships can be cleared as efficiently as has been the case to date, it must be ensured that the bunkering process can be carried out at the same time as the loading and unloading of the ships," said Dr Alexander Geisler, managing director of ZVDS. "Germany needs uniform standards for handling LNG at sea ports, be it for bunkering, power generation or for transportation purposes."

Because of the extensive safety regulations applicable worldwide and thanks to decades of experience in the transportation of LNG, ships powered by LNG have the best safety record of any type of vessel.

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DNV GL Academy offers tanker training

At the end of this month, DNV GL Academy Poland, part of the newly formed Maritime Academy Baltic, will be holding a specific Tanker Week at the DNV GL Technology Centre in Gdynia.

The five day event will be split into segments starting on 26th October with Vetting Inspections. Participants can sign up to just one course or attend the whole week.

This course will aim to empower shipmanagers, owners, terminal operators and others who are involved in the vetting process with a greater knowledge and additional skill sets to make the correct informed decisions applicable to vetting a vessel.

The focus points will include:

- International regulatory and non-regulatory requirements.
- History and statistics in ship vetting.
- Reducing risk in ship vetting.

- Vessel screening.
- Port State Control and third party vetting programmes, plus TMSA.

The following two days will be reserved for tanker hull inspections with a survey simulator workshop.

Here, the training will be focused familiarisation with structure and equipment, rules and conventions, survey requirements, typical deficiencies, acceptance criteria, repairs, documentation understanding, reporting, plus safety issues at work.

Another two-day course on 28th-29th October, will include a TMSA workshop aimed at efficient tanker operation.

This course will provide a knowledge of

practical risk assessment and incident investigation. The focus points will be:

- TMSA elements related to risk assessment.
- Practical step-by-step approach to risk assessment - system and hazard identification.
- The application of change management, according to TMSA.
- Methods of incident investigation and analysis, according to TMSA.

All of the courses will be conducted in English.

Tracy Plowman, senior training advisor at DNV GL Academy based in Hamburg, told *Tanker Operator* that in general, the training courses will be given by locally-based trainers,



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or those flown in specifically for a course. At present, courses are offered in 18 countries covering a wide range of subjects regarding most types of vessels.

Some 50% of the Academy's business comes from developing tailored courses for specific customers, she explained. She is based at DNV GL's maritime headquarters in Hamburg, which is where the governance unit sits, giving an overview of the whole operation.

In another move, the DNV GL Academy started to offer a Post-Graduate Diploma in Executive Maritime Management in September.

It is being offered in conjunction with the

IMO training vehicle World Maritime University (WMU). The WMU brings academic and research expertise and DNV GL best practice experience in the shipping industry.

This programme can be tailored to an individual manager's needs, ie, it can be delivered in a classroom, distance learning, or a mixture of both. The classrooms are located in select DNV GL academies worldwide.

The modules used include:

- Setting the Scene - Contemporary global maritime regulatory and management issues in the shipping sector.

- Remaining competitive in a changing market- strategic financial tools.
- Managing resources - HR management, organisational processes and leadership in a maritime context.
- Mastering complexity- Effective management of safety, security and risk.
- Staying ahead of the curve - Maritime environment technology, sustainability and challenges.

The programme runs for 11 months to July, 2016 and every eight weeks, a module is completed with an assessment given before the next module is tackled.

TO

Tanker business change

Although DNV GL's maritime business is now centred on Hamburg, the tanker segment remains at Hovik, just outside Oslo and in June, Catrine Vestereng took over as business segment director tankers.

"We hope to bring something to owners and shipbuilders in experience and competence," she said. "We can bring a lot into the business by supporting owners with competence. We know the regulations and (as a class society) have issued guidelines."

She explained that with tanker construction, DNV GL was involved in the compilation of the IACS Common Structural Rules (CSR) within a pool of class societies and is involved in pre-approved designs at the major shipyards. The class society has published a guidelines booklet on the CSR for bulkers and

tankers.

With some owners, future thinking is at the forefront of their projects. "We will continue to trouble shoot, focusing on compliance, utilising our database on Port State Control recordings to trend and pinpoint problems to help owners gain zero offhire time," Vestereng said.

The class society is offering all of its clients access to all the data held and is also offering direct access to technical experts on a 24/7 basis. "They are very qualified to give a qualified answer," she claimed.

DNV GL calls this service - DATE (Direct Access to the Technical Experts). More than 400 experts are available from competence centres in Hamburg, Oslo, Piraeus, Houston and Singapore.

A series of tanker seminars are also being arranged. ■



Catrine Vestereng.

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Operating tankers in an ECA

Bremen-based small to medium size tanker concern Carl Buettner recently made the decision to fit one of its tankers with scrubber technology.

Tanker Operator spoke with managing director Thorsten Mackenthun about operating product tankers in the ECA areas.

He explained that at present, the company has one vessel - the 2009-built 15,202 dwt *Levana* - fitted with a scrubber system but that it was working on a second scrubber from a different manufacturer, which was still in the planning process.

The *Levana* was fitted with a SAACKE LMB scrubber in November, 2013. The unique characteristic of the SAACKE solution is the upstream soot separation, thus avoiding the usual production of sludge, which is difficult to process, the company claimed at the time of the installation.

“At the moment, we have no further plans for additional scrubbers but will use MGO, since we are trading more than 90% in the ECA area,” Mackenthun said.

He thought that the stricter rules for operating in Northern Europe and the Baltic makes shipping as a tonnage service provider more complicated. He said that his company has taken the responsibility of operating in a cleaner and greener environment since the very beginning.

“It is definitely a disadvantage that the

Northern European shipowners have to deal with the strong regulations applying to the SECA and the Southern Europeans have no SECA rules at all which is hard to understand.

“Carl Buettner was the first tanker company in Europe with double hull tankers, for example; we always make sure to implement the rules and regulations before they have been ratified. What we claim is the difference in political handling for European waters, such as SECA or Mediterranean,” he said.

As for newbuildings, Mackenthun said that since the company had a fleet of 10 ships of different ages, it was always screening the market to see if it made sense to plan newbuildings, opt alternatively for secondhand

tonnage or even to charter in vessels.

Today, Carl Buettner’s fleet of 10 IMO II chemical/product tankers is in the range of 13,000 dwt to 24,000 dwt. They are currently operating as pure product carriers. Mackenthun explained that the product market was rather stable this year, compared to 2014, due to more cargo availability. He also said that all the vessels were operated in the spot market and on voyage charters.

The company has three vessels flying the German flag while the other seven ships use the Gibraltar flag. “This is mainly for cost reasons; as far as flag state performance, we see no big differences between these two,” he said.



Levana's sistership LEMONIA has not been fitted with a scrubber system thus far.

Owners still looking to save on energy consumption

Despite the dramatic fall in bunker prices, there has been no let up in the number of owners seeking to save on fuel consumption due to environmental reasons, such as emissions reduction, said Walter Bauer, Becker Marine Systems' director of sales and projects.

Some owners are looking for a hydrodynamic package involving bulbous bows, Twisted Fin rudders and Mewis Ducts, depending on the intended speed of the vessel, among other innovations.

In general, the patented Becker Twisted

Fin is applicable for faster vessels, such as containerships, while the Mewis Duct is favoured among the slower speed bulker and tanker owners.

Bauer said at present, the market is roughly split 50:50 between retrofits and newbuildings. He also said that Becker’s rudder designs are mainly sold to shipyards, while the ducts are marketed to owners.

As for their installation, Becker’s flap rudders can be retrofitted while the vessel is in the water using boats, while the Mewis Ducts and Twisted Fins are fitted while a vessel is in a repair or newbuilding dock. At the time of the installation, Becker will send

one of its engineers to ensure that the equipment is properly aligned.

“It is in our own interest to send an engineer, otherwise we could get a claim,” Bauer explained.

Thus far, around 1,000 Mewis Ducts have been sold and there are around 650-700 vessels, primarily bulkers and tankers, in operation fitted with the fuel saving device.

Becker now has more than 20 agents worldwide and is present in most of the major shipping countries, including the UK, where the company is represented by Simplex-Turbulo, the manufacturer of Simplex shaft sealings. ■

KOTC - Beyond compliance

The Kuwait Oil Tanker Co (KOTC) works with a broad range of suppliers, including DNV GL, to build and operate one of the most advanced, fuel-efficient tanker fleets in the world.*

As a subsidiary of the Kuwait Petroleum Corporation (KPC), KOTC is committed to providing safe and efficient transportation for Kuwait's leading export (petroleum), which is in line with KPC's strategic vision.

Recently KOTC completed a nine-vessel newbuilding programme, where the company worked with different suppliers to implement new systems to operate a cleaner, safer, and more fuel-efficient fleet.

Ali A Shehab, KOTC's deputy CEO - fleet operations, said that unlike most shipowners, whose approach to operations has been driven by new regulations and bunkering costs, the company goes much further and consciously travels the extra mile. "Rather than wait for new regulations or react to changes in bunker prices, we actively seek new ways to improve our overall performance," he said. "As a state-owned entity, KOTC not only has an obligation to provide KPC with excellent and cost-effective transportation services, we also represent the State of Kuwait, which has very specific policies on how we behave as a company."

In 2014, KOTC completed Phase III of its ambitious newbuilding programme, which

included four VLCCs, four MRs, and one LR2. The nine vessels were built at two separate yards and involved multiple suppliers. "From engine manufacturers to bridge control, classification to marine coatings suppliers, we worked with different industry leaders," said Jamil Al Ali, KOTC's manager fleet newbuilding projects group. "Most owners tend to stick to the same suppliers, but we believe a more diversified approach helps us achieve better results."

Al Ali said that using multiple suppliers not only allows KOTC to test different systems, it also helps deepen the technical knowhow of the organisation. "KOTC is part of a larger, state-sponsored effort to recruit and train the next generation of Kuwaiti seafarers, and we gain more expertise by working with different suppliers," he explained. "This strategy has also helped us build a strong international network – we have friends everywhere!"

KOTC takes the same approach to classification societies. "Different classification societies have different strengths and we have worked with many of the leading classes across our fleet. However, we have enjoyed a strong, long-term relationship with

Ground-breaking study

In February 2015, KOTC signed an agreement with a Danish environmental protection system manufacturer, Pres-Vac Engineering, to measure and minimise VOC emissions from tankers during transit in local and international waters.

This 'first of its kind' study was sponsored in part by the Danish Maritime Authority and will include the installation of specialised equipment to monitor emissions on KOTC vessels. ■

DNV GL for many years," said Shehab. "Their unrivalled technical expertise, especially in fuel efficiency, noise and vibration, crew comfort and ship safety has been very useful. Their quick response to our requests is also commendable."

Early adopter

Ralph Becker, DNV GL's regional business development manager in the Middle East & India, noted that KOTC's approach to shipping



Ali A. Shehab, Deputy CEO (Fleet Operations) KOTC.



The VLCC Al Funtas is part of KOTC's fleet renewal programme, delivered in March, 2014.

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shares much in common with DNV GL's mission to help the industry become safer, smarter and greener. "All shipowners are looking for affordable ways to lower bunkering costs, comply with regulations and gain a competitive advantage," he said. "But KOTC is an early adopter, and the work they do is not only effective, but also serves as a model for other shipping companies."

Indeed, KOTC's newbuildings include a number of innovations, amongst others the latest generation Tier II energy saving engines to reduce SOx, NOx and CO2 emissions and hull forms designed to optimise the water flow to the propeller, reducing hydrodynamic resistance during vessel transit. Furthermore, the four VLCCs and the Aframax (LR2) are also equipped with volatile organic compounds (VOC) reduction systems (De-VOC), which work by controlling and maintaining the pressure in the cargo loading drop lines above ambient pressure, minimising the generation of VOCs, especially at the initial stages of cargo loading.

Proven results

Shehab acknowledged that there were risks in being an early adopter, but said the results speak for themselves. "Measured against the voluntary targets set by the IMO's Energy Efficiency Design Index (EEDI), our initial analysis shows that we have achieved around 12% below the benchmark for the VLCC and 20% below on our MR tankers," he said. "What we learn from this newbuilding programme will optimise our decisions for the next phase of our fleet renewal."

Earlier this year, KOTC announced plans to add eight more vessels to its growing fleet – a mix of very large gas carriers (VLGCs), liquefied petroleum gas (LPG) and MRs – scheduled to be delivered in 2016 and 2017. "As always, we welcome new ideas to help us achieve a cleaner, more fuel efficient fleet," Shehab said. "In fact, we are already in discussions with a number of suppliers who we believe will help us achieve our goals."

**This article was written by Alexander Wardwell.*



**Jamil Al Ali, (Manager Fleet NewBuilding Projects Group)
KOTC.**

Navigation Advanced for Mates/Masters

This second edition of 'Navigation Advanced for Mates/Masters is aimed at today's navigator, the publishers - Witherby Publishing Group - said.

The watchkeeper currently has an increased workload, which demands that there should be clear methods of working and concise instructions given.

Written by Capt Nadeem Anwar, who is curriculum manager at Fleetwood Nautical Campus, the book is claimed to be easy to follow for learning and college work as well as for those at sea.

The 386 page, well-illustrated hardback gives a number of working examples, plots, templates for working and exercises to help the navigator gain the both the basic and advanced skills needed.

It is primarily aimed at Masters and Senior Navigating Officers, although it will also be of

benefit to Junior Ships Officers to develop skills for shipboard applications, also for future career progression, the author said.

Capt Anwar explained in the preface that there is increasing concerns over the competence and skills of seafarers, especially the navigation watchkeepers. Seafarers' training and development is time consuming, costly and demanding. There is also a need to keep knowledge up to date by staying in tune with new developments and practices.

To a large extent, the future of maritime safety relies on advanced navigational skills. This book not only mentions the methods, it also explains the methods, Capt Anwar said.

Each section is well illustrated with pictures, maps and graphics with a list of

templates at the end.

Subjects covered include regulatory requirements, passage planning, sailing, ocean routing, bridge procedures, radar navigation, extreme weather and celestial navigation, electronic nav aids, tides and tidal streams, marine communications, SAR and ECDIS and IBS, plus other concerns that the navigator may have.

At the end of this hardback book, as well as the templates, an almanac can be found reproduced from the HM Nautical Almanac Office, plus a glossary of the plethora of abbreviations used in the book and a comprehensive index giving a page reference to all the subjects mentioned, however small.

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Collective effort needed to keep pirates at bay

While Somali-based piracy in the Indian Ocean and Gulf of Aden is suppressed, there is no room for complacency regarding the ongoing threat, a leading expert said.

At a meeting organised by BIMCO during London Shipping Week, EU Naval Force (EUNAVFOR) Operation Commander, Major General Martin Smith MBE, said that the significant reduction in pirate attacks since 2012 had been achieved by the 'collective effort' of shipping companies and dedicated naval forces, including the EU Naval Force.

However, he warned that while opportunity for pirates to go to sea and attack ships had reduced, the pirates' intent and capability remained.

Major General Smith said: "It is clear that we have (together) come a long way since early 2011, when 736 hostages and 32 ships were being held for ransom in anchorages off Somali beaches.

"However, the recent incidents of Iranian dhows being captured by groups of armed men demonstrate that there are still some who are prepared to go out to sea and take vessels for ransom.

"Collectively, we have been able to curtail their use of mother ships to attack far from the coast, but I remain convinced that if pirates perceive that we are lowering our guard, they will seize the opportunity and plan an attack on a vulnerable ship. And if they take one ship, this could re-energise their business model which, you know all too well, could cost the international community and shipping industry dearly."

The current EU mandate runs until December, 2016. In the coming months, EU member states will carry out a strategic review of the piracy threat to enable them to make a collective decision on how best to proceed post-2016.

At the briefing, Andrew Varney, managing director of Port2Port, said, "Private sector actors are increasingly responsible partners in

the collaborative approach needed to ensure maritime security. Private security companies complement state government efforts, something I am committed to providing for the shipping and offshore Industries."

Giles Noakes, BIMCO's head of security, also discussed the vital role to be played by commercial players, saying, "they must ensure the survivability of shipping against threats."

Change for the worse

In a later statement, security concern MAST agreed that the situation in the Indian Ocean could very quickly change for the worse.

Gerry Northwood OBE, MAST COO, said: "For commercial shipping, the Indian Ocean is arguably the safest ocean on the planet. Put simply, the current security framework is working, but it remains extremely fragile and dependent on international navies maintaining a presence in the Indian Ocean, Best Management Practice 4 (BMP4) being diligently applied and for at least the majority of vessels to be protected by armed guards.

"Yet we continue to see speculative approaches by skiffs equipped with assault rifles and ladders. A MAST team recently fired warning shots at a skiff to prevent a boarding attempt in the southern Red Sea. Periodically, commercial vessels are reporting similar approaches, which demonstrate that the pirate threat remains latent. There are other warning signs indicating the security situation could deteriorate."

In July, the Kenyan Government released a number of convicted pirates enabling them to return to their homes in Somalia, which has also raised concerns.

In another piracy hotspot - Southeast Asia - the Malaysians have announced an initiative aimed at regional co-operation and also the

inclusion of armed guards on board ship.

Northwood commented: "Responsible governments, like the Malaysians and Indonesians, are taking an increasingly proactive approach to maritime security because they recognise that national wealth is intrinsically linked to good management of their Territorial Waters and Economic Zones.

"Regional co-operation and allowing armed security teams on vessels transiting through SE Asian waters will help improve a layered defence system that includes the deployment of rapid response teams announced by Malaysian and Indonesian authorities in August after a spate of attacks.

"Local and regional authorities need to do what they can to secure a safe environment for vessels to transit through, but shipping companies cannot afford to relax their guard either. The responsibility will still be on the ships and crews to take necessary precautions and ensure security measures remain effective while in transit, at anchor, in port and during cargo operations," he warned.

Information sharing

Meanwhile at an IMB meeting held last month, it was proposed that a common worldwide information sharing framework could speed up the receipt and distribution of critical details needed to enable naval and law enforcement forces to respond quickly enough to protect seafarers and arrest the perpetrators.

"Information sharing and co-ordinated action between concerned coastal states is crucial in responding to this threat. However, the proliferation of reporting centres in some regions could create a degree of confusion that can leave seafarers and ships unnecessarily at risk," Pottengal Mukundan, IMB director, said.

KVH gears up for big data

KVH Industries has introduced a second generation of its mini-VSAT Broadband solution.

This new offering introduced at London International Shipping Week, is designed to transform the maritime VSAT market with a combination of data delivered at the network's highest speeds, lower tariffs than previous airtime plans, plus the content, tools, and support to optimise broadband effectiveness.

As the shipping industry enters the era of big data, areas such as engine monitoring are now possible, the company said.

The expanded service -mini-VSAT Broadband 2.0 - encompasses rugged antennas and other hardware, flexible airtime options, extensive operations and entertainment content, innovative content delivery and comprehensive support – all available from a single vendor in a turnkey solution.

“Other satellite communications providers respond to increasing broadband demand by simply increasing airtime rates. We knew there was a better solution,” said Martin Kits van Heyningen, KVH CEO. “We provide maritime customers with affordable, usage-based plans

at the data speeds they need to take advantage of new cloud-based applications for improving operational efficiency – and we give them the tools they need for bandwidth management by user and vessel.”

New features of KVH's mini-VSAT Broadband 2.0 solution, which will be available on 1st October, include:

- **New Airtime Rate Plans:** Usage-based plans, designed around each ship's monthly requirements for operational and crew data, deliver data at maximum speeds on the network at every price point. In some cases, the top downlink speed of 4 Mbps is 15 times faster than previous plans, while the cost has been reduced by one third.
- **My KVH Network Management Portal:** This secure portal enables a ship operator to manage network usage by vessel or by individual crew members, allocate operational and crew data, and receive customised usage alerts by email and SMS text message.

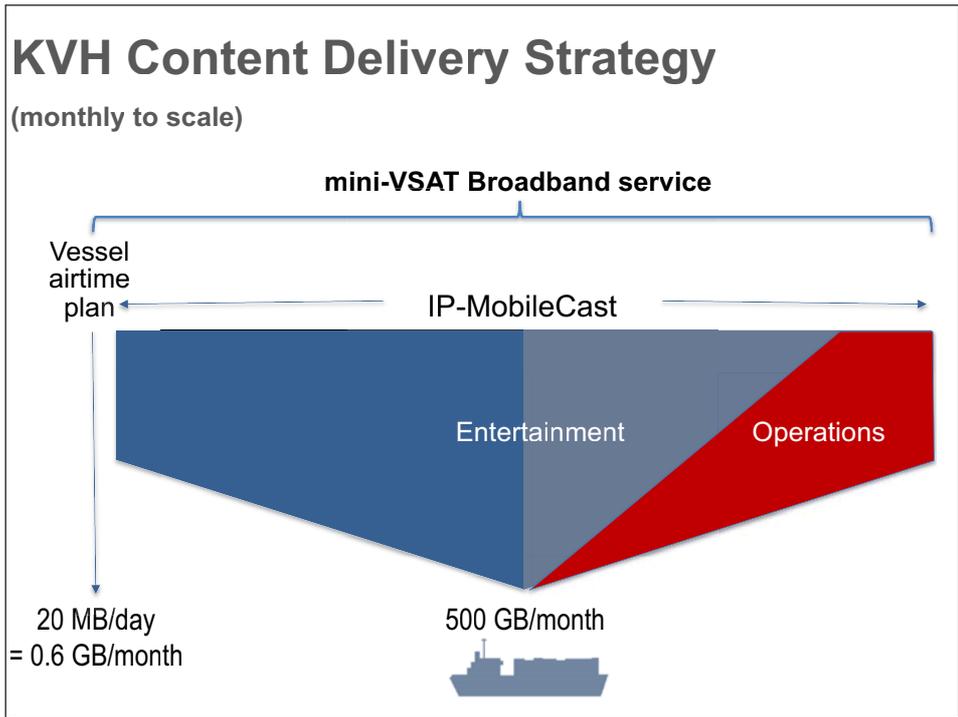


KVH's Brent Bruun.

- **KVH OneCare:** This global customer support programme covers application engineering, solution deployment and operating support, with KVH as the single point of contact. The programme is designed to minimise lifecycle costs and maximise service availability, and features an enhanced standard warranty covering parts and labour for two years for all KVH mini-VSAT Broadband antenna systems.

- **News and Sports Content Packages:** New entertainment content packages are designed to make news and sports programming more accessible to more subscribers via KVH's IP-MobileCast content delivery service.

“Ever since we launched the original mini-VSAT Broadband service in 2007, we have been leading the industry in innovative solutions,” claimed Brent Bruun, KVH executive vice president of mobile broadband speaking at the London briefing. “Already, more ships rely on KVH's mini-VSAT Broadband network than the next two VSAT providers combined*, and our growing



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customer base and satellite capacity are testimony to our forward thinking.”

The new features are claimed to boost KVH’s solution, which includes: global connectivity from the maritime industry’s most extensive C/Ku-band satellite network; a global private terrestrial and MPLS network for enhanced data security; compact yet powerful patented TracPhone V-IP series systems designed exclusively for the mini-VSAT Broadband network; and affordable delivery of gigabytes of the content needed on board vessels today via IP-MobileCast, the company’s content delivery service.

Entertainment

KVH’s IP-MobileCast offers one-to-many multicast efficiency to deliver up to 500 GB of operations and entertainment content per month to vessels without impacting the vessel’s data plan, bandwidth, or network performance.

“Competitive market factors make it clear that the maritime industry needs to change how it thinks about connectivity and its impact on competitiveness and profitability,” said van Heyningen. “KVH’s mini-VSAT Broadband 2.0 is the only complete satellite communications solution that helps maritime enterprises meet their complex operational requirements, while providing affordable communications and engaging content for their on board personnel.”

At the presentation, *Tanker Operator* was told that the company was aiming at newbuildings, as the system’s hardware could be designed in at an early stage. “We are making good progress,” the company claimed.

Antenna system

KVH has also introduced the TracPhone Fleet One marine satellite communications antenna system, a 28 cm diameter unit designed for vessels needing global satellite phone service and basic satellite Internet access. It complements KVH’s other Inmarsat-based offerings in the FleetBroadband family and its own TracPhone product line for mini-VSAT Broadband service.

Utilising Inmarsat’s airtime service, the TracPhone Fleet One offers a satellite phone service everywhere at sea except in the polar regions, and provides data speeds up to 100 Kbps, typically sufficient for email and limited Internet access along the coast worldwide.

The antenna system has manufacturers suggested retail price (MSRP) of \$4,995, and the basic airtime plan provides 50 minutes of voice and 5 MB of data for just \$49.99 per month.

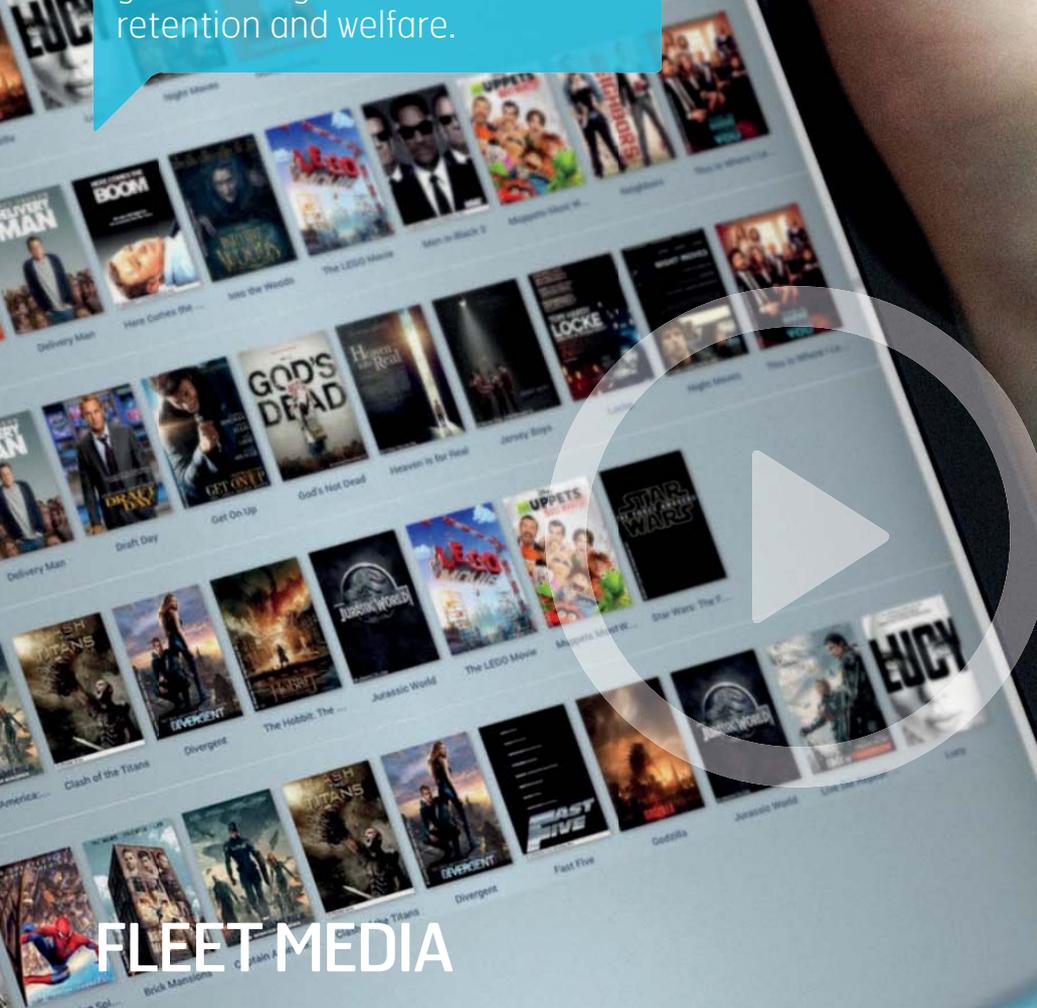
In addition, the TracPhone Fleet One system supports the free ‘505’ safety service, directing any emergency calls to a rescue centre.

“The demand for satellite phone service and broadband connectivity at sea continues to grow, and KVH offers the most complete line of solutions,” said Bruun. “From the weekend sailor or small fleet owner using Fleet One to the most sophisticated global commercial maritime operators taking advantage of our global mini-VSAT Broadband service, we offer a capability set and price point matched to customers’ needs.”

* According to COSMSYS.

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Shipboard terminals keep up with the pace of change

Some companies specialise in maritime antennas and terminals instead of offering a complete hardware and software communications package, such as KVH (see page 25).

One such company is Intellian, which claims to be the industry's fastest growing satellite antenna technology company.

Now in its 11th year, Intellian holds a 35.6% share of the stabilised antenna market, making it the market leader under a single brand, as verified by the 4th Edition of the COMSYS Maritime VSAT Report.

Paul Comyns, vice president global marketing, said that the company offers a one-stop shop for maritime satellite antennas and its approach has been successful because it combines superior products with responsive customer service, bringing a level of value to the market that did not exist a few years ago.

The company's extensive product range targets a wide cross-section of the maritime market, which has resulted in the setting up of one of the largest and most diversified distribution and support channels in the industry.

Intellian has built on its success in the stabilised TVRO market by developing a varied and comprehensive range of antenna systems with over 30 different products making up the current product portfolio.

For example, as well as SatelliteTV, Intellian provides VSAT, FleetBroadband (FBB) and Global Xpress (GX) terminal solutions. The company has invested in a global supply chain and service network and following a significant outlay on its Rotterdam logistics centre last year, the company claimed it had solidified its position as the industry's only hardware provider with a direct supply chain spanning three continents - Europe, Americas and Asia.

One of the key components claimed to contribute to Intellian's rise is Aptus, a graphical antenna control interface. The dedicated Intellian Aptus software enables users to connect to their antenna through a simple one click process, while dealers,

integrators and technicians can remotely connect to an antenna from anywhere in the world to provide routine maintenance and support.

Aptus continually monitors antenna performance and provides diagnostics, issuing alerts when updates are required. Users can download and install the new updates to their antenna system via Aptus mobile with one touch from their smartphone or tablet.

Pre-configured terminals

In addition, one touch commissioning enables Intellian's pre-configured terminals to go from power-up to network connectivity in 30 seconds, the company said. No calls to the network operations centre (NOC) are required, nor is post installation configuration necessary.

Intellian also believed that it was unique in the industry in offering a three-year warranty

on its marine products. It also invests 10% of revenues in R&D, while some 30% of its workforce is devoted to product development. The company has also completed a substantial expansion of its manufacturing and R&D facilities in South Korea to serve the shipbuilding yards with company engineers.

Comyns pointed out that the company's attention is on streamlining 'user experience' and an example of this is the Intellian v240M, the world's first antenna to provide auto-switching 2.4 m performance in both C- and Ku-band on a single reflector. Conventional MultiBand solutions have only partially addressed market needs by mounting a 2.4 m C-band reflector and a 1.2 m Ku-band reflector inside a single radome, he said

The company has formed an alliance with Kymeta to market new VSAT technology. The terminals, built by Intellian, will integrate Kymeta's thin, flat, lightweight, electronically



Intellian claims 35.6% share of the stabilised antenna market.



beam-steered patented Tenna satellite antennas, which are built on metamaterial-based technology.

Intellian was also selected by Inmarsat to be an official Global Xpress (GX) partner. In the maritime sector, Intellian was the first manufacturer to receive type approval for the supply of terminals for the GX network. The company worked in conjunction with Inmarsat for three years to develop its GX60 and GX100 terminals for the Inmarsat Ka-band service, which will be in operation shortly.

Intellian said that it had identified the need for a seamless and cost-effective transition process and produced a Ku-to-Ka band terminal. The v100GX, which is already on the market, will offer the future higher performance made available through GX.

To complement the new GX terminals a below deck unit (BDU) has been designed, featuring a built-in GX modem for simplified installation and reduced overall space requirements. The unit is Wi-Fi enabled, has a built-in eight-port ethernet switch and integrated AC power supply, as well as a front panel touch display with easy navigation buttons.

Comyns explained; "The maritime world is mirroring the same trends currently driving onshore communications, with all users sharing a common appetite for expanded access to connectivity and ever increasing broadband speeds. Satisfying this can address particular industry issues, such as crew attraction and retention, where some estimates suggest connectivity is a factor in crew retention in up to 85% of cases."

Data exploitation

More generally, Comyns saw the GX-capable products that support enhanced satellite communications as the gateway to connectivity at sea matching user experience in the home or the office. They are also pivotal to shipping's ability to exploit the data-based applications that will facilitate the optimisation of operational efficiency, condition-based monitoring and process automation, he said.

Recently, Inmarsat also announced that

integrated Ka-band and L-band solution that utilises capacity from the first GX satellite in commercial service, 1-5 F1, and Inmarsat's existing Inmarsat-4 fleet.

Intellian's new 65 cm GX60 and 1 m GX100 antennas are both approved for use, along with the FB250 and FB500, for FleetBroadband Xtra. The GX60 and GX100 terminals were extensively tested live at sea last year, and now with the FB250 and FB500, Intellian is able to fully support the new services.

Inmarsat has now completed the integration, evaluation and testing of the Intellian FleetBroadband Xtra solution incorporating Intellian's GX100 and GX60 GX terminals along with their FB250 and FB500 FleetBroadband systems.

Comyns thought that around 19,000 vessels could be fitted or re-fitted with GX friendly terminals during the next few years and there were only three main suppliers in the market.

Recently, Intellian partnered with Telenor Satellite Broadcasting (TSBc) to deliver high-speed maritime connectivity via the 60 cm and 1 m VSAT platforms.

The v-Series products were designed with the ease of installation and use deemed as the defining factors in providing a solution to accessing the THOR-7 high throughput Ka-band

Intellian's GX and FleetBroadband terminals are now approved for use with FleetBroadband Xtra.

Designed to enable maritime customers to benefit from high-speed broadband connectivity, Fleet Xpress is an-

satellite.

Both the v60Ka and v100Ka include Intellian's Aptus software with built-in spectrum analyser. Other benefits include secure SSL connection and the ability to network via the LAN function for simple management of multiple devices.

The v60Ka and v100Ka are both approved by TSBc for use on the THOR-7 network, while the v60Ka is currently the only approved 60 cm system ready for the network.

The THOR-7 satellite provides regional coverage with a favourable look angle over the main European shipping lanes, utilising relatively small spot beams, which provide high-power performance for shipping.

Supported by the iDirect patented Velocity platform, TSBc is able to offer VNO service solutions on its fixed beams, similar to those provided on the Ku band iDirect platform.

In conversation with *Tanker Operator*, Comyns said that the optimum size of antenna was 1 m up to 2.4 m. He also said that a retrofit market was growing for more modern systems due to the increased bandwidth and speeds available.

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Are you ready for new technology?

Technology development is accelerating and will continue to do so with no indication that its rapid pace will slow in the next 15 years.

Neither will the trend toward the increasingly integrated nature of technology applications reverse, says a new report 'Global Marine Technology Trends 2030 (GMTT 2030) Report', put together by Lloyd's Register, QinetiQ and the University of Southampton.

GMTT 2030 covers commercial shipping, naval and ocean space sectors, but *Tanker Operator* has only looked at the commercial shipping sector of this report, although it could be argued that all three are inter-connected.

The authors believed that with far-sighted leadership, commercial shipping can take advantage of these technologies for a prosperous, safe, sustainable and secure future. More than 56 critical technologies were examined that might possibly be developed and implemented around 2030. Of these, a further 18 technologies were selected that scored the highest in a net assessment combining technical feasibility on a commercial basis, potential marketability, and, most importantly, their transformational impact.

For each sector, eight technologies were chosen for their transformational effects when used individually and in combinations. Individual technology from four different perspectives were analysed and assessed:

- A concise explanation by a technology provider who wishes to sell to a potential buyer.
- A concise business case by a buyer who wishes to raise capital from an investor.
- An assessment by an investor on the risk and uncertainties.
- An examination of the technology's wider transformational impact.

In the commercial shipping sector the report evaluated robotics, sensors, big data analytics, propulsion and powering, advanced materials, smart ship, shipbuilding, and communication technologies. These technologies were found to be transformational in nature when used individually and when combined.

These eight technologies will probably be

implemented differently from ship type to ship type. These ships will be called TechnoMax Ships as technology implementation will be at the optimal level in 2030. These ships will be smarter, data driven, greener, with flexible powering options, fully connected wireless on board, digitally connected through global satellites.

TechnoMax Ships will require fundamental changes in terms of design, construction, operation and supply chain management. They will be designed by technologically advanced shipbuilders, ordered and operated by owners to sharpen their competitiveness and boost their corporate social responsibility credentials, the report said.

Two technology arenas will shape commercial shipping in 2030 with a significant impact on ship system design and ship operation.

- 1) A technology arena originating from within the industry, as intense competition encourages technology sophistication and operational efficiency in order to gain commercial advantages.
- 2) A technology arena that comes from other sectors, as maturing technology is ripe for transfer to ship system design and operation to enhance safety, as well as financial and commercial performance.

The first arena includes propulsion and powering, shipbuilding and smart ship, while the second arena includes sensors, robotics, big data analytics, advanced materials, and communications.

These eight technologies are not isolated, but are connected to each other. For example, smart ship technology is the integration of sensors, big data analytics, communications and advanced materials. It also includes propulsion and powering, as efficiency and emissions reduction are linked with future smart ship design and operations.

Robotics technology will include sensors that give robots better sensory and mechanical capabilities than humans, making them ideal for routine tasks. The robots' cognitive

abilities will be highly dependent on big data analytics technology and many of the building blocks for futuristic and highly disruptive robotic systems will be in place by 2030.

The wide application of sensors and communication technologies on ship components, systems and ships will generate extremely large volumes of data in nano-seconds. Data analytics technology is necessary for ubiquitous infrastructures to make use of these data for enhanced ship operational efficiency and to generate new business opportunities.

Together, these eight technologies will help the shipping industry to meet demands from customers who want shipping to use the latest technologies in order to give them a competitive edge and to be socially responsible, the report said.

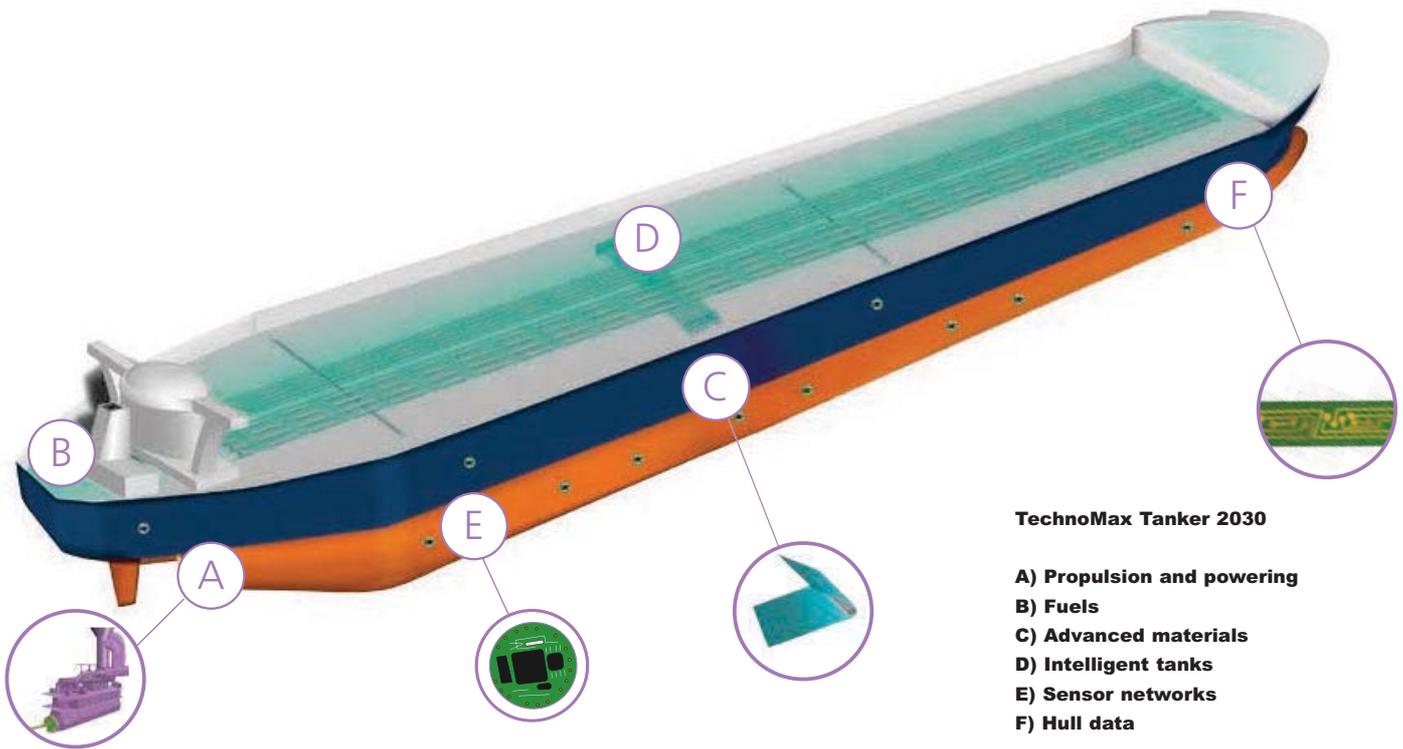
Advanced materials

Developing advanced materials for ship applications will be a critical component of improving future ship performance. New features will be introduced, and multi-functional materials can be created.

The characteristics of metals will be enhanced by adjusting their structures at microscale or nano-scale. The exceptional combination of strength and toughness of metals can be achieved by nano-precipitation, such as doping nano-sized carbide or copper precipitates.

A new class of alloys can be created to offer high malleability and corrosion resistance. Introducing magnesium or calcium nanoparticles will strengthen welds. A new anti-corrosion coating doped with graphene will potentially offer premium formability and corrosion protection to low-alloy steel in comparison to the traditional zinc-based coatings that are less ductile than the substrate steel.

Metals will still be the dominant bulk material used in ship structures, but there will be an increasing appetite for composites to replace steel in selected applications. The use



TechnoMax Tanker 2030

- A) Propulsion and powering**
- B) Fuels**
- C) Advanced materials**
- D) Intelligent tanks**
- E) Sensor networks**
- F) Hull data**

Source: LR.

of polymer matrix composites, from the traditional glass fibre and epoxy resin to the more recent carbon fibre-reinforced plastics, can offer lightweight, stronger, and tougher materials that do not corrode. Next-generation resilient mount materials will be explored to actively reduce the noise and vibration released from machinery.

With the ever-tighter competition, shipping companies are driven to invest in new materials that offer better mechanical properties or versatile functionality, leading to improved operational efficiency and reduced operating expenditure (OPEX). Better fuel economy or more cargo-handling capacity can be achieved by introducing high strength-to-weight structural materials, such as advanced high-strength steel, aluminium, glass fibre, or carbon fibre composites. Self-repairing materials can reduce the need for maintenance. Meanwhile, material suppliers will continue to look for sustainable sourcing.

The cost of purchasing new types of advanced materials and their price volatility will always be the first hurdle, as these materials will be new to the marine environment, while their life expectancy and material performance are unknown.

Materials should be marinised, for instance, delaying the degradation caused by seawater. When nano-particles are embedded, potential releasing routes should be analysed. Workers in the shipbuilding, repair, and recycling yard

should subsequently be given instructions for health and safety protection.

When combustible materials are proposed, the strict fire-protection requirements found exclusively in the marine industry can halt the process if regulators are not convinced by the suitability of their fire-safety design. If different materials are applied, the bonding method should be carefully designed to avoid failures.

Even though we will not see a drastic steel replacement in commercial ships on the same scale as the aviation or the automobile industries over the next 15 years, a revolution in advanced materials will quietly come into full play, from ship structures to machinery.

A new generation of machinery will emerge with enhanced performance. Inherent smart features can be designed for corresponding applications; these may include self-repairing materials developed for bearings or for the exposed surface of ice-class vessels. Materials will become more dependable and more reliable. However, new materials' behaviour-monitoring strategies should be developed to accommodate their new characteristics.

Regulators and classification societies should develop requirements in surveying and testing these new technologies. The use of more versatile materials could lead to some parts of vessels being less recyclable. End-of-life strategies should be considered during the product development stage.

An unprecedented amount of data associated with shipping has already been produced by different sources and in different formats, such as the world meteorological and oceanographic data, traffic data, material and machinery performance data, data on cargo flows across the world, maritime accident data, and even passengers' and seafarers' personal data.

However, traditional analysis does not allow for the full use of so much data, nor can it translate complex connections between different datasets stored in different formats. The main difference between traditional data analysis and big data analytics is that the former requires a person to define what questions to ask. A keyword search is implemented for troubleshooting, even though the solutions may or may not be found.

Big data analytics involves deploying a large number of algorithms designed to identify the correlation between data. When the correlation is identified, new algorithms will be established and applied to the dataset automatically. This is how the 'dynamic learning' feature comes into play. Intuitive conversions will offer a confidence-ranked response. Researchers will no longer need to predefine sampling or structure the data before they can analyse it, offering instant knowledge to realise fact-based management. The same dataset can also serve different purposes for different organisations.

IT infrastructure will be upgraded to retrieve, store, and process data in real time. Archived data can be stored either on board a ship or onshore, thanks to the support of communication technologies. Furthermore, cognitive systems will act as data interpreters for human consumption. These systems will combine machine learning and natural language processing to offer an intuitive interface between a person and a machine.

The shipping industry will therefore move from a decision-tree driven approach to the adoption of a probabilistic approach. Real-time performance monitoring, alert systems and/or visualising situational awareness can all be achieved wherever you are and whenever you want, the report said

Shipping companies, flag states, port states, and shipyards will become data-driven businesses. Data analytics will foster condition-based asset management and predictive maintenance. Companies will be under pressure to provide high-quality self learning algorithmic packages that can learn from data in order to stay competitive.

Action will be taken quickly following events or incidents in maintenance planning, pricing and logistics arrangement. The shipping industry will become more transparent. This implies a change in the industry's business and operation model. Transparency will also assure companies and individuals that the process is lawful and that their data is protected.

New services will be created and new professional skills will be required. Enhanced operational efficiency and safety will be achieved by real time monitoring of vessel performance, asset management, compliance, emergency response and incident or accident investigation. The connectivity between ship to shore, ship to ship and people to ship or shore will be strengthened.

Regulators should consider standardising digital reporting methodologies and taxonomy for data to ensure data synergy and to assist subsequent data mining that will offer reliable information.

Tanker concept

As for the TechnoMax tanker, the technologies applied will be influenced by the implementation of emerging ECA and SECA areas in the traditional routes of this ship type. The potential implementation of the Mediterranean as an ECA could have a big impact on the design of this vessel type and the exploration of new propulsion alternatives and the vessel's dimensions.

Propulsion and powering - The main

propulsion package fitted on board large tankers will still be large-bore 2-stroke engines. Combustion mapping, heat flows, re-tuning, the self-adjusting and close monitoring of essential and non-essential parts and remote monitoring will be possible with the new, intelligent large bore engines range.

The overall efficiency of the propulsion plant will be enhanced with the use of new materials, such as graphene and its alloys, in heat exchangers and condenser piping. This will improve the overall thermal efficiency of that equipment and will reduce associated maintenance and chemical dosing. 3D-printing devices for expensive spare parts (ie, engine sensors, connectors, pump casings, impellers, etc) will improve repair activities on board and will consequently reduce OPEX. Lighter propulsion packages, using lighter materials together with optimised maintenance strategies, will have an influence on the fuel bill.

Fuels - Operations in current and emerging ECAs will see the diversification of marine fuels that can comply with ever-stricter emissions limits. This will lead to an increase in the use of gas as a marine fuel and in potential new and local fuel supply solutions emerging. In this way, the utilisation of alternative fuels will become feasible from both technical and financial angles, for use in ECAs and near-shore operations.

These alternative fuels include methanol and ethanol, but also more traditional fuel types such as fatty acid methyl esters (FAME), and even non-traditional fuels such as glycerol.

Advanced materials - Graphene's anti-bacterial properties will create new opportunities for application in fields such as hull coating. By means of graphene films, hull surfaces will be covered, avoiding micro- and

macro-fouling attachments. The robustness and resistance of graphene are useful characteristics for this type of application.

Intelligent tanks - Sensor networks will be embedded on bulkheads and vessel structures. Graphene batteries will help networks to operate independently and for long periods of time. An intelligent tank-cleaning schedule will be easy to track using sensor networks. This will help to optimise cargo schedules and to properly monitor the state of the tanks.

Sensor networks - Smart dust-sensor networks will comprise a vast number of ultra-small, fully autonomous computing and communication devices, which will work together to accomplish large sensing tasks. The length of the type of vessel drops into the operational distance these type of devices are able to operate within.

Hull data - Graphene is strong, conductive, thin and stretchable. Graphene strips, with allocated sensors, alongside the hull will provide more accurate data about the hull's working conditions. Not only will they monitor external factors (seawater temperature, sloshing, impacts and fouling), but they will also monitor internal factors (stresses, microbial induced corrosion, and bending).

This device will help during real sea-state conditions when the vessel is pitching and pounding. In this manner, we will see in real time the longitudinal stresses (hogging and sagging) caused by the sea, weather or cargo conditions. This will facilitate a new approach called Hull-Skin-Data Centred Decisions and would be adopted according to those working parameters.

By means of models generated in real time, decision-makers will be able to make better informed decisions, the report stressed.

NAPA streamlines compliance with CSR

NAPA has released new tools and interfaces with class society software to streamline ship design compliance with IACS' Common Structural Rules for Bulk Carriers and Oil Tankers (CSR BC&OT).

Updates to 3D structural design software, NAPA Steel, and the release of a geometry modelling tool, NAPA Designer, will deliver a shift from 2D to 3D design requirements. This will eliminate duplication between software systems and reduce the man-hours needed to meet the new rules, the software design company said.

In addition to fulfilling the new

requirements, which entered force on 1st July, ship designers are now facing the challenge of class societies having developed their own independent rule check software.

With NAPA's new modified interfaces with class society software, including Bureau Veritas' MARS2000, ClassNK's PrimeShip-HULL, DNV GL's POSEIDON and Nauticus Hull, and Lloyd's Register's RulesCalc, the design information can be integrated automatically, significantly speeding up the process by removing duplicated work. ■

Carriage of fuel blends discussed

DNV GL has issued an update regarding the regulatory status of shipping fuel blends on tankers.

A biofuel blend is made up of a biofuel part and a petroleum oil part. Examples may be mixtures of ethanol and gasoline or FAME and diesel.

Recognised biofuels are those IBC Code products listed in Annex 11 of the MEPC.2 Circular, which is issued annually. Currently, there are eight recognised biofuels listed:

- 1) Fatty Acid.
- 2) Methyl Esters (FAME).
- 3) Vegetable oils Ethyl alcohol (ethanol).
- 4) Alkanes (C10-C26), linear and branched with a flashpoint >60°C.
- 5) Alkanes (C10-C26), linear and branched with a flashpoint ≤60°C.
- 6) Alkanes (C5-C7), linear and branched.
- 7) Alkanes (C10-C17), linear and branched.
- 8) Tert-Amyl ethyl ether.

While pure biofuels are shipped on chemical tankers under the IBC Code Certificate of Fitness (CoF), a biofuel blend may be carried either as an oil subject to MARPOL ANNEX I or as a chemical subject to the IBC Code.

Under which regime a biofuel blend belongs depends on the petroleum-oil/biofuel blending ratio. If the blend contains 75% or more of petroleum-oil, it is considered oil under MARPOL ANNEX I; and where the petroleum-oil part constitutes for less than

75% of the total blend, it is considered a chemical.

The IMO guidelines on the carriage of biofuel blends came into effect in 2011. To allow sufficient time for oil discharge monitoring equipment (ODME) suppliers to develop solutions, a ‘period of grace’ until 1st January, 2016, was granted for tankers without an ODME approved for the biofuel blend carried, provided that all residues and tank washings are pumped ashore.

As from 1st January, 2016, to carry a biofuel blend under the MARPOL ANNEX I regime the ODME is required to be type approved for the specific blend and concentration carried. The ODME type approval standard MEPC.108(49) has been amended, and ODME manufacturers are now offering upgrade kits for existing equipment accordingly. Needless to say, if the shipping of biofuel blends is not intended, an upgrade will not be necessary.

Things to consider when upgrading or replacing an existing ODME:

- An on board survey including a function test by an attending DNV GL surveyor will be required.
- The ODME manual has to be revised and re-approved₁.
- A new type approval certificate₂ has to be

provided. It is essential that the relevant blends and concentrations are covered by the type approval and included in the type approval certificate.

- The IOPP certificate will not be affected unless upgrading from a pre-MEPC.108(49) standard such as A.586(14). When considering the oil tanker deck firefighting system requirements in SOLAS, it should be noted that when carrying biofuel blends containing more than 5% ethyl alcohol, alcohol-resistant foam is required.

Chemical tankers

Currently, there are five biofuel entries in Chapter 17 of the IBC Code, which will be included in the vessel’s certificate of fitness, provided all the carriage requirements are met by the vessel.

In addition, there is one provisionally assessed ‘Biofuel blends of jet fuels and alkanes (C10-C17), linear and branched’ included in list 1 of the latest MEPC.2 Circular, which is awaiting a formal assessment by IMO.

Prior to shipping other biofuel blend compositions under the IBC Code, the producer/shipper has to initiate a product assessment according to the IMO guidelines in order to have it included in list 1 of the MEPC.2 Circular and finally in Chapter 17 of the IBC Code.

Bio-fuel blends of Diesel/gas oil and Alkanes (C10-C26), linear and branched with a flashpoint >60°C (>25% but <99% by volume)	X	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	No	15.12, 15.17, 15.19.6
Bio-fuel blends of Diesel/gas oil and Alkanes (C10-C26), linear and branched with a flashpoint ≤ 60°C (>25% but <99% by volume)	X	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	ABC	No	15.12, 15.17, 15.19.6
Bio-fuel blends of Diesel/gas oil and FAME (>25% but <99% by volume)	X	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	No	15.12, 15.17, 15.19.6
Bio-fuel blends of Diesel/gas oil and vegetable oil (>25% but <99% by volume)	X	S/P	2	2G	Cont	No	-	-	Yes	C	T	ABC	No	15.12, 15.17, 15.19.6
Bio-fuel blends of Gasoline and Ethyl alcohol (>25% but <99% by volume)	X	S/P	2	2G	Cont	No	T3	IIA	No	C	FT	A	No	15.12, 15.17, 15.19.6

Footnotes:

1) A complete ODME manual including both operational and technical information shall be submitted for re-approval if a new ODME is installed. If the instrument is in compliance with MEPC.108(49), and measurement cell and/or software is to be renewed for compliance with MEPC.240(65) and MEPC.1 Circular 761, the attending surveyor can endorse the amendments in the manual on board.

2) The form of the type approval certificate should be in accordance with MEPC.240(65) (2013 amendments to resolution MPEC.108(49)).

Rivertrace issues biofuel warning

The new regulations on the carriage of biofuels (see page 33) could limit the trading flexibility of product tankers from next January, warned Rivertrace Engineering's managing director, Mike Coomber.

This is because ODME on board most existing vessels is not geared up to handle biofuels.

From next January, Coomber said that vessels without up-to-date type-approved equipment will not even make it on to charterers' shortlists, as they will no longer be eligible to carry biofuel cargoes.

"In a spot survey of tanker owners, which we carried out recently, we found that most were not aware of the new regulations," Coomber explained; "They are sleep-walking into a situation in which the employment opportunities for their ships will become seriously jeopardised."

The regulations are complicated but boil down to the fact that from next January, biofuels will be subject to the same discharge rules as oil cargoes derived from fossil fuels today.

"It is usually a relatively simple matter to upgrade equipment on board, but it will require careful planning, individual analysis of what is required by way of hardware and careful planning for installation visits. Time is running out for many operators," Coomber said.

Under the current regulations governing the discharge of oily water, or dirty ballast as it is known, in place since 2005, tanker operators can discharge waste water in volumes of 30

litres per nautical mile provided the ship is under way at more than seven knots, or up to 1/30,000th of the total cargo carried, whichever limit is reached first. This applies to black and white oil products – dirty oils and refined products.

Basic equipment

Prior to 2005, ships could discharge waste at much higher rates, at 60 litres per nautical mile, thus monitoring equipment on board product tankers of more than 10 years old is generally far more basic.

Coomber claimed that oil discharge monitoring manufacturers, like Rivertrace, have type-approved products immediately

ARE YOU COMPLIANT WITH THE NEW REGULATIONS?

Next year all vessels carrying bulk petroleum products containing biofuel must comply to new discharge regulations.*

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To find out more email sales@rivertrace.com

* IMO Resolution MEPC.108(49) as amended by MEPC.240(65)



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Milbros Off-Line

The off-line version has all the information that is available on the web version. It is designed to be installed on board vessels with or without internet access. A unique synchronization feature via the internet or via e-mail allows the ships to always have up to date information. Company private specifications, notes and documents also synchronize with the ships which allows the office and ship to always have the same information. Single workstation or onboard network versions available.



available. But, depending on the type and age of the installation on board, the number of ship days necessary for an upgrade will vary.

“On straightforward upgrades, all that is likely to be required is replacement of the measuring cell and installation of a new circuit board. You can do this work at sea and, with travel time, it’s likely to cost about \$10-12,000,” he explained. “But on pre-2005 units, you will basically have to start again. This could mean a new monitoring system, seven to 10 days’ sailing time for installation, and a bill of \$30-40,000.”

The number of product tankers likely to

require upgrades is not clear, but Clarkson’s figures reveal that the product tanker fleet consists of about 2,600 vessels. Although there are still a significant number of ships built before 2005, most of the fleet is less than 10 years old.

Whatever the precise number, Coomber said that it will be a big one, and there are now less than a few months left to upgrade what are likely to be hundreds of tankers. Otherwise, from January, they simply won’t be able to carry biofuels in any form, blended or otherwise.

Demand for system upgrades will confront

the five major suppliers with a major challenge in terms of hardware. But more daunting still are the logistics. Coomber warned that there is a limited number of suitably trained personnel capable of carrying out the necessary work on board ship and, depending on where vessels are operating, there will be complicated travel arrangements, security clearances and visa issues. There is a real risk of technical personnel being delayed until after ships have sailed.

Fearing a bottleneck, Coomber urged tanker operators not to lose any more time.

TO

New engine for chemical tankers

The 35,000 dwt chemical carrier *Chemroad Queen* has become the first ship to enter service powered by MHI-MME’s new UEC50LSH-Eco engine.

Mitsubishi Heavy Industries Marine Machinery & Engine Co (MHI-MME) has been developing the 500 mm bore, 2,300 mm 2-stroke engine to incorporate new technology, including reduced fuel consumption, slow steaming, low engine-load capabilities and compliance with emission regulations.

The engine installed in the tanker was built by licensee Kobe Diesel and was delivered to the shipbuilder, Shin Kurushima Dockyard, in March after completing shop testing. On board testing was completed in August and the ship, owned by Iino Kaiun Kaisha, entered service without any complications.

Its design began with thorough market research and the engine power output and speed were adjusted to be suitable for chemical tankers, MRs and bulkers.

MHI-MME has recently received follow up orders for 5UEC50LSH-Eco-C2 main engines



Chemroad Queen.

for 38,000 dwt chemical tankers to be built at Kitanihon Shipbuilding and said that many inquiries were also being received.

■

Second MaK retrofit on products tanker

Building on the success of recent MaK diesel engine dual fuel retrofit conversions, Caterpillar Marine is currently undertaking another dual fuel engine retrofit conversion on board the 2006-built chemical/products tanker *Fure West*, owned by Furetank Rederi.

The vessel’s MaK M43C diesel engine will be retrofitted in hull to a 7-cylinder M46 dual fuel (DF) unit, with each cylinder offering 900 kW of rated power.

In addition, Caterpillar is also supplying the complete gas system for the tanker, including bunker stations, two LNG tanks measuring 4.15 m x 24 m and the vaporiser.

This project, backed by the European Union and developed with the Zero Vision Tool, marks the second MaK engine dual fuel retrofit undertaken. In 2014, Caterpillar successfully completed the dual fuel engine retrofit conversion on the Anthony Veder LNGC *Coral Antheia*.

“We’re pleased to continue to build upon our successful track record of dual fuel conversions in the commercial marine industry and offer an increased scope of supply to our customers,” Finn Vogler, Caterpillar Marine senior engineer, said. “We have a market-ready technology available that our commercial marine customers can be completely confident in and after our success on board the *Coral Antheia*, we have seen the demand for MaK dual fuel solutions increase substantially.”

With a bore of 460 mm and stroke of 610 mm, the M46 dual fuel engine was designed for electric drive propulsion systems, as well as mechanical propulsion systems.

Although designed for unlimited operation on LNG, marine diesel oil and heavy fuel oil, the M46DF will reach efficiency in gas mode. In addition, existing M32E engines can be retrofitted to the MaK M34DF dual fuel unit.

As a result of the synergies between the two engines, Caterpillar can perform in hull retrofit conversions without having to move the



The 17,600 dwt chem/prod tanker *Fure West* is the second vessel to be recently retrofitted with an MaK gas engine.

engine block or perform extensive machining.

For the *Fure West* conversion, dealer Pon Power had a significant role in the project. “We’re able to differentiate our solutions in the market by offering a collaborative partnership with our dealers to ensure the retrofit conversions are completed in an expedited manner and with a reduced number of parties involved, as a result of our ability to provide the complete gas system for a vessel as well,” Vogler explained.

TO

Arctic Aframax tanker design unveiled

Finnish engineering design concerns Deltamarin and Aker Arctic Technology have jointly developed an Arctic Aframax-sized tanker concept, focusing on safe operations.

Deltamarin's expertise in affordable energy efficient cargo vessels coupled with Aker Arctic's strong track record in Arctic vessel designs have developed a concept, which apart from being ice strengthened and equipped with other new features, will provide cost effective and reliable tanker operations both in open water and in ice, the companies claimed.

The Arctic Aframax tanker is intended to ship crude oil and oil products. The vessel will be strengthened to ice class PC5 (equal to about Russian Maritime Register of Shipping category Arc6) and will be capable of continuously breaking ice thicker than 1 m.

She will be able to operate on the Northern Sea Route during the extended summer months, and with icebreaker assistance - even longer. During the winter months the vessel could operate in sub-Arctic sea areas, such as the Baltic Sea or Sakhalin.

Deltamarin's experience in designing cargo vessels was used to minimise the newbuilding and operating costs of this tanker design.

Deltamarin's Director of Ship Design, Markku Miinala and Aker Arctic's Project Manager Riku Kiili, said. "The design integrates optimised ice breaking and open water performance, as well as the latest energy efficiency features applied together with the Polar Code requirements.

"This unique combination results in an affordable building and improved transport economy by cost efficient operation. The design can be fine-tuned according to the customer's wishes," they said.

The vessel's bow and hull shape are claimed to have the best balance between open water performance and icebreaking capabilities. The specially designed hull strengthening will improve safety when operating in Arctic waters, the designers said.

An ice load monitoring system will be fitted to the hull, which will measure ice loads from the hull and provides online support to the ship's officers ensuring safe operations. The system will also help the shipowner in the long term by analysing the data and creating information for optimal operations.

Emphasis has also been placed on winterisation for cold climates in all aspects of the concept design.

She will be fitted with two CP-propellers and shaft lines directly coupled to slow speed diesel engines. The vessel can also be operated on LNG with dual fuel engines fitted. In addition, there is a possibility to fit two bow



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The bow and hull shape has the best balance for open water and icebreaking operations.

thrusters and shaft power take-off/power take-in (PTO/PTI) systems.

The designers also focused on the development of an improved navigation bridge configuration, where the new Aker Arctic ARC Bridge Concept will be used. The visibility from the bridge is claimed to be excellent in any direction and good ergonomics, including access and passages to command posts, will be created.

TO

Principal Particulars - Arctic Aframax 118,000 dwt crude carrier

Class.....	PC5/RMRS Arc6
Loa.....	266 m
Lbp.....	258.1 m
Beam.....	46 m
Depth.....	22.5 m
Draught, design.....	14.8 m
Ice breaking.....	1 m (continuous)
Open water speed, service....	13.5 knots



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The vessel is designed with twin engines, rudders and propellers.

Keeping turbochargers operational

ABB Turbocharging recently signed long-term service agreements with three shipping companies, covering 400 turbochargers.

Each of the three companies, which included Teekay, a Norwegian-based offshore shipping company and a ferry concern, signed a maintenance management agreement (MMA) with ABB Turbocharging in Norway.

By signing these service agreements, ABB Turbocharging will take full responsibility for planning and scheduling turbocharger servicing. The agreement also includes monitoring for early warning of upcoming service requirements.

ABB Turbocharging offers customisable service packages from basic up to full service, with capability across more than 100 fully-owned service stations in 50 plus countries. The full service package enables maintenance planning in advance at a predicted cost level for the customer.

Each service station is fully equipped to handle all ABB turbochargers, from the smallest to the largest. The company's network of turbocharging service stations is aligned to global customer demand, for example service stations in Middle East shiprepair yards were opened to address future projected demand.

As for remote monitoring, this is still a relatively new technology across the industry. ABB said that it was working towards a solution that meets customers' requirements and will be accepted in terms of the deliverables, cost, and implementation in remote infrastructures.

ABB's software products like EMMA and Octopus, which are installed on more than 300 vessels, provide this infrastructure and turbocharger monitoring devices are planned to be embedded into these systems.

ABB Turbocharging told *Tanker Operator* that its equipment had been fitted on board more than 100 tankers.

Some of the latest projects include working with Navig8 in Singapore, Petredec (LPG carriers), BP Shipping, Kogas (LNGCs) and

Arcadia Ship Management. "Triggered by this, we also see a growth in customers signing MMAs," the company said.

"Our latest generation products, ensure the highest efficiencies leading to lowest fuel consumption and emissions. By continuous investment in our R&D, ABB turbochargers are fully prepared today for IMO Tier III, and thereby enable engine manufacturers to adjust to latest regulations," *Tanker Operator* was told.

For newbuildings, with the exception of a series of small vessels on which the shipyard has standardised the equipment, the shipowner usually makes decision which turbochargers to fit on 2- stroke engines.

Retrofits

As for retrofits, the time and effort needed depends on the type of upgrade required. A component upgrade involves change of components of the installed turbochargers, for example, a new compressor stage, which typically comes as a complete new cartridge, including compressor stage and bladed shaft. This takes around 12 - 24 hours per engine. The job can even be undertaken during the ship's operation/sailing, assuming one of the engines can be temporarily shut down.

"If we do a complete turbocharger upgrade (changing a turbocharger) it takes roughly up to two weeks for V-engines with two turbochargers fitted per engine. This needs to be done during drydocking. Typically, modifications on the engines are also required (eg, a change of camshaft). If only the turbochargers need changing, it could be done in a week or so (one engine, two turbochargers). So both options need careful planning in advance but can be done quite efficiently," the company explained.

Turbocharger upgrades mentioned above mainly apply to vessels fitted with 4-stroke engines, eg, LNGCs. On tankers with 2-stroke

engines, the engine working principle is different and therefore upgrade possibilities are not the same. These are limited to optimisation for different operation conditions, such as slow steaming, low load tuning, etc.

The fuel savings potential by only changing/upgrading the turbocharger is very limited because of the engine working principle, therefore most of ABB's upgrade work is undertaken on vessels with 4-stroke engines.

The company also explained that it was constantly looking to upgrade turbocharger and resulting engine performance to the benefit of the end user. This becomes feasible because technology advances over time resulting in ABB being able to fit or tune older installations with newer technology - eg, more efficient components/turbochargers, or a re-matching/optimisation of the power system to changed operational conditions, legislation, such as emissions etc. Whether this is useful and which options are available, depends on each specific case. This applies in the same way to both 2-stroke and 4-stroke engines.

ABB also offers training worldwide in turbocharger operations. This involves explaining the product operations and guiding customers through possible trouble-shooting scenarios and educating them on ABB's products.

On the daily routine maintenance side, cleaning and washing of the turbochargers is explained. For tasks beyond routine, sometimes requiring special equipment, a network of ABB specialists is available to offer support whenever and wherever required. This also ensures resource efficiency and safe operation.

Most customers prefer the OEM to carry out their service requirements, as this saves them time and minimises risks by handing the job over to experts.

Tanker terminal idle time measurement and analysis

Dock utilisation is a typical key performance indicator (KPI) used by marine tanker terminals to measure efficiency. It is generally calculated as a percentage of time a dock is occupied as opposed to vacant or experiencing an outage.*

A more objective KPI is dock idle time, or the time a tanker is alongside and not transferring cargo. Properly measuring dock idle time and establishing a systematic approach for this KPI's data collection, reporting, benchmarking and trending analysis can significantly improve dock operations and enable terminal operators to work collaboratively with their stakeholders on achieving quantifiable reductions in overall vessel call times.

Utilisation is normally presented as the percentage of time the dock is occupied, and is classified into three categories - occupied, vacant and outage. Based on the definition of dock outages, however, dock occupancy may not necessarily equate to effective dock utilisation. While an outage is defined as a period of time when vessels are restricted from occupying the dock or when a vessel cannot leave the dock after the cargo transfer has completed, it is further classified into two types based on the terminal's ability to impact the outage.

Local factors add complexity to the outage equation. For instance, if the terminal's waterway has tidal or daylight transit restrictions, how do you incorporate the time a vessel is alongside waiting for high water or sunrise? Is this time considered an outage outside the terminal's control, or is it a dock occupancy? A terminal's operations department might categorise these restrictions as dock occupancy to show a higher utilisation number. These are just a couple of examples of why dock utilisation is a less objective KPI than dock idle time, which is defined as the time a vessel is alongside and not transferring cargo.

Measuring and logging

The dock idle time KPI is actionable and relevant for any operations team that wants an efficiency measurement for vessel call management. Lower dock utilisation is a direct result of any dock idle time reduction, and only by measuring dock idle time is it possible to optimise dock operations.

The first step in reducing dock idle time is identifying root causes of dock idle time by classification of delays and routine events. The first layer of idle time classification is the three distinct periods of a vessel call evolution. The pre-transfer period includes events from vessel 'NOR' through managing the vessel arrival. Transfer event periods include events associated with preparing for, performing and completing cargo moves. To better aid reporting, concurrent and consecutive cargo moves on the same vessel call should be managed by separate transfer event periods. Finally, the post transfer period encompasses any events that occur after all transfer periods are complete.

Each vessel call event time must be accurately, consistently captured by the dock team in order to facilitate accurate trending. Is this done with a paper log in the dock shack where the primary goal is to comply with local regulations? Does the process rely on third parties to manage the logging of dock event times? Either of these approaches is a much greater risk of error, and forfeits the opportunity to exploit valuable information. A much better approach is to replace paper logs with an easy-to-use system for entering events in real time.

Accurate and consistent data logging is critical for both routine events and delays as both impact idle time.

Once the data is being consistently

collected, it is possible to identify areas where idle time can be reduced. Is one shift consistently beating the benchmark time between 'Hoses Off' and 'Vessel Ready' status? Learn how they are accomplishing this, and establish it as a best practice for all shifts. Or, perhaps there is the opportunity to compare call-out times between third parties, as the basis for initiating customer service conversations with clients.

Pay special attention to delays. By categorising delay start and stop times, terminals can identify what delays are most severely impacting dock alongside time. Once these delays have been identified, look first at the categories which are under the terminal's control and represent the largest piece of the overall delay pie. For instance, is the most frequent delay type the waiting times for tank space? Work with customers to help them be better prepared for the upcoming transfer, and consider charging tenants for dock time, if customer-related delays exceed a specific threshold.

No matter who is responsible, delays eat into a cargo owner's lay time and have an impact on demurrage costs, which is of great concern to any terminal's current and potential clients.

Implementing a process to measure dock idle time in a consistent fashion with an easy-to-use system can significantly increase vessel calls per year for every dock, and provide the necessary metrics and a collaborative environment for improving efficiency and client relationships.

**This article was written by Robert Kessler, director, business development, enterprise solutions PortVision (R), a service of Oceaneering (R).*



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**HIGH PERFORMANCE,
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Human factors in casualties examined

The Nautical Institute's (NI) latest book - *Navigation Accidents and their Causes* - looks at major casualties and the lessons that can be learned, setting out good practice to avoid them in future.

The book examines nearly 30 casualties and the problems of fatigue, bridge resource management, Colregs and other issues where human factors contributed to the accidents.

In his Foreword to the book, Koji Sekimizu, IMO secretary general, said: "This timely publication from The Nautical Institute should provide a crucial guide for every mariner serving at sea and serve to assist in reducing collisions and groundings. The publication is written in maritime English for international mariners. Each chapter can be read individually, thus forming a valuable on board resource."

An international group of authors, including accident investigators, Master Mariners, navigation specialists and university lecturers, drew on their experience and knowledge to look at the mistakes that have led to collisions and groundings. Previous casualties were used to illustrate where failures have occurred and where lessons can be learned. The need for risk assessment in advance of a voyage is highlighted in several ways, including bridge resource management and passage planning.

The authors looked into the future, to identify trends that may impact on navigational risk and suggested ways to mitigate them. This innovative approach goes beyond the scope of Collisions and their Causes and Strandings and

their Causes, both previously published by the NI and written by the late Capt Richard Cahill. While *Navigation Accidents and their Causes* examines failings that Capt Cahill identified so clearly, it goes further by suggesting on board training and mentoring as the way to learn from accidents, the NI said.

Technical Editor, David Pockett BSc FNI, a leading casualty investigator and a member of the panel of Special Casualty Representatives at Lloyd's, explained that navigation aids are only "as good as the user" and need an alert observer who understands the input and output, can assess the data provided and identify faults.

In the future, he said "the navigator will still play an important role but the job specification will be wider and more sophisticated than before. Spatial issues too will become ever more of a challenge. The continued exploration for hydrocarbons offshore and implementation of renewable energy systems will have an impact on navigation, particularly in coastal areas," he explained.

New exclusive economic zones, reduced sea room, greater regulatory measures and the need for yet tighter control all suggested a leaning towards a 'Big Brother' approach in the future. He said that with the prospect of autonomous ships and increased involvement of VTS, it might be a case of "the navigator navigating or being navigated, or perhaps

moving from active to passive navigation."

The book launch coincided with a seminar organised by the NI on Manning and Fatigue. Capt Nick Nash FNI, an Institute vice president, explained: "We have been informing the world about the dangers of fatigue and lobbying for change for decades. The danger of operating a Master/mate six on/six off system is that the ship cannot comply with the ISM Code and its own SMS. Or at best, has great difficulty in complying. Extreme fatigue in all watchkeepers is bound to result.

"We will continue our campaign as fatigue is a factor in many accidents and near misses, minor and major. We hope that is the start of a new phase in our work towards reducing, if not removing, the threat that crews face from fatigue.

"The overall message from the book and the seminar is that everyone can learn from the mistakes of others and everyone has a part to play in ensuring that training and experience are used effectively to keep vessels safe. On board training and mentoring may hold the key, and the navigation bridge is an ideal place for this to take place," he concluded.

****Navigation Accidents and their Causes is available from The Nautical Institute, price: £40; ISBN: 978 1 906915 32 2 www.nautinst.org/pubs**



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Hooks and the Arctic high on the LSA agenda

There have been several initiatives announced by the leading lifeboat and liferaft suppliers recently.

For example, VIKING Life-Saving Equipment has acquired Nadiro, a company formerly owned by the Maersk Group and SH Group.

Established in 2009, Svendborg, Denmark-based Nadiro manufactures high-quality lifeboat and rescue craft systems, developing and promoting its patented Drop-in-Ball technology to help ensure crew safety.

VIKING held the status of 'preferred distributor and service provider', supplying the company's lifeboat release and retrieval systems (LRRS) to enable shipowners to comply with new SOLAS regulations by or before 2019.

Hook retrofitting is necessary to prevent serious accidents resulting from unsafe lifeboat deployment systems. Nadiro enables VIKING to provide high-quality, extremely reliable solutions that ensure safety levels beyond basic compliance, the company claimed.

VIKING CEO Henrik Uhd Christensen explained that the acquisition of Nadiro was a strategic move to enable the company to better address this key safety issue for its customers, and as part of the continued expansion of its already extensive product portfolio.

"For more than a decade, on-load release

hooks installed to enable lifeboats to be lowered into and retrieved from the water have themselves been the cause of numerous accidents," said Christensen. "Some have involved fatalities. With our stated mission to protect and save human lives all over the world, and our global leadership within maritime safety equipment, doing everything we can to rectify the problem has been a natural focal point for VIKING over the past few years."

He added; "Nadiro has performed well, and its products have been instrumental in ensuring the safety of crew on board many vessels. Now the time has come to add further power to Nadiro's expansion via a focused, global safety platform. And VIKING is the right company to provide that platform."

With VIKING's global network and resources support, VIKING Nadiro, as the brand will be renamed, enables the company to provide a solution that goes beyond basic compliance. "The VIKING Nadiro brand will give shipowners a complete and high-quality answer to the LRRS compliance challenge," Christensen concluded.

In another move, manufacturer, service and training provider of life saving appliances (LSA) - Harding Safety - has been certified by



VIKING's Henrik Uhd Christensen.

DNV GL as 'Maritime Training Provider' according to DNV GL ST-0029.

"Harding - Global Training Department delivers effective and efficient training services to both customers and employees. Proper training in the correct operation and maintenance of Harding life-saving appliances, increases both safety on board and the lifespan of the equipment," explained Sergio Meekel, Harding Safety's global training director.

"Our certified Instructors develop and facilitate these courses, worldwide and in accordance with international regulations and requirements. To meet client specific training demands, we also offer custom-made courses, focused on familiarisation and installed equipment.

"Each year we train a large amount of participants, which vary from class societies to shipowners, superintendents and crew members. They are mainly trained in operation and maintenance of lifeboats, fast rescue craft, davits, winches and related equipment.

Create awareness and understanding of the risks involved with improper use and maintenance of life saving appliances is a key element in these training sessions.

"The Harding Global Training Centre, which is to be located at Schiedam, near Rotterdam,



Harding has been recognised as a training provider by DNV GL.



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together with our complete course-portfolio, are now certified by DNV GL.

“The establishment of our new Global Training Centre together with the MTP certificate we received, is the result of intensive teamwork and commitment from the last months. It will secure our course quality which

is carried out by certified Instructors, positively affect our course results and drive our future training business development, resulting in a safe LSA working environment,” Meekel concluded.

Arctic operations

Ship operators working in polar regions can now equip their vessels with liferafts chosen from the SurvitecZodiac range, which have been manufactured to meet demanding Arctic operating conditions.

This follows the development of a heating system that can be specified to keep any one of the nearly 60 different liferaft models in its range fully operational at temperatures down to minus 50 deg C.

The Arctic range has evolved from a two year development programme that was launched in response to the increased levels of shipping in the Arctic and Antarctic and to the requirements of the new IMO Polar Code.

Demand is such that ship sets of Arctic liferafts have already been sold to a yard in China for fitting on board two vessels and with only one other choice of supplier available, further orders are anticipated shortly, the company said.

The new liferaft heating system runs off the vessel's emergency electrical supply and has been developed so that it can be integrated within the container of any Survitec liferaft without affecting its float-free characteristics.

A self-regulating heating blanket activates automatically when temperatures fall below +3 deg C, making it able to prevent the freezing of seals, hydrostatic release and trigger mechanisms, while also maintaining the flexibility of the polyurethane liferaft fabric in sub-zero temperatures.

The heating system was developed at the SurvitecZodiac factory in Chevanceaux, France where the liferafts are manufactured to IMO Polar guidelines and Russian winterisation rules.

One of the biggest challenges for the designers was to find a facility capable of testing the liferafts at temperatures down to - 50 deg C. Although commercial refrigeration units are often able to freeze to - 40 deg, it proved to be a major challenge to find somewhere capable of reaching the polar extreme. Once this had been achieved, however, it became possible to demonstrate the durability and performance of the Arctic system to Bureau Veritas inspectors.



Hooks have entered the limelight following high profile accidents.

LR issues statutory alert on tanker stability

Lloyd's Register (LR) has issued a statutory alert to crude, chemical tanker and gas carrier owners and managers on the new requirements for stability instruments on tankers.

New stability instrument requirements will apply to all tankers/gas carriers whose keels were laid on or after 1st January, 2016. These ships will be required to fit an approved stability instrument, capable of verifying compliance with intact and damage stability requirements.

Tankers/gas carriers whose keels were laid before 1st January, 2016 must also comply with the requirements -by confirming or upgrading existing equipment, or installing new equipment- at the first applicable scheduled renewal survey of the ship after that date, but not later than 1st January, 2021.

Owners and operators can apply to their flag administrations for a waiver if their vessels are loaded in accordance with approved conditions and fall into one of the following categories:

- Tankers that are on a dedicated service, with a limited number of permutations of loading, so that all anticipated conditions have been approved in the stability information provided to the Master in accordance with the relevant regulations.
- Tankers where stability verification is made remotely by a means approved by the administration.
- Tankers that are loaded within an approved range of loading conditions.
- Tankers constructed before 1st July, 2016, provided with approved limiting KG/GM curves covering all applicable intact and damage stability requirements.

The new requirements were introduced to MARPOL Annex I and the IBC, IGC, BCH and GC Codes by IMO Resolutions MEPC.248(66), MSC.369(93), MSC.370(93), MSC.376(93) and MSC.377(93)), respectively, thus making

the provision of a stability instrument mandatory on board all oil tankers, chemical tankers and gas carriers.

Vessels are still required to carry approved stability documentation regardless of whether they are fitted with an approved stability instrument or not, LR warned.

IOPP Form B certificates for oil tankers and IBC/BCH and IGC/GC Certificates of Fitness (CoF) for chemical tankers and gas carriers will be required to reflect the provision of an approved stability instrument on board in accordance with the new regulations, or, alternatively, the applicable waivers granted by the administration.

"The stability instrument must be approved by Lloyd's Register or the flag administration, taking into account the performance standards recommended by the IMO (Part B, chapter 4 of the 2008 IS Code; Annex, Section 4 of the

Circular MSC.1/Circ.1229; and the technical standards defined in part 1 of the Circular MSC.1/Circ. 1461)," LR said. "The loading instrument should have a Document of Approval, which clearly reflects this capability. The LR Program Installation Test certificate will serve this purpose if it clearly states that both intact and damage stability aspects are covered by the software.

"If vessels require a new and/or upgraded stability software installation to comply with the latest requirements, the software should have a valid LR General Approval Certificate clearly specifying 'Type 2' or 'Type 3' software. To avoid complications associated with developing suitable KG/GM limit curves and their potential restriction on operational capacity, we strongly recommend that Type 3 stability software is fitted on board," LR said.

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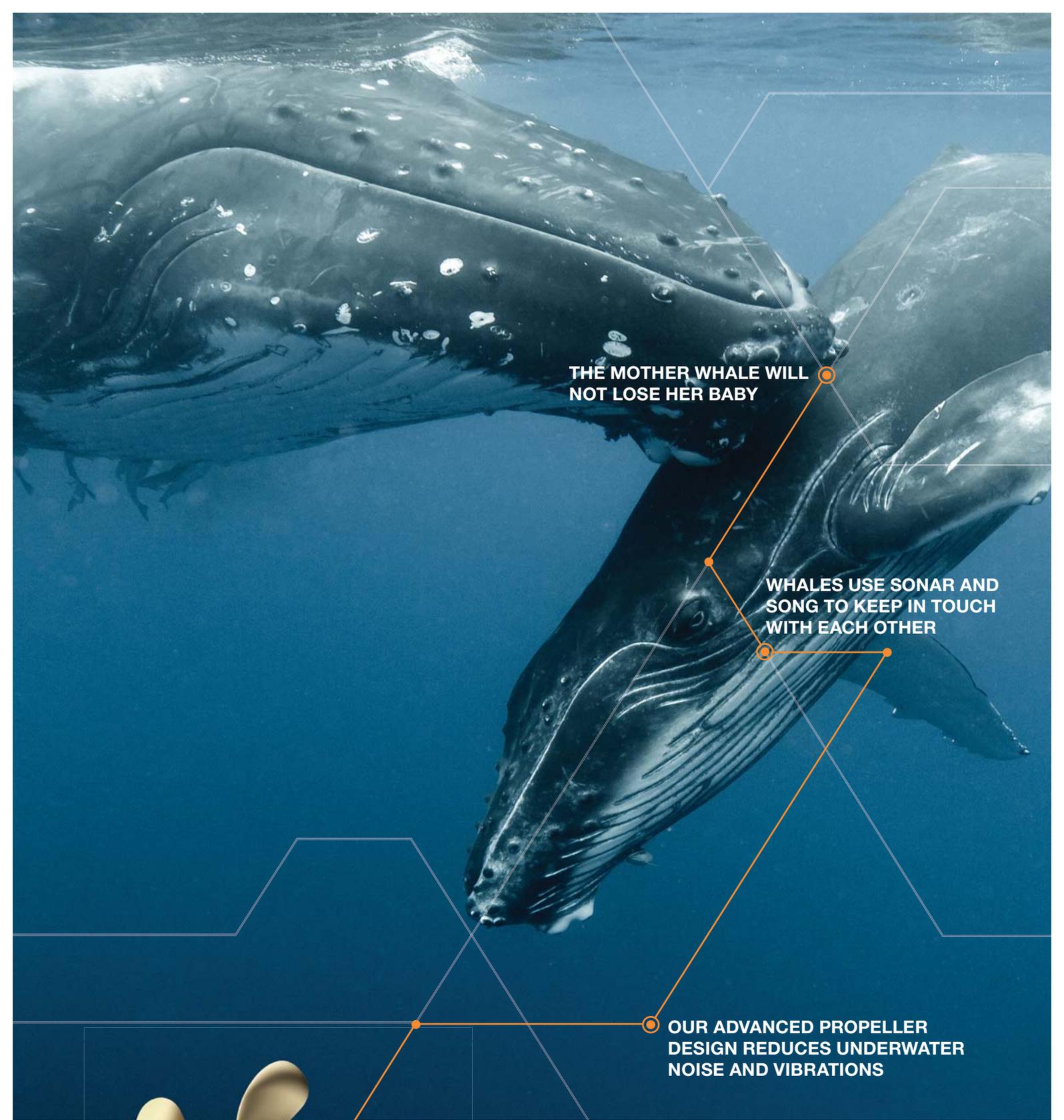
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