TANKEROperator

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Contents

Becker Marine Systems' patented Mewis Duct has proved ideal for vessels with high block co-efficiencies.

As of July, around 1,050 Mewis Ducts had been fitted on various ship types, reducing CO2 emissions by around 5.7 mill tonnes in total.

Another 96 were on order.

Crude oil tanker market struggles to find support

BIMCO's Peter Sand has analysed the parlous state of the crude tanker sector.
Crude oil tanker earnings have never been this bad since records began, he said.

Average earnings for VLCCs in the first half of this year were as low at $6,001 per day, with a Suezmaxes earning $10,908 per day and Aframaxes making $9,614 per day.

All of the rates are heavily loss-making for an industry which needs a much-improved fundamental market balance to lift freight rates above break-even levels into profitable territory, Sand said in one of his excellent reports.

As the crude oil tanker fleet kept growing faster than demand, in 2017, losses returned to the industry, after three profitable years.

Sand said: "2018 has been absolutely horrible for the crude oil tankers with freight rates and the fleet utilisation falling to a record low level. The total crude oil tanker fleet hasn't grown at all in 2018. In fact, the VLCC and Aframax fleets haven't been growing over the past 12 months. The freight market is severally impacted by very weak demand growth.

"Overall, the freight market is oversupplied. The key to higher earnings lies within a very low fleet growth and a return to normalised demand level. The sooner the better – but patience is required," he stressed

Most likely we must wait until the second half of 2019 before an improved market balance will again deliver profits to the industry, he thought.

Since the beginning of 2018, despite massive demolition activity, there is an unchanged fleet size. Recycling is a critical element for a recovery to develop. For example, around 13 mill dwt was recycled in the first half of 2018.

Moreover, a different oil market balance may also cause a return to an oil price contango, which is likely to indicate an increased demand for tankers for floating storage.

When conducting a fundamental analysis of the crude oil tanker market the focus is on calculating the utilisation rate of the fleet, with the aim of developing a strong correlation between that and the actual freight rates.

For the drybulk market, that correlation is very strong, and BIMCO has used this to show the road to recovery for this particular market. For the crude oil tanker market, the correlation is weaker, but still strong enough to rely on for direction – is the market going up or down?

In the short term, freight rates may react more than the underlying tanker market fundamentals indicate. This year is an example, as the first half of 2018 saw a very serious deterioration of freight rates when compared to 2017. A drop, which the medium to longer term fundamental changes alone could not explain.

Supply/demand

Therefore, changes to the utilisation rates mostly give an indication of the direction of the market much more than a specific freight rate level. For that reason, BIMCO focussed on changes to the supply/demand balance, rather than forecasting specific freight rate levels for the coming years.

For the supply side, it is important to acknowledge the impact of floating storage. When low, it's irrelevant, but when it becomes widespread it provides a positive trigger to the market, as the available trading fleet becomes nominally smaller. The correlation between freight rates and utilisation improves quite a lot, when adjusting for floating storage.

Last year saw a low level of floating storage, which meant that the supply side grew faster than the nominal fleet development. As supply (adjusted for floating storage) significantly exceeded an otherwise solid demand growth, freight rates and fleet utilisation rates dropped.

Crude oil tanker shipping has also benefited from longer sailing distances to China, but naturally Chinese imports need to continue to grow.

However, the figure that matters most is the 110 VLCCs on the orderbook, which are all scheduled for delivery within the next 33 months. There are also 50 Suezmaxes and 124 Aframaxes on order, but this doesn't really matter in the bigger picture, Sand said.

"It seems safe to say that the supply side holds the key to an improved freight market – and the change of the utilisation rate provides the direction of the market. Keeping crude oil tanker demolition activity high while holding back on contracting new ships is required to tame the fleet growth, today and tomorrow.

"How big a task the supply side is faced with will depends very much on the future demand for floating storage capacity. A big juicy oil price contango in 2019 would have a major positive impact on freight rate levels. It is not possible to predict if a significant contango will materialise and that is why we cannot make a firmer prediction as to when real improvements will appear," Sand warned.

Looking ahead, the year when the industry will return to profitable freight rate levels depends on the supply side growing (adjusted for floating storage) at a much lower level than the demand side.

Small improvements to the fundamental balance will not be enough for a market turnaround, he concluded.

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SMM - bigger, better, smarter

This year's SMM already looks to be the largest on record and indeed is a sell-out.

The organisers are expecting 2,200 exhibitors from 69 countries and around 50,000 visitors to the Messe in Hamburg during the week starting 3rd September this year.

The halls' 90,000 sq m of exhibition space was fully booked some time ago. The number of national pavilions has increased, with Panama, Estonia and Columbia each now represented by a dedicated pavilion. The Japanese shipyard association JSEA also requested a 50% increase of its exhibition space.

This year's supporting programme includes the Maritime Future Summit (MFS) on 3rd September, which has bridging disruptive technologies on its agenda. On the first day of SMM, 4th September, for the first time TradeWinds Shipowners Forum will cover the globally changing maritime business during an interactive discussion format.

On 5th September, participants at the global maritime environmental congress (GMEC), will look in particular at ballast water management and new propulsion technologies. Offshore Dialogue, taking place on 6th September, explores new maritime technologies for future needs, among them deepsea mining and a responsible Arctic development.

A two-day event from 6th to 7th September, MS&D – the bi-ennial international conference on maritime security and defence - will explore future challenges with three panel discussions included..

During the SMM advance press conference held in Hamburg in May, industry representatives gave a preview of the topics to be highlighted. Top items on the agenda will be the digital revolution, eco-friendly propulsion technologies, new growth opportunities and the challenges associated with disruptive markets.

"We want to offer real added value to enterprises of this sector – those who are represented at SMM with a stand of their own, and those who are sending their decision-makers to Hamburg to get informed about new trends in innovative technologies," said Bernd Aufderheide, President and CEO of Hamburg Messe und Congress.

"The convenient clustering of exhibitor groups in the exhibition halls, or the theme routes successfully introduced during the last SMM, will make it much easier for visitors to find what they need," Aufderheide added.

Disruptive markets where among the topics addressed by Dr Martin Stopford. During the panel discussion, the non-executive president of Clarkson Research provided an overview of the current market situation. While some shipping segments have recovered, he said, the overall mood was subdued.

"Over the past two years, shipbuilders have faced increasing pressure," he said. The tonnage entering the market in 2018 is going to amount to less than half of that delivered in the boom year 2011. South Korea in particular is losing market share. Contrary to the general trend, orders for cruise ships doubled between 2015 and 2017, reaching a volume of $19.5 bill," he said.

Consistent with the motto of this year's SMM, 'Trends in SMMart Shipping,' Stopford believed digitalisation to be a key driver of increased efficiency within the sector. However, he said that a stepwise approach was advisable: "It is better to do something simple that delivers for your business, rather than getting disappointed with attempting something too ambitious that fails," he stressed.

A 'Smart Shipping Toolbox' could help build smarter ships, manage fleets smarter, and ensure logistics are really efficient, Stopford said. The goal would be an integrated transport service.

As Kjersti Kleven, co-owner and board member of the Norwegian shipbuilding group Kleven Maritime and Chairwoman of SEA Europe, the Shipyards' and Maritime Equipment Association, said, shipbuilders are increasingly able to benefit from the enormous advances in the field of robotics.

In the age of digitalisation, investment in research and development were of paramount importance for the industry, she said. As for 3D printing, the realisation of many ideas would still be a long way off, but the technology held a lot of promise and could give rise to new business models. Referring to 3D printing, Aufderheide pointed out that SMM will include a special exhibition highlighting the potential uses of this technology.

Hapag-Lloyd, COO Antony Firmin, described what a shipowning company can do to overcome the current economic challenges. Stricter environmental regulations would bring extra pressure, Firmin said. In his opinion, the IMO Emission Reporting System is "the only and the right way to get meaningful global data about

CO2 emissions" and is preferable to the regional EU MRV Directive which only accounts for one fifth of global emissions. "The collection of commercially sensitive information must take place in an anonymised and confidential manner," he said.

Referring to the fact that new regulations on CO2 emissions and ballast water management are likely to stimulate shipbuilders and suppliers businesses, Kleven said: "We will build everything the market demands." However, it will not always be easy for customers to identify the most suitable technology.

Wayne Jones, executive board member–global sales & after sales at the engine manufacturer MAN Marine Solutions, called the recent decisions taken by the IMO regarding the reduction of greenhouse gas emissions "an enormous success", although admitting that the goal was very ambitious.

It is therefore very important for the entire industry to support this decision: "We have been promoting a maritime energy transition for years, and we are committed to driving a CO2-neutral global economy that includes shipping," Jones emphasised. "We firmly believe that the switch to low emission gas fuels is the silver bullet to de-carbonise international shipping," he added.

Radiating confidence about the future of shipping, Knut Ørbeck-Nilssen, CEO of DNV GL – Maritime, was sure that the "digital transformation will forever change the shipping industry and pave the way to new business models."

DNV GL's Knut Ørbeck-Nilssen

For example, he said, detailed, real-time cargo and route information, as well as data relating to the operation and condition of the vessel and its components will make future supply chains much more adaptable and efficient. "The development and spread of cloud based technologies and computer power will change not only how we manage data but how we design, build and test vessels, their systems and components."

Even today digital solutions are unfolding their economic potential in concrete ways: For instance, DNV GL uses drones equipped with cameras to inspect structural elements in ships, tanks or offshore installations; and since last October, customers have been able to manage ship certificates in electronic format. More than 100,000 certificates for about 8,000 ships have been issued by DNV GL to date.

Apart from increasing the efficiency of operational processes, digitalisation will also improve safety on board. "The new level of decision support will give us better control over assets and systems, increase on board situational awareness, and reduce human factor incidents and operational risk," said Ørbeck-Nilssen.

Kleven agreed that major advances in this field lie ahead: Another innovation, the 'digital twin' of a ship, provides shipowners and shipbuilders alike with an entirely new level of data transparency, allowing them to sell added value with their ships by optimising operation or maintenance.

Reducing complexity, enhancing transparency is where MAN's Jones sees the key benefits of digitalisation. To aggregate all the different data collected separately in a variety of storage locations, a joint platform for the entire industry is under development. Jones emphasised the importance of protecting data privacy and security, revealing that a major digital innovation

developed by his company will be showcased at this year's SMM.

Cybersecurity is also the subject matter of a joint project undertaken by the IACS member class societies, Ørbeck-Nilssen reported. The organisation is also developing a common terminology for different levels of autonomous ship operations.

"This is a highly interesting field, which is developing fast," Kleven added. The first autonomous ship will be contracted very soon, she said.

Digitalisation discussed

Kicking off the week, MFS will cover digitalisation and big data through to artificial intelligence (AI), new technologies that have the potential to revolutionise global shipping. 'Mind the gap – bridging disruptive technologies' is the theme. At the summit, two expert panels will discuss how digitalisation and other mega trends can be used to make the shipping business more transparent and efficient, and how to best prepare the sector for the future.

At MFS, Ulf Sive from the Swedish Maritime Administration's Sea Traffic Management Validation Project will speak about the role the maritime industry could play in the logistics chain. Standardised information sharing will be a key element in this logistics network and have a significant impact on trade flows and business models.

Numerous research institutes and companies are currently conducting intense research into autonomous shipping. Some initial tests have been completed successfully. According to the SMM Maritime Industry Report (MIR), one third of responding decision-makers from shipping companies believe that unmanned ships can realistically be expected to be in commercial use within the next 20 years. But who will be liable if something goes wrong? In his speech Wu Sun from the Chinese Class Society CCS will examine some technical and legal aspects.

The Japanese National Maritime Research Institute (NMRI) has conducted a comprehensive research project. Its scientific director Kohei Matsuo will present the results. The 'Technology Roadmap to 2050' will provide some insights into the changes innovative technologies will bring about for both, the shipping and shipbuilding segments. Under the aegis of the Japan Ship Technology Research Association (JSTRA), the scientists studied innovative technologies in various industries and countries.

The head of DNV GL Maritime Research department, Dr Pierre Sames, will look ahead to the year 2030: How will artificial intelligence and the use of 'Digital Twins' change the way classification societies work? As for manufacturing, 3D printing technology and the evolution of smart factories based on process automation using robots and algorithms will cause major structural upheavals: Nick Danese, CEO of the French engineering firm NDAR, refers to this development as a "wake-up call for the shipbuilding industry."

"This topic will be supplemented by a special exhibition on 3D printing, including live demonstrations, right here at the fair complex," said Claus Ulrich Selbach, Business Unit Director Maritime and Technology Fairs at Hamburg Messe und Congress.

Environmental conference

Bringing effective ballast water management and a lower sulfur limit for ship fuels, new, stricter environmental regulations are forcing the shipping industry to take action.

At SMM's concurrent environmental conference Global Maritime Environmental Congress (gmec), experts will discuss challenges and opportunities facing the industry.

The countdown is on. The new 0.5% sulfur limit for ship fuels will take effect on 1st January, 2020. According to SMM's report, as many as 44% of shipowners are considering LNG propulsion for their newbuildings.

Shipowners worldwide are facing the challenge of having to make far-reaching decisions: Will low-sulfur fuel be available in sufficient quantities at reasonable prices? Are exhaust gas scrubbers a smart investment? Or would it be better to opt for LNG right away? Questions like these will be discussed at gmec on 5th September.

Speakers such as Katharine Palmer, Lloyd's Register's Global Sustainability Manager, will advise the industry on how to best comply with current regulations and prepare for future ones. Exhibition Hall A5 is dedicated to the 'Green Propulsion' theme with a special focus on LNG.

As for ballast water management (BWM), the IMO has granted shipowners a transitional period before they must comply fully. Meanwhile, the industry is working full speed on implementing the BWM Convention, which took effect in 2017.

This necessitates billions of dollars in investments. In a study of the global BWM market between now and 2026, the US market research firm Stratistics MRC forecasts a growth rate of nearly 40% per year.

Understanding which types of BWMS are suitable for a specific ship types, and which of these systems meet both the IMO rules and the stricter requirements of the US Coast Guard is challenging.

A gmec expert panel including Debra DiCianna of the US consulting firm Choice Ballast Systems, Tim Wilkins, Environment Director at Intertanko, Stamatis Fradelos, Principal Engineer, Operational Environmental Performance (OEP) Team, ABS and others will provide insights.

"Numerous manufacturers are reporting record numbers of incoming orders," claimed SMM's Selbach.

Cyber problems

Enhancing transparency, boosting efficiency - big data has arrived in the shipping industry. But besides opportunities, network integration also harbours risks. At MS&D experts will outline how maritime enterprises can protect themselves effectively against cyber criminals.

Threats originating from climate change, and security policy challenges are further items on the agenda at the conference, which takes place on 6th and 7th September.

According to the Global Risk Report 2018, the number of cyber attacks against companies has nearly doubled over the past five years. The TO

Employment opportunities

On Friday, 7th September, a Maritime Career Market (MCM) will open aimed at those seeking to pursue a career in the maritime industry.

At the MCM-Forum supported by DNV GL, industry experts will present different careers and educational pathways.

MCM will bring together specialists, potential employers, students and educational institutions to present the latest information on various educational opportunities, as well as study programmes and careers in the maritime industry.

There will also be professional advice available about how to make applications and communicate effectively in everyday working life.

Admission is free of charge for school and university students.

An exhibitor taster

There are obviously too many exhibitors for *Tanker Operator* to mention at SMM this year but as usual in exhibition previews, we have highlighted a few in strict alphabetical order.

For example, **Alfa Laval** said it will again have a strong presence at SMM.

As the company enters its second century of marine service, the focus will continue to be on lifetime vessel performance – achieved through equipment, co-operation and services in applications throughout the ship.

For more than 100 years, Alfa Laval has become a full-scope partner to shipowners, ship operators and shipyards. At this year's SMM, the company will showcase a breadth of equipment innovation, but also the depth of understanding and commitment needed to keep customers competitive in a changing industry.

Equipment from many of Alfa Laval's 17 product groups for vessel performance will be on display at the stand, including flagship systems, such as Alfa Laval PureBallast 3 and Alfa Laval PureSOx.

Alfa Laval experts will also be on hand to discuss the ways Alfa Laval equipment, knowledge and services combine to achieve customer goals throughout the vessel lifetime:

- Confidence in meeting regulatory demands - From cost-effective treatment of large ballast water flows to fuel-adapted NOx reduction and scrubber connectivity that simplifies compliance with the global sulfur cap, Alfa Laval has the solutions.

- Operations customers can count on - Though reliability has always been important at sea, it has never been more critical than today. New fuels and on board processes are creating new uncertainties, but even familiar threats like cat fines are on the rise. Alfa Laval has the equipment needed to ensure reliability – from separators and filters to solutions for fuel gas supply and multi-fuel boiler combustion – but also the knowledge, global network and comprehensive service offering to keep vessels running problem-free.

- Smarter ways to save and profit - In an industry where the demands are often higher than the margins, every opportunity for efficiency counts. Working in applications from fuel treatment and waste heat recovery to freshwater generation, Alfa Laval boosts efficiency through equipment innovation, process line synergies, connectivity, training and more.

A new exhibitor at SMM this year, will be the French water microbiology specialist **aqua-tools**, who will present its B-QUA ballast water testing kit.

B-QUA adopts a bioluminescence methodology called ATP2GTM to monitor Adenosine Tri-phosphates (ATP) in the ballast water. It is the industry's only BW test kit capable of analysing, in less than an hour, all three factions (bacteria, >10 to <50µm and >50µm) required of the IMO BWMC D2 Standard.

The success of aqua-tools' second-generation ATP (ATP 2G) method in detecting bacterial ATP and larger planktonic organisms in ballast water is due to the homogenisation of the water sample. This eliminates the complex structures that conventional agents fail to break down, which enables detection of phytoplankton and zooplankton organisms well below the D-2 limit values.

Evoqua, which was publicly listed earlier this year, will showcase its type approved electrochlorination-based SeaCURE ballast water treatment system (BWTS).

The company unveiled a remodelled, compact SeaCURE unit last year as a skid-mounted, plug-in-and-play BWTS that is 76% smaller and 85% lighter than existing electrochlorination-based systems.

Mounted on a 2 m x 1.5 m, easy to install skid, it is one the of smallest BWTS available capable of treating flow rates of up to 6,000 cu m per hour.

Another key feature, is that the SeaCURE BWTS can also be configured to work as a vessel's marine growth prevention system, protecting against the build-up of biofouling in seawater in critical machinery and cooling systems.

First time exhibitor

Another SMM first-timer will be Germany's **FuelSave**, which will present its fuel consumption reducing technology, FS Marine+.

FS Marine+, introduced to the market in June this year, is a new solution aimed at optimising the fuel consumption efficiency of all marine diesel engines. The technology, proven in both in-the-field and laboratory tests, is offered with a contractually guaranteed 10% saving on overall fuel costs.

The technology also significantly reduces CO2, NOx, and Particulate Matter (PM) emissions, through a cleaner and cooler combustion process.

The patented engine efficiency enhancement system uses an on board hydrogen synthgas generator to inject a gas and liquid water/methanol solution into an engine's combustion chamber to significantly improve efficiency.

It can be applied to almost all types of 2- and 4-stroke engines, although those running on HFO, MGO or MDO benefit from the greatest efficiency gains and, consequently, the highest savings and best return on investment.

FuelSave plans to exhibit a new containerised FS Marine+ system at SMM.

Underwater repair specialist **Hydrex** representatives will be on hand to discuss the latest environmentally-safe technologies for underwater hull repairs, along with details of its sister company Subsea Industries' eco-safe range of coating systems.

MAN Energy Solutions will focus on future themes and new hardware on its stand, which will present itself in a totally new livery in accordance with the company's recently unveiled, new corporate design.

The stand layout also marks a clear departure from previous years, placing an emphasis on exchange and orientation in an uncertain industry environment.

A new departure for MAN is the introduction of its Vision Talk Box that will bring together a group of experienced panellists from across the industry to take part in exclusive debates at the company's stand.

The sessions will take place on Tuesday, Wednesday and Thursday and direct their attention towards the current major topics of interest within the maritime sector, including digitisation, de-carbonisation, energy efficiency and future fuels.

MAN will also present new dual-fuel engines. The 2-stroke business unit will be promoting its new ME-LGIP dual-fuel engine, aimed at de-carbonisation and the growing LPG sector.

The 4-stroke sector will also be represented by the new MAN 45/60CR engine. The marine unit is initially available as 12V/14V versions with 15,600 and 18,200 kW power outputs respectively.

In addition,, MAN PrimeServ, the company's after-sales division, is using SMM to advance the de-carbonisation vision through, among other things, the promotion of its retrofit service that converts existing, HFO-burning engines in the field to dual-fuel operation.

Naval Dome, the Israeli-based manufacturer of a cyber protection system, will also be attending SMM for the first time this year.

Naval Dome's cyber defence technology, which can be installed on multiple ship systems, uses intelligence agency security technology to prevent internal and external cyber-attacks with minimal human intervention.

It integrates with existing systems and software, providing real-time cyber alerts and blocks malicious files to prevent unauthorised access to critical systems and data.

Navaids

Navigation equipment supplier, **Raytheon Anschütz** will announce a new navigational radar and chart radar software.

An intuitive user interface and a smart range of scalable functionality characterise the new Synapsis Radar NX application.

Raytheon Anschütz developed the Radar NX software in an agile development process using the expertise of experienced marine radar users and the know-how of specialised user interface designers.

With the new radar and chart radar application, Raytheon Anschütz completes the Synapsis NX series of innovative bridge navigation systems.

The optimised grouping of data and current settings provides operators with clear situation awareness. In addition, the quick access bar makes the most often used operations and functions available at a fingertip. Operators benefit from a superior non-distracted overview, situation awareness and a fast interpretation of the radar picture.

Radar NX delivers customers optimised performance in tracking and anti-clutter processing. It can also include an advanced, smart radar video merging function, which integrates the video of multiple radar transceivers into a single, unobstructed radar video.

The software is scalable to include additional functionality beyond basic IMO standards to support special customer requirements such as helicopter tracking and guidance.

Raytheon Anschütz has built the new Radar NX application on the technical foundation provided by the Synapsis integrated navigation system (INS). This means the highly integrated INS functions, such as radar/AIS target management, alert management or sensor integrity monitoring, are also available for a stand-alone radar system.

SKF will launch four new products at SMM, while showcasing a wide range of its latest offerings for the maritime sector.

The first launch will be SKF's new environmental-friendly shaft line solution – Simplex BlueRun. This range of water-lubricated stern tube solutions includes Simplex BlueRun bearings, carrier bushes, as well as the Simplex BlueRun tail shaft monitoring system.

In addition for the optimisation of oily water treatment processing on board any vessel type, SKF has developed two new products. These include the Turbulo SolidMaster, a filtration unit that precedes an oily water separator and mechanically removes suspended solids in the bilge water.

Also on stand will be the new Turbulo HycaLogger, an electronic tool/log book to log raw data of the oily water separator, ie all oil discharges from the oily water separator.

Thordon Bearings will present its propeller shaft bearing and seal systems, COMPAC and

SeaThigor at the company's new two-tiered duplex exhibition stand.

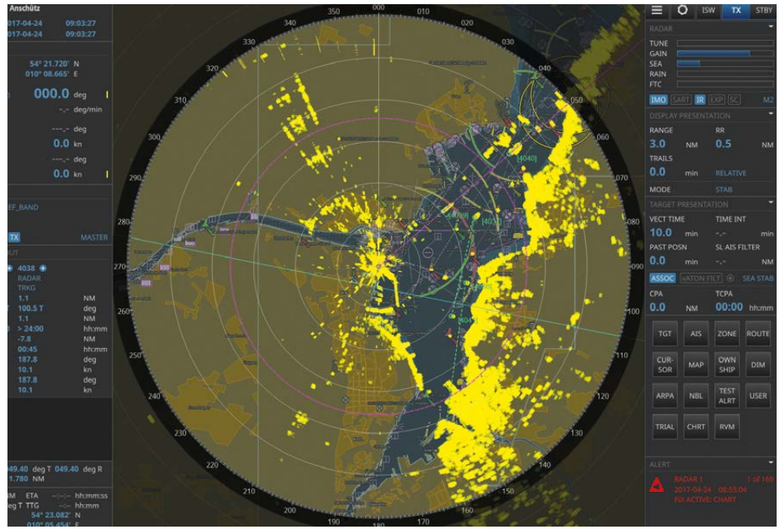
The Canadian company will also use the SMM platform to announce a new development in seawater lubricated shaft bearing technologies.

Although this major development currently remains under wraps until the event, Thordon, will also release the findings from its research paper 'Our Future, Our Ocean'. Key figures from shipowning companies and environmental agencies will also be available to discuss the merits and sustainability of seawater lubricated propulsion.

Earlier this year, Thordon Bearings unveiled a new web-based platform to provide information about the commercial, technical and environmental advantages of using grease-free and seawater-lubricated polymer bearings across a wide variety of applications.

Global supplier of marine distress signals, **WesCom Signal and Rescue** will be exhibiting at SMM for the first time under its new name, which was announced in October, 2017.

For more than 100 years, WesCom Signal and Rescue has been supportive of its many distributors and partners around the world, developing a range of bespoke programmes to enhance training facilities. In the last 12 months, this has included providing more than 1,000 dummy products, as well as creating detailed animations and guidance materials for over 120 training establishments.



Raytheon's Radar chart (see page 9)

The safety brand has also worked closely with Survitec Viscom to develop a series of training animations for its branded SOLAS and non-SOLAS products. These assist maritime training establishments both with classroom training, offering an alternative information source, and for the increasingly popular use of web-based training courses. They can also be included within ships' digital training manuals on board and offer a highly effective method of teaching compared to traditional pictorial training manuals.

Scrubbers - a diverse range of opinions from shipmanagers

InterManager, the international trade association for shipmanagers, has canvassed members' opinions on the use of scrubbers and has found an interesting range of opinions.

As an organisation, InterManager believed that scrubbers are not a long term solution to achieve a real impact on the environment.

When asked for their opinions, shipmanagement members considered the long and short term benefits and disadvantages of scrubber use, some citing potential short-term commercial disadvantage if operating in a market where competitors have installed scrubbers.

Capt Kuba Szymanski, InterManager Secretary General, said the potential solution lies in the hands of fuel producers: "What we as an industry need to do is to push the problem back to the oil companies and fuel suppliers to encourage them to provide the planet with cleaner fuel. New fuel - not some heavy fuel grouped with filters, which gives an illusion of cleanliness when it erroneously complies to a good regulation that lacks a clear process of easy global enforcement.

"To make life simpler, and therefore more sustainable, heavy fuel should not exist at all. That would make it easier to enforce a level playing field for everyone and scrubbers would not be needed," he added, pointing out that "from a practical point of view, shipmanagers and their owners are being asked to do something almost impossible. Not knowing the price tag of fuels (low sulfur and regular bunkers) in 2020 is like asking us to look into a crystal ball."

InterManager's Capt Kuba Szymanski

Intermanager has conducted an investigation among its membership into the use of scrubbers and considered whether their use does carry much weight. The feedback indicated that the decision depends on various factors, such as the size of the ship, fuel oil consumption, trading area, operational profile and the availability of high sulfur fuels, now and from 2020 onwards. In order to determine whether there is a sound business case, the price difference between high and low sulfur fuels is a paramount factor.

Installation issues also need to be taken into account. The majority of the scrubbers offered nowadays require a lot of space and additional pumps and ancillary equipment. Then there is the choice for either an open, closed or a hybrid system. The latter two systems require even more space. Whether an open system remains allowed is uncertain, as rules are expected to be more stringent in this respect.

Several InterManager members stressed the need for crew training and competency if scrubbers are installed and were concerned about manning levels. Others expressed fears that they may adversely impact crew health.

It remains unclear as to whether high sulfur fuels will remain available in the Sulphur Emission Control Areas (SECA). Some of the members whose vessels trade mainly in SECAs are, as far as practically possible, utilising speed optimisation and lower fuel consumption, having taken into account the size of vessels and their fuel consumption level.

Capt Szymanski concluded: "We are proud that our industry is committed to reducing its carbon footprint – let's show the world that we are genuinely concerned by making the whole process simpler, more fluid and therefore more efficient!"

InterManagers' members' viewpoints:

- The topic of scrubbers is brought up and supported by shipowners who are short sighted and motivated by short term financial gains, trying to take advantage of a gap in the enforcement regime. This is not an example of sustainable behaviour.

To make life simpler and therefore more sustainable HFO should not exist at all, it should be easier to enforce a level playing field for everyone and forbid scrubbers completely.

There is also an increased risk to human health due to the chemical residue, which is highly dangerous for the crew. Another important issue from the shipmanager perspective is the considerable resources needed in operating/maintaining scrubbers in addition to BWTS and manning remaining the same!

From a shipmanager point of view, we have little say on whether to install scrubbers.

From a shipowner's perspective we install what our timecharter would require/request.

One oil major has advised us that there would not be any short supply of LSFO post 2020.

Our industry colleagues indicate they believe scrubbers may be a deadweight in two to three years.

- We have changed all our vessels to MGO.
- There is a doubt on the usability of a scrubber as there is no specific info that LSFO would not be available after the 2020 deadline. There are serious views that it may turn out to be a deadweight after a few years.

There are also concerns that it may require charterparties to be amended to incorporate a scrubber clause - w.r.t non-operation of it causing delays, as some ports may not allow other fuel to be burnt, byproduct issue, etc.

We as owners build ships once a timecharter is fixed. If the charterer wants, we install it. At one time, we had two ships fitted with scrubbers and they were just two among nine on the water at that time!

- We have contemplated the use of scrubbers.

Whether the use of scrubbers does carry much weight depends on various factors, such as the size of the ship, fuel oil consumption, trading area, operational profile and the availability of high sulfur fuels, now and from 2020 onwards.

To see whether it is a sound business case the price differential between high and low sulfur fuels is also a paramount factor.

The majority of the scrubbers offered nowadays require a lot of space and additional pumps and ancillary equipment. Then there is the choice of either open, closed or a hybrid system. The latter two systems do require even more space. Whether an open system remains allowed is uncertain. We expect the rules will be more stringent in this respect.

In case scrubbers are installed, the crew needs proper training to operate the systems.

Our vessels trade mainly in SECAs. As far as practically possible, we use speed optimisation and thereby lower the fuel consumptions. Taking the size of our vessels and their fuel consumptions into account led us to the conclusion to deploy low sulfur fuels and focus on speed optimisation. Another factor we are not sure about is whether high sulfur fuels will be available in SECAs.

The above considerations are applicable to our existing fleet. Whereas for our newbuildings, we opted to build vessels powered by LNG. At this moment in time, LNG is one of the most eco friendly fuels available and reduces SOx and NOx significantly. The first eco friendly tanker powered by LNG will be delivered at the end of this year.

- This is quite a complicated issue.

At the moment the decision whether to install a scrubber or not is largely an economic one. The current spread between IFO and HFO is about $350 per tonne.

So for larger ships the payback is not that long assuming the HFO will be available.

Based on discussions we have had with oil suppliers/traders, it is possible to buy HFO for 2020/2021 delivery.

The HFO consumed by the world shipping fleet is about 4 mill barrels per day. So it will clearly take some time for the refineries to be able to switch over and deliver enough LSFO.

The spread is likely to increase for a time until the refineries have adjusted. Having the refineries adjust is clearly the long term solution – especially since it will be impossible to fit the world's fleet of 60,000 ships with scrubbers within a reasonable time frame. Most estimates indicate that there will be about 2,000 ships with scrubbers by 2020.

The economics for scrubbers are best for the larger, high consuming ships. So there will be a drive in these segments to install scrubbers.

The problem you are up against as an owner is that if most of the ships in your segments install scrubbers, the freight will be set by these ships with much lower fuel costs and you will have a real economic problem without fitting a system.

An average VLCC burns 75 tonnes of fuel per day, and with a spread of say $350 per tonne, the daily fuel cost will be $26,750 per day lower using HFO. Let's say you retain half to finance the scrubbers you will still be $13,000 per day more competitive than a ship burning more expensive low sulfur alternatives.

Over time, we would expect the refineries to adjust and the price spread to decrease. Meanwhile the refineries will maximise profits.

So my view is that the scrubbers will be a temporary economic response to an expected fuel spread for a part of the industry.

- Although it is always finally the shipowners' decision what action to take in this matter, I feel that we, as shipmanagers, certainly have an obligation to support our clients with technical advice on these important changes.

TO

More Shipmanager's take on scrubbers

Following on from InterManager's members comments on the forthcoming low sulfur fuel oil cap, *Tanker Operator* asked shipmanagement companies to give their opinions on scrubbers.

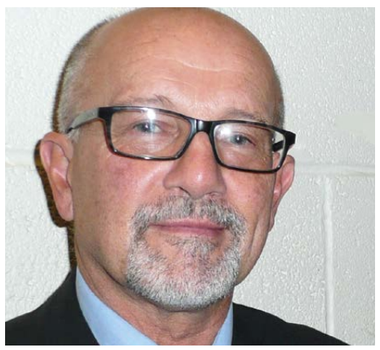
Jonathan Crispe, BSM's Corporate Expert - Technical said that the company believed that a significant part of the world fleet will have scrubbers fitted. "BSM is currently working on several projects and is well positioned to advise owners on the challenges related to the forthcoming 2020 regulations, including scrubbers as a compliance option.

"We are seeing a significant interest in scrubbers both for newbuilding projects and retrofits. One really needs to look at the specific vessel and trade requirements before a well-versed decision can be taken.

"Fitting scrubbers to newbuildings is obviously preferable in terms of integration with the other ships' plant and overall lower cost, particularly for the hybrid systems. The retrofit option is more problematic and may possibly extend the planned drydocking or require a longer repair period.

"That said, ships with EGCS will continue to burn high sulfur fuel oil, which is expected to be more economic when compared to low sulfur marine fuel. The payback period is therefore expected to be quite short.

"However, it is an option that comes with other challenges, such as limited supply infrastructure (at least for a while); generation of chemicals and waste disposal that means ships need access to port reception facilities (also limited); and ongoing maintenance costs," he said.



BSM's Jonathan Crispe

Wallem Group Technical Director, Ioannis Stefanou, commented that although the great majority of owners had adopted a 'wait and see' approach, this changed this summer when many big and small companies announced plans to install scrubbers on their vessels; some going as far as taking a stake in scrubber manufacturers.

Most of the retrofit scrubbers seem to be ordered for larger vessels.

"Given the right assumptions with regards to HFO availability and price, this probably makes absolute sense, since large vessels, such as VLCCs have enough space for a scrubber installation and have high consumption of fuel.

"We have seen the same trend in our managed fleet over the past few months, with an increasing number of owners of larger vessels declared their intention to install scrubbers on their vessels as a retrofit. Wallem is currently supervising the construction of several vessels with scrubbers installed," Stefanou explained.

Thome Ship Management's Rajiv Malhotra, a technical manager in the Technical Support and Innovation Department, said that the company had not started on any scrubber retrofit projects on its managed vessels.

As indicated, the choice between using scrubbers or compliant fuel is primarily guided by the vessel size, as this significantly impacts fuel costs, and the vessel age, as this determines the ROI.

A complete scrubber installation project can take close to a year to complete and retrofits can cost anywhere between $3-6 mill, depending on vessel's size and therefore, it is not a decision which can be made in haste.

Though the ROI projected by scrubber manufacturers appears attractive, the decision to install scrubbers cannot be based entirely on the ROI, as there are many variables involved including - the future price differentials between compliant fuels and high sulfur fuels, future availability of fuels, plus the feasibility of owners realising the commercial benefits from installing scrubbers, where charterers are purchasing the fuel.

Preparations for using compliant fuels also need to be started well ahead of the compliance date to ensure the readiness of a vessel's fuel systems (bunkering, storage, transfer and service systems) and for a complete revision of procedures.

VIQ7

Tanker Operator also asked for comments on SIRE's new VIQ (see page 24).

Crispe commented; "We already apply the content of the VIQ to our existing procedures, as well as make sure all our managed vessels comply with each question as ship safety is of utmost importance to BSM."

Stefanou said; "This extensively revised VIQ brings the questionnaire in line with our times, with the inclusion of elements of Cybersecurity, Ballast Water Management and LNG bunkering to name a few. This version has also been reduced by around 90 questions to simplify it," he said.

As a live document, the SIRE VIQ questionnaire has had to adapt to the current developments in order to remain relevant. The latest revision achieves just that while at the same time manages to produce a more compact and focused questionnaire.

Wallem Ship Management managing director, David Price, added "We believe that OCIMF have set up a working group to look at the inspection process as it stands today and whether technology would be able to replace the standard VIQ-based inspections that are carried out today, eg could an inspection be carried out by VR without an inspector attending?

"Of course this is a long way off yet and we will continue to work closely with OCIMF to make sure our managed vessels fully comply with the current inspection regime," he concluded. TO

Global sulfur cap and charterparty issues

The forthcoming 0.5% global sulfur cap will doubtless throw up commercial challenges, as well as technical issues.

Contracts and charterparties (c/ps) will likely be impacted unless the new fuel regulations are reflected in the clauses, especially spanning the changeover period of 1st January, 2020 and beyond.

In a presentation and writing in North P&I Club's *Signals* magazine, deputy director FD&D, Tiejha Smyth, outlined the key problems and said that c/ps will require close attention.

In particular, challenges are expected on those vessels whose c/ps span the IMO' s enforcement date. She said that unfortunately, there is no single magic clause to deal with the issues that might arise.

For example, all bunker clauses will most certainly need to be reviewed but other clauses might also need to be looked at, depending on the owner's chosen method of compliance.

Some of the key issues were discussed including the carriage of non-compliant fuels come the cut off date. It is likely that the carriage of non-compliant fuels will come into force on 1st March, 2020 for vessels not fitted with exhaust gas cleaning systems (EGCS) or scrubbers.

Non-compliant fuels will have to be removed to avoid fines and possible vessel detentions. Assuming that this fuel is not used up before the cut-off date, who will be legally obliged to arrange and pay for the removal of the fuel? This will depend upon the wording in the c/p's clause, so it is important to consider this when the c/p is drafted, Smyth warned.

She added that there maybe significant logistical difficulties in removing the non-complaint fuels and it is likely that the resale value will be less than the original purchase price. Issues might also revolve around who owns the non-compliant fuel and therefore, who has the right to remove it.

At present, vessels burn either 0.1% maximum low sulfur fuel in ECAs or 3.5% maximum outside. However, in 2020 there will be three levels - 0.1% in ECAs, 0.5% everywhere else, or plus 0.5% by using a scrubber. This raises the question as to what will low sulfur fuel mean come 1st January, 2020?

She advised moving away from descriptive terms such as low sulfur and high sulfur and instead specify the exact sulfur content of the fuel in the c/p.

Moving onto to 'bunkers on redelivery' (BOR), in a c/p, when a vessel is redelivered from a timecharter, it is usually stipulated that the vessel is redelivered with about the same amount of low sulfur and high sulfur fuel on board as at her delivery. The owner will often be required to buy the fuel back at the same price as at delivery.

Little value

However, high sulfur fuel bought back by the owner at redelivery will have little value unless the vessel is fitted with scrubbers. BOR c/p requirements might mean that the charterer is able to redeliver the vessel with insufficient compliant fuel on board to make the next bunkering port, therefore, owners might want BOR clauses to reflect this.

Some c/p bunker quality clauses require that the charterer provides fuel that complies with ISO 8217. However, not all fuels are covered by this standard, ie hybrids, thus the bunker quality clause might need amending to ensure that the charterer supplies fuel of the correct specification, which is safe and suitable for the vessel and is in compliance with MARPOL and other relevant regulations.

Although it is anticipated that there will be enough compliant fuel available to meet the increased demand, it maybe geographically fragmented, A vessel might trade in areas where compliant fuel cannot be supplied or even be unable to trade in such areas, thus the trading limit clauses might need to be reviewed. The same is likely for the use of new hybrid blends, while LNG still has limited availability worldwide.

Bunker tank cleaning will be needed if switching from heavy fuels to hybrids, blends or distillates. Tank cleaning might also be required before switching between different products, depending on the advice given by the fuel supplier. To achieve, this cleaning products will be need, waste will need to be disposed of and tome might be lost during the cleaning. Again responsibility for all of these operations will depend on the c/p's wording.

Different fuels contain different calorific values and energy densities. The vessel's performance could be affected by any of the chosen compliance methods, so the performance warranties might need to be amended. Smyth advised owners to check with their engine manufacturers.

It is unlikely that existing c/ps will state who will be responsible for installing a scrubber system. If the charterer is likely to benefit from fuel cost savings then there might be a case for a commercial agreement as to who will pay for the system and installation.

Addressing the question of whether owners can be compelled to install scrubbers, she highlighted a Court of Appeal deliberation on a dispute regarding this issue. In 2005, the then new MARPOL regulations came into force, which basically said it was unlawful for any ship to carry fuel oil as a cargo unless the vessel was either double hulled or double sided. Expensive modifications would therefore be required to allow the vessels in the case to be allowed to carry the fuel oil cargo.

The Court found that the owners were in breach of certain clauses in the particular c/p for not having carried out the necessary modifications - namely, a warranty relating to MARPOL compliance and a clause in the c/p requiring the vessel to have on board documents required by any applicable law to allow the vessel to trade.

An EGCS installation is only option for compliance and as is the situation today, it will be possible to meet the new sulfur regulations without installing a scrubber. Therefore, the absence of an EGCS on board will not necessarily mean the vessel is in breach of MARPOL, or impact on the vessel's documentation.

As for any fines, in the first instance, the owner will be responsible for paying any incurred penalties. However, they might be entitled to indemnification by the charterer depending on the c/p's terms. It might be less clear who is responsible for lost time and costs should the vessel be detained by Port State Control.

She stressed that early consideration of the above will be key to avoiding future headaches. The solutions will not be the same in every case and maybe best considered in the light of the vessel's intended trading pattern.

Additional problems could arise as the technologies develop and as the industry gets an idea of compliant fuels availability, etc. These could necessitate c/p terms review from time to time, she concluded.

A BIMCO sub-committee is currently looking at sub-clauses, either to add new ones, or to amend those already in place.

TO

Marine fuels loss prevention guide available

To help its members tackle the issues of quality, quantity issues and increasingly stringent environmental regulations, leading to costly, complex legal disputes, North has published a marine fuels loss prevention guide.

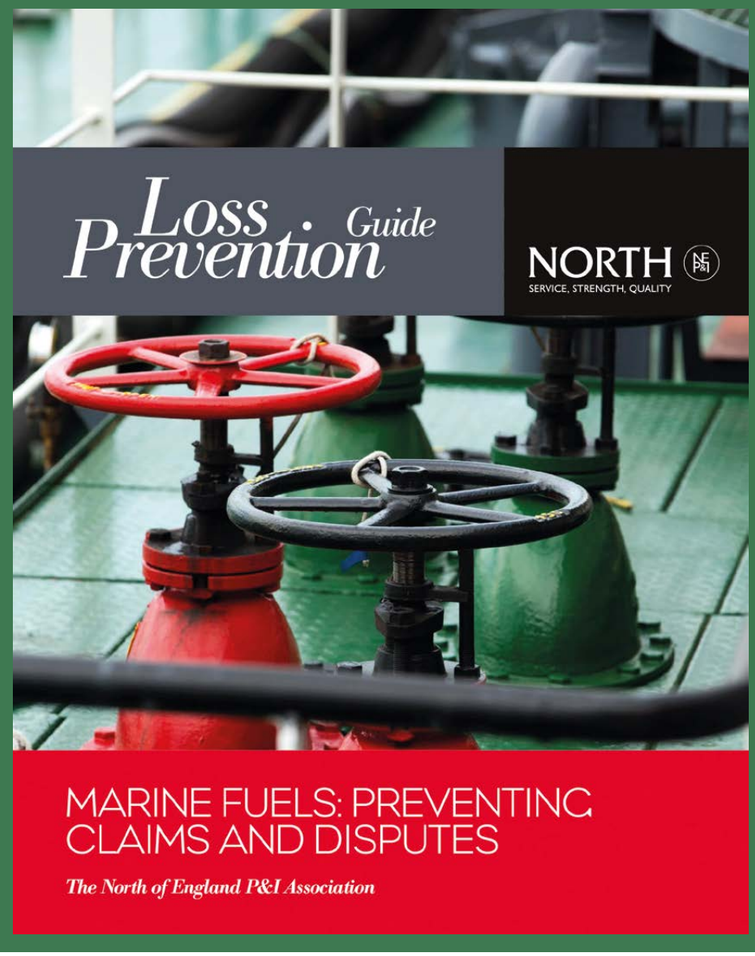
'Marine Fuels: Preventing Claims and Disputes' provides advice on how marine fuel claims and disputes can be avoided. It also provides guidance on how to have the best chance of success when pursuing or defending a claim.

The guide is aimed at ships' officers, vessel operators and managers and timecharterers to give them an understanding of what can go wrong when purchasing, bunkering and using marine fuels and what steps can be taken to prevent disputes and mitigate their impact.

Marine fuels' nature and characteristics are discussed along with purchasing, contractual obligations, loading, handling, sampling and testing. At the end of the guide is a chapter on claims management and the vitally important collection of evidence.

This new guide reinforces North's long held and often repeated 'golden rule' on resolving bunker quality and quantity disputes, ie the success of any bunker quality and quantity disputes will depend upon the quality of evidence collected in support of the claim.

To put it simply, the party with the strongest evidence to support a claim is more likely to succeed, North said. More importantly the guide reflects the principal - prevention is better than cure.



Charterers prefer scrubbers

Tankers charterers (operators) are prepared to pay significant premium in order to secure tonnage fitted with scrubber technology, ahead of IMO's 2020 rule, shipbroker Gibson said.

One of the most hotly debated subjects in the shipping markets this year has been the approaching IMO global sulfur cap of 0.5% on marine bunker fuels in 2020. In particular, a lot of discussions were focused on scrubbers. Many owners appeared sceptical and hesitant to embrace the technology and for very good reasons, as the technology is largely unknown and unproven.

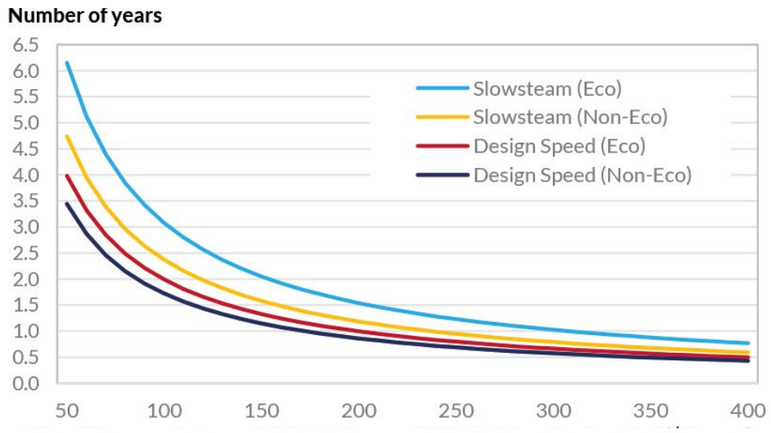
According to BIMCO, only around 450 vessels have scrubbers installed – less than 1% of a global merchant fleet of around 60,000 ships. The costs of installation are also sizeable, at around $2.7 mill for an open loop scrubber on a newbuilding VLCC, according to a South Korean shipyard. Retrofit costs could be considerably higher, depending on the ship's specification.

Another concern is that the environmental legislation could also evolve over time, possibly making the investment in scrubbers obsolete. For example, suggestions have been made that open loop systems could face further regulations in Europe, as they discharge waste sulfur directly into the sea. Finally, there are question marks about high sulfur fuel oil availability in distant and small ports, with limited storage capacity, said Gibson.

Despite these concerns, charterers are showing strong interest to timecharter tonnage fitted with this technology. Recently, there have been several T/C deals with oil majors, where a notable premium has been paid for tonnage fitted with scrubbers compared to tankers without the technology on board.

A new trend is starting to emerge where newbuild tankers are being ordered fitted with scrubbers or being 'scrubber ready', meaning that the equipment could be installed at the later stage. Three major tanker owners have recently declared their commitment to install scrubbers on some of their existing vessels and newbuilding tonnage.

DHT Holdings has revealed plans to install scrubbers on a sizeable number of its VLCCs (including several of their older units).



VLCC Scrubber Repayment Period (calculations based on retrofitting an existing tanker)
Source: Gibson Shipbrokers

Frontline has also announced its investment in a scrubber manufacturer, with plans to install scrubbers on the company's VLCC fleet. TORM has also confirmed that scrubbers will be fitted on some of its product tankers.

At present, over 30% of the current VLCC orderbook has been reported to include scrubbers, while another 9% is 'scrubber ready'. However, the actual number of vessels being fitted with scrubbers could be even higher as some deals have been concluded privately.

Gibson thought the the latest announcement by two major VLCC players could well be the game changer when it comes to owners' perception and strategy going forward with regards to the approaching IMO global sulfur cap.

Financial sense

On paper, installation of scrubbers makes perfect financial sense. Not only are charterers willing to pay a significant premium over prevailing market rates to secure tonnage ready for 2020 but also the cost of a VLCC scrubber retrofit could be repaid in under 18 months, if the spread between high sulfur fuel oil and compliant 0.5% sulfur bunker fuel is at $200 per tonne.

The repayment period will be even shorter if the price differential is at 3.5% and 0.5% sulfur bunker fuel is over $200 per tonne. After the cost of investment is repaid, an owner can achieve significant savings, enjoying a strong competitive advantage compared to tonnage without scrubbers.

This of course represents an attractive investment case but only if an owner can secure a slot at a shipyard for installation/ retrofit over the next couple of years. Longer term there are other concerns, such as a potential narrowing of the spread between high and low sulfur bunkers.

Also, uncertainty surrounds the ongoing issue of CO2 emissions – how they will be addressed and what new regulations the shipping markets will then have to face?

Favoured fuel

Agreeing with this scenario, Marc Sima, founder and CEO of Germany-based FuelSave said; "High sulfur fuels will remain the industry's favoured fuel until methanol and hydrogen-based alternatives have attained commercial viability. Until then, the pursuit of

LNG is just throwing good money after bad."

He cited the cases of more shipowners opting to install marine exhaust gas cleaning systems (scrubbers) on their fleets, together with the publication of a UMAS report, which puts paid to the notion that LNG is a viable way of meeting emissions rules.

Agreeing with the UMAS findings that there would be no significant reduction (if not a potential increase) in CO2 emissions through the wider take-up of LNG, he refutes the suggestion that low sulfur fuels will become the industry's primary fuel source by 2020.

"I really can't see the global fleet switching across to low sulfur fuel in little under two years' time. Not only would shipowners have to make sure their engines are compatible with the fuel in time, but assuming they are, they would also have to revise their supply chains, evaluate compatible lubricating oils, and then sit back and watch their operating costs increase.

"It just won't happen. Low sulfur fuels may be today marginally more expensive than LNG, but should the industry make the switch en masse, what are the refiners going to do, reduce the cost? I doubt it," he said.

To meet the 2020 global sulfur cap, Sima advocated the continued use of HFO/ MDO/MGO with the appropriate emissions abatement technology – a scrubber – as the only cost-effective and proven solution for emissions reduction. If a scrubber is opted for, its economic and emissions-reducing efficiency can be further optimised by using FuelSave's patented FS Marine+ solution, he claimed.

This is ostensibly a fuel additive that can be used with almost any type of 2- and 4-stroke engine running on HFO, MGO or MDO. It uses an on board hydrogen synthgas generator to inject a gas and liquid water/ methanol solution into an engine's combustion chamber to significantly improve efficiency. In pilot tests aboard a heavy lift type ship, fuel consumption was reduced by 25% equating to net savings of 15%.

"When a scrubber is used in concert with FS Marine+, higher fuel efficiencies can be achieved since the scrubber has less work to do, which equates directly to a greater reduction in fuel consumption. With a scrubber working with our process, we found shipowners can reduce the amortisation rate for the scrubber which, currently does not provide a great return on investment. FS Marine+ provides a real solution to emissions reduction, and without the kind of high investment the use of LNG or low sulfur fuels would require."

It is also thought that use of the FuelSave solution could allow for the installation of a smaller scrubber, due to the improved exhaust gases, reducing installation volume and costs. This makes it possible to install a scrubber on ships where space is limited.

As a simple-to-install retrofit solution, with or without a scrubber, FuelSave is claimed to add a different dimension to the emissions debate, providing shipowners with an alternative solution.

In addition, the system has shown to have a beneficial impact on engine performance, as it cleans up the combustion process, resulting in fewer carbon deposits and a reduced lubricating oil requirement.

This has been confirmed by Hamburg-based engine service company Carl Baguhn, which reported less soot on engine cylinders and less wear and tear, due to the cleaner combustion process.

Following the FS Marine+ installation on board the SAL heavy lift ship, Carl Baguhn technical advisor Carsten Körbelin, said: "It is a matter of fact. We have been maintaining the owner's Mitsubishi auxiliary engines for some years. They run on MDO, have always been well maintained and operated under normal conditions. But since we installed the FuelSave system, the engine has become much cleaner. There is no visible soot and engine running is much smoother, with reduced levels of noise and vibration. The improvement is astonishing. This is something very special."

Use of FS Marine+ also extended the times between lubricating oil changes from 500 hour to 1,500 hours, thus reducing engine maintenance and service costs.

Legal and practical implications of US Gulf bunker problems

Following recent reports of marine fuel contamination on an unprecedented scale in the US Gulf region, UK law firm, HFW considered some of the issues arising for those affected, including shipowners, timecharterers and bunker suppliers.

Reports suggested that possibly up to 100 vessels may have been affected by contaminated fuel oil stemmed at ports in the Houston and US Gulf region. Contaminated supplies of blended fuel oils, such as IFO 380, were first reported in the US Gulf region in February and appear to have persisted.

Whilst the root source of the issue remained inconclusive, initial reports based on advanced fuel testing methods, such as Gas Chromatography Mass Spectrometry (GCMS), seemed to point to adhesive phenolic compounds as the principal contaminant, although other products may also be involved.

Vessels affected reported a range of technical problems. These included blocked fuel filters, fuel pump seizures and even the complete loss of main engine power, giving rise to the possibility of serious incidents, such as collisions or groundings.

The issue appears to have been compounded due to the lack of detection of contaminants via conventional fuel testing analysis performed in accordance with ISO 8217 requirements and fuel specifications, commonly incorporated into marine fuel supply contracts and also timecharterparties.

The issue has affected a number of suppliers, leading some to speculate that the problem is linked to a refinery, or cutter stocks that are lighter petroleum products added to heavier fuel to reduce viscosity.

HFW gave some examples of the issues arising, proceeding on the basis that the supply of marine fuel oil was arranged by a timecharterer.

Shipowners-

- The immediate question will be how to deal with the contaminated fuel remaining on board and not yet burned. This will need to be assessed on a case by case basis and is likely to require the input of a marine fuel specialist in conjunction with an owner's P&I Club and legal advisors.

Options may include the blending or filtration of the contaminated fuel, or alternatively its complete discharge, as well as fuel tank and fuel system cleaning. Initial indications suggest that discharge may be the only option in many cases. Discharge of the contaminated fuel also presents challenges. For example, the contaminated fuel may be designated as a chemical waste requiring specialist handling and not suitable or permitted for onshore fuel storage facilities.

The issues of where and how to dispose of the contaminated fuel will therefore need to be carefully checked in advance via local port agents and with the relevant authorities. Owners will be looking to their charterers for assistance and co-operation in the arrangements, as well as putting them on notice of the claims.

- Although circumstantial evidence may point to fuel contamination, when considering their potential claims against charterers or bunker suppliers, owners will need to consider and preserve the evidence necessary to prove that the cause of the problem is off-specification fuel oil and that the cause is not a ship related problem.

This will include retaining samples of the contaminated fuel, as well as establishing that the relevant maintenance checks of their fuel filtration and pumping system are up to date and in order via documentary records. Evidence of previous bunker supplies, potentially going back over a period of time, may also be required to rule out problems caused by earlier stems.

Owners are advised to speak to their P&I Club and technical experts at an early stage in order to assess what evidence ought to be preserved.

Needless to say, in order to bring a claim in damages arising from a contaminated fuel supply, owners will need to carefully consider the relevant charterparty terms, seek legal advice and report to their insurers. They will also need to try and ensure that they take steps to minimise their losses, to ensure that their claims are not prejudiced. This could be a simple as switching the fuel supply to other fuels on board (possibly even requiring the use of more expensive low sulfur fuel), or ensuring that repairs are performed as soon as possible.

- Owners purchasing marine fuel from the US Gulf region are advised to be vigilant and alert to potential technical problems, keeping their crew informed on the latest developments, circulating bulletins issued by P&I Clubs, the US Coast Guard and classification societies, and on the lookout for warnings signs of fuel contaminants, to be advised by their technical experts.

Owners with ships regularly calling at the affected ports may also wish to check that they have on board spare parts for their fuel pumps and systems. Some owners with a regular service to the US Gulf may also need to consider revising the wording to their existing charterparties for greater protection.

Timecharterers -

- The effects of the contamination will inevitably lead to downtime, in addition to any time spent deviating to a port of refuge, discharging, filtering or blending contaminated bunkers, as well as awaiting the arrival of spare parts and fuel analysis test results.

This in turn is likely to result in off-hire issues. Owners will inevitably be saying that the vessel remains on hire for the period of any delays and claiming their costs in addition as damages. However, the burden remains with owners to establish that the cause of any problems was due to the supply of contaminated fuel.

Charterers will need to consider very carefully whether or not they intend to withhold hire for the time lost and the potential implications if they do so, such as the rights that owners may have under the relevant charterparty to withhold performance, cancel the contract or exercise liens over cargo and /or freight. In cases where contamination is clearly established, then charterers should exercise extreme caution before deducting from hire.

- Having to deal with or dispose of the contaminated fuel or perform repairs may result in the need to deviate the vessel from its intended voyage. These issues will create problems for charterers if they are the contractual carriers under bills of lading, so that they may face potential claims from shippers or receivers and will need to look to their P&I Clubs for support.

- Owners will look to charterers to take responsibility for any contaminated fuel supplied and take over the handling of the issue. Charterers will need to try and engage with their suppliers to seek support (for example on the issue of the discharge and handling of the contaminated fuel) and carefully consider the terms of the relevant bunker supply contract, in particular the law and jurisdiction clause, time bar clauses and any clauses dealing with the limitation of liability.

Charterers should be especially alive to the potential for short contractual time periods for bringing and notifying claims under the relevant supply contract. If bunkers were stemmed sometime ago and the contamination only recently discovered, charterers could be at risk of potential time bars if not carefully checked and the necessary steps taken.

Bunker suppliers -

- Suppliers concerned that they may have received contaminated fuel stocks, or in order to provide confidence to their buyers, may consider performing more advanced fuel testing analysis (such as GCMS) to try and rule out the risk of future fuel contamination problems and claims.

Bunker suppliers will also need to consult with their insurers and put them on notice of any potential claims. They will also need to carefully review their supply chain in order to investigate any problems and pass on any claims brought by their customer to their own supplier under the relevant contract.

- In cases where there is conclusive evidence that contaminated fuel has been supplied, a supplier may wish to adopt a co-operative approach in order to try and minimise the claims brought against them, as well as looking to commercial resolution of the claims before legal costs rise.

Owners, charterers and bunker suppliers -

- The existence of chains of marine fuel supply contracts on potentially back-to-back terms, entail that similar legal issues may arise at different stages of the supply chain, or in time charterparties where charterers are commonly obliged to supply and pay for bunkers.

- All parties will need to ensure that sealed samples of the fuel supplied are carefully retained for testing and testing protocols agreed in case of any allegations of contamination.

Applicable law

Given that the majority of supplies were made in the US, it is anticipated that there will be a US law element to the claims brought against suppliers, either due to the contractual terms of the local physical supplier, or by application of US tort law for claims to damage to property. Indeed, the possibility of class actions in the US against suppliers cannot be ruled out.

The question of the applicable law is far from straightforward, and the existence of 'umbrella' bunker supply agreements entered into by larger ship operators with bunker traders and suppliers, means that English law could potentially apply to the relevant supply contract. The applicable law will need to be assessed on a case by case basis.

Fuel contamination is not a new phenomenon and the issue for discussion is how it may be addressed in the longer term, HFW said. Modern technologies, such as blockchain, with point of origin traceability could be a solution in due course, such as being currently looked at as a method of controlling contamination in the food industry.

Footnote: This briefing was written by HFW's partner Paul Dean and senior associate, Rory Grout.
Dean is HFW's representative on BIMCO's sub-committee established to develop a charterparty clause to address the 2020 global sulfur cap. Grout is assisting.

VIQ7 and Ship-to-Ship transfers

OCIMF's new VIQ, edition 7 will be implemented on 17th September this year.

There is a radical change as to how OCIMF approaches ship-to-ship transfer (STS) operations, as SIRE and TMSA auditors will be expected to look at a number of items related to STS issues.*

DYNAMARINe's STS specialists have analysed VIQ7 in relation to STS operations and have given an assessment and also added advice.

Paragraphs 8.51 to 8.55 outline the new requirements during vetting inspections for vessels. These requirements with the relevant records are expected to be available to the technical operators (DOC holders).

The qualitative information, as outlined in the new VIQ, will have to be supported by recorded processes within the Safety Management System (SMS) and also be depicted in the respective elements of TMSA.

Paragraph 8.51

- Senior officers should be familiar with the requirements and risks (hazards) during STS operations. This process may be satisfied during the familiarisation of new officers, similar to other company/ operational procedures of the SMS. Attention is drawn to knowledge of RISKS/ HAZARDS, which have to be in line with those of ANNEX K of the latest OCIMF guidelines.

Within the DYNAMARINe network, the following optional features were developed - STS drills, e-learning for seafarers and STS status gap analysis performed on board, which provide means for addressing hazards to senior officers for familiarisation and enhancement of their preparedness.

- New requirement for risk assessment of the STS location. This is currently implemented in PART B of DYNAMARINe's report. The company said it was also working towards supporting it with more information on the STS location on the basis of available data on OSIS. There is a process for the STS location assessment, already in place, according to the guidelines already set out by OCIMF in relevant publications, supported also by weather analysis.
- For consecutive STS operations, or similar circumstances, where work rest hours may exceed the required by STCW, the role of POAC would be expected to be transferred to either the Master or Chief Officer who should meet the requirements for POAC according to Manual on oil Pollution. In this respect an STS simulation course with relevant certification should be available to Masters and C/Os under these circumstances.

Paragraph 8.52

- Senior deck officers engaged in the assessment of the Joint Plan, as well as the information received by the STS service provider and POAC should have the capacity to assess that POAC qualifications comply with the requirements of MARPOL for ANNEX I cargoes.

Prior to the commencement of the STS operation, the identity(1) and POAC qualification should be made available to the master for verification of compliance.

- PART C of the risk assessment reporting provides the assessment of POAC qualification in relation to requirements, as well as an indication of past experience.

Paragraph 8.53

- Reference is made to the type of chocks used for the mooring lines. It is clearly stated that all lines should be led through closed type fairleads or chocks, for all tankers that are subject to SIRE vetting inspections.
- Attention is drawn with the relevant evidence available on board from the mooring plans, on the type of fittings used during past STS operations (see comments on Paragraph 8.54).
- PART A (Screening Report) of the onlineSTS.net service provides the compatibility analysis on the availability of closed chocks from both participating vessels, DYNAMARINe claimed.
- Open chocks should not be used without prior assessment of freeboard change, weather conditions, type of STS operation, assessment of the STS location and proposed mooring pattern. Such assessment should take place with the consensus agreement of technical operators.

Paragraph 8.54

- This paragraph outlines the STS information expected to be collected by the Master and/or technical operators.
- Crew experience is readily available for review under the onlineSTS.net platform.
- Master's feedback is also readily available through the onlineSTS.net platform.

ANNEX I – Extracts from VIQ7

8.51 Are the officers and crew familiar with the requirements and risks during ship-to-ship transfer operations?

Any oil tanker over 150 gt involved in STS operations shall carry on board a plan prescribing how to conduct STS operations (STS Operations Plan), which shall be approved by the administration. The STS operations plan shall be written in the working language of the ship (MARPOL Annex I Reg 41.1).

Notes: STS operations plans are not required for offtakes from FPSOs, FSOs, or for bunkering operations (see MARPOL Annex I, Reg 40 for full details). Operational plans shall be developed taking into account the information contained in IMO's 'Manual on Oil Pollution, Section 1,

Prevention' and the ICS/OCIMF/SIGTTO/CDI 'Ship to Ship Transfer Guide, for Petroleum, Chemicals and Liquefied Gases First Edition 2013'.

A risk assessment should be undertaken when considering the suitability of an STS transfer location. A further risk assessment should be made for the STS operation (STS Guide 1.4). All STS transfer operations should be conducted under the co-ordination and advisory control of one individual, who will either be one of the Masters concerned, an STS superintendent or the POAC.

To prevent fatigue during extended operations, the role may be formally transferred to another suitably qualified person (STS Guide 1.5.1). In case the vessel is equipped with permanent fenders and hoses, there shall be procedures in place to monitor and assess the condition of such equipment in accordance with manufacturer guidelines.

8.52 Does the POAC have the necessary qualifications and experience and are officers aware of these requirements?

For transfers involving MARPOL Annex I cargoes, the POAC should have at least the following qualifications or level of experience -

- An appropriate management level deck licence or certificate meeting international certification standards, with the International Convention on Standards of Training Certification and Watchkeeping for Seafarers (STCW) (reference 9), dangerous cargo endorsements up-to-date and appropriate for the ships engaged in the STS operation.
- Attendance at a recognised ship handling course.
- Experience in conducting mooring/ unmooring operations in similar circumstances and with similar vessels.
- Experience in oil tanker cargo loading and unloading.
- A thorough knowledge of the transfer area and surrounding areas.
- Knowledge of spill clean-up techniques, including familiarity with the equipment and resources available in contingency plans.
- Knowledge of STS operations plans (appendix A1.5) and associated joint plans of operation (Section 5.2).

For transfers involving cargoes other than MARPOL Annex I cargoes, it is recommended that the STS superintendent has similar qualifications and levels of experience to those detailed above, relevant to the type of cargo transferred (STS Guide 1.7).

8.53 Are closed fairleads and mooring bitts provided?

It is recommended that all fairleads used during STS transfer operations are of an enclosed type. Such fairleads should be strong enough to take the anticipated mooring loads and large enough to allow the mooring line (plus any soft rope and tackle) to pass through comfortably (STS Guide 9.3). It has been found that full strength enclosed fairleads and bitts for spring lines need to be positioned no more than 35 m forward and aft of the cargo manifold (STS Guide 9.3).

It is recommended that all tankers be fitted with an array of mooring bitts of sufficient strength on each side of the ship (STS Guide 9.3). In addition, it is recommended that provision be made for securing fender lines (STS Guide 9.3).

8.54 Are officers aware of the requirements of the ship-to-ship transfer checklists and are there records of STS operations maintained?

The checklists should be used not only at the time of transfer but also when the operation is being planned. Adherence to check list procedures will ensure that the most important aspects of an operation are covered.

The checklists are:

1. Pre-fixture information;
2. Before operations commence;
3. Before run-in and mooring;
4. Before cargo transfer;
5. Before unmooring (STS Guide 3.4 and Appendix E).

Note: STS records which should include, but not limited to the following:

1. STS Checklists as per latest ICS/ OCIMF/SIGTTO/CDI guidelines edition 2013.
2. The JPO (Joint Plan of Operations) as provided by the service provider.
3. Risk assessment as submitted by the service provider.
4. Detailed Mooring Plan of participating vessels.
5. Copies of certificates of fender and hoses.
6. Notification to coastal authorities.
7. Details of drills associated with the specific STS operation.
8. Records of crew experience.

Post feedback/ assessment by the Master -

If the vessel has been engaged in STS operations in the past 12 months then records should be spot checked for compliance.

8.55. If a ship-to-ship transfer was in progress during the inspection, was it conducted in accordance with the recommendations of the OCIMF/ICS STS Transfer Guide?

To eliminate the potential for incendive arcing between the two ships, when presenting the hose string for connection, one of the following arrangements should be used:

- A single insulating flange fitted at the manifold of one ship or within each hose string and all hoses in the string electrically continuous.
- A single length of electrically discontinuous hose fitted in each hose string.
- Hoses that are specially constructed to prevent static build-up and limit electrical conductance to an inherently safe level. Where an insulating flange is used, it is important that no part of the conducting hose outboard of the insulated flange comes into contact with the ship to which the insulating flange is fitted, for example from the use of non-insulated hose saddles, as this could cause a spark (STS Guide 3.10.4).

Synthetic moorings passed through shipside fairleads may be subjected to chafing from cyclical loading due to the vessel's motion. Lines can be protected with suitable chafing covers. The covers may be lubricated to minimise the potential for them being damaged.

Additional lines should be readily available to supplement moorings if necessary, or in the event of a line failure (STS Guide 6.6.2).

Footnote: [1] CDI/ICS/OCIMF/SIGTTO STS guidelines, 2013 edition, paragraph 4.3.

**This article was supplied by DYNAMARINe.*

What you need to know about MEG4

Developing mooring systems that are adequate for intended service, with maximum integration of guidelines across a wide range of ship types and sizes is essential.

Although multiple guidelines exist, none are as extensive or well-received as OCIMF's Mooring Equipment Guidelines (MEG).

Nearly a decade after releasing MEG3, vessels have increased in size and mooring operations complexity has also significantly increased.

As a result, OCIMF recently released MEG4 to provide more insights on hardware designs, mooring dynamics, mooring line design, inspection and discard criteria, as well as recommendations on mooring line strength and questions buyers should ask mooring line manufacturers, manufacturer, DSM reported in an analysis of the updated guidelines.

These questions include topics, such as fibre choice, mooring line design, linear density of the load-bearing core, special coatings, and material wear mechanisms. In addition, several new tests will are detailed throughout MEG4 that will require compliance from mooring line manufacturers to prove that their lines are fit for mooring specified vessels.

DSM is the inventor and manufacturer of the patented Dyneema, which is claimed to be the world's strongest patented fibre, a leading material choice in the mooring industry.

Many ship operators specify mooring and tow ropes made with Dyneema SK78 because they are stronger, lighter, more durable and easier to handle than other materials, the company said. Based on extensive knowledge of fibre technology, rope design and mooring practices, DSM played a critical role in the development of the MEG4.

Jac Spijkers, DSM's Application Development Manager, was vice chair of the OCIMF MEG4 committee responsible for the new guidelines, which took nearly two years to complete with input from experts worldwide. "The MEG4 is an important step in providing safety for large carriers," Spijkers said.

Today's vessels rely on crews to manage critical operations. Keeping these operators safe requires the right procedures, equipment and training. Mooring lines play a vital role when berthing.

Whereas previous guidelines provided limited details in terms of requirements for safety and performance, MEG4 gives insights into the safe use of mooring lines and tails, placing more emphasis on selecting the right line with the right construction (the select phase) and monitoring its conditions in use and discarding after use (the operate phase).

Other key chapters and changes that have been incorporated into MEG4 include:

- Enhanced guidance for purchasing, condition monitoring, and retirement of mooring lines and tails.
- Enhanced guidance on documentation of mooring equipment.
- New chapter on the Human Factors in Mooring Design.
- New chapter on Jetty Design and Fittings.
- New chapter on Ship Shore Interface.
- New chapter on Alternative Technologies.

"As we continue to build our knowledge of mooring line behaviour, failure mechanisms and new mooring technologies, we will continue contributing to industry bodies and regulatory institutions," explained Spijkers. "We support our customers – the mooring line manufacturers – in creep calculations, advice on mooring line design, our proprietary coatings, reliable end-connections and mooring hardware related topics.

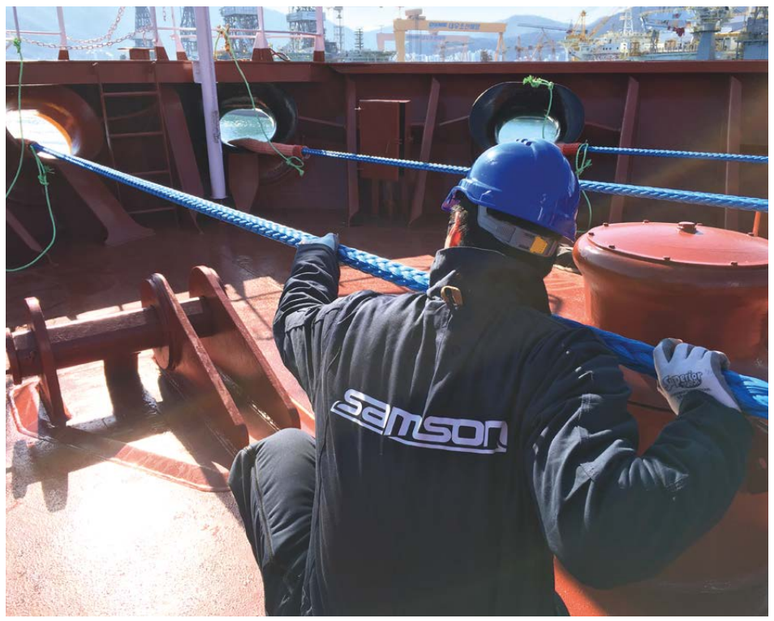
"Only by working in close co-operation with mooring line manufacturers and the vessel owners and operators, safe use and long lifetime will be ensured,"he added TO

Samson launches solution to streamline MEG4 transition

Samson, the developer of high-performance synthetic rope solutions has launched a new integrated technology and service solution; the patented Icaria.

Icaria is more than software – it is a package that represents service and technology combined, to support Samson customers in a collaborative and integrated way. It consists of several components to help maximise line life, reduce risk, and improve safety and communications, the company told *Tanker Operator*.

It has been designed to facilitate the transition process to MEG4 operational best practices.



Samson has unveiled an integrated technology and service solution

OCIMF's release of the fourth edition of its Mooring Equipment Guidelines marks a significant change in how mooring systems will be designed, selected, maintained, and retired.

"As the regulatory environment evolves, vessel owners and operators have the opportunity to upgrade tools and systems to ultimately improve safety," Samson's Director of Engineering, Kris Volpenhein said.

"Icaria is designed to streamline implementation of MEG4 best practices by providing advanced tools, services, consultation, and support for both new and existing vessels. Icaria customers will have support in both MEG4 plan development and implementation," he added.

This solution helps facilitate the transition process by providing assistance with the selection or confirmation of the appropriate mooring line system, identification of gaps and focus areas for more frequent or robust maintenance routines, and recommendations for setting service life expectations.

Icaria also includes learning management, training, and certifications for crew members to improve decision-making. TO

An evolution in mooring technology

Nylacast has introduced the Chock Liner -a patented low friction technology supporting safe and reliable moorings for vessels of all types.

The transition from steel wire rope to fibre rope is widespread across industry. Fibre rope has a good strength to weight ratio and ease of handling, resulting in much lower risk of injury.

A major weakness with fibre rope is poor resistance to external abuse and abrasion through everyday operations and poor surface contact. Abrasion continues to be one of the most common root causes of rope failure and reduction in its residual strength.

It is impossible for synthetic rope to perform to its maximum capabilities when used with poorly maintained deck equipment, often rusted or with a rough surface finish. Rope manufacturers recommend surfaces are correctly prepared, maintained and routinely inspected before and after rope installation.

A 300-microinch finish (7.62 microns) is recommended for all deck hardware, which comes into contact with the rope, in addition to the avoidance of chocks heavily scored from previous wire rope use.

Nylacast's Chock Liner mooring technology is versatile and capable of being fitted to new vessels and retrofitted to existing chocks and panama fairleads with no hot work or drydocking required.

Increased safety is a feature of the Chock Liner, which reduces rope wear and abrasion, reducing the risk of breaking or failure. There is also no need for crew members to be near mooring lines under tension, as minimal (if any) chafe protection is required following its installation.

Chock Liner should last for a vessel's lifetime

Its smooth surface and finish and its material characteristics provide better equalisation of mooring loads, especially when in a high swell. The self-lubricating, low friction material requires little or no maintenance and no painting, coating or external protection.

The materials technology in Chock Liners allow for the use of HMPE fibre rope with lower risk of abrasion and wear when in contact with the chock or panama fairlead. Chock Liner is also suitable for polyester/polypropylene, polyester and nylon ropes, as required for FLNGs, FSRUs and ship-to-ship transfers where a specific synthetic pennant may pass through the fairlead.

In all cases due care and attention is required in relation to the loads involved, chock designs and rope sizes.

Chock Liner has been tried and tested in industry for many years, Master of Teekay's LNGC 'Tangguh Sago', commented, "The Nylacast Chock Liner is an excellent product for preventing mooring rope wear and damage. I believe the Chock Liners should be installed on all vessels equipped with HMPE ropes. We have installed 30 Chock Liners to the vessel, which are still in excellent condition after seven years of continuous service and should last the lifetime of the vessel."

Lankhorst's fluorescent mooring rope

Glowing in the dark

Elsewhere, maritime ropes supplier, Lankhorst Ropes, will unveil the maritime industry's first fluorescent mooring rope, one of the many new safety and performance Lankhorst rope developments, at SMM 2018.

Also featured will be the Lankonect synthetic fibre rope connection providing tug operators with a quicker and safer connection during towing, new reflective Lankoforce rope for towing and mooring and enhanced spliced eye protection to reduce abrasion.

Tipto Winchline is a dedicated floating mooring line developed especially for self-tensioning winches.

The addition of a phosphorescent tracer yarn in the rope's outer jacket allows the rope to glow in the dark, thus increasing the visibility of the rope. Its load-bearing 7- strand core combines high strength and relatively low elongation. The outer non-load-bearing braided jacket also provides protection of the core for longer service life and increases crew-safety by minimising the risk of snap-back.

As standard, most of the Lankhorst's mooring ropes now include improved eye resistance to abrasion with a Defender jacket made from polyester yarns and with a protective coating. The jacket is added to the mooring rope during splice make-up.

Lankhorst Ropes was a member of OCIMF's multi-disciplinary working group and was closely involved with the development of MEG4 for the safe mooring of tankers and gas carriers at terminals.

TO

Dual fuel engine in ethane milestone

Two vessels powered by the world's first ME-GIE (gas injection ethane) 2-stroke engines accumulated 10,000 hours of operations in total since coming into service at the end of 2017.

This was confirmed by Hartmann Reederei, the German shipmanagement company, earlier this year, together with MAN Energy Solutions (MES).

The 36,000 cu m liquefied ethylene gas (LEG) carriers - 'Gaschem Beluga' and 'Gaschem Orca' – were ordered by Hartmann and Ocean Yield of Norway, and constructed at Sinopacific Offshore Engineering (SOE) in China to transport ethane derived from US shale gas to European crackers for the production of ethylene.

Capt Ulrich Adami, Hartmann Reederei fleet manager, said: "We are grateful to MAN Diesel & Turbo (now MES) for developing the ME-GI engine to burn ethane. The ME-GIE is very reliable and about 97-98% of our ships' passage back and forth over the Atlantic has been on ethane. Our charterers are happy with the positive budget implications that have come with being able to exploit the fuel on board."

"You are always taking a risk with prototypes, in this case not just the engine but all the new features that were implemented into these vessels. But I was confident in all respects that we had reliable partners and we wouldn't have any major issues, so the risk was mitigated.

"Overall, the propulsion system performs very well with an even better fuel consumption than predicted, and we are recording higher sea-passage speeds during heavy weather in the Atlantic. I believe the 'Gaschem Beluga' and 'Gaschem Orca' are among the fastest vessels over the Atlantic," he said.

René Sejer Laursen, MES' sales & promotion manager, said: "We're very happy to hear the positive reports from Hartmann regarding fuel consumption for gas operation. We thank Hartmann for believing in our concept and are ourselves very happy with the performance of the ME-GIE engine.

The gas driven 7G50ME-GIE engine

"Our inspections of the cylinder liners on both sides of the Atlantic have also shown that they still look like brand new. Regardless, we continue to look for ways to further improve the ME-GIE's performance and are currently working on lowering pilot-oil consumption, which we ultimately expect to drop down to just 1%," he said.

Hartmann said that there was potential demand for further vessels. Market reports suggested that Chinese concerns were looking into cracking ethylene with ethane as feedstock, which could result in more ships burning ethane coming into the market.

Hartmann is also a part of the JHW consortium, which ordered five 85,000 cu m very large ethane carriers (VLECs) in 2016. Each vessel will be powered by a single MAN B&W 6G60ME-GIE main engine.

Propulsion systems

The two 36,000 cu m vessels were fitted with propulsion packages supplied by MES, Frederikshavn (Denmark) that also feature a remote control system AT3000, a VBS 1350 – ODS Mk5 CP propeller, a rudder bulb and a shaft generator with a frequency converter that enables it to run on variable speed between 80 to 100 rev/min.

The engine features MES' newly developed pump vaporiser unit (PVU) that matches the requirements for the supply of high-pressure LNG to the ME-GIE engine. The PVU supersedes previous fuel-gas supply systems with its low installation costs, smaller space requirement and full

pump redundancy. Tier III operation can also be met in combination with SCR or EGR systems. The engine can be delivered in the 5-90 MW power range.

The benefits of the ME-GIE's diesel-type combustion is that they can now operate on almost any gas quality – without any reduction in efficiency – and through a complete combustion maintained by a relatively high gas-injection pressure, MES claimed.

It can run on a mixture of LPG and methane, or ethane, with an unchanged gas-mode efficiency. Such a mixture may comprise as much as 50% LPG, while MES' findings thus far indicate that an even greater LPG percentage can be used. The engine has negligible methane/ethane/LPG slip.

Its development to burn ethane is part of the 'Maritime Energy Transition', an umbrella term that covers all MES activities in regard to supporting a climate-neutral shipping industry.

This promotes a global 'turn to gas', driven by the IMO, and a common approach by the shipping industry and politics to invest in infrastructure development and retrofits.

Launched in 2016 after COP 21, the initiative has since found broad support within the shipping industry and German politics, the company said.

MES said it saw significant opportunities in ME-GIE development, as the engine can also run on almost any form of waste gas. These gases could be the light hydrocarbons or VOCs emitted from crude oil during storage and during the loading/unloading of crude oil.

This opens the door for new applications for the engine in, for example, shuttle tankers, for power generation in remote power plants, or in offshore applications – such as FPSOs – where VOC is abundant and poses a potential environmental hazard.

Suezmax orders

In addition, Hyundai recently finalised a contract for two Suezmaxes for Turkish shipowner, Ditas Shipping.

The 158,000 cu m capacity crude oil tankers will each be powered by an MAN B&W 6G70ME-C9.5 2-stroke main-engine that feature integrated exhaust gas recirculation (EGR) systems.

While there are already IMO Tier III-compliant vessels with EGR systems in service, these Suezmax newbuildings will be the first vessels with keel-laying after 1st January, 2016 to be officially certified as complying with Tier III emission restrictions within existing North American NOx Emission Control Areas (NECAs) and the US Caribbean Sea NECA.

EGR is a NOx emissions-control technology that works by recirculating part of an engine's exhaust gas back to the engine cylinders. MES originally developed, designed, and manufactured the first EGR system for a 2-stroke marine diesel engine for operation on a container vessel in 2010.

A part of the exhaust gas is drawn through a scrubber, cooler, and water mist catcher by suction created from an electrically driven, specially designed blower. The blower raises the pressure of the exhaust gas, which is then mixed with the charge air via a unique charge air pipe, before entering the main-engine coolers.

Within the scrubber, the exhaust gas is washed with water, which consequently becomes acidic, depending on the sulfur from the fuel in the exhaust gas dissolving in the water. Sodium hydroxide dosing is therefore required to neutralise the acidic scrubber water.

In addition, the scrubber washes out particulate matter (PM) that becomes suspended in the scrubber water, and it is therefore necessary to have a water treatment system (WTS) to remove PM from the scrubber water, and discharge the PM as concentrated sludge into the vessel's sludge tank. The WTS is designed for cleaning the scrubber water to such an extent that it can be discharged into open sea.

A fully automated control system provides for easy operation by the ship's crew and correct and swift reactions to engine load variations.

Following efficiency optimisation trends in the market, MES said that it thoroughly evaluated the possibility of using even larger propellers and thereby engines with even lower speeds for the propulsion of tankers and bulk carriers.

Such vessels may be more compatible with propellers with larger diameters than designs thus far used, and therefore able to facilitate higher efficiencies following adaptation of the aft-hull design to accommodate a larger propeller. It is estimated that updated aft-ship designs with the G-series of engines offer potential fuel-consumption savings of some 4-7%, with a similar reduction in CO2 emissions.

Simultaneously, the engine itself can achieve a high thermal efficiency using the latest engine process parameters and design features, MES claimed. TO

ABS CHEM - supporting chemtanker class approvals

The highly competitive chemical tanker market must balance the need for high safety standards and commercial imperatives, especially when it comes to securing cargoes, writes Stein Nilsen, Technical Advisor, ABS.

New product releases, name changes of existing chemicals and agreements between countries, mean that owners must regularly work with class to obtain an addendum to their Certificate of Fitness (CoF) in order to carry the named cargo.

Because different cargoes have different safety requirements for items such as monitoring or temperature systems, not all chemicals can be carried by all ships. Running the vessel configuration against cargo safety requirements has until now required manual checking and verification by the owner, followed by submission of a request for verification by class.

The speed of response is critical because even while a vessel is approaching port to discharge, the chartering department will be looking for a return cargo. If a customer has stems available, the team will want to start negotiating rates as soon as possible.

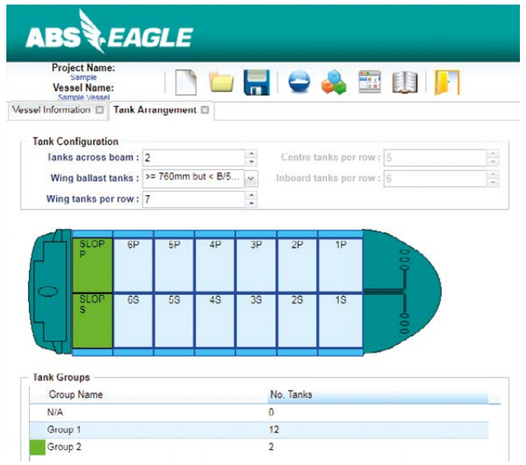
Any delay in discovering that the ship is not suitable to carry a specific cargo could mean that the business is lost; by the time a substitute is found, the opportunity may have gone. With other operators ready to bid, time is of the essence and the faster the owner can confirm the vessel the better.

It's a problem identified by ABS, which in response released ABS CHEM, claimed to be a unique client-focussed version of the software used by its engineering department to determine if vessel characteristics match cargo criteria.

Owners will often have a general idea of the vessel's configuration but rather than be forced to check pages of documentation to see if ship and cargo are compatible, ABS CHEM allows them to enter full vessel details only once. When a new cargo is identified they can quickly check to obtain a preliminary decision on whether carriage is permitted.

The owner must still seek final approval from the ABS engineering department but by using ABS CHEM for a preliminary approval means the operations team can continue scheduling and even loading operations, knowing that they will likely obtain the addendum.

Where they discover that the vessel is incompatible with the cargo, they can save the cost of the class society verification.



Having dramatically reduced the time needed for owners to gain initial approval for their vessels, ABS is working to reduce the feedback cycle still further. Plans are being developed to enable the export of existing ship characteristics held by ABS into the 'owner version' of ABS CHEM, shortening the process and allowing both parties to access the same data set.

A service only available from ABS, CHEM fulfils the class society's mission by supporting the safe carriage of chemical cargoes, since the CoF addendum is only granted if the vessel is deemed to have the correct configuration to make the voyage in accordance with class rules.

In a market like chemical tankers, it means that chartering and operations staff can plan and prepare in confidence - even before the laden vessel has discharged - knowing the vessel can meet charterer requirements - something that could make the difference between fixing and missing the next cargo.

Marine fuel advice

In another move, ABS recently issued the 'Advisory on Marine Fuel Oil' to help industry prepare for IMO's 2020 global sulfur cap.

This advisory provides owners and operators with guidance on the considerations and challenges with marine fuels, which are likely to be used in addressing the 2020 global sulfur cap requirements.

"The IMO 2020 sulfur cap requirement will introduce a significant demand change from heavy fuel to low sulfur fuel almost overnight. The industry currently is debating how to prepare as the consequences of this shift are difficult to predict," said Dr Kirsi Tikka, ABS Executive Vice President and Senior Maritime Advisor. "The ABS Advisory addresses concerns about the safety impacts and quality of the new blended and hybrid fuels that are currently not covered by the ISO fuel standard, and provides guidance on fuel selection, modification considerations and operational challenges."

In a recent informal poll of shipowners and operators conducted by ABS, 53% said their fleets were not yet ready to meet upcoming sulfur cap requirements. As the deadline for compliance approaches, it is vital that industry consider the available options and the impacts on their fleets.

The ABS Advisory provides in-depth technical guidance covering a range of topics, from fuel properties to operational risks to potential preparations. TO

ClassNK's fifth generation CSR software

It is four years since ClassNK became the first class society to develop and release software to undertake the calculations called for by IACS' Common Structural Rules (CSR).

Adopted by IACS in 2013, CSR was designed to enhance ship safety and reliability by requiring a more comprehensive structural analysis at the design stage. The new rules encompassed the need for FEM analyses covering the entire range of cargo hold structures, as well as new formulae for buckling, fatigue, and residual strength criteria.

The CSRs brought practical challenges for shipyards and vessel designers, as the calculations needed to perform these analyses and satisfy the requirements are both complicated and time-consuming.

As a result, ClassNK developed PrimeShip-HULL, which is now used by around 90 shipbuilding and design companies, located mainly in Asia's shipbuilding countries. With more than 600 licenses in use, most shipyards constructing the ships subject to CSR now use ClassNK's software.

Earlier this year ClassNK released the fifth version of PrimeShip-HULL. As well as absorbing IACS' latest round of amendments to CSR, the update includes several refinements to existing functions and introduces some new ones.

In addition to UI tweaks aimed at streamlined workflow, the report generator in PrimeShip HULL's prescriptive calculation software now operates independently. This allows users to continue editing cross-section data or other tasks whilst a report is generated in the background.

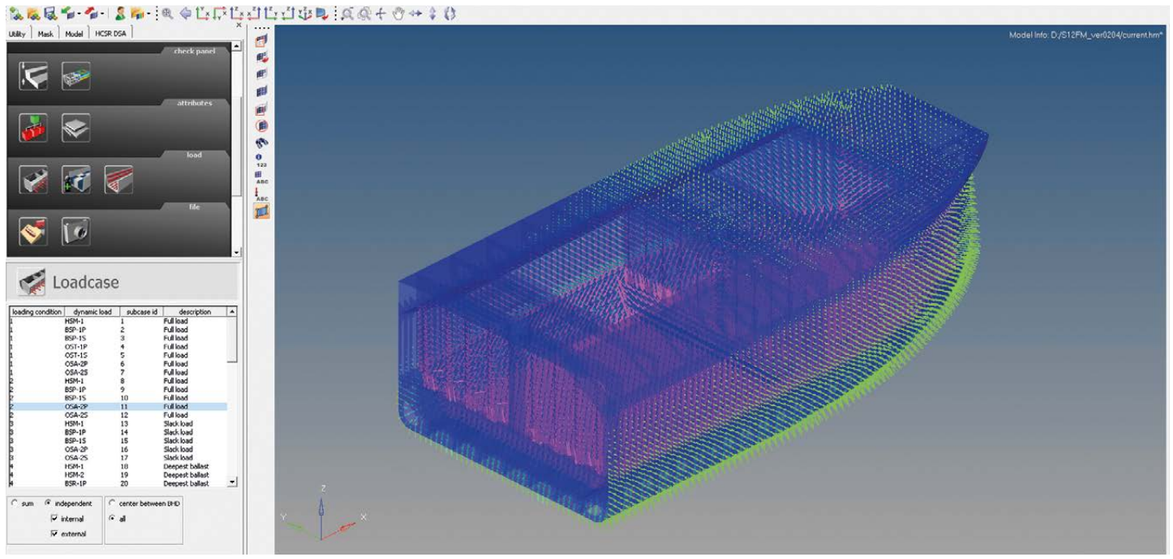
The ability to transfer data between the CAD - and other design tools used by naval architects - and PrimeShip-HULL quickly and efficiently became the key to the software's success. In the latest round of improvements, the data linkage function for importing body plan data from 2D CAD software has been further enhanced making it possible to create sectional data from the body simultaneously, eliminating the need for repetitious data conversion.

Integration

PrimeShip-HULL is tightly integrated with NAPA Steel, the program most widely used by the world's shipyards. For instance, in the case of oil tankers, data from 3D structures, such as transverse webs, bulkheads and other non-longitudinal members, can be effortlessly transferred between the two applications. This is particularly helpful when conducting structural evaluations in the initial design phase.

The direct strength assessment software now includes a parameter check and update function, which can detect model-dependent parameters and update them automatically. This saves time by preventing parameter setting errors that would otherwise require the assessment to be redone. The yield assessment calculator has become more user-friendly and the buckling assessment calculator has been optimised to shorten the calculation times.

The software's enhancements and new functions will further reduce necessary man hours and shorten design lead times. Some yards have reported an over 50% reduction in the man hours spent on structural evaluation for prescriptive requirements and for direct strength requirements through Finite Element Analysis (FEA), although results depend on vessel type, structure, and coarseness of the original CAD data.



PrimeShip HULL screenshot

Drones for ship inspections/surveys

As a global classification society and IACS member, operating in today's interconnected world, Korean Register (KR) is continually applying scientific expertise and adopting new technologies to provide better services for its customers.

One example is the use of drones on a regular basis to conduct ship inspections. The drone inspection service was launched in 2017, following extensive research and collaboration with the Geochang Industry Academic Foundation, Republic of Korea.

Before launching the service, KR completed extensive trials using camera-equipped drones, testing them to confirm flying stability, resistance to frequency interference and quality of footage.

Lee Jeong-kie, KR Chairman and CEO said at the time; "We are delighted to offer our customers full ship inspection services with camera-equipped drones, employing the very latest technology. The service offers significant advantages saving time and capital resources, as well as increasing efficiency and safety at the worksite."

The surveys are conducted on board in many of the high risk and difficult to access areas. Using unmanned aerial vehicles or underwater remotely operated vehicle drones, they can easily and safely explore confined spaces with restricted access, poor ventilation or environmental high-risk areas, or parts of the ship which would require scaffolding for surveyor access.

KR said that the drones offer the biggest cost saving in situations where scaffolding would have been needed for an inspection. For example, scaffolding can take three days to erect in a bulk carrier and two more days to dismantle, with a close-up survey of a cargo hold costing around $36,000. By comparison, a drone survey requires no scaffolding and offers significantly reduced management costs.

Moving forward, KR plans to provide new services using a variety of different drones to expand its inspection service areas. The footage will still be analysed by KR's expert surveyors but different drone types will be used to assess thickness measurement and conduct more intensely detailed surveys.

More than 1,000 vessels benefit from efficiency derived fuel savings

While some markets are tentatively improving, the pressure is still on shipowners and operators to implement measures to enhance the environmental performance of their fleets.*

This is to ensure that their operations deliver optimum efficiencies and to reduce their overall CO2 emissions.

Operational efficiencies are dramatically influenced by a ship's ability to move through the water smoothly. When fouling organisms, such as barnacles and biological slime, attach to a vessel's hull, the extra drag they create means that additional fuel is needed to move the ship – which increases both the fuel consumption and the associated CO2 emissions.

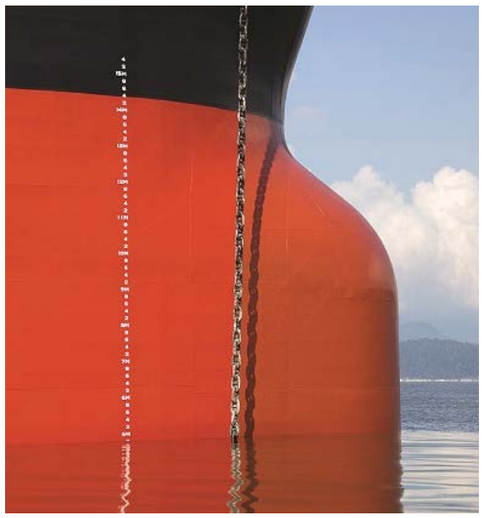
As fuel is the biggest expenditure for most ships, reducing fouling and hull roughness can have a significant impact on a vessel's bottom line performance.

Danish-based coatings manufacturer, Hempel, offers a proven solution to this age-old problem, with its high-performance fouling defence coating Hempaguard®. Hempaguard uses Hempel's Actiguard® low friction fusion technology, which combines a smooth silicone coating with a consistent steady biocide release through a hydrogel layer.

Launched just five years ago, it's suitable for and has been applied to all types of vessels and in April, 2018 the company celebrated the 1,000th full vessel coating, clearly demonstrating its success with shipowners and operators.

The fuel-saving properties of Hempaguard means that, collectively, the owners of these 1,000 vessels have reduced their annual bunker bill by more than $400 mill. This corresponds to a reduction in CO2 emissions of more than three million tonnes each year.

Surpassing every expectation, Hempaguard X7 can offer a 6% fuel saving, compared to other best-in-class antifoulings over the vessel's entire docking interval. It delivers excellent fouling resistance even for idle periods of up to 120 days and uses 95% less biocide than traditional antifoulings.



A Hempel coated Euronav VLCC

Proven protection

Leading tanker owner Euronav chose Hempaguard after impressive results over a 45-month test period. The company had been using Hempel's silicone coatings since 2007 and was keen to try new technology, trialling a patch test on an active vessel before making a full-ship application.

Hempaguard was applied to the VLCC 'Famenne' using a 300 sq m test patch. The ship was operating in warm waters with high and rapid fouling growth. The results were impressive. Checked after 23 months in service and again after 45 months in service, the Hempaguard test patch clearly outperformed the VLCC's standard SPC coating, in terms of smoothness and low surface friction.

'Famenne' mainly trades between Asia and the Middle East but during the test period it sailed around the world, experiencing several idle periods. It was the long idle periods where Hempaguard's combination of low surface friction silicone with efficient fouling prevention biocides clearly outperformed all other coatings for much longer.

Following the positive results and anticipating significant fuel savings, Euronav switched a number of vessels to Hempaguard for full-scale applications, with the first three vessels being the Suezmax 'Devon' and the VLCC's 'Hakone' and 'Hirado'.

As a next step, Hempel invited Euronav to take advantage of its performance monitoring service. The service gives customers accurate performance data for a vessel's hull and propeller – helping them to see exactly how fuel savings are being achieved and allowing them to make adjustments if performance drops.

The monitoring of three Euronav vessels began in 2015, six months before they switched to Hempaguard X7. Six months after the full-ship application, the data clearly showed an increase in propulsion efficiency, of which a significant portion was directly attributable to Hempaguard.

Hull performance monitoring gave Euronav complete insight into their return on investment and the opportunity to work closely with Hempel to improve long-term efficiency. The information boosted operational efficiencies to such an extent that as a direct result, Euronav decided to switch three more vessels – the VLCC 'Sandra' and the Suezmaxes 'Maria' and 'Captain Michael' over to Hempaguard.

TO

**This article was written by Davide Ippolito, Group Product Manager, Marine, and Nikolaj Malmberg, Group Product Manager, Marine, Hempel A/S.*

PPG tank coatings - over a decade of high performance

Selecting the right tank coating can make a crucial difference to a chemical tanker's earning power.

It's a choice that plays a major role in deciding which cargoes can be carried by the vessel, as well as influencing operational issues such as turnaround time and ease of cleaning.

When d'Amico Tankers needed a coating that could meet the demanding standards of charterers, including ExxonMobil, Total, Shell, Glencore and Vitol, it sought a system that would maximise revenue-earning capacity and make operations as versatile as possible.

The d'Amico Group was founded - and remains - a family-owned business, operating a modern, versatile fleet of around 40 product and chemical tankers through fully owned subsidiary d'Amico Tankers Limited. All d'Amico vessels are double-hulled and provide worldwide shipping services to major oil companies and trading houses.

d'Amico's choice for the MR 'High Spirit's' cargo tanks was the patented PPG PHENGUARD, a popular choice for chemical and product carriers with over 25 mill sq m applied.

PPG PHENGUARD is claimed to provide maximum resistance and exceptional performance. Its unique, proven technology ensures the widest range of vessel cargo-carrying capability, including highly aggressive loads such as methanol, EDC and fatty acids, thereby increasing vessel flexibility.

It is also resistant to hot water, as well as grey water and galley waste.

A three-coat phenolic epoxy system, PPG PHENGUARD is easy to apply using standard shipyard techniques, with a surface that remains smooth in service, enabling efficient cleaning with maximum resistance, durability and a consistent track record of performance.

PPG PHENGUARD was first applied to 'High Spirit' during construction in 1999 and following 12 years of high performance, the owners expressed their full satisfaction with the system and decided to proceed with a full tank re-coating in 2011 for the tanker and her two sister vessels 'High Challenge' and 'High Wind'.

A typical product tanker cargo tank

Re-coating was carried out using the most advanced version of the PPG PHENGUARD range: PPG PHENGUARD 965. This upgraded coating provides quicker curing, thus reducing time to service and also has a glossy finish, which makes cleaning even easier between cargoes.

For owners operating in this type of specialised markets, PPG's global network of technical teams is available to support customers with tailor-made solutions for specific operational needs and cargo types, the company said.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