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OCTOBER 2017 www.tankeroperator.com

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Contents

***Front cover** - Direct Marine Printing Supply services the marine industry by supplying laser jet printers, toners, ink and toner cartridges.*

IMO changes to disrupt industries as 2020 nears

This comment piece is attributed to research work undertaken by IHS Markit on the likely repercussions of the IMO's impending 0.5% sulfur cap.

Both the global refining and shipping industries will experience rapid change and significant cost and operational impacts, according to an IHS Markit report.

Kurt Barrow, vice president of downstream research at IHS Markit along with Sandeep Sayal, IHS Markit senior director of refining and marketing research, are two authors of a report entitled 'Refining and Shipping Industries Will Scramble to Meet the 2020 IMO Bunker Fuel Rules.'

"The two industries are vastly unprepared," Sayal said. "Neither has made the necessary investments for compliance, which means that the 2020 implementation date will result in a scramble. Both industries are taking a wait-and-see approach until firm signals are in place by the IMO for compliance with the regulation."

"Shippers will face significant compliance costs by having to upgrade equipment or switch to more expensive fuels," Barrow said. "Refiners will experience significant price impacts, as they shift production to deliver more lower-sulfur fuels to the market and, at the same time, find a market for the higher-sulfur fuels they produce. Refineries, like ships, do not turn on a dime, so it takes significant investment and market demand to retool a refinery to deliver new supply."

Several options will be available to meet the new IMO regulations, IHS Markit said. Low-sulfur bunker fuels - primarily for smaller vessels- and LNG - primarily for newbuilds - will be part of the solution.

However, researchers expected that on board ship scrubbers will be the primary compliance path for ships, which could then continue to burn higher-sulfur fuels.

"From the shipping industry point of view, IHS Markit estimates that about 20,000 ships account for around 80% of heavy fuel-oil bunker fuel use," said Krispen Atkinson, senior consultant, IHS Markit Maritime & Trade research. "Currently only about 360 ships have installed scrubbers, since there is currently no economic incentive for the ships to add scrubbers. However, based on the price spreads between low-sulfur bunker fuel and high-sulfur fuel oil during the scramble period, it will be economic for many of them to install scrubbers."

He said that the payback period for installing a scrubber on the largest vessels would be two-to-four years in 2022-2025, and less than one year based on peak-price spreads in 2020.

Overall, the installation of scrubbers and some level of non compliance will not be in time to halt the disruption on refined products markets, IHS Markit said.

The primary challenge with the bunker fuel quality change (which requires sulfur content to be reduced from 3.5% by weight to 0.5% by weight) is the disposal of high-sulfur residual fuel—not the production of low-sulfur bunker fuel.

The largest refinery margin disruption will be significant but fleeting, according to the report, with impacts felt most notably in 2020 and 2021. IHS Markit expected an unprecedented light-heavy price spread during 2020/2021.

As shipowners respond to the large-scrubber investment incentives, high-sulfur bunker fuel demand will rebound, although not to prior 2020 levels.

Due to increasing demand and addition of de-bottle necking capacity for residue conversion, IHS Markit estimated price spreads will moderate within a few years.

Refiners will produce more distillates, as new demand arises for these products during the disrupted years. With HSFO priced at coal-thermal parity and demand for middle distillates (kerosene, jet fuel, diesel) increasing to blend to low-sulfur bunker fuel, refining margins will benefit, but in different ways.

"Refiners of sour-crude will be negatively impacted by the nearly valueless sour-crude residue, while refiners of sweet-crude conversion will experience moderately higher margins, but sweet-crude prices will reflect the low-sulfur residue value," Barrow said. "It is the high-conversion refiners of sour crude that are expected to have extraordinary margins."

Highly complex refineries will benefit the most from the IMO specification change, IHS Markit said. These refiners will produce the least amount of residual fuel oil and the highest amount of distillate and gasoline, compared to lower-complexity refiners.

Crude-price relationships, specifically between light-sweet and heavy-sour crude, will widen around the compliance time frame.

Assuming the specification change implements as announced on a global and instantaneous basis with no phase-in timing or quality transition allowances, the margin uplift will be acute in the compliance period of 2020 - 2021. TO

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All eyes on oil market rebalancing – is it happening?

BIMCO's analyst, Peter Sand, has taken one of his regular looks at the tanker market, analysing both demand and supply up to the beginning of September this year but before the devastating hurricanes hit the US Gulf and East Coast regions.

Demand is the one key factor to watch. However, the one thing that's impossible to measure accurately on a global scale are oil stocks.

Global stocks for both crude oil and oil products rose significantly following the sharp fall in crude oil prices in the second half of 2014. But while this may seem to be in the past, it is still haunting the oil market and tanker market. Demand is currently below normal levels and will only increase once the global oil stocks have been reduced.

Tankers enjoyed above-normal demand as the stocks were building, but will continue to suffer as long as they remain high. The strong fleet growth in 2016 and 2017 only makes the downturn tougher on owners and operators struggling with stretched balance sheets, as earnings drop.

So, what is the right level of future oil stocks? It's anyone's guess now, but BIMCO believed that it is much lower than the estimates of the 'money managers and bull traders', but not as low as the level seen before the rise in 2014.

Global oil demand has grown markedly since then and it seems fair to strive towards a level equal to a given number of days of supply, rather than a multi-annual absolute average.

BIMCO believed that some rebalancing has taken place in recent months, but much more is needed. Data regarding OECD-stocks only provides an indication of how the market is developing in one part of the world. Likewise, any draw down on stocks in the US should not be used as a global proxy, as the US only holds 1/6th of OECD stocks.

Bearing in mind that if global stocks have a surplus of 180 mill barrels, it will take a whole year to reduce that at the rate of 0.5 mill barrels per day. The Energy Information Administration (EIA) has estimated that global liquid fuel stocks have risen by more than 1 mill barrels per day on average for six quarters in a row, that's at least 540 mill barrels of stock stored.

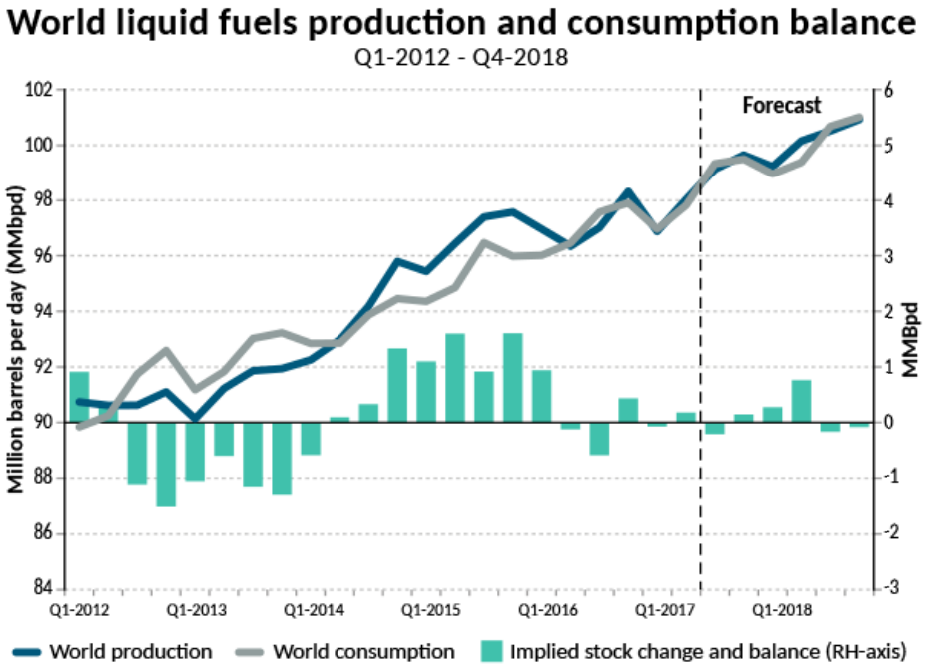
Seaborne trade

The global tanker industry is directly linked to the global oil industry. Today, demand for seaborne oil transport is below normal and fleet growth is high, which means that the fundamental balance is uneven. The result is declining tanker earnings with the main culprit being the fast-growing fleet.

We tend to forget however, that demand is not that bad, Sand said. Looking beyond the regular draw on stocks, other demand factors remain strong. US gross input to petroleum refineries hit an all-time high in the week ending 26th May, when 17.7 mill barrels per day were refined (some of the refineries were badly hit by 'Harvey', thus increasing demand for refined products -Ed).

Global oil demand as forecast by IEA may pass the 100 mill barrels per day mark for the first time, hitting 100.1 mill barrels per day in 4Q18, and for 2017, growth has been revised up to 1.5 mill barrels per day. In addition, China is still believed to be increasing its strategic petroleum reserves (SPR) and crude oil imports were up by 13.8% year-on-year to the end of August, hitting 8.55 mill barrels per day on average.

Earnings for VLCCs in the spot market were as low as $8,775 per day, a level last seen during the difficult years of 2011-2013. The year-to-date (beg September) average stood at $20,489 per day. Based on a set of



Source - BIMCO, Short Term Outlook, August 2017.

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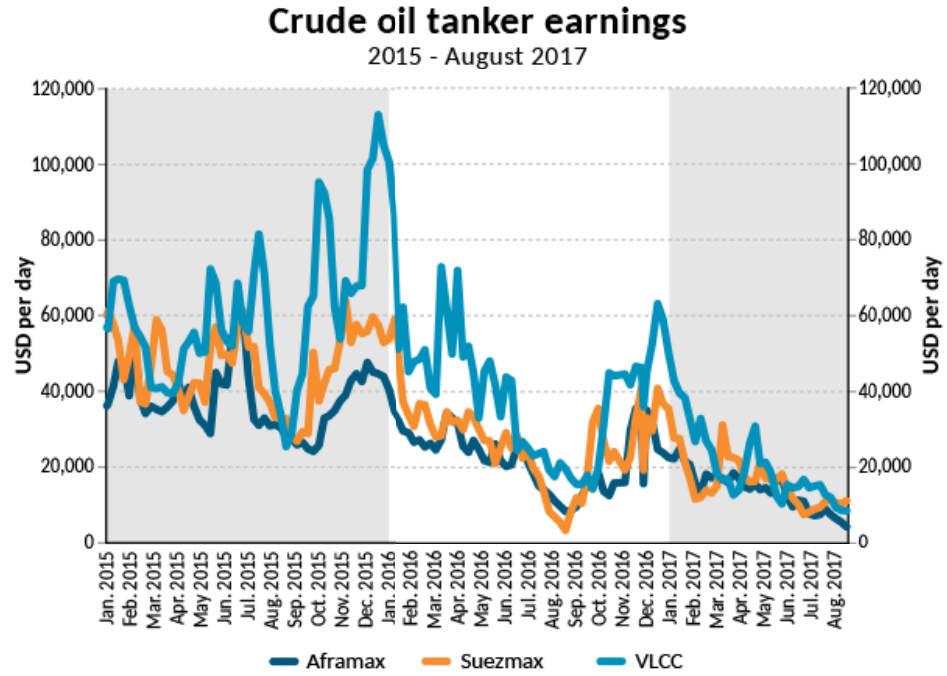
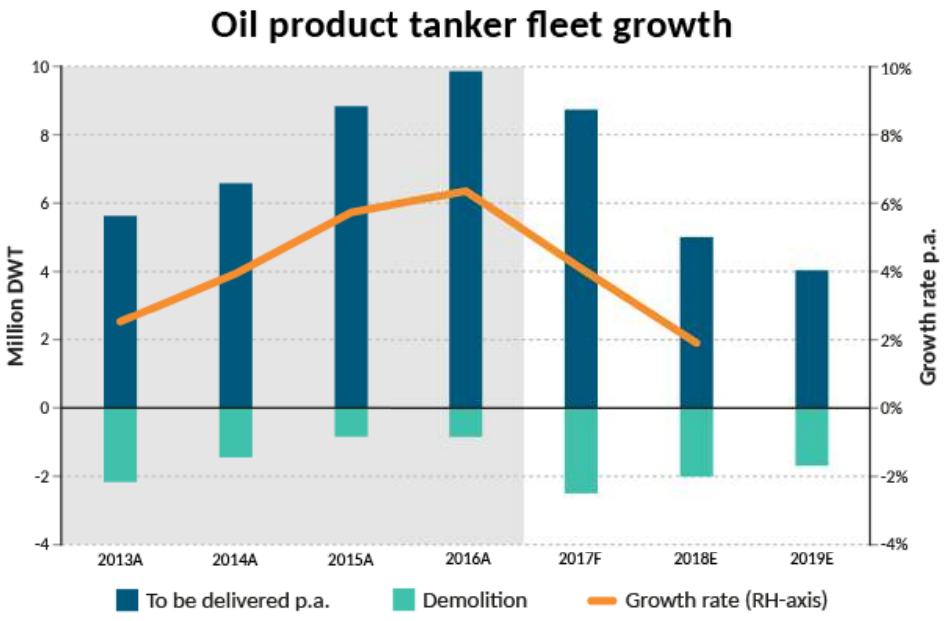


Source - BIMCO, Clarksons.



Source - BIMCO estimates on Clarkson's raw data.

A is actual. F is forecast. E is estimate which will change if new orders are placed. The supply growth for 2017-2019 contains existing orders only and is estimated under the assumption that the scheduled deliveries fall short by 10% due to various reasons and 35% of the remaining vessels on order are delayed/postponed.

assumptions, BIMCO estimated that spot trading VLCCs built in 2005 and later are loss making at that level, because of heavy financing costs. Any profits made from older ships do not outweigh the losses of the younger vessels.

As earnings very often follow from one segment to the next, Suezmaxes and Aframaxes also suffered. Earnings for the product tanker sector on average appeared to have stopped falling, as they dropped steadily throughout 2016, reaching the mid-year level at the end of last year. BIMCO forecast that average earnings in this segment will also be loss-making.

MRs have earned no more than $10,040 per day, while Handysizes have dropped to $7,658 in 2017 down from $8,962 in 2016. LR1s have a year-to-date average of $7,873 and LR2s - $9,235 per day -there was a spike seen in earnings following the hurricanes but rates have softened again- Ed.

The tanker fleet is growing strongly. By the end of August, the crude oil tanker fleet had grown 4.3% year-to-date, and the oil product tanker fleet had grown by 3.6%.

Deliveries into the crude oil tanker fleet, included 36 VLCCs, 41 Suezmaxes and 23 Aframaxes, plus some Panamax and smaller units. The crude oil tanker fleet expansion remains on course for a six-year-high, measured in deadweight tonnage, however, the fleet growth percentage is down from last years' 5.9%, to 4.7% for the full year of 2017.

Meanwhile, 23 LR2s, equal to 45% of the total added oil product tanker capacity overshadowed the recent years' favourite - MRs - as 'only' 38 new ships were delivered during the first seven and a half months of this year. The fast-growing fleets come as no surprise. But the continued low levels of demolition in both tanker segments are a roadblock to changes to the current poor earnings environment in the freight market and a possible recovery.

The fact that one VLCC was reportedly sold for demolition in April, but was then subsequently sold to a new owner, one month later at a higher price, seemed irrational, as overcapacity is increasing amongst crude oil tankers in general and VLCCs in particular.

Product tankers

Turning to product tankers, just two LR2s left the fleet thus far in 2017, a year that saw MRs, almost exclusively being demolished.

BIMCO continued to believe that demolition will pick up during the final five months of 2017, but the actual demolition rate only amounted to one third of the forecast full year levels by mid-August. The ongoing poor freight market conditions will drive demolition, Sand said.

Over the last few months, shipyards have been busy signing new orders for tankers. Amongst them were 14 LR2s and 14 Suezmax ordered in June, supplementing the nine VLCC's ordered in May. Up to mid-August, a total 32 VLCCs were ordered in 2017, up from 12 in the first quarter.

Assuming 2.5 mill dwt of product tanker capacity will be demolished; fleet growth will hit 4.1% in 2017. Should demolition fall short of that by 1 mill dwt, the fleet will expand by 4.8%.

Not a day goes by without a story about global oil stock levels. Many of them trying to be the messenger of positive news for the oil market and the tanker shipping market. However, sometimes business interests and wishful thinking are not supported by facts. Money managers and financial traders run businesses, which are very different from the shipping industry.

TO

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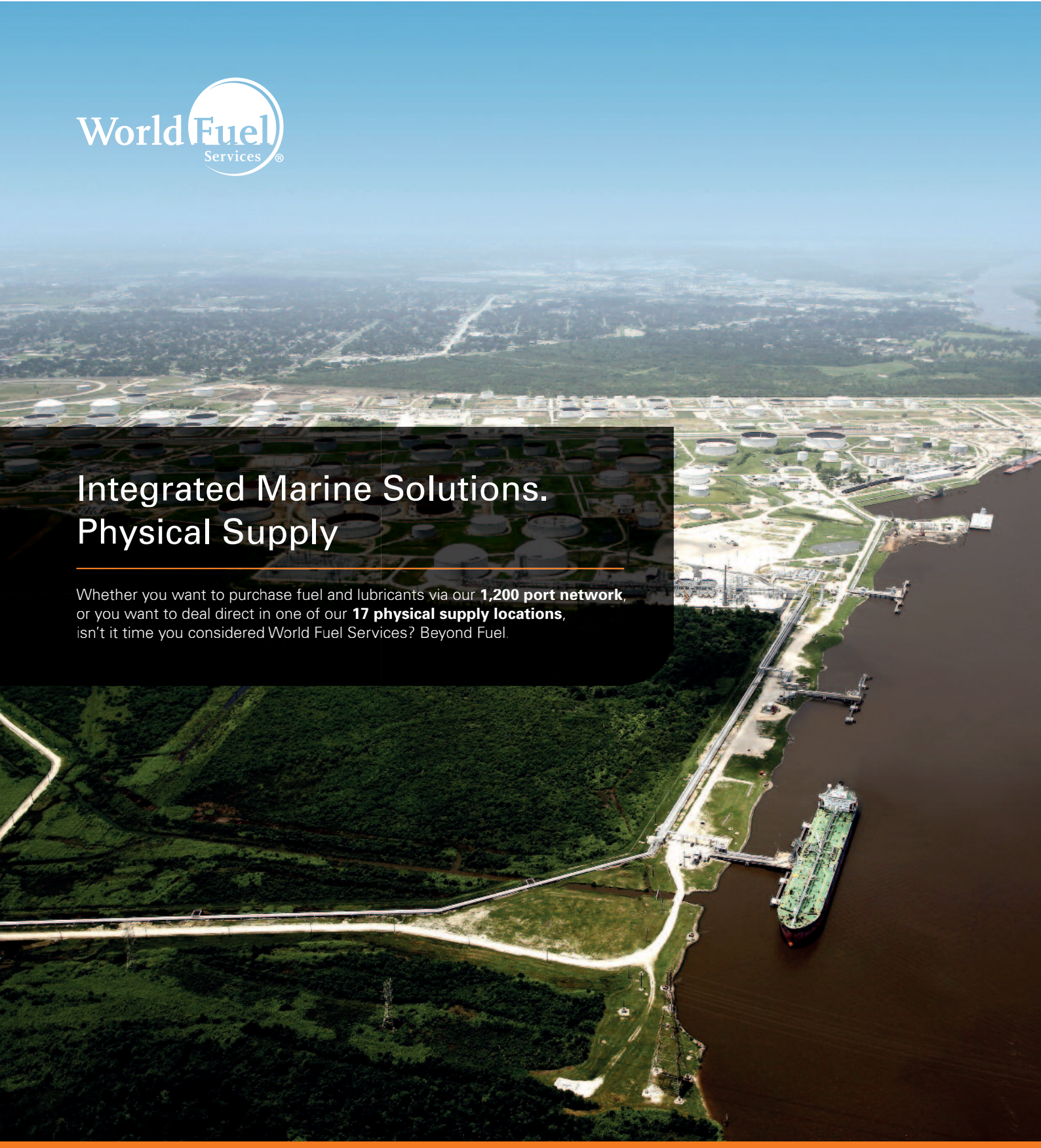

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Ørbeck-Nilssen sets the IACS agenda

In a wide ranging presentation, recently installed IACS Chairman, Knut Ørbeck-Nilssen, CEO of DNV GL – Maritime, gave the state of play in the shipping industry and announced a series of initiatives for the class society grouping to provide the support its stakeholders need in a rapidly changing industry.

Talking generally, he said that the world's economy and population will continue to grow, so the shipping industry needs to look beyond the current challenges thrown up by the difficult markets to 2020 and beyond.

Between 2003 and 2008 there was a super cycle driven by China's expansion and globalisation in general. Ørbeck-Nilssen said he didn't think that this situation would return. "The new normal is quite similar to the old normal seen between 1990 and 2000," he said.

Today, there is consolidation between shipping companies, shipyards and equipment manufacturers. Regulatory pressure on the maritime industry is also resulting in a more demanding operational framework.

There is a gradual transformation to digitalisation and as connectivity increases so this not only engenders new opportunities, but also increases the cyber security threat. "The role of class is more important than ever for stakeholders," he said, referring to an ever more complex shipping industry.

He said that class had a key role to play in the continued development, implementation and regulation of maritime technologies by bringing familiar assurance processes to new and unfamiliar technologies.

Class will expand into new verification fields, such as cyber security, data quality assurance and advanced sensor-based cyber and physical systems.

Turning to IACS, Ørbeck-Nilssen said that the current tectonic market shifts, regulations and technology make it crucial that IACS retains its position as a trusted and reliable technical association with a high performance and superior quality standards.

The 12 class society members are responsible for over 90% of the world's commercial fleet, ensuring the highest quality standards and a reliable self-regulating safety regime.

IACS is working towards adapting the regulations to the new needs and the removal of regulatory barriers that hinder new technical advances, including ship autonomy.

He said that IACS supports the IMO's work on new technology regulations and signed a co-operation agreement with the IMO last December to work more closely together. "This can benefit the IMO, flag states and the entire shipping industry," he said.

Aligning with the IMO, IACS is extending its strategic horizon to five years from the current one year.

Three focus areas

Ørbeck-Nilssen also revealed that IACS will focus its efforts in three main areas -

- Review its membership criteria, quality systems and performance measurement.
- Modernising class for the future in anticipation of the advance of digitalisation and new technologies, focusing on quality and safety.
- Deepen the association's ongoing commitment to transparency and continuity.

Reflecting the increasing complexity, regulatory scrutiny and challenging markets, selected initiatives are currently being implemented, including changes to membership criteria, applicable to both existing members and new applicants, although he stressed that there are no new applicants at present.

In addition, the quality of IACS benchmarking and performance criteria is being revised as a tool to help each member improve their performance, for example KPIs on how each member is performing. This will regularly be reviewed and the new criteria is due to enter into force on 1st January next year.

Among the new technologies under scrutiny in the digitilisation field are vessel autonomy, electronic certification, new survey techniques, approval methods and cyber safety.

Some flag states do not recognise e-certificates, which is one of the restrictions in place to be looked at as part of the digital development. He said that IACS will start

Knut Ørbeck-Nilssen (left) with IACS secretary general Robert Ashdown (right) set the agenda.

work on developing procedures relating to the use of e-certificates, while continuing to support IMO's work in promoting their use throughout the industry.

Explaining vessel autonomy, Ørbeck-Nilssen said that autonomous ships does not mean vessels with no crew on board but a system whereby crew could be reduced. Taking a tanker as an example, he said that a company employing four engineering officers on board might be able to reduce the number by using shoreside capabilities digitally, thus reducing OPEX.

Another example of digital technology is the possible use of digital twins being used for approval methods giving a virtual representation of the vessel. However, as vessels become more connected, so safeguards will be need to be in place, he warned.

Modernising survey methods and enabling the use of new technologies will be another focus area.

Ørbeck-Nilssen is overseeing the evaluation and further development of the results of a newly formed working group reviewing the implications of new survey technologies and techniques, such as condition-based monitoring (CBM) and remote monitoring and diagnosis (RMD) with a view to developing IACS guidelines and recommendations that enable data taken from these new technologies to be used more widely for surveys.

Questions have asked over the use of drones for surveys, etc. Ørbeck-Nilssen explained that they could be fitted with high resolution cameras or other technologies going forward and could also be made Ex-proof and be programmed for specific tasks.

Finally, he said that IACS is committed to transparency and to serving the needs of the maritime industry in a consistent way, ensuring alignment with the IMO.

Last year was described as a monumental 12 months for the association.

For example, during the year, the IMO recognised IACS members' rules, including the Common Structural Rules conforming to the IMO's Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers (GBS).

This move was claimed to have put IACS in a unique relationship with the IMO, culminating in the signing of a Memorandum of Understanding between the two organisations in December last year.

Also 2016 saw the 25th anniversary of the Quality System Certification Scheme (QSCS). IACS said in its annual review, that it was pleased to see that in a climate of increased ship inspections, IACS members global Port State Control (PSC) performance steadily improved.

Knut Ørbeck-Nilssen

Knut Ørbeck-Nilssen is the CEO of DNV GL - Maritime and a member of the Executive Board of DNV GL SE.

He was appointed CEO in August, 2015 and prior to that had been the Chief Operating Officer and President of DNV GL - Maritime.

After joining DNV in Oslo in 1990 as a structural engineer, Ørbeck-Nilssen worked in DNV's core business areas serving the maritime and oil & gas industries. He undertook many roles in the organisation, including project management, across a wide range of technical disciplines and also held a number of management positions. He was also based in Japan for two years.

In September, 2013, he was appointed as Director of Division Europe, Africa & Americas in DNV GL – Maritime, one of two geographic divisions responsible for DNV GL's core maritime and offshore classification business.

For a period, he held both the position of President of DNV GL - Maritime, as well as Director of Division Europe, Africa & Americas.

Ørbeck-Nilssen holds a Bachelor of Engineering degree from Heriot-Watt University where he was awarded a First Class Honour's Degree in Civil Engineering in 1990. In his final year, he was awarded the Watt Club Medal, Heriot-Watt University's premier award for undergraduate students.

He also received an undergraduate degree in Civil Engineering from Oslo Polytechnic in 1987. ■

E2S Warning Signals achieve further DNV GL approvals

E2S, an independent manufacturer of audible and visual warning signals, has extended its range of MED compliant products.

The range includes alarm horn sounders and now combined audio-visual alarms with Xenon strobe beacons.

Selected products from E2S Warning Signals have been approved as compliant to the Marine Equipment Directive, MED, EU Directive 2014/90/EU by DNV GL.

The DNV GL approval confers global approval to IEC 60092 – 504, covering electrical, electronic and programmable equipment intended for automation, control, monitoring, alert, and safety and protection systems for use on ships.

In addition, the approval covers IEC 60533, which specifies minimum requirements for emission, immunity and performance criteria regarding electromagnetic compatibility (EMC) of electrical and electronic equipment for ships. The products are also CPR compliant through VDS approval to EN 54 -23 for audible signals and EN 54 -23 for combination audio visual signals.

The MED compliant products are 24 VDC versions of fire alarm horn sounders SONF1, A105N and A112N.

For Ex-proof applications, the IECEx and ATEX approved BExS110 alarm horn sounder is also MED compliant.

Combined audible and visual signals SONFL1X, AL105NX and AL112NX are available with outputs up to 119dB(A)@1 m paired with a 5 Joule, 200 candela Xenon strobe unit fitted with a clear lens for maximum light output. ■

NV MED----DNV GL has certified that E2 products are MED compatible.

Relaunched agency to help take Fujairah to another level

Based at the Port of Fujairah, Fujairah National Shipping (FNS) is targeting greater market share by becoming the first 'one-stop-shop' maritime services company in the region.

To help achieve this, FNS has undergone a relaunch with a new management team and technology platform in place in order to take advantage of the port's strategically important location just outside the Strait of Hormuz.

Originally founded in 1982, FNS aims to become one of the top three maritime services companies in the region by the end of 2018, the company said.

The Port of Fujairah is claimed to be the only multi-purpose port on the eastern seaboard of the United Arab Emirates and has unique access to international east – west shipping routes.

Previously known as Fujairah National Shipping Agency, FNS, which also has offices in Dubai, was relaunched under the leadership of its new CEO, Sanjeev Sarin.

Prior to joining FNS, Sarin worked in several senior strategic roles, covering ship agency, shipmanagement, clearing and forwarding, logistics and distribution, technical and crew management, plus commercial chartering.

With major new capital to be invested over a 12-month period, FNS services now include agency, husbandry, shipmanagement, repairs, maintenance, clearing, forwarding, offshore support, crew management, warehousing, and distribution. In addition, FNS offers bunkering, oil storage and shiprepair.

Based on new data analytic capabilities, the company is also launching new technology platforms, which will help clients to optimise voyage management and supply chain efficiency, FNS said.

A new FNS marine workshop will open at Fujairah in the first quarter of next year, while wholly-owned subsidiary, Amwaj Ship Management is expanding to deliver services to increasingly diverse commercial shipping fleets and to offshore support vessels.

Tanker Operator spoke with Sarin, about his ideas for the company and how Fujairah is expanding.

Speaking about the ambitions of rival Omani port of Sohar to become a transhipment hub for the Gulf region, Sarin explained that Sohar will not have any impact on Fujairah, as it is aimed at the container and drybulk sector. He thought that maybe it would impact on other more established liner ports in the region.

"With the recent tie up with Hutchison Ports, Sohar is positioning itself as the 'Gateway to the Gulf' in as far as drycargo is concerned," he explained.

The recent MOU signed between Fujairah port and Abu Dhabi Port Company (ADPC) is also based on plans to invest in the infrastructure necessary for developing liner transhipment and drycargo trades, along with augmenting Fujairah as a prime cruise destination on the UAE's East Coast.

However, Fujairah is better known as an oil and chemical transhipment base. For example, a $175 mill VLCC jetty opened for business in September last year and this, with the other terminals, has increased throughput (oils and liquids) eightfold over the last 10 years.

"The VLCC jetty is just about meeting its utilisation expectations, while the LNG berth, funded by Mubadala, is running behind schedule. Onshore storage of oil and oil products is expected to hit 14 mill cu m by 2020," he said.

Fujairah Port is also currently liaising with Emirates LNG for evaluation, safety and technical feasibility of LNG ship-to-ship transfers.

In addition, separate bunker barge jetties – 3A and 3B - will be completed and commissioned by December, 2017.

FNS CEO Sanjeev Sarin.

Sarin also said that the huge Fujairah anchorage will continue to retain its title of the world's second largest anchorage and bunkering hub.

As for the new physical assets, as part of its relaunch, Sarin explained; "FNS as port users, based on our business profile, own and operate various assets at Fujairah Port to service the ever increasing number of ships calling in port and anchorage. This would include but not limited to – crew boats/supply craft/bunker barges and ships/repair and storage areas and warehouses, etc.

"With construction of a new service port in Fujairah, FNS expects to enhance its investment portfolio largely driven by demand," he said.

Added to this, FNG has plans to invest in a maritime academy, although these plans are under evaluation and are in their infancy at present. "They will perhaps need some more time before they come to fruition," he said. TO

Managing a large fleet in today's market

Tanker operator spoke with Wallem Ship Management about managing vessels in today's regulatory driven market.

Starting off with the EU MRV rules and the 0.5% sulfur cap putting an extra strain on third party management in terms of costs and personnel, the company said that it was too early to say what impact these regulations will have on third party shipmanagement.

"We have taken a proactive approach in preparation for the EU MRV. We have signed an agreement with a verification body and have been working hard to gather all the necessary data, so we are ready to go when we get the green light from our clients, " Wallem said.

Regarding the 0.5% global sulfur cap, Wallem's senior management is involved in current discussions on the topic at the various technical bodies company representatives sit on around the world. Like everyone, Wallem said it is watching and waiting to see what will happen and looking at the various options and challenges there are, including the issue of the availability of the fuel in 2020.

As for the fitting of ballast water treatment systems, the owner clients have to do what makes the best financial sense to them (retrofit or scrap), but Wallem will be there to advise, help and support to minimise any burden to them.

More than 40 vessels within the Wallem-managed fleet already have a BWTS installed; either during the newbuilding stage or retrofitted. These are systems across the range of five different treatment technologies and by various manufacturers, so a good bit of experience has been gained already, which is being passed on to the owners. "We are continuously working with both the manufacturers and owners to ensure that these BWT systems perform as they should," the company said.

Pre-joining training at the Wallem training centres includes BWTS familiarisation courses and crew training by the manufacturers is also focused upon, both on board and ashore. The company's policy for vessels that have BWTS on board is that they are operated regularly in order for the crew to be familiarised with the operation and so that they are in full operational condition for when they are required to be used. "We also rotate some of our senior officers who are experienced with certain systems to enable them to share their knowledge and experience on board," Wallem said.

If an owner decides to install a BWTS then one person focuses on ensuring that the systems on board are fully operational before handing over responsibility to the fleet superintendents. "We have found that working closely with the manufacturers and a strong emphasis on training are essential for smooth operations," the company said.

Cyber security guidelines

As for cyber security, now part of TMSA3, Wallem has BIMCO cyber security guidelines in place on all the managed vessels. As part of preparations for the introduction of requirements around cyber security compliance next year, the company is developing a cyber security policy and a risk assessment for vessels. In addition, Wallem is continuing to focus on increased awareness and training on this topic, both at sea and ashore.

Turning to moorings, OCIMF is putting together a mooring guide. Answering the question - has mooring caused any particular problems either with mooring parties, machinery or ropes, Wallem said that an analysis of industry accidents showed that design and equipment safety played a significant role in 62% of the reported mooring incidents.

Of particular note was that 51% of the identified design and equipment safety factors were the result of a parted mooring line. Shipboard conditions, such as heavy weather, workload and crew competency, played a role in 22% of mooring incidents.

Wallem said that it had found that effective communication was critical for safe mooring especially when a number of teams/groups (eg the bridge team, ship mooring parties, tug crews, lines boats and shore gangs) are involved.

These groups are separated by distance and line of sight, while language, culture, radio communication, background noise and other factors can further complicate matters. In addition, maintenance instructions should be adjusted for ropes and for maintenance and inspection of machinery in cases where vessels have high harbour visit frequency and for those that frequently visit ports with adverse weather conditions.

Turning to tankers, Wallem has been managing large tankers, such as VLCCs, for many years and this sector has been growing steadily over the years. The company has a very high crew retention rate of around 90% for tankers, compared to around 88% of the whole fleet. That said, there is a shortage of experienced maritime professionals industry wide and more needs to be done to attract the younger generation to a career in this industry, Wallem stressed.

As for the question of shore staff, Wallem has a very strong emphasis on training and professional development, which includes supporting seafarers' transition to roles ashore. Around 80% of the marine safety department in Wallem Ship Management are ex-seafarers (Master Mariners or Chief Engineers) from Wallem-managed vessels and many shore staff have maritime expertise in the fields of naval architecture or mechanical engineering.

Wallem said that it is able to provide crew to match shipowners and customers' needs and have shore staff to match the crew's nationality in offices around the world to ensure smooth and effective communication.

As for future investment in shipping giving

third party shipmanagement concerns opportunities, Wallem thought that to some extent there was renewed interest by US private equity (PE) investors in shipping - especially tanker shipping.

Shipping markets across all sectors are rather soft. The asset values have also softened and are lower than the 10 year average, particularly in certain tanker sectors. This gives investors an opportunity for asset play in these sectors. The PE's are now focusing in particular on operations and management of the assets, as they are looking at a medium term hold. It is paramount for them to have a robust management team looking after operations and management of their assets.

Easy access

Third party shipmanagement companies provide easy access to technical excellence without having to invest into experienced management teams. Wallem claimed to be ideally suited to assist the PE's with operations and management of their assets with a unique maritime services offering across shipmanagement, commercial management, ship agency, advisory and investment solutions.

Wallem currently has eight owned training centres located around the world – in India, the Philippines, China and the Ukraine – which for the moment suits the company's training needs. The priority remains on maintaining a high quality of service, due to having full control over the seafarers' training via in-house programmes. For this reason, Wallem said it is not looking at using third party academies at this point in time. However, the company does visit and audit other training centres for benchmarking purposes.

Training at the Wallem centres allows its seafarers to update their skills in areas, such as navigation, engineering, bridge management and safety management. Training includes the effective use of Wallem's own systems and processes that form the backbone of efficient and safe vessel operations.

All seagoing staff must successfully complete appropriate courses on a regular basis. The result is a team of seafarers who understand and comply with the requirements of charterers, shipowners, port authorities and all applicable international laws & regulations.

Wallem takes a blended learning approach, encompassing extensive use of real-time simulators (including the latest navigating bridge and engine room simulators) for learning purposes and to recreate incidents and accidents. Classroom-based learning is combined with e-learning, including webinars and virtual classroom learning via skype. Videos, role-play and experience sharing are also included.

Looking ahead, Wallem is planning and investing in the latest learning trends. The company has also recently started using 3D animations and is trialling some new and exciting training technology, including video gaming concept and Virtual Reality technology, aimed in particular at engaging the interest of the younger generation.

"We are committed to embracing all new technology, which can improve the efficiency and safety of operations on board and will continue to look at how we can use virtual reality technology for areas such as repair and maintenance, the company told *Tanker Operator*.

In addition to technical skills, training at Wallem is also designed to help seafarers build up business acumen, management and leadership skills to help in the delivery of a quality service.

Industry compliance requirements are very high and in order for a company like Wallem to be a preferred partners with the oil majors and operate to the highest standards, a great deal of background work is required. When a new vessel is taken on, an increase in headcount is needed, as far as the people who directly manage the vessels within the fleets, ie superintendents. However, due to the company's size the existing central technical and safety department personnel can be leveraged to implement initiatives, new technologies and perform other scalable centralised functions.

A small company would have to add to its headcount in order to be able to comply with all the new regulations and oil major requirements that come into force.

Wallem manages its vessels in separate fleets and aims to have around 20-30 vessels in each fleet.

Company operating costs have not changed much thanks to the fact that crewing (at around 60% of costs) has been stable for some time. Technical costs are also relatively flat. Lube oil is due to go up but Wallem said that it had locked in some good prices for this year. TO

A Wallem junior tanker cadet - the company firmly believes in having its own training academies, rather than use third party facilities.

Strait's navigational safety gets a boost

Singapore has been in the news recently due to a couple of high profile collisions, plus a clamp down on bunkering operations.

The Maritime and Port Authority of Singapore (MPA) has been actively pursuing increased safety of navigation in the Singapore Strait for several years, which is one of the most used stretches of water in the world

For example, in August, the MPA and IT giant IBM announced that they had jointly completed the pilot trial of three modules under the MPA-IBM SAFER project, which will be rolled out progressively starting this month.

Project SAFER, derived from 'Sense-making Analytics For maritime Event Recognition,' is a collaboration between MPA and IBM to develop and test new analytics-based technologies, aimed at improving maritime and port operations to support increasing Singapore's growth in vessel traffic.

Altogether, there are seven modules under the project, which offer many new capabilities for automating and increasing the accuracy of critical tasks that previously relied on human observation, reporting - VHF communication, and data entry.

These seven modules include:

- Automated movement detection.
- Infringement analytics.
- Pilot boarding detection.
- Bunkering analytics.
- Prohibited area analytics
- Vessel traffic arrival prediction.
- Utilisation detection and prediction.

The pilot trial of the three modules completed included automated movement detection, infringement analytics and pilot boarding detection. The rest of the modules will be rolled out by January, 2018.

MPA's Port Operations Control Centre (POCC) handles more than 1,000 vessel movements daily in Singapore waters. One of the many roles of the Vessel Traffic Management (VTM) officers is to enter the start and end time and location of vessel into the Port Traffic Management System whenever a Master reports a movement over the radio.

Using cognitive and analytics technologies to detect and predict vessel movements, this module is deigned to reduce radio communications between the MPA control centre and the Masters and eliminates the need to enter ship movement details by automatically detecting the start/end time and location of vessel in real time.

Singapore Strait's dense passing traffic can be seen from the guard tug over the wreck of a dredger.

In addition, SAFER improves the accuracy of the information in movement time and location by up to 34%, as well as frees up VTM officers to carry out their other roles, the MPA claimed.

Infringement analytics - MPA's port inspectors (PI) keep the area safe by enforcing regulations on marine safety and environmental protection. They also co-ordinate and respond to any marine incidents in the port.

Common infringements include operating in port waters without a valid permit or licence, transponder-related infringements, such as switching it off deliberately and speeding.

Previously, PIs were guided by their intuition to look for suspicious activities rather than quantitative information when patrolling the waters. As a result, they may miss certain events of interest. With the machine learning based analytics and vessel prediction models, developed for the SAFER system, PIs are able to detect suspicious or abnormal vessel behaviour through alerts that are sent through. This enables them to take a more targeted approach when conducting inspection, hence improving efficiency of their daily routine.

Pilot Boarding Detection - MPA works closely with PSA Marine (PSAM) to ensure that 95% of vessels requiring pilots will be served within 15 minutes. Currently, MPA conducts audit checks when there is an appeal or dispute. The SAFER module enables MPA to automatically detect the pilot boarding time thus validating PSAM's pilotage service levels. The system will also facilitate dispute resolution, if any.

"We will continue to develop our digital strategies through the use of data analytics and machine learning technologies to optimise our port operations and enforcement to meet existing as well as future demands," said Andrew Tan, MPA CEO. The SAFER project will enable us to reap immediate benefits, especially in the areas of next-generation port enforcement and monitoring of vessel movements."

"AI is transforming every industry and the marine domain is no exception. The SAFER solution is an example of how IBM's AI

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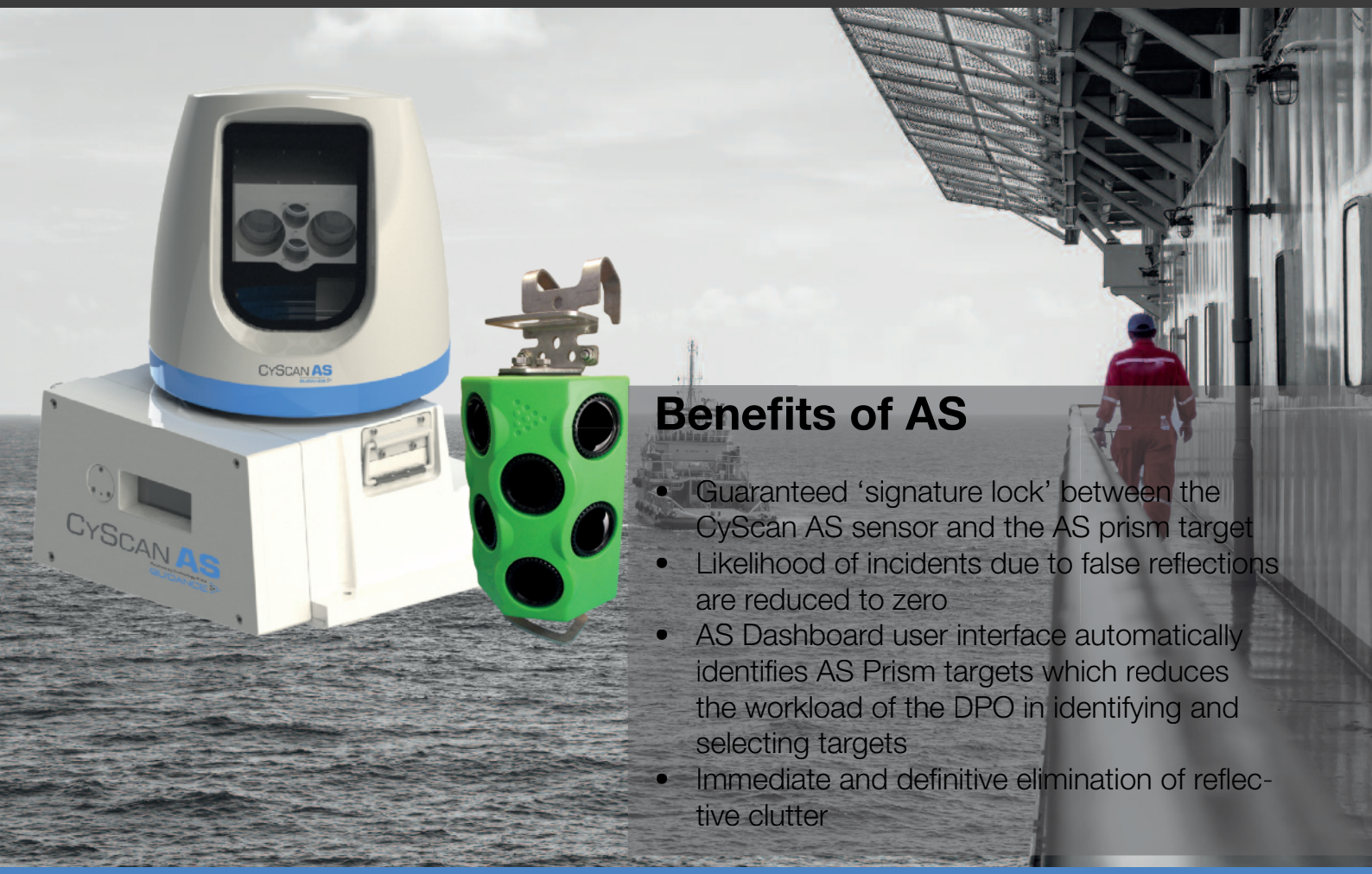

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research for business is supplementing and increasing human capacity by making our waterways and sea lanes safer and more efficient," said Robert Morris, Vice President, Global Labs, IBM Research.

MPA and IBM are still developing and testing the other four modules to provide advanced information on traffic density within Singapore port waters - detect illegal bunkering activities; detect vessels moving into prohibited areas; and predict vessel arrival time.

In another move earlier this month, Vesper Marine, in partnership with Brand Marine Consultants (BMC), Hanseatic Underwriters and the (MPA), has completed an installation of its AIS-based Guardian:protect system.This system was designed to protect vessels from hazardous shipwrecks within the Singapore Strait entrance channel to the port and alert the authorities as to its presence. One of the catalysts for installing the system was the sinking of the dredger 'Cai Jun 3' on 12th March this year. Realising the potential danger, the Singapore authorities knew that action had to be taken quickly. As an immediate safeguard to warn vessels entering the Strait near the sunken vessel, two tugs were stationed at the site of the wreck as 'guard boats', while salvage operations were ongoing.

As the cost of running the tugs was astronomical, salvage company BMC contacted Vesper Marine, which specialises in AIS collision avoidance and subsea hazard protection systems, The company worked with BMC to alert inbound shipping in a more cost-effective method.

Vesper Marine's Guardian:protect solution, a 24/7 asset protection system specifically designed to prevent accidental encroachment on marine assets by vessels, was temporarily placed on board one of the tugs, eliminating the need and expense of a second tug. The solution was claimed to have the additional advantage of minimising human error with smart rules that trigger automatic vessel notifications if a ship is on a collision course with the wreck. The system sets concentric electronic cordons at five nautical miles, two nautical miles and 500 m around the shipwreck and automatically alerts vessels and the control team when vessels are predicted to come too close.

Dennis Brand, BMC managing director, said "We needed a partner that had a lot of hands-on experience with marking offshore hazards and Vesper Marine had done work similar to this all over the world."

The system went live in June and was relocated to a land-based site on the coast of Malaysia in August. This has further reduced costs, decreased liabilities for the insurer and enabled the marking and cordoning off of even more potential hazards, the company said..

The wreck was a dangerous obstacle being located at the entrance of the Traffic Separation Scheme in the Singapore Strait, a critical area for one of the busiest shipping lanes in the world. Since the solution went live, more than 8,000 vessels have been warned about their proximity to the danger zone.

Jeff Robbins, CEO and co-founder of Vesper Marine described the wide scope of this innovative protection system, "The Guardian system is precisely designed for natural and man made hazards, fixed and moving zones, and can be changed in real time with changing conditions. "In the Singapore Strait situation, while managing safety of vessels around the wreck, as salvage operations progress, the zones can be redefined dynamically within our cloud based software, to enhance the safety of shipping, salvage operations and the efficiency of the shipping lane," he said.

MPA tries to address age old bunkering issues

When one thinks of Singapore shipping, bunkers immediately spring to mind.

Since January, the MPA has been enforcing the use of mass flow meters (MFM) on bunker tankers and barges, which gave rise to some forecasters predicting a fall in bunker supplies and the number of vessels calling at the various anchorages for bunkers.

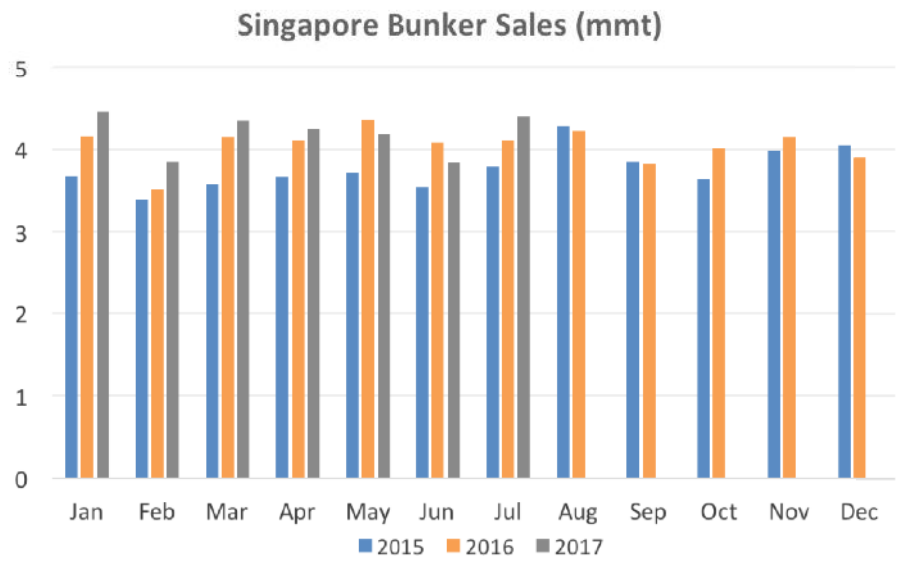
Figures published by Ocean Freight Exchange (OFE) in August showed that sales in Singapore rose by 6.8% year-on -year in July to 4.39 mill tonnes - a six month high - following two consecutive months of declining sales.

Year-on-year growth for the first seven months of this year has averaged 3%, OFE said.

The introduction of MFMs has increased barging costs and lowered supplier margins resulting in suppliers trying to push the movement of larger volumes, forcing owners and operator to purchase larger stems.

The average stem size grew in July by 12%, compared with last year, to 1,297 tonnes, outweighing the drop seen in the number of vessels calling for bunkers, which fell for the seventh consecutive month to 3,386, down by 4.7% year-on-year, as more vessels are bunkering in North Asia.

Sales of the most popular 380 cst grade was 3.31 mill tonnes in July, up by 8.4% on the year, while sales of 500 cst, favoured by containership operators fell by 1.4% to 845,000 tonnes, due to a narrower spread ex wharf for the two grades



Source - Ocean Freight Exchange.

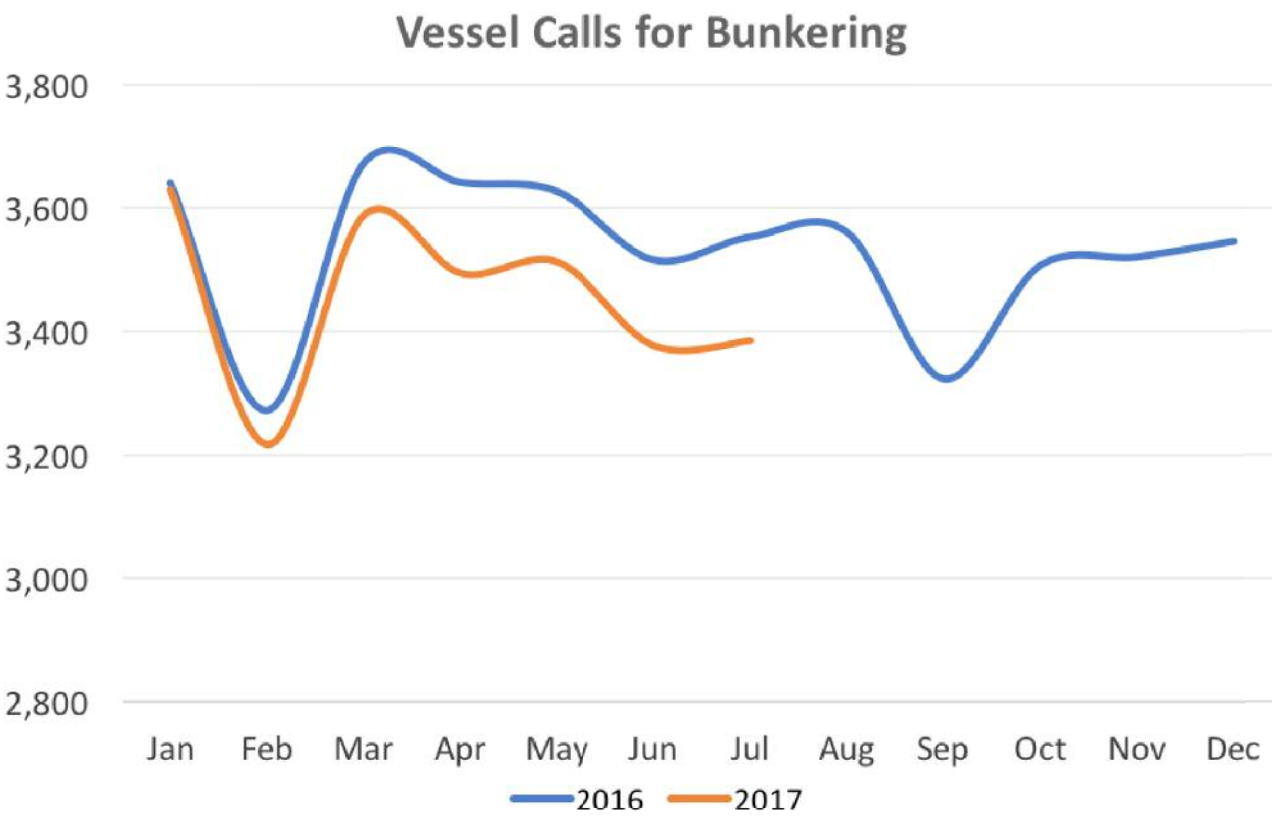
The MPA has cracked down on suppliers it perceives as not coming up to scratch. For example, last month, the organisation announced that it would not be renewing the bunker supplier licences of Panoil Petroleum and Universal Energy when they expired on 31st August, 2017.

Universal Energy's bunker craft operator licence will also not be renewed.

As a result, both companies will no longer be allowed to operate as a bunker supplier and bunker craft operator in the Port of Singapore.

At least one of the suppliers accumulated demerit points, which led to its suspension. Jointly developed by MPA and the Singapore Shipping Association (SSA) and implemented on 1st June, 2003, the demerit points system is part of the Accreditation Scheme for Bunker Suppliers.

The Scheme aims to recognise good bunker suppliers and deter malpractice in the industry. Annual renewal of the bunkering licence is subject to bunker suppliers achieving the



Source - Ocean Freight Exchange.

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accreditation qualifications, the MPA explained.

The International Bunker Industry Association (IBIA) said it believed that the benefits achieved from adopting mandatory use of MFMs for deliveries in Singapore must be protected by effective enforcement, and that using approved MFMs to measure quantity being loaded onto bunker tankers as well as that delivered to a ship would address a missing link in supply chain integrity.

IBIA members and other industry stakeholders have shown a great deal of interest in instances where breaches of the MFM regulations have been suspected, such as the temporary suspension in March of the harbour craft licences of five bunker tankers operated by Panoil while authorities investigated irregularities found on their piping fixtures, the association said.

IBIA said that it continued to support vigilance and firm action by the MPA and other relevant authorities to deal with suspected irregularities, and considers it important that all proven cases of abuse of the MFM protocol are dealt with as swiftly as possible in order to retain the confidence of the global shipping community in the application of the MFM regulations.

For example, as mentioned above, the MPA announced that it had revoked the bunker craft operator licence of Panoil Petroleum with effect from 14th August 2017 after checks revealed that there had been unauthorised alterations made to pipelines on board the five bunker tankers that had their licences suspended in March. MPA claimed that these alterations had allowed bunker fuel measured by the MFM to be siphoned out, undermining the accuracy of the readings from the system.

Another area of concern that affects suppliers and bunker craft operators, but which falls outside the MPA's jurisdiction, is the potential for variations in delivery volumes between Singapore oil terminals and bunker tankers. Bunker tankers have to accept the delivery volume recorded by the terminals, and IBIA said that it had been told that MFM-equipped bunker tankers have experienced discrepancies, which put bunker craft operators at a disadvantage.

IBIA said it would support a solution, which applied the respective MPA approved MFM system for bunker tanker figures for oil terminal loadings, and is now helping to close what is regarded by many as a significant loophole in the bunker supply chain.

A cross industry group including IBIA, SPRING Singapore, the SSA and the Singapore Chemical Industry Council is in dialogue with relevant bodies governing the Singapore terminals in an effort to resolve this issue. The MPA is also involved in these discussions.

Marine Fuels Committee

At the first meeting of the newly elected SSA Council (2017/2019) held last June, it was decided to form a Marine Fuels Committee.

In addition to addressing operational issues relating to bunkering operations, which were previously addressed by the SSA's Bunkering Sub-Committee, the new committee will also address such issues as preparing Singapore's bunkering sector for the 0.5% global sulphur cap and the rise of LNG as a marine fuel.

"Bunkering has always been a very important segment of our industry and issues relating to bunker and marine fuels in general have grown increasingly complex. As such, in the anticipation that owners will take an increasing interest in what their ships consume, we have formed the Marine Fuels Committee to help ensure that our members will be well-prepared for the future. The Committee will be chaired by SSA Councillor, Ms Caroline Yang," explained SSA president Esben Poulsson,

Currently, the SSA represents over 460 member companies, comprising shipowners and operators, shipmanagers, ship agents and other ancillary companies, such as shipbrokers, class societies, marine insurers, bunker suppliers, maritime lawyers, and shipping bankers, amongst others. TO

Inmarsat unveils 'Fleet Secure' service

Inmarsat showcased its new 'Fleet Secure' service' at London International Shipping Week. 'Fleet Secure' is claimed to be the maritime industry's first and only fully-managed service to detect vulnerabilities, respond to threats and protect ships from widespread cyber attack. The service will be commercially launched as a standard option on Inmarsat's Fleet Xpress service.

It is a unified threat management (UTM) and monitoring service that will power cyber resilience at sea, offering vessel owners and managers continuous transparency on the status of their digital security and a 24/7 response to cyber crime, Inmarsat said.

It detects external attacks via high-speed satellite broadband connectivity, while also protecting vessels' networks from intrusion via infected USB sticks and crew devices connected to the on board LAN. Fleet Secure will easily integrate with Fleet Xpress for no additional outlay on hardware and no impact on the customer's contracted bandwidth, the organisation stressed.

"Cyber crime is an inevitable downside of the digital economy, on land or at sea," said Peter Broadhurst, senior vice president safety and security, Inmarsat Maritime. "Other maritime cyber security offerings we have seen address only part of the threat or some of the management issues. Inmarsat's new 'Fleet Secure' service provides an all-inclusive, real-time managed monitoring service, giving ship operators and managers the cyber security tools they need to protect their fleets continuously from malicious attack or malware, detect vulnerabilities and respond to threats."

The UTM is powered by Singtel subsidiary Trustwave, a provider of information security solutions and is available in a choice of three service levels, which include -

- A fully-managed 'Gold' standard, with real-time threat monitoring and analysis, including immediate notifications to the customer with high severity level security threats followed up by telephone to escalate threat management.
- 'Silver' level - a daily review and threat analysis.
- 'Bronze' level, which enables users to self-check the vessel's network status via an online portal.

The UTM combats viruses and blocks access to unsafe websites, isolating an infected area of the network to prevent it from spreading to other systems on board.

"The threats from cyber attack demand robust technical solutions, network integrity, operational and training support, and raised awareness across the maritime sector," Broadhurst added.

'Fleet Secure' complements the resilience of Inmarsat's own satellite and ground network, enabling consistent cyber security standards to be maintained. Inmarsat said that it will remain at the forefront of providing solutions to this challenge and is supporting a joint working group set up by IACS to formulate a robust set of recommendations for cyber security at sea.

Code of practice

At a seminar organised by Inmarsat held during LISW, the UK's 'Code of Practice on Cyber Security for Ships' was launched by Transport Minister Lord Callanan.The guidelines have been produced by the Institution of Engineering and Technology in close association with the UK Department for Transport and the Defence, Science and Technology Laboratory.

They are aimed at helping senior shipping personnel who have responsibility for the on board security of a range of ships' systems at a time when the increased complexity and connectivity of vessels is making security and resilience more critical.

Lord Callanan commented: "The increasing use of digital technologies in the management of ships provides increased efficiency and the ability to compete in the global market. However, such technologies expose ships to cyber security vulnerabilities and we need to be aware of the risks.

"The 'Code of Practice on Cyber Security for Ships' provides actionable good practice on areas such as developing cyber security plans;

Inmarsat's Peter Broadhurst.

devising mitigation measures; ensuring the correct structures, roles, responsibilities and processes are in place; handling incidents and highlighting standards," he said.

Smart ship

Not stopping there, Inmarsat has signed a Memorandum of Understanding (MoU) with Samsung Heavy Industries (SHI), establishing a relationship to leverage the 'smart ship' connectivity offered by Fleet Xpress at the vessel construction stage.

This agreement envisages the South Korean shipyard installing Inmarsat-approved terminal hardware and offering applications to cover remote machinery diagnostics and CCTV services, to utilise the satellite communications platform's capabilities from the time the ship is delivered.

The new service, which has been dubbed 'Smart Ship' by SHI, will allow owners to enhance efficiency by harvesting data from hull-monitors and equipment sensors on board in real-time, using Inmarsat's dedicated bandwidth for Certified Application Providers (CAPs).

AIS-based tracking tools transform maritime logistics

It has been a decade since the advent of web-based vessel-tracking tools that leverage real-time and historical AIS data to enhance vessel, port, and terminal efficiency, while reducing costs and increasing safety and security.*

These tools have enabled stakeholders to improve vessel and associated dock and terminal activities during a period of unprecedented growth in crude oil transportation traffic. At the same time, the tools have brought sweeping change in such areas as demurrage reporting, while enabling new capabilities, such as virtual tendering, just-in-time arrivals, and key performance indicator (KPI) benchmarking and trending.

Among the areas most impacted by vessel traffic growth in the last 10 years were Gulf of Mexico ports whose higher volumes were initially driven by finds in the Bakken shale fields, and in West Texas, Mexico, and other locations.

Banned from being exported, this crude was first used as cheap feedstock and refineries ran to capacity while transporting growing volumes of refined products by water between ports and for export. As the balance between imports and exports shifted, midstream providers built new terminals supported by a train-and-barge infrastructure primarily between the Bakken fields and Gulf Coast refiners.

The gradual lifting of the crude oil export ban, beginning in 2015, cleared the way to ship up to a million barrels daily of ultra-light US crude to the rest of the world.

Web-based vessel-tracking tools helped manage this first wave of vessel traffic growth, and the industry is now heading into a new period of even faster growth with new traffic dynamics. Midstream operators have added more terminals to accommodate VLCCs that are moving exports from US ports. This is accelerating traffic growth while introducing the more complex dynamics of partial VLCC loading at the berth, as a second, smaller tanker is loaded nearby, followed by a ship-to-ship transfer in the deeper Gulf waters.

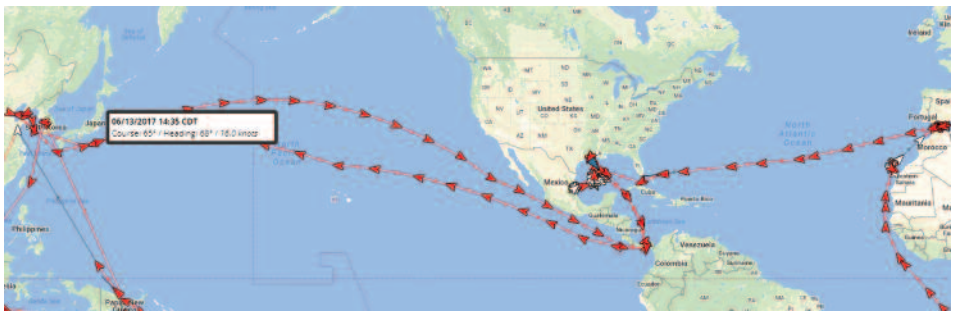
Screen shot of a vessel making a 180 deg turn in the Houston Ship Channel with the help of two tugs.

Gulf ports have also been impacted by the Panama Canal widening, which has not only increased traffic but also changed its flow. Gulf ports now also support LNG trades to Asia and deregulated Mexican exports, as well as bigger containerships from the Far East whose movements often require restrictions on other traffic.

Even as AIS-based vessel-tracking tools were helping to accommodate vessel traffic growth, they were also changing how that traffic is managed, with greater transparency and collaboration.

For instance, cargo and terminal owners in the early 2000s often came to different conclusions regarding the root causes of demurrage-inducing delays and who was responsible for penalties. Now, the top oil and gas companies use these tools thus enabling all stakeholders to discuss these issues with vessel operators, using the same information about real-time and historical vessel movements, which ultimately leads to much better collaboration on root-cause identification and correction.

Today's tracking tools have also enabled capabilities, such as just-in-time scheduling based on vessel locations and dock availabilities. As the foundation for today's



A track of a gas tanker.

Oceaneering International's Robert Kessler.

integrated, web-based terminal management and analytics platforms, these tools give terminal operators a complete overview of all activities.

This contrasts with 10 years ago, when, for instance, tug operators could adjust arrival times at terminals, as there was no way to independently confirm them. Now, dispatch and operations centres benefit from real-time vessel data for all AIS-enabled vessels along the waterway and vessel locations and movements are incorporated into current logistics practices with custom filters, views, and identified fleets to help increase productivity. This also enables terminal and vessel operators to collaborate to improve KPIs in such areas as the average delay time at the berths.

Today's collaborative tools also support initiatives, such as OCIMF's 'virtual tendering' for reducing carbon emissions. Rather than allowing vessels to run at full sea speed toward the load/discharge port within the laycan period and then sit there for several days, terminals identify a vessel's available berthing time well before arrival. The vessel then slows to accommodate the jetty availability, but is allowed to log arrival time as though she had proceeded at charter speed.

AIS-based tools make this possible by accurately predicting arrival times, considering weather conditions and other external factors, plus helping to manage subsequent vessel scheduling in a manner that is flexible enough to support berthing upon arrival.

Rising vessel volumes and changing traffic patterns over the past decade have created a growing need for improved visibility and transparency, stronger safety and security, and better ways for terminal and vessel operators to work together.

Collaborative AIS-based vessel-tracking tools and services have met these challenges while creating new opportunities to improve efficiencies and to operate against KPIs in ways that benefit all stakeholders. TO

**This article was written by Robert Kessler, program manager, Maritime Global Data Solutions, Oceaneering International.*

Cobham antennas cover all brands

Of course satcoms software cannot function without the correct hardware being fitted on board a ship.

Tanker Operator spoke with Cobham SATCOM's Jens Ewerling, director, maritime broadband, about the issues involved.

In the light of increased bandwidth and speed, the choice of antenna always depends on the market segment and the customer requirements today, he said.

In commercial shipping, the standard 1 m antenna size and homogenous Ku-band beams make it possible to put thousands of ships on the same networks. For example, the new powerful HTS satellites, such as Intelsat EpicNG, will bring more bandwidth to these antennas, while still enabling smaller antenna sizes.

Bandwidth demand on tankers will require the standardised 1 m antennas and in some cases 60 cm antennas will provide the required levels of connectivity, he explained.

He also claimed that Cobham can supply antennas for almost all communications functions, depending on the client's needs, as the company is the only manufacturer of mobile equipment to develop systems for all bands used in maritime communications - VHF, UHF, MF/HF, L-band, Ku, Ka, C and X bands.

The basic antenna technology has not changed. A VSAT antenna must be able to point with 0.2 deg accuracy at a geostationary satellite that is 36,000 km away in space. And, as the power and bandwidth requirements are not decreasing, antenna size will be maintained on most vessels. Therefore, while Cobham is constantly developing ways to better and easier interact with antennas, the size will in most cases remain constant.

However, as mentioned above, state-of-the-art maritime VSAT service providers who are using HTS satellite services, such as Intelsat EpicNG, will be able to offer good bandwidths on much smaller antennas, such

as the new SAILOR 600 VSAT.

This means that the antennas can be carried on board and lifted into place by two people, Ewerling explained. There is no need for a crane to position a SAILOR 600 VSAT – the antennas weigh just 35 Kg. This means that thousands of dollars can be saved on installation costs. It also makes installation logistics easier, as a ship doesn't have to visit a port with the correct or readily available crane facilities to have an antenna installed, he explained.

Cobham offers comprehensive global service packages and extended warranty packages to its system integrator partners. Ewerling explained that the company does not offer any products or services direct to consumers. The global service network enables the partners to deliver fast, high quality service to the end-users, he claimed.

Popular terminal

He also said that with 50,000 SAILOR FleetBroadband systems shipped to the global shipping market, being by far the largest consumer, the most popular user terminal is the SAILOR 500 FleetBroadband providing the highest possible bandwidth on Inmarsat's L-band service, and redundancies, including safety features on the Inmarsat BGAN-X.

As for VSAT (Ku and Ka bands), the most popular antenna size by far is the 1 m with the SAILOR 900 VSAT the best-seller across all manufacturers worldwide with almost 5,000 units shipped thus far.

Talking of hardware upgrades, Ewerling explained that a maritime satcom service provider deploys an antenna procured from Cobham SATCOM for a specific broadband service at a specific price.

For larger antennas, upgrades occur from C-band to Ku-band, or to a higher uplink power, or SAILOR 900 VSAT can be converted into a SAILOR 100 GX to operate on Inmarsat's new Fleet Xpress service, which includes Ka-band from the GX satellites.

The company also has the SAILOR 900 VSAT High Power variant, which features a new 20W extended frequency BUC.

This was designed to enable higher performance and bandwidth for vessels that have high uplink requirements (large quantities of data to upload), he said. TO

Reliable VSAT connectivity improves Sun Enterprises operations

The tanker and bulker owner's Marlink Sealink VSAT Allowances with MSS backup and XChange provide high quality internet connectivity for business applications and crew welfare.

Previously equipped with Inmarsat FleetBroadband for business communication, Sun's core objective was to improve the operational efficiency of their fleet through high quality, stable connectivity. As data became larger and their data volume increased, the company required VSAT to support increased bandwidth and business critical applications.

Marlink offered its Sealink Plus VSAT solution to equip Sun's fleet of 22 tankers and drybulk carriers. This solution bundles VSAT, MSS and XChange, giving stable communications for operations and crew, with integrated tools for monitoring and managing the link.

As part of the package, Sun worked with a Marlink key account manager to determine which Sealink VSAT option would best suit its requirements and determined that a 20 GB per month allowance would enable significantly more capacity for smarter operations, crew access to social media, web browsing and phone calls.

The flexibility of Sealink Allowances were claimed to be a major draw, since they can be easily upgraded or topped up throughout the duration of the contract via Portal360, Marlink's online service management platform.

Inmarsat FleetBroadband was also included as an MSS backup service, which was a convenient option for Sun, given that FleetBroadband was already installed across the fleet and could be easily integrated with the Sealink VSAT.

The only change was that the company now always pays the same monthly fee for their connectivity package, regardless of the bandwidth amount consumed or carrier used (Sealink VSAT or Inmarsat FleetBroadband MSS).

Pilot project

Sun Enterprises first embarked on a pilot VSAT project. and selected a vessel with the most extensive routes to run the trial. Following the trial, Marlink was selected over other service providers for proving the best solution with outstanding performance.

Marlink's XChange Power service delivery platform was fully integrated to allow Sun to easily manage and control the communications network from on board and from ashore

Crew welfare

Crew welfare communication was addressed thanks to the XChange, as the company was able to provide prepaid vouchers for connectivity and manage users and credits from the shore, while also monitoring data traffic and setting priorities over their separated crew and corporate networks.

"We have worked with Marlink airtime on board for more than 10 years. For safe, efficient and reliable operation of our vessels worldwide, it's important to have a communications provider that we can trust.

"When we decided to upgrade to VSAT to modernise our fleet and strengthen communication on board, we decided to test a few other VSAT providers, but Marlink's excellent service and support made the decision easy.

"Reliable, always-on connectivity, IT network stability and appropriate crew communication facilities are the most important factors for us to ensure our fleet operates efficiently and economically. With Sealink VSAT, Marlink has provided us with a complete connectivity solution that provides high performance and a stable foundation for our business going forward," said Kostas Tsalikis, IT manager, Sun Enterprises/Livanos Group of Companies. TO

****See interview with Marlink's Tore Morten Olsen on Page 27 of this issue.*

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NaviPlanner - a major digital step forward

Anyone who has used Google Maps or an in-car satnav to plan a journey will know how simple yet powerful these technologies have become. They've effectively replaced the need for paper road maps, and can pinpoint destinations and the duration of the drive with incredible accuracy.

What makes them even more usable is the ability to plan stop-offs at tourist attractions, shops or fuel stations and to see where traffic jams or hazards will affect you. This all makes for better journey planning.

On a tanker's bridge, mariners may have been wondering why it's not this easy to plan a route at sea. Well, with the release of NaviPlanner, Nautisk believed it has done just that – offering the capability to create a compliant route plan in minutes.

Nautisk's head of innovation, Kjetil Bentsen, said that a fresh approach to digital navigation was desperately needed and the company's Norwegian approach has made it possible. The business itself has transformed over the past 18 months, moving away from traditional paper charts to a comprehensive digital product offering.

"Norwegians have a philosophy of getting things done in the right way. Our senior managers coach people. Our business structure is very flat so we all pull together. When we say what we're going to do, we just do it. NaviPlanner has been developed using a similar approach.

"We asked, 'what's the right way to plan a route in the digital age?'. The result is NaviPlanner, and it's the first product of its type to bring a range of digital technologies together to make mariners' lives simpler," he said.

NaviPlanner is an intuitive voyage planning software that will suggest, review and plan optimum routes in seconds. Bridge officers choose their ports – start and arrival waypoints – and the software automatically suggests which routes could be possible. You can review them visually and add stop off destinations.

The clever bit is how these routes are created. Bentsen explained: "The software essentially calls on a history of journey planning by master mariners, tapping into planned routes like a form of 'crowd sourcing'. It's an example of big data, where we use machine learning to sift through trends and patterns in a number of datasets to calculate the best routes available. These interface with our compliant navigational chart data and other digital information in one package.

"This means that, visually, you can select a route and then ask to see other relevant information, such as piracy, weather, currents, NavArea warnings and so on. It does all this in seconds," he claimed.

Compliance has been a key driver for NaviPlanner, and Nautisk has again used technology to its advantage.

"It's vital that our customers remain compliant, whether operating a single vessel or a global fleet," said Bentsen. "NaviPlanner allows the user to create a complete voyage plan in a few minutes, based on the information held in the system, such as port data and some prompts for relevant data from the user. We've used a traffic light system to make this simple, so where there's a red or amber light it indicates some information is needed. Once you have eliminated red lights you can produce a complete, compliant route plan as a PDF."

NaviPlanner also provides clear notifications of when new permits and ENC updates are ready. The clever bit is in how Nautisk updates the charts.

"We developed our own protocol that combats poor data speeds and data integrity, which can be an issue with satcoms during a journey. Data transfer can be expensive, but also unreliable – but loss of connection in drop-out areas is not a problem for the software.

Nautisk's Kjetil Bentsen.

"Our proprietary ECTP (Efficient Content Transfer Protocol) – the same that features in our Neptune voyage information system – reduces file size through data compression and resumes downloads from last drop out to maintain file integrity. Downloads to NaviPlanner can easily be handled via the standard VSAT trunk that most tankers will already have on board and be paying for," he said.

Bentsen believed the software will save operators time and money on managing their operations.

"NaviPlanner is intuitive, much like a satnav, so limited training is required to make the most of its many capabilities. And no new technology is required. It runs on any PC running Windows 7 or above, and because it is fully touch screen compatible it will operate on existing back-of-bridge systems and screens. It's also available through one monthly subscription so there's no capital outlay – just one monthly invoice for single or multiple vessels.

"We believe NaviPlanner is the most innovating voyage planning tool to date," he concluded.

VSAT business growing despite industry challenges

Shipowners and operators are now realising the benefits of instant comms and information, according to Tore Morten Olsen, Marlink's president maritime.

The benefits of having an always available voice and data link to shore have been evident since Marlink kicked off the modern maritime VSAT era in the early 1990s, he told *Tanker Operator.*

However, now with the Internet of Things and the advent of smart shipping thinking, the applications and data infrastructure, ie, cloud storage, there is more in place to be leveraged by the maritime industry.

Although newbuilds are down, there are still thousands of ships operating with legacy, 'pay as you go' satcom services. "As many more fleet owners understand the benefits of moving to VSAT or multi-band communication services – such as fixed monthly costs and higher bandwidth – we are seeing regular requests for fleetwide upgrades," he said. "In fact, our VSAT business has grown year on year, despite the financial challenges in the industry, due to the global downturn. Some of this business is newbuild, but a lot of it is retrofit."

The industry's continued adoption of VSAT is based on the fact that when done properly, communication is an investment, not a cost. For example, with a fast and reliable data connection, shipping companies can adopt more digitalisation into their vessel and fleet operations, to eg, reduce bunker costs through continuous engine performance monitoring, which can significantly improve operational efficiency.

As for customer requirements, it is impossible to describe an average delivery, he said.

"There is of course an element of meeting a customer's budget needs, but there is so much more to it. Where does a vessel operate? How many crew are on board? Is the owner keen to adopt new processes to enhance efficiency? With so many differing needs, we developed a multi-band, technology agnostic portfolio of satcom services and business critical solutions that can be applied to ensure individual customers are getting the service that delivers them the best value and utility," he explained.

Extolling the advantage of VSAT, Olsen said that this service enables always on, high bandwidth IP connectivity, providing the most complete maritime broadband available today. Because it can offer such a solid user experience with potential for very high speeds, which in turn enables more digitalisation on board, VSAT is much more in demand and is seen as a natural progression for many vessels using legacy satcom services.

Olsen also explained that part of Marlink's overall value is that the company can provide any level of service required.

"We have worked with some very large shipping companies to ensure the total integration of satcoms within their operations, helping them to standardise their IT platforms and essentially operate smarter and more efficiently.

"On the flipside, many of our customers experience fast, always available maritime broadband and voice services without much intervention from us. This is helped by the XChange communications management system on board, and Portal360, an online service management tool that can be accessed by our service provider partners and end-users remotely," he said.

Budget control

Payments vary, according to a client's preference, but one of the key attractions of VSAT and the multi-band services that Marlink offers is budget control.

A customer can pay a fixed monthly price for their primary (VSAT) channel and back-up communications (even if the back-up channel is normally 'pay as you go'). This means there are no shock bills.

"'Pay as you go' is notoriously hard to manage. If you don't control Windows and anti-virus updates on board, they can use a huge amount of data. We've heard stories of surprise invoices for over $80,000 arriving at the end of the month, caused by unwanted and even unnoticed PC updates on board. It's this that makes a fixed monthly fee, regardless of usage, very attractive.

"On the other hand, you do want the software on board to be updated, to better protect yourself against cyber attacks, but it's important to plan this in advance, so the most cost-effective channel is used," he advised.

Addressing the cyber security issue, Olsen said that most if not all of the maritime industry is touched by the threat of cyber crime. P&I clubs, class societies, equipment & service providers, national and international industry organisations and owners' clubs are working hard to establish solutions and ensure awareness.

"The issue is now at the C-Level, Cyber security is one of the biggest issues facing the shipping industry today and Marlink is committed to supporting our customers to secure their IT networks," he said.

Marlink takes a multi-layered approach, helping customers to fight the various methods of intrusion that include - Email threats, Malware Apps on personal devices, pharming and phishing (social engineering), worms and rootkits.

A vessel may be infected by a Trojan Horse program, such as spyware and adware, ransomware or 0-Day exploits. So, Marlink has developed several services that act as lines of defence to stop this from happening. TO

Waste heat recovery system development hots up

The development of a new waste heat recovery system could not only deliver fuel savings of up to 8% for shipowners and operators but also transform environmental standards.

A two-year £3.6 mill project to develop technology engineered to reduce emissions and vessel operating costs by converting waste heat from a vessel's engine into electricity, is currently underway.

This new waste heat recovery system could not only deliver fuel savings of up to 8% but also transform environmental standards in the marine sector.

It is being funded by the UK Energy Technologies Institute (ETI) and led by AVID Technology, with assistance from Royston Power and France's Enogia. UK North East-based engineering specialist RED Engineering is also providing support and input.

At the heart of the waste recovery system is equipment that uses the Organic Rankine Cycle (ORC) heat transfer process and a turbo-generator power conversion system to convert thermal energy from the engine jacket water into electricity.

Specifically, an environmentally safe refrigerant is boiled with waste heat. This refrigerant steam is then used to drive a turbine, which in turn powers a generator. The refrigerant is then cooled and pumped back around the system.

This heat recovery technology is already available but what is new, according RED Engineering's managing director, Joe Orrell, is AVID's high-power density generator and electronics, which have been redesigned and packaged into a system that is much smaller in volume than traditional ORC systems.

Orrell said that the project demonstrates the efficiency savings that are achievable using advanced engineering solutions: "This draws on technology and expertise developed for the automotive industry, taking costs out and increasing durability. The result is a system with a lower cost per installed Kw than anything on the market in a package size that meets the tight constraints imposed by marine applications."

AVID's founder and managing director, Ryan Maughan, added that the smaller volume of the package when compared to traditional ORC systems offers significant advantages. "The ORC system is very compact and can therefore be accommodated into a much wider range of vessels. The whole system can fit into a vessel's engine room as a retrospective installation, which gives some indication of its size, flexibility and impact on vessel layouts," he explained.

Modular design

The system is being designed to be modular to meet retrofit market demands. This will allow the equipment to be easily broken down and transported through tight hatches and access doors, although Maughan pointed out that "re-assembling and installing inside the vessel is bound to throw up some interesting challenges to overcome," as the project moves towards its conclusion.

The projected 8% fuel saving comes from a market study completed by the ETI but multiple systems can be connected to generate more power, which in turn, would generate a fuel saving that is dependent on how many systems are installed versus on board engine power.

RED Engineering's role is to ensure that the equipment developed complies with the appropriate marine regulations: SOLAS requirements and DNV GL class rules. This involves leveraging its expertise in safety critical marine systems' engineering and working on the documentation and design rules, which will allow the technology to progress beyond the concept to the application stage.

The firm's engineers are also providing technical input to support the installation of a demonstration unit next year, while Royston is involved in working with the vessel operator

AVID's Ryan Maughan.

to undertake installation ahead of in-vessel testing and commissioning. Enogia is responsible for the design of the ORC turbine.

The system is being developed to ensure it meets the challenge of operating in harsh marine environments on all types of vessels. It will be installed on a commercial ship to demonstrate the potential for the technology in the mass marine market.

Progress on the project from initiation to concept phases has been rapid. Qualification testing and approval of key components is underway, alongside the design and development of the turbo-generator, system packaging and design approval from DNV GL.

Maughan said: "The system is currently in a land-based development and testing phase and we are going through the design process necessary to make the technology marine-ready and obtain class approvals. While we anticipate challenges ahead in finalising the class approval before moving to installation in an actual vessel, we are confident about the long-term success and viability of a system that could deliver major cost savings for shipowners and operators."

Challenges facing product and chemical tankers

As an owner and operator of a fleet of mid-size tankers, one of the challenges we face is how to make an efficient ship on paper a high performing ship on a daily basis, writes Mark Cameron – Executive Vice President and COO, Ardmore Shipping.

At the same time, regulatory obligations and market challenges we face are constantly evolving, conditions that are shared by our peers in other industry segments, particularly on the regulatory side, but many are particular to product and chemical tankers.

As an industry, it is right to be forward-thinking around such interesting questions as the possibility of more automation. However, for most owners, our attention is focused on the challenges of today and the immediate future. Nowhere is this more pressing than with emissions and ballast water regulations.

With the clock ticking to 2020, we are actively planning for the solution that is right for our fleet, whilst keeping our options open. Presently, we believe the most feasible option is 0.5% sulfur bunker fuel, whether low sulphur HFO or gas oil. Gas oil appears most viable at this stage, but we continue to evaluate hybrid or HFO options.

Mark Cameron.

Price differential will be key, but for now, our approach is to maintain a watching brief. There is unlikely to be a one-size-fits-all solution for any company, let alone the industry - a combination of scrubbers and low sulphur fuel could be an option for some.

Whatever the solution, it is vital to have a level playing field when it comes to compliance. The Trident Alliance, of which Ardmore is a member, is doing valuable work to campaign for robust enforcement of the regulations, for the good of the industry and the environment.

The Ballast Water Convention remains at the top of anyone's agenda and it barely needs to be said that this poses a massive operational challenge. Again, this is far from being a box-ticking exercise with crew and equipment suppliers having a vital role in ensuring compliance.

We currently have 10 vessels with ballast water treatment systems installed. As well as gaining experience in their use and assessing their operational capacities, we also have a comprehensive plan for retrofitting the balance of our fleet to ensure we meet our obligations.

However, it is a pity that in a global industry like shipping, we have different regional models and regional standards for the same issue. This fragmented approach is far from conducive to delivering the global best practice that the industry should strive towards.

Sustainable fleet growth

As a sector, we need to be mindful of the fleet growth that we can sensibly sustain. We hope that any newbuild decisions will be mindful of the wider supply-demand balance of the product and chemical tanker segment.

When it comes to delivering high performance, we are proud of our commitment to investing in eco-efficiency. Ardmore's fleet of product and chemical vessels comprises 21 'eco-design' tankers and six 'eco-mod' tankers. Our 'eco-design' tankers are designed and equipped with an array of eco-efficient features, including electronic engines and refined hull lines. Our 'eco-mod' ships have had technical modifications to their propulsion systems and hull to improve their performance.

However, investing in the design, build and modification of our fleet to achieve industry-leading standards of efficiency would be meaningless without the third strand of our approach - investing in our crew.

Safe, efficient operations and world-class performance begins and ends with crew. That is why we empower them with the authority to take the operational decisions necessary to optimise the performance of their ships and give them the tools to achieve this.

We also do our best to ease the burden of new regulations. When a new regulation is introduced, the burden is felt most acutely on board, adding further demands to an already-complex operational environment. As an industry, we must do more to champion the harmonisation of regulations, considering the demands on crew when new regulations are introduced and strive to make their working lives easier, safer and more rewarding.

The operational environment is always a complex one for product and chemical tankers, but we have some choices available to manage those complexities, on board and ashore. Organisations that want to thrive should embrace change, work in partnership with their customers and empower their crew.

Thun to expand tanker fleet

News that Thun Tankers had declared an option for a fifth 17,500 dwt IMO II intermediate product/chemical tanker, prompted *Tanker Operator* to have a look at the fleet.

The five sisters will be delivered between April, 2019 and April, 2020 are to be built by Avic Dingheng Shipbuilding in China. They will be commercially managed in the Gothia Tanker Alliance.

By increasing the series from four to five vessels and opting for gas oil engines over dual fuel types, Thun, together with its partners in the alliance, said it could further widen its client offering and trade outside SECAs, if necessary.

The vessels will be built to the latest design with a focus on energy efficiency, sustainability, new regulations and customers' needs, the company said and are being designed in-house. They will be commercially managed by Furetank, which is responsible for the intermediate segment within the alliance.

Equipment supply is currently being finalised but the main engines are likely to be Wärtsilä gas oil engines, while the tanks will be coated with an epoxy, enabling the vessels to carry vegoils and easy chemicals, as the elasticity found in epoxy will allow the coatings to last for the ships' lifetime of around 20 years without the need to recoat the tanks.

A Thun Tankers intermediate type newbuilding.

In addition to the five intermediate sisters, Thun Tankers, together with alliance partners Furetank Rederi and Rederi AB Älvtank, had earlier ordered six 16,300 dwt intermediate

Gothia Tanker Alliance newbuildings

Vessels	Owner	Dwt	Delivery
Coastal (4) LNG fuelled	Thun Tankers	7,999	2018-2021
Intermediate (1) LNG fuelled	Thun Tankers	16,300	2018-2019
Intermediate (2) LNG fuelled	Älvtank	16,300	2018-2019
Intermediate (3) LNG fuelled	Furetank	16,300	2018-2019
Intermediate (5) Gasoil	Thun Tankers	17,500	2019-2020
Total - 15 vessels			

Source: Thun Tankers

tankers with LNG propulsion and epoxy coated tanks.

One of the six vessels will be owned by Thun Tankers, three will come under Furetank ownership and two will be controlled by Älvtank. These vessels are being built to a FKAB design at the same Chinese yard and will be delivered between May, 2018 and early January, 2020.

In addition to the six intermediate size tankers, Thun has also contracted four 8,000 dwt tankers again with dual fuel propulsion units, able to run on LNG and/or gasoil, but with Interline coated tanks.

These coastal tankers will be built at Sheepswerf Ferus Smit in the Netherlands with delivery between November, 2018 and January, 2021. They are intended to replace Thun's 'G' type vessels, which will be phased out.

They were designed for an increased performance, an improved manoeuvrability with a nozzle fitted propeller, the latest hull design for further improved performance and reduced bunker consumption, improved cargo handling, cargo heating with heat exchangers, vegoil and easy chemical resistant coatings, full IMO II type design.

In addition, the coastal vessels will have an improved cubic capacity of around 1,500 cu m with more or less same dimensions as the previous ships, thus improving clients ability to increase sales into niche ports.

17,500 dwt IMO II Intermediate Tankers - Principal Particulars

Delivery	April 2019 - Jan 2019
Dwt	17,500
Cubic capacity	21,000 cu m
Ice class	1C
LOA	149.8 m
Beam	22.8 m
Draft	8.5 m
Tank coating	Phenolic epoxy

They will also be fitted with a ballast water treatment system and are designed to give reduced noise levels both above and under water. They will also be prepared for land-based electricity supply for loading operations.

Propulsion package

Wärtsilä was contracted to supply the engines, propellers, and fuel supply systems for the four 8,000 dwt tankers (see also page 33).

The 115 m long coastal tankers feature a 'next generation' design focusing on high energy efficiency, low noise levels both above and below the water, and environmental sustainability.

Wärtsilä's full scope of supply for each of the four vessels includes a 6-cylinder Wärtsilä 34DF dual-fuel main engine, a Wärtsilä LNGPac fuel supply system, a Wärtsilä Gas Valve Unit (GVU), and a controllable pitch propeller (CPP) with HP nozzle. The equipment will be delivered to Ferus Smit commencing in 2018.

A notable feature of the fuel system to be supplied is its open type Tank Connection Space (TCS) that allows natural ventilation. The benefits of this system are its reduced weight, a combined cargo heating medium that controls the temperature both inside the TCS, as well as for evaporating the LNG, less installation work for the yard and a reduced power supply requirement, Wärtsilä claimed.

When delivered, the ice-class 1A vessels will be capable sailing year round in the Baltic Sea.

With the latest Thun intermediate type newbuildings, the Gothia Tanker Alliance has 15 vessels on order (see table on page 31). Its members are Rigel Schiffahrts, Northern Energy Services, Uni-Tankers, Rederi AB Älvtank, Furetank, Wisby Tankers and Thun Tankers and there are currently around 40 vessels commercially managed in the grouping.

Overall, the Thun Group has 12 vessels on order, which includes two 6,000 dwt Ice Class 1A dry cargo ships, also ordered at Ferus Smit, in addition to the tankers.

Describing itself as being an exponent of regional shipping, the Erik Thun Group currently manages around 45 vessels, which include tankers, drycargo vessels, cement carriers and self-dischargers. TO

Coastal 8,000 dwt Newbuildings- Principal Particulars
IMO IBC code type II chemical tanker, Finnish/Swedish Ice class 1A

LOA	114.95 m
LBP	112.22 m
Design draft	6.9 m
Beam	15.87 m
Deadweight	7,999 t
Cu m capcity	9,540 (100%) – 9,350 (98%)
Main engine	Wärtsilä type 6L34DF
Main engine output	3,000 kW
Bow thruster output	450 kW
Aux engines for cargo ops	3 x 350 kW each
Cargo tanks	Nine
Double valve segregations	Five
Max. Spec gravity of cargo	1.025 t/m
Cargo pumps	Framo
Cargo pump capacity	350 cu m/h per pump
or up to 1,500 cu m/h provided shore facility permits	
Loading capacity	800 cu m/h per tank pair

'Coralius' completes first STS LNG bunkering

The recently delivered LNG small scale/bunkering vessel 'Coralius' has bunkered her first vessel.

The ship-to-ship (STS) transfer operation took place in international waters of the Northern Kattegat between Frederikshavn, Denmark and Gothenburg, Sweden.

The receiving vessel, the 144 m long 'Fure West', is an oil and chemical tanker owned by the Swedish shipping company Furetank and operated in the Gothia Tanker Alliance. She mainly operates in the Baltic and Kattegat area.

In 2015, Furetank retrofitted the tanker with a gas engine, thus pioneering the use of LNG as a marine fuel in Europe.

"The bunkering of 'Fure West' confirmed that 'Coralius' delivers in accordance with what it is built for. This is a key milestone in our history of developing the LNG availability. We are happy working together with our customer Furetank for this first of several upcoming ship-to-ship bunkerings," Kimmo Rahkamo, Skangas CEO, said.

In the middle of September, the 5,800 cu m 'Coralius', carrying her first cargo of LNG, arrived at Skangas' terminal in Øra, Fredrikstad, Norway. The ship loaded the gas cargo from the company's production facility at Risavika, near Stavanger.

'Coralius' is owned jointly by Donso-based Sirius Shipping and Rotterdam-based Anthony Veder and is commercially operated by Skangas. She was built by Royal Bodewes in the Netherlands and is fitted with state-of-the-art bunkering equipment to meet the increasing demand for STS LNG bunkering, Skangas claimed. ■

Tankers to be fitted with complete propulsion packages

Earlier this year, Wärtsilä won a significant order for a complete propulsion package, including duel fuel engines, for a series of coastal tankers.

The contract calls for the supply of engines, propellers, and fuel supply systems for the four new coastal tankers being built by Dutch shipyard Ferus Smit for Thun Tankers.

The ships will run on both LNG and diesel and the order was confirmed in the first quarter of this year (see also page 30).

The 115 m long 8,000 dwt coastal tankers feature a 'next generation' design focusing on high energy efficiency, low noise levels both above and below the water, and environmental sustainability. Wärtsilä's solutions were selected primarily because they meet all these criteria, the company claimed.

The full scope of supply for each of the four vessels includes a 6-cylinder Wärtsilä 34DF dual-fuel main engine, a Wärtsilä LNGPac fuel supply system, a Wärtsilä Gas Valve Unit (GVU), and a controllable pitch propeller (CPP) with HP nozzle. The equipment will be delivered to the yard commencing in 2018.

A notable feature of the Wärtsilä fuel system to be supplied is its open type tank connection space (TCS) that allows natural ventilation, the company claimed. The benefits of this system are its reduced weight, a combined cargo heating medium that controls the temperature both inside the TCS as well as for evaporating the LNG, less installation work for the yard, and a reduced power supply requirement.

"The fuel efficiency of the Wärtsilä 34DF engine, whether in gas or diesel mode, was a prime consideration in its selection for these 'next generation' tankers. Similarly, the successful track record of both the CPP and LNGPac solutions, and the proven efficiencies that they have demonstrated, were convincing arguments in our favour," said Aaron Bresnahan, vice president, sales, Wärtsilä Marine Solutions.

"We have worked closely with Wärtsilä on many projects for more than 45 years, and we recognise their technical expertise and the reliability of their products. We are pleased, therefore, to have Wärtsilä as a partner for this project where efficiency and sustainability are the key essentials," said Anders Källson, Erik Thun managing director.

When delivered, the Ice Class 1A vessels will be capable of sailing in the Baltic year round.

Wärtsilä's 34DF engine is manufactured in configurations from 6L to 16V, giving 500 kW per cylinder and a total maximum mechanical output of 8,000 kW. The engine speed is 750 rev/min.

The 8,000 dwt design ordered at Ferus Smit by Thun Tankers.

Based on the Wärtsilä 32 diesel engine introduced in the mid-1990s, fuel flexibility means the engine can be optimised for constant speed generating sets, as well as variable speed mechanical drives, for main engine applications.

The patented Wärtsilä LNGPac is a complete fuel gas handling system for LNG fuelled ships and includes the bunkering station, LNG tank and related process equipment, as well as the control and monitoring system.

This order follows the one announced in September of last year for four, since increased to six newbuilding tankers to be built at the Avic Dingheng shipyard in China, on behalf of three Swedish owners - Furetank (two vessels), Älvtank, and Thun Tankers (one each).

These vessels will be commercially managed by Furetank Chartering in the Gothia Tanker Alliance. The contracts were signed in the second quarter of 2016.

The tankers were designed to fulfil the IMO's Tier III requirements and will be fuelled primarily by LNG. Each vessel will be fitted with a 9-cylinder Wärtsilä 34DF dual-fuel main engine, two Wärtsilä Auxpac 20 auxiliary engines, the gas valve unit, a controllable pitch propeller (CPP) compliant with Ice Class 1A, a high performance nozzle, a Wärtsilä Energopac rudder system, a Wärtsilä selective catalytic reduction (SCR) system for the auxiliary engines, 12 Wärtsilä deepwell cargo pumps, and two Wärtsilä deepwell ballast pumps with frequency control systems.

Wärtsilä will also supply the vessels with a gearbox and shaft alternator having a 'take-me-home' functionality. Delivery of the Wärtsilä equipment was due to commence in spring of this year.

In order to achieve optimal propulsion efficiency for these vessels, Wärtsilä used its OPTI design methodology. This uses accurate information via computational fluid dynamics (CFD) analysis to calculate the performance of the propeller, nozzle and rudder, including their interaction with the vessel's hull, thereby enabling a design that gives a perfect match between the various propulsion elements.

The vessels will be built to a design developed by Swedish ship designer FKAB, together with Furetank. They feature a special focus on minimising the impact on the environment, with a close to 50% reduction in CO_2 emissions over similar class vessels built between 2002 and 2012, the company claimed. TO

Major upgrade of MDT engine control system

MAN Diesel & Turbo (MDT) has released the latest version of its proprietary engine-control system - SaCoS 5000.

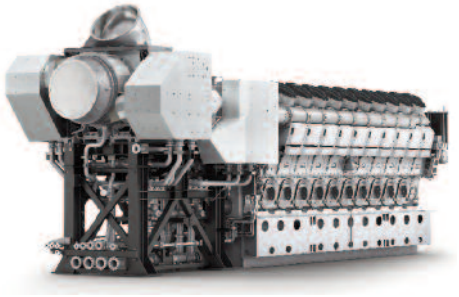
This represents a comprehensive upgrade and expansion of the original system's capabilities, and marks the culmination of four years of R&D effort, MDT said.

The development of SaCoS 5000 is in response to the increasing complexity and exponential growth in functionality of modern engines.

Günther Glas, MDT's Head of Systems Automation - 4-stroke, said: "The main benefit of SaCoS 5000 is its function-oriented architecture that makes it ultra-flexible and enables us to offer tailor-made solutions, like in the automotive industry. This allows us to add different options to a standard system for the individual customer, such as cylinder-pressure measurements, crank-case monitoring, and injection-system leakage monitoring."

Furthermore, the new system is capable of handling complex functions that demand a lot of control and calculation resources. These include cylinder balancing and MDT's ECOMAP function that allows operators the flexibility to run an engine following different SFOC power characteristics, facilitating optimal efficiency at different load points.

The new SaCoS also lays the foundation for the next generation of MDT's digital products: "SaCoS 5000 is a key element of our digitisation strategy and enables a new line of digital solutions, which will be available from the year 2018 on. This will offer distinct benefits to our customers," said Audi Lucas, MDT's chief digital officer. "Those solutions will feature a new and modern security design, with both active and passive defences, while continuous upgrades will ensure that the system evolves as needs change. They will also allow hybrid local and cloud based analytics across a customer's fleet and a completely new and revolutionary way to exchange data in real time with all partners necessary. With the introduction of SaCoS 5000 we take a first step into that digital future."



MDT's new MAN 45/60 engine

SaCoS 5000 was primarily developed at MDT's headquarters in Augsburg with assistance from its St Nazaire and Copenhagen sites. It was introduced to the market on the new MAN 45/60 engine.

TO

Autonomous ships - fact or fiction?

Maritime activity over the next decade will be dominated by unmanned surface and underwater vessels, according to a report on the future of autonomous maritime systems launched on 12th September.

Written and researched by Lloyd's Register, QinetiQ and the University of Southampton, the report is a follow-up to 'Global Marine Technology Trends 2030', looking at how technology trends will impact upon the regulatory and social aspects of maritime operations.*

Tim Kent, LR's technical director, marine and offshore, said: "Networks of autonomous surface and underwater vessels are set to radically change the nature of maritime operations. Developments widely reported in the media, such as those in autonomous shipping, are happening with greater pace than expected as little as two years ago. These developments enabled by technology provide new opportunities and potential for disruptive business models. However, the principal challenges will be the integration of these autonomous systems into current maritime operations, legal and regulatory requirements, and not least the impact upon seafarers."

Bill Biggs, senior campaign leader for autonomy, QinetiQ, said: "Technological advances in consumer and adjacent markets are a real opportunity for the maritime sector. Applied artificial intelligence, low cost low size sensors, increased connectivity, improved cyber security and better energy management, are all likely to drive rapid and disruptive change. Trials already undertaken by navies and transport companies demonstrate the opportunities that autonomous maritime systems present."

Professor Ajit Shenoi, director of the Southampton Marine and Maritime Institute at the University of Southampton, said: "The report recognises that autonomous systems and associated technologies will require people to learn to work seamlessly with them. Crew members of the future may become shore-based, managing vessels remotely from the office or the sea, creating the need for new training and skill sets. The potential for the command and control to be geographically displaced from the vessel will also require behavioural and cultural changes within the maritime community."

David Dingle CBE, Maritime UK chairman, said: "I'm delighted that this timely and thought-provoking report is being launched during London International Shipping Week, demonstrating the UK's pre-eminent role in cutting-edge innovation and thought leadership for our global industry. This thought leadership from three world-leading companies and educational institutions, coupled with exciting developments from leading manufacturers, such as Rolls Royce, ASV and a wealth of small and medium size players, mean that the UK, the world's maritime centre, really is leading the autonomy revolution."

To download a copy of 'Global Marine Technology Trends 2030 Autonomous Systems', visit www.lr.org/GMTT2030

TO

*See IACS' chairman's comment on autonomous tankers on page 9 of this issue.

IMarEST and IPPIC launch template for biofouling

A biofouling management template has been introduced following the IMO guidelines.

The IMO's Guidelines for the Control and Management of Ships' Biofouling to Minimise the Transfer of Invasive Aquatic Species, adopted in July, 2011 provided a globally consistent approach to the management of biofouling on ships.

The Guidelines gave recommendations on general measures to be considered in order to reduce the risk of transfer of invasive aquatic species not only in relation to the aspects of choosing the right fouling control paint for the different parts of the ship but also to give consideration to other parameters, such as the ship design, drydocking and maintenance, recycling, crew training, etc.

The Guidelines suggested that plans for managing the biofouling are developed for each individual ship. Each ship shall also keep on board a biofouling record book to document the various management procedures that have been taken throughout the lifespan of the ship.

Whilst IMO guidance details the information, which is important to be recorded regarding fouling control, no formal template is provided in which to keep the information. As a result, IMarEST and IPPIC have joined forces to provide a template to capture all relevant information prescribed in the IMO guidance with particular attention to coatings.

The template encompasses:

- The choice of anti-fouling system (AFS) for the external hull with a check list system.
- Selection of AFS for niche areas where hydrodynamic conditions may differ from those found on the external hull.
- Planned management actions to be completed between scheduled drydockings to minimise the biofouling on the hull.

"The introduction of aquatic invasive species to new marine and freshwater environments, which includes through hull fouling, is considered to be one of the greatest threats to the world's freshwater, coastal and marine environments and to marine biodiversity. As such we are delighted to be playing a role in supporting the implementation of international guidelines in this area," David Loosley, IMarEST CEO said.

"The marine coatings industry has supported the shipping industry in preventing the translocation of invasive species with effective fouling control products for generations. This particular collaboration reflects a focus on helping shipowners and operators select the right product for the right niche area and making their reporting obligations as simple as possible," added Dr Gareth Prowse, Chair, IPPIC Antifouling Coatings Committee.

Paper published

Invasive species were also highlighted in a paper presented by the Tel Aviv University's School of Zoology (TAU).

TAU claimed that half of the vessels passing along Israel's Mediterranean coast are carrying invasive ascidians, presenting a global threat to ecosystems around the world.

Dr Noa Shenkar, who led the research, said: "These organisms are passing through the Suez Canal, latching onto ropes and the bottom of the ship. They're filter feeders, so they cover and clog every surface they latch onto, creating a lot of drag for the ship and damaging marine biodiversity in their new environments. They're a major threat to our coasts and are very costly to shipowners."

Among the non-indigenous ascidians (NIA) being carried, TAU researchers discovered a Caribbean species new to the region. The findings, according to the authors of the report, "strongly support the hypothesis that marine vessels constitute a substantial vector for the introduction and dispersal of NIAs."

These findings were welcomed by Belgium-based marine coatings supplier Subsea Industries.

Founder and chairman, Boud Van Rompay, said: "The NIA threat is increasing because the antifouling systems in use since the TBT ban have been less effective in eliminating hull fouling. There is currently no miracle cure that will, on its own, prevent the spread of NIAs.

"The only known way of removing the threat is to clean the fouling organisms off mechanically, which is only possible with a hard-type coating. This ensures the underlying protective coating is not damaged. The industry has to consider taking a different approach to hull protection," he said.

This is a view supported by the research findings. The paper- 'Monitoring the Magnitude of Marine Vessel Infestation by Non-Indigenous Ascidians in the Mediterranean' - said that "self-polishing hull coatings are ineffective" in controlling biofouling in "hidden and protected" areas.

The research also found: "The method of rapid high-pressure freshwater wash fails to provide adequate treatment for removal of invertebrates inhabiting internal hidden areas; especially ascidians, that can survive the drydocked time outside the water.

"Of greater concern is that it allows vessels to continue their regular operations and at maximal speed for longer periods; conducting a thorough maintenance procedure every three to four years rather than every one to two years," the paper said.

Van Rompay added: "This research substantiates what we said in January this year; that the entry into force of the Ballast Water Convention will not alone prevent the transfer of invasive aquatic species. There has to be mandatory legislation in place to prevent biofouling on ships' hulls. Hopefully this research will generate greater awareness of the problem and result in appropriate action." TO

Mobdocks tailor made for odd hull shapes

August saw a flurry of activity for Hydrex dive teams, with a number of hull repair and shell plate projects in Europe and the US.

All repair projects were carried out while the vessels remained afloat and on hire using the Antwerp-based company's mobile drydock technique, Mobdock. However, the repair to the flat bottom plates of the vessel in Santander required a more bespoke solution.

A 115 m LPG carrier had just left drydock at Santander, Spain, when damage to the flat bottom was discovered. Since returning to drydock was not an option, due to the dock's unavailability and cost, Hydrex was contacted to carry out the repair.

The vessel's shape, however, necessitated the design of a bespoke Mobdock so technicians could carry out the repair underwater in drydock-like conditions, while the ship was berthed alongside the repair yard.

Once diver/technicians discovered the extent of the damage, which required a 400 x 300 m insert, they began to tailor-make a Mobdock on site to fit the rounded shape of the hull.

It was constructed at the yard for installation by the Hydrex team. The shipyard team was then able to effect repair in the best possible conditions, keeping the vessel on-hire and on schedule without having to wait for a drydock to become available.

A tailored Mobdock also had to be constructed in Palm Beach (Fla) to facilitate the repair of a section of hull affected by corrosion. The damaged area was the aft starboard side shell plating by way of the bilge, so it was imperative that the Mobdock could sit perfectly over the rounded shape of the hull.

After the modified Mobdock was installed, the frame covering the damage was removed. This allowed the diver/technician team from the Hydrex facility in Tampa (Fla) to cut away the damage and the surrounding area. A new insert plate was then positioned and welded following Hydrex class-approved procedure.

"This is the real beauty of the Mobdock concept," explained Dave Bleyenberg, Hydrex production executive. "We can modify or build custom-made solutions on site to suit any shaped hull or appendage in very little time. This way most repair projects can be carried out underwater, in dry conditions.

"Of course, there are occasions where damage does not allow a permanent repair, but we can install temporary doubler plate over the

damaged areas, allowing vessels to keep sailing until their next scheduled drydock.

"This was the solution offered to the operator of an offshore supply vessel recently, when a small hole was discovered in the hull on the starboard side of the flat bottom. A minor patch repair like this can easily be carried out in less than a day without any interference to a ship's schedule," he claimed. TO

Thordon expands its service division

Thordon Bearings has expanded its Global Service and Support (GSS) division to meet market demand for installation and maintenance support of its entire product portfolio.

GSS now offers more services to assist shipowners, shipbuilders and repair yards with the installation, commissioning, maintenance and shaft/stern tube alignment services for the full range of oil and grease-free Thordon propeller shaft, rudder and deck bearing products.

Thordon GSS' manager, Carl Sykes, said: "We have seen a marked increase in the number of projects GSS teams have been involved in this year and have therefore increased our service and support personnel to meet this demand."

This year, GSS teams have seen a steady rise in the number of different projects around the world, the majority of which were installation projects.

"We have carried out a number of propeller shaft bearing and water quality package installations this year, especially to cruise ships, tankers, containerships and naval vessels, but we have also noticed an upswing in projects involving our TG100 seal," Sykes said.

TG-100 seals are claimed to be easy to repair in-situ, so no drydocking is required to replace component parts. Such was the case recently when a seal was damaged due to an incident in the engine room. Parts were replaced quickly and efficiently to ensure the vessel went back into service swiftly.

Sykes also said that there has been a rise in the number of shaft coating projects for newbuild tankers and bulkers under construction at Asian shipyards. "As more shipowners opt for seawater lubricated bearings, they have to ensure their shafts are protected from corrosion. Our ThorShield shaft protection system is increasingly specified, which is applied by a Thordon GSS technician to ensure the coating is applied properly, so that shipowners can benefit from extended shaft withdrawal inspection periods." TO

Thordon is seeing increased business for its service division.

Safe and secure using today's technology

In this article, Niklas Falkmer, Scanjet Marine managing director, looks at how technology advances are helping vessel operators to maintain safety performance in the face of challenging market conditions.

The need to upgrade to meet legislative requirements has seen most larger vessels equipped with the basics in terms of safety systems. However, the continuing weakness of the global economy and fall-off in commodity prices, has put extreme pressure on fleet operating costs, leading to concerns among maritime regulators and industry bodies over the potential effect on safety, especially where maintenance intervals are stretched out.

For tankers carrying hazardous liquids, including chemicals and LNG/LPG, these risks are substantially increased, with a danger of explosions, fire and large-scale pollution where systems fail. In addition, with more extremes in weather conditions predicted, having the right monitoring systems in place is even more crucial in managing safety risks at sea and in port.

Some of the greatest risks occur during cargo transfer. Compression of the air in the tank during loading can cause pressures to rise unless vented to the atmosphere, while falling liquid levels during unloading may create a vacuum, unless air is admitted from the external atmosphere to balance the pressure.

In transit, the fluctuating temperature of the gases and vapours could also compromise the integrity of the cargo tank. The accidental release of dangerous liquids or gases also presents a serious fire hazard. The International Standard 15364:2016 requires the installation of pressure-vacuum relief valves to protect vessels systems, subject to gas/vapour pressure or vacuum beyond the parameters of the tank. SOLAS, Chapter II-2, Regulation 4, and IMO Maritime Safety Committee (MSC) Circular No. 677 (MSC/Circ. 677) also call for additional requirements in relation to the prevention of the passage of flame into cargo tanks in tankers.

Pressure/Vacuum valves, such as Scanjet's high velocity valves, prevent tank ruptures, due to over- or under-pressure by maintaining pressure and vacuum within a tank. Under the current standards, individual tanks must each be fitted with its own pressure valve. A key prerequisite is that tanks can be safely ventilated, even in the event of a fire on deck. This is ensured by designing the pressure valve so that the velocity of the venting gases is above 30 m per sec.

Scanjet's Vacuum valves additionally incorporate two nets that act as flame arresters to prevent passage of flames into the tank. During voyages, the VOC dedicated nozzle maintains the integrity of the tanks, while during loading the main valve is open to provide full capacity. This design ensures optimum VOC handling while minimising the demand on inert gas systems within a simple to maintain solution.

Preventive barriers

Among the more recent developments is a nitrogen generator system, which creates pure, dry and contamination-free nitrogen gas to protect cargoes by creating a membrane that ensures the gases above the cargo in the tanks remain inert (containing less than 5% oxygen).

Scanjet's Feen IGS system also eliminates the risk of tank explosions during tank cleaning and cargo discharge. Scanjet supplies a range of systems to create the inert environment, which is mandatory under SOLAS for tankers carrying flammable cargo and having a deadweight of over 8,000 tonnes.

Scanjet's Niklas Falkmer.

Vessel operators are also required to monitor vapour emissions during oil discharge, under IMO and USCG regulation CFR 46 part 39, parameter 39.20 -13. The latest vapour control systems offered by manufacturers, including Scanjet, are designed to monitor emissions in the main vapour collection lines.

Scanjet's system comprises a detector cabinet mounted on deck near the vapour manifolds with EEx ia approved oxygen and pressure sensors, flow fall switch, 5-way manifold selector and calibration facility. The system can be configured with multiple pressure sensors and links to on board computer through an RS-85/-422 serial interface.

Also mandatory under the latest regulations, is for an alarm system to be fitted to prevent overfilling of liquid cargo tanks during loading. Suitable for all types of liquid including hydrocarbons and chemicals, Scanjet's high level and overfill alarm system provides a complete unit, which uses acoustic wave or magnetic float reed technologies and can be delivered as a single or dual point system.

For situations where a more comprehensive solution is required and for large more complex vessels, integrated tank management intelligence systems may be the answer. TO

Scanjet's comprehensive marine portfolio

Scanjet is a supplier of intelligent tank management with a comprehensive marine product portfolio, backed by a 24/7 worldwide support and spare parts service, this includes:

- Tank cleaning equipment (fixed and portable).
- Tank level gauging for cargo and service tanks.
- Flooding and ballast control systems.
- Vapour emission control systems.
- High velocity P/V valves.
- Uninterrupted power supply equipment.
- Anti-piracy marine protection equipment.
- Gas freeing fans (air driven and water driven).
- Oil detection monitoring equipment.
- Inert gas system (IGS).

Could you afford a tanker fire?

Fires on board tankers can be devastating, to crew, vessel and cargo. Fire safety standards on board cannot afford to slip.*

Although the value of the marine assets that fire systems protect is increasing rapidly, the competitiveness of the free market places great pressure on cost cutting. Often, cheap systems only minimally comply with the regulations and, in fact, there are very few qualified engineers who may be considered experts on the subject.

The International Maritime Risk Rating Agency (IMRRA) has ranked fire safety as the leading tanker deficiency seen by Port State Control (PSC) for the first six months of the year. In March, 2017 there were 152 cases of fire reported. IMRRA placed 12.5% of tankers it assessed in January, 2017 into the higher risk category – a six month high.

Serious cases of tanker fires and risks have been reported in the past year. In September, 2016 a Pemex oil tanker had a serious fire in the Gulf of Mexico. She was carrying 80,000 barrels of diesel, 71,000 of gasoline and 16,000 barrels of desulfurised gasoline. In March, 2017 there was an explosion on a Chinese tanker, in which three crew members went missing and serious damage to the vessel was caused. As recently as July this year, fire safety is still being neglected, with the crew of the tanker 'Iba' reporting empty fire extinguishers - despite transporting crude oil - and leaking life boat's hydraulic system with no means of testing.

The UK P&I Club has suggested that extended periods of time on board a ship without a fire incident can lead to complacency and therefore a failure of prioritising prevention methods and fire incident practices. It is impossible to prepare for all eventualities on a vessel, and it is often easier to influence the prompt detection of fires and their effective extinguishment, and these factors therefore play a key role in minimising fire damage on board vessels.

The so called 'Ungoverned Space' is the area where either tanker regulations or the protecting systems are not effectively providing consistent and reliable safety. This life-threatening issue must be dealt with, with specific regard to loss of contents in fixed fire extinguishing systems and need for improvements to room integrity testing. Even in 2017, gaseous fixed fire extinguishing systems are often overlooked, and are misunderstood at all levels - by owners, managers, chief engineers and crew.

Tankers extinguishing installations are an essential defence against the risk of fire at sea. The main fact that needs to be understood is that they must be able to actuate, or release their gas, in the event of a fire. Gaseous extinguishing systems are highly pressurised, the risk of leaking and discharging is accepted as part of their use, shown in the regulations that demand their upkeep, eg IMO SOLAS FSS Ch5. 2.1.1.3: 'Means shall be provided for the crew to safely check the quantity of the fire extinguishing medium in the container'.

Adding to this are the details of their leakage within the regulations, which is troubling. ISO 14520-1 clearly states that: 'If a container shows a loss of agent quantity or a loss of pressure (adjusted for temperature) of more than 5%, it shall be refilled or replaced.'

Given that the gaseous systems are designed specifically to the individual need of the tanker, then a 5% loss of agent may mean that they would not fully extinguish the fire. Manual weighing is not only laborious, but also dangerous to the crew conducting the servicing.

Coltraco's Portalevel MAX Marine.

Innovative Solutions

Coltraco Ultrasonics has several solutions for ensuring an extinguishing system is fit for purpose. These include -

- The patented Portalevel MAX Marine, which is designed primarily for the vessels' crew to inspect large fire suppression systems of up to 600 cylinders.
- The ease of operation in comparison to weighing, increases the ability of more regular and frequent checks, improving fire safety management on board.
- Coltraco's method of inspecting leaking cylinders with ultrasonics, enables identification in under 30 secs using Portalevel with one person, instead of the traditional 15 minutes, with two people laboriously weighing.

The patented Portasteele calculator is a tool that converts the liquid level height of C02, NOVEC™ 1230 and FM-200® liquefied gaseous extinguishant agent readings taken on an ultrasonic non-destructive liquid level indicator device into the agent weight/mass. Furthermore, Portasteele can convert an expected agent weight back to the required liquid level allowing users to anticipate where the level should be.

Addressing fire at sea is critical, especially when all owners and managers are seeking to reduce risk, cut costs and concentrate on safety. TO

**This article was supplied by Coltraco Ultrasonics.*

Linked ship/shore emergency shutdown systems discussed

An information paper, jointly released by CDI and OCIMF earlier this year, recommended an emergency shutdown (ESD) connection that will link ship and terminal ESD systems, so that manual activation by the terminal or ship will stop cargo transfer operations.*

"Linked ship/shore ESD systems have been a standard safety feature of LNG transfer operations for many years," said OCIMF Director Capt Andrew Cassels at its launch last April. "It has been a challenge for the oil and chemical industries to do the same, because there hasn't been a universally-accepted piece of equipment to achieve the required connection. This paper recommends a connection that should help terminals and vessels achieve that compatibility."

CDI's General Manager, Capt Howard Snaith, agreed, adding. "The point of the ship/shore interface remains one of the most critical aspects of safe cargo operation. I strongly believe this paper will bring a lot of benefits to the industry both ashore and afloat in enhancing safety relating to that point of change in cargo custody transfer."

The paper recommended the use of an electrical umbilical incorporating 5-pin twist connectors for universal adoption. It can be used to provide the connection at both onshore and offshore terminals.

Linked ship/shore ESD systems have been a standard safety feature of LNG transfer operations for many years. Similar safety issues exist with oil and chemical transfer operations, but the provision of linked ESD systems between ships and terminals has been hampered by the lack of an accepted industry standard for equipment to achieve the required

connection.

The paper gave details of a recommended connection for the industry that will enable ship and terminal ESD systems to be linked so that manual activation by the terminal or ship will stop cargo transfer operations. The minimum requirement of any linked ESD system is:

- All cargo transfer pumps will be stopped when an ESD is activated on the ship or terminal.
- The ship's cargo transfer pumps will be stopped when a terminal tank high level alarm is activated.

The paper covers any ship that carries oil and chemicals, including barges, and the terminal can be both onshore and offshore.

It is recommended that ships and terminals involved in oil and chemical transfer operations are provided with the necessary equipment to enable inter-connection of ESD systems.

An electrical umbilical incorporating 5-pin twist connectors is recommended for universal adoption. These connectors have been used for several years within segments of the LPG industry and have a proven record of reliable service. A terminal may adopt other forms of ESD system, eg incorporating a wireless connection or a different connector. If another form of ESD system is used, the terminal is responsible for making sure it is compatible with visiting ships.

Minimum recommendations

The minimum recommendations are aimed at linking manual ESD activation functions. Once ship and terminal systems are connected, a limited number of additional activators and actions may be included. Any expansion of system functionality beyond the minimum requirements should be thoroughly assessed to make sure they add real safety benefits.

ESD systems for cargo transfers are used to stop the flow of cargo liquid and vapour in an emergency and to bring the cargo handling system to a safe, static condition.

It is recommended that linked ESD systems are installed so that an ESD trip activated on the ship will send an ESD signal to the terminal and vice versa.

A core recommendation is that, as a minimum, ESD is manually activated. Some ship and terminal systems will include the provision for automatic shutdown of cargo transfers in abnormal operating conditions, eg high tank levels, high or low tank pressures, excessive pressure in the cargo transfer system, fire or gas detection and excessive ship movement or break-out.

In a linked ESD system, the party receiving the cargo, ie the ship in the loading port and the terminal in the discharge port, can stop cargo flow by shutting down the transfer pumps in a controlled way. The receiving party should never have to shut valves against a full flow of incoming liquid.

A linked system also allows either party to activate a controlled shutdown of the transfer process if a leakage or fire is discovered, without generating unacceptable surge pressures in the pipework that would make the situation worse. Once the ESD has been activated, further action may need to be taken to secure ship and terminal systems.

The purpose of the SSL is to transmit, without delay, a signal from ship to terminal or vice versa. For oil and chemical transfers, the minimum recommendation is to use an electric SSL that incorporates a 5-pin twist connector.

Complete systems are available from instrumentation suppliers and manufacturers, but it may also be possible for ships and terminals to develop compatible systems using readily-available components.

The following minimum requirements should be met to achieve a functional and safe ESD system:

- Ability for either party to manually activate the other's ESD.
- On activation of own ESD, the other party's ESD is automatically activated.
- Electrical classification is appropriate for the working environment.
- Uses an electrical umbilical that has recommended male 5-pin twist connectors at each end, for connection to female 5-pin twist connectors on the ship and jetty.
- Can be de-energised during connection.
- Interfaces electrically with existing ship and terminal ESD systems.
- When connected, includes an indication of the system's health.
- Is automatically activated if electrical power is lost or the circuitry is damaged.
- Raises an audible and visual alarm when activated.
- Indicates system re-set status.
- Can be tested; for ships, both at sea and in port.

An indication of the activating party may be included as an enhancement.

Programmable electronic equipment, including operating systems and configuration software, should be proven for use in safety applications.

Linked ship and terminal ESD systems reduce the risk of hose or pipeline failure causing cargo spills in two ways. Excessive

pressure surges caused by a unilateral shutdown can cause hose rupture and mechanical damage to valves, pipelines and supporting structures. Excessive vessel movement alongside the berth or vessel breakout from the berth may result in hose or MLA failure. The linked system should therefore be considered a critical safety system for cargo transfer operations.

Reduced failure risk

Pre-arrival testing of the linked ESD system will reduce the risk of a failure during operation, but contingency plans should be made for any failure of the linked system. It is recommended that the terminal and ship discuss contingency plans before operations begin. The terminal's emergency response procedures should also address failure.

A pendant ESD unit may be used as a mitigation measure, if available.

The linked ESD system improves operational safety during the transfer of oil and chemicals between ship and terminal. It provides a quick and safe way of stopping the transfer of cargo and, where applicable, isolating ship and terminal cargo systems in a controlled manner. The ESD can be activated either manually or automatically under abnormal operating conditions. Some terminals also have a second level of protection that enables rapid disconnection of the loading arms from the ship.

The ship or terminal receiving tanks are often some distance from the transfer pumps and the kinetic energy in the moving liquid can be considerable. The potential hazards of surge pressure should therefore be considered. The ship and terminal ESD systems need to be connected using a suitable cable or wireless communications link to allow ESD actions to be co-ordinated.

The terminal actions above are typical for export facilities and may vary to suit the design of the plant. If loading by gravity, the terminal ESD system should stop the cargo flow safely and quickly, taking into account pressure surges.

As a minimum, ESD should be activated by

Activation of ESD should trip visual and audible alarms on the ship and terminal and the following actions -

Ship		Terminal
Transmits ESD trip signal to terminal via SSL.	>>>	Receives ESD trip signal from ship.
	or	
Receives ESD trip signal from terminal.	<<<	Transmits ESD trip signal to ship via SSL.
		Stops cargo flow, either by tripping terminal's cargo transfer pumps or by other safe means.
Optional		
Transmits ESD trip signal to terminal via SSL.		Transmits ESD trip signal to terminal via SSL.

Manual operation of an ESD trip (minimum requirements) -

Ship	Terminal
Activates ESD by manually operating trips,eg switches or push buttons, one of which should be in the terminal's control room (or equivalent).	Activates ESD by manually operating trips, eg switches or push buttons, one of which should be in the terminal's control room (or equivalent).
Manual trips should be located in accordance with the ship's design so they can be reached quickly by anyone who has identified a serious hazard.	Manual trips should be located so they can be reached quickly by anyone who has identified a serious hazard.
The manual ESD should not form part of any other shutdown system.	The manual ESD should not form part of any other shutdown system.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either:

- Manual operation of an ESD trip.
- An automatic trip on loss of electrical power to the ESD circuit.

Optional activators for ESD - Any expansion of system functionality beyond the minimum requirements described above should be thoroughly assessed to ensure that positive safety benefits will be achieved.

In addition to the minimum requirements, automatic activators may be considered.

It is recommended that, as a minimum, ship and terminal ESD systems are linked by an electrical umbilical that terminates in recommended 5-pin twist connectors. The linked ESD systems should enable either ship or terminal personnel to manually activate the remote shutdown of either the ship or terminal's cargo transfer pumps.

Oil and chemical tankers should present a female 5-pin twist connector at each manifold location. The connector should be linked to the ship's cargo shutdown system which, as a minimum, should include the provision to trip the ship's cargo transfer pumps.

Terminals handling oil and chemical tankers should present an ESD link to ships that comprises an electrical umbilical with a male 5-pin twist connector for connecting to the ship's female connector at the ship's manifold.

Loss of electrical power to the ESD circuit (minimum requirements) -

Ship	Terminal
The ship's cargo pumps will typically trip automatically without any intervention from the ESD system.	The terminal's transfer pumps will typically trip automatically without any intervention from the ESD system.
The activation of ESD on the ship will trip the terminal's transfer pumps under ship blackout conditions.	The activation of ESD on the terminal will trip the ship's transfer pumps under terminal blackout conditions

The terminal end of the umbilical should be linked to the terminal's ESD system which, as a minimum, should include the provision to stop the cargo flow, typically by tripping the terminal's cargo transfer pumps.

Some terminals have developed ESD systems that use wireless technology. The terminal will provide the ship with a wireless transmitter/receiver if using a wireless system. To provide an interface for these wireless systems, it is recommended an additional female 5-pin twist connector is provided in the ship's CCR. This should connect to the ship's ESD circuit including an on board power source.

The terminal-supplied wireless transmitter/receiver module should be fitted with a male 5-pin twist connector to enable connection to the CCR mounted standard female 5-pin twist connector.

Terminal supplied wireless technology may also be used to provide an ESD link at offshore terminals, in which case the additional 5-pin twist connector in the CCR will be used to connect the terminal's ESD system to the ship's ESD system.

In addition to manual activation, it is recommended that terminals include an automatic shutdown function that trips the ship's cargo transfer pumps on activation of a terminal receiving tank high level alarm. TO

**A copy of the paper can be obtained from Kelly Hadley, Publishing and Communications Manager, OCIMF - kelly.hedley@ocimf.org*

Rope-free mooring system from Trelleborg

Trelleborg's marine systems operation has launched AutoMoor, a rope-free, automated mooring system.

AutoMoor uses smart technologies to enable a faster berthing process and improve safety levels within the port environment.

Using vacuum technology to rapidly attach and secure a vessel at berth, it reduces vessel motions and continuously monitors all mooring loads acting on the vessel at a berth, providing live data to the operator to optimise day-to-day port and terminal operations.

It also minimises personnel involvement to reduce human error and improve safety.

Richard Hepworth, President of Trelleborg's marine systems operation, said: "Docking and mooring can play a critical role in increasing throughput of an individual berth and overall port facility. No matter the application, ports and terminals worldwide are under pressure to increase throughput.

"However, trying to do so at the same time as dealing with increasing vessel sizes can be difficult. Optimising operational windows is an effective route to improving efficiency and one that AutoMoor enables by reducing the time taken to moor vessels," he said.

With mooring units that provide real time data to monitor vessel mooring loads, Trelleborg is offering the automated technology needed to compete effectively in today's complex, global landscape, the company claimed.

Automated mooring technologies minimise downtime by reducing the effects passing ships have on moored vessels. When using mooring lines, operators may need to interrupt operations, costing time and money in delayed product transfer.

Using an automated mooring system to dampen vessel motions and extend the range of conditions in which efficient transfer can take place can have huge implications for efficiency.

AutoMoor is also intended to help ports and terminals become more environmentally efficient, because vessels can be secured in under a minute and released in 30 secs. This reduces vessel idling time and reduces the time tugs are required alongside the vessel until the mooring operation is complete, cutting overall emissions.

Trelleborg's AutoMoor solution falls under the operation's SmartPort portfolio, which is the company's answer to the need for a standardised way to collect and store data in marine applications.

It's a technology platform that connects port operations, allowing users to analyse asset performance and apply data insights, to improve day-to-day decision making.

The most important aspect of SmartPort is the open API structure, which enables collaboration with third party systems and third party assets. Trelleborg has supplied many products for the port environment, from fenders to mooring equipment to ship performance monitoring to navigation and piloting systems: each of which can have their own sensors fitted.

By adopting SmartPort architecture, all of these systems and more can be brought under one cloud based system, the company claimed. TO

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