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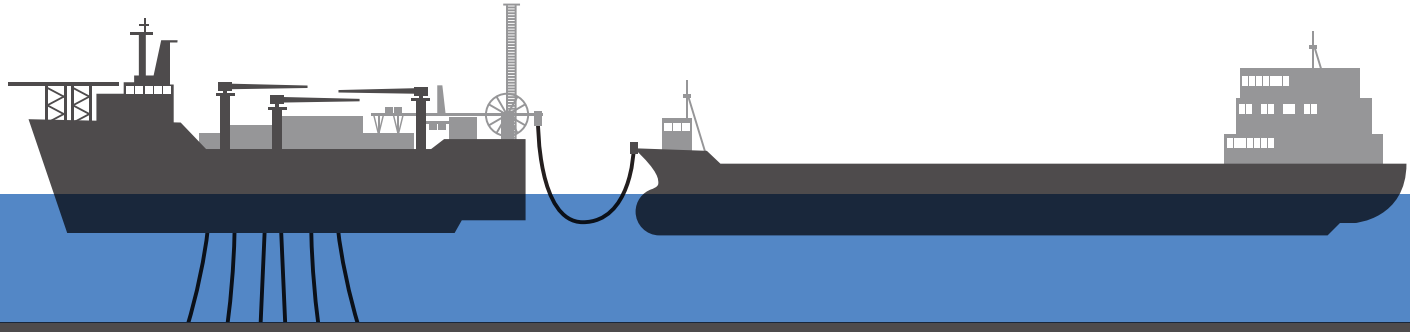

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***Front cover** - Despite the relatively low bunker prices, owners, operators and managers are still striving for that little bit extra in savings. Efficiency is the name of the game and with the new low sulphur standards and other environmental issues fast approaching, there is no let up in sales of fuel saving equipment, such as the Mewis Duct and rudder systems offered by Becker Marine.*
The company is also marketing its LNG power plant concept to cruise ships and containerships at the port of Hamburg.

Will humans be left behind by technology?

While attending a few seminars and presentations recently, it has become apparent just how fast technology is racing ahead.

Technology is completely changing the shipping industry, how is is structured, how it is run, notwithstanding the plethora of new rules, regulations and guidelines that go with it.

There is a new breed of ship operators and seafarers needed to cope with these changes, these will have a completely different mindset to their counterparts of just 15-20 years ago.

The relatively new electronics coupled with the communications revolution, has spawned digitalisation whereby even if a seafarer sneezes, it is recorded in head office.

This technological revolution inevitably takes its toll on the human factor in that the older seafarers are not generally used to using computer programs, whereas the younger generation is perfectly au fait with smartphones, apps, ipads, computer screens, etc.

Indeed, one seminar split the age groups up into eras of what was perceived to be computer literacy. Your Editor found that he was rather unkindly labelled a 'fossil'. Needless to say it was the younger groupings that were deemed to be the most technologically savvy.

For example, the older generation navigators were more used to 'looking out of the window' and using paper charts, whereas the younger navigators are perfectly at home behind a screen. However, this brings its own dangers in ECDIS assisted groundings and collisions, to give just one example.

Where does this leave the middle to older generation? As in any walk of life, some will adapt easily while others will fall by the wayside.

It is much the same with the shipowners, operators and managers - some have said we don't need 'big data', while others have already recognised that by analysing it to their own particular needs, operational improvements can be gained.

Those with a fleet of one to half a dozen vessels may not feel the need to embrace the level of digitalisation on offer, but those with larger fleets probably do need new analytical tools to help them run their fleets more efficiently.

There are a plethora of consultants, software houses, class societies, OEMs and others now offering their services having proved to themselves that improvements can be made by analysing shipboard data.

As one company warned recently - has the software been designed by in-house (company) personnel or by designers with seafaring experience, such as marine engineers or navigators? There's a world of difference!

Of course, the use of all this new technology needs new training methods, which costs a shipowner/manager both time and money. For example, there are now a wealth of ECDIS training centres set up worldwide to cope with the IMO edict on type-specific ECDIS training certificates and updates.

Are we capable of reading - let alone understanding - 500-page Safety Management System (SMS) manuals for the new equipment written in English, which is more often than not, the seafarers second or third language? These are now delivered in digital format often with a dozen or so cross checks to help the seafarer.

Data analysis training

Could we soon see new data analysis courses being set up for superintendents, if they havn't been already or will they call in a third party specialist? It depends on their needs, if they really know what their needs are in the first place and how to accommodate them.

There is no doubt that 'big data' and the 'Internet of Things' are here to stay and are improving rapidly almost daily. How can shipping take advantage of this?

As mentioned, it very much depends on an owners/managers fleet size, whether he of she can see an advantage in employing these so called experts and if he or she is willing to cover their vessels in sensors and the additional cabling needed, which today is relatively easy using fibre optics.

The regulators are also getting there, illustrated by the IMO's progress on eNavigation, EEDI, MRV, among others, helped by organisations, such as The Nautical Institute, which has become much more proactive down the years in promoting operational advancements in navigation and other areas.

Unfortunately, this comment piece was written before the BIMCO/ICS Manpower Report was published (due on 16th May), which will probably reveal an industry in crisis recruitment wise.

And just what will the seafarer of the future look like? An IT expert no doubt but will he or she have the navigational or engineering skills to operate and maintain tomorrow's vessels? Training will have to take on different skills to cater for this.

Don't start me off on autonomous ships, an idea which has been around for 30-40 years and apart from possible short voyages from A to B, such as ferries, is totally impractical. Its introduction for deepsea shipping would give the law makers at the IMO a field day and would take years to sort out.

The world is rapidly changing and shipping with it. It is time for us dinosaurs to except the inevitable or move on.

TO

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Keeping an eye on fleet growth

Historically, net fleet growth has been a primary factor that has influenced freight rates in the long term. McQuilling looks at the state of play.

In addition, short-term supply disruptions, such as inclement weather, port delays, slow steaming and vessel maintenance can also cause rates to be volatile and less predictable.

Market participants have been keeping a watchful eye on tanker supply developments this year, as many of the vessels from the bloated orderbooks of the previous years are expected to be delivered, triggering concerns of a weakening tanker spot market, McQuilling Services said in its latest 'look' at the tanker market.

McQuilling expects an average net fleet growth of 4.1% this year (3.7% in DPP/4.6% in CPP), The consultancy closely monitors changes in vessel supply throughout the year in its 'Tankers Monthly Summary' . This includes newbuilding deliveries and exits for the eight major tanker classes.

The consultancy looked at net fleet growth for each tanker sector in the first quarter of this year with the following results.

In the crude tanker segment, 10 VLCCs were delivered with zero exits through March. McQuilling forecast a net fleet growth of 46 ships in this sector in 2016 (Figure 1). Short-term supply disruptions, due mostly to widespread port delays at the world's busiest terminals, have prompted bouts of volatility in freight rates in the first half of this year. In general, VLCC rates have averaged below last year's levels by roughly 13%.

Growth in the other crude tanker segments was limited, as of the end of the first quarter. Just one Suezmax, 'Diligent Warrior', was delivered to the trading fleet, while zero demolitions were recorded. A net fleet growth of 32 Suezmaxes is expected in 2016.

The uncoated Aframax fleet has grown by three as the 'Diamond Faith', 'Primero', 'British Renown' and 'British Respect' were delivered and the 2005-built 'Trident Star' was sold for conversion in March. A net fleet growth of 25 Aframaxes is forecast for this year.

On the other hand, the Panamax fleet has contracted by one vessel as the 1984-built 'Mars' was sent to the breakers in January. With a limited orderbook over the past few years, the Panamax fleet is only expected to expand by two vessels in 2016 – the smallest growth of all of the tanker fleets.

Clean tankers

Clean tanker fleets are forecast to expand by 4.6% in 2016, with the MR2s expected to register the highest amount of growth by ship numbers.

However, through the first quarter, the LR2 fleet has seen 11 newbuilding deliveries and zero demolitions, the highest level of growth in the clean tanker segment year-to-date. The LR2s have felt downward pressure this year in the spot markets, specifically on the TC1 (AG/Japan) benchmark route, as a result of an oversupply of tonnage relative to demand.

Rates averaged WS112 in 1Q16, a loss of 19% year-on-year due to declining transcanal (AG-UK/Cont and MED/Far East) volumes available to balance tonnage supply. Demolitions in this segment are forecast to remain limited with just two vessels possibly sent to the breakers in 2016 and deliveries to total 29.

Their smaller clean counterpart, the LR1, has also not seen any vessels leave the fleet as of the end of the first quarter. Four Navig8 newbuildings, all built at STX, were delivered and are currently trading in the LR8 pool. The owner is expected to take delivery of additional LR1s throughout the course of the year.

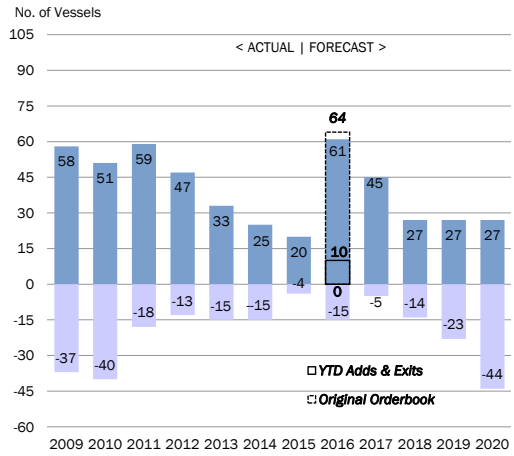
This segment has likewise been pressured by oversupply and TC5 (AG/Japan) spot rates have declined 29% year-on-year as a result. McQuilling expected a net fleet growth of 27 LR1s by the year end.

The MR (IMO III + products) sector has recorded minimal growth with the MR2 fleet growing by five (seven additions and two demolitions) while there was no change to the MR1 fleet size (Figure 2). By the end of 2016, MR2s are expected to grow by 29 vessels and the MR1s by 16.

Looking towards the second half of this year, McQuilling said that DPP tonne/mile demand will probably increase amid rising AG/West volumes, lending support to the VLCC and Suezmax classes, despite an influx of supply growth as the year moves forward.

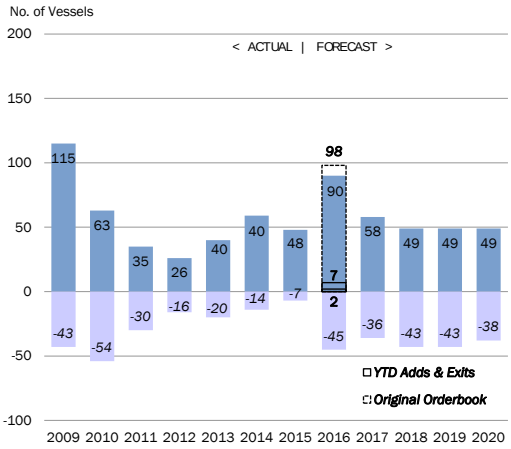
The clean tanker segment, specifically the LRs, will need to see a resurgence of the naphtha arb to stimulate tonne/mile demand growth and thus firmer freight rates, especially as the LR fleet is anticipated to expand by 54 vessels by the end of this year.

Figure 1 - VLCC Additions and Exits; 2009-2020



Source: McQuilling Services, Tankers Monthly Summary

Figure 2 - MR1/MR2 Additions and Exits; 2009-2020



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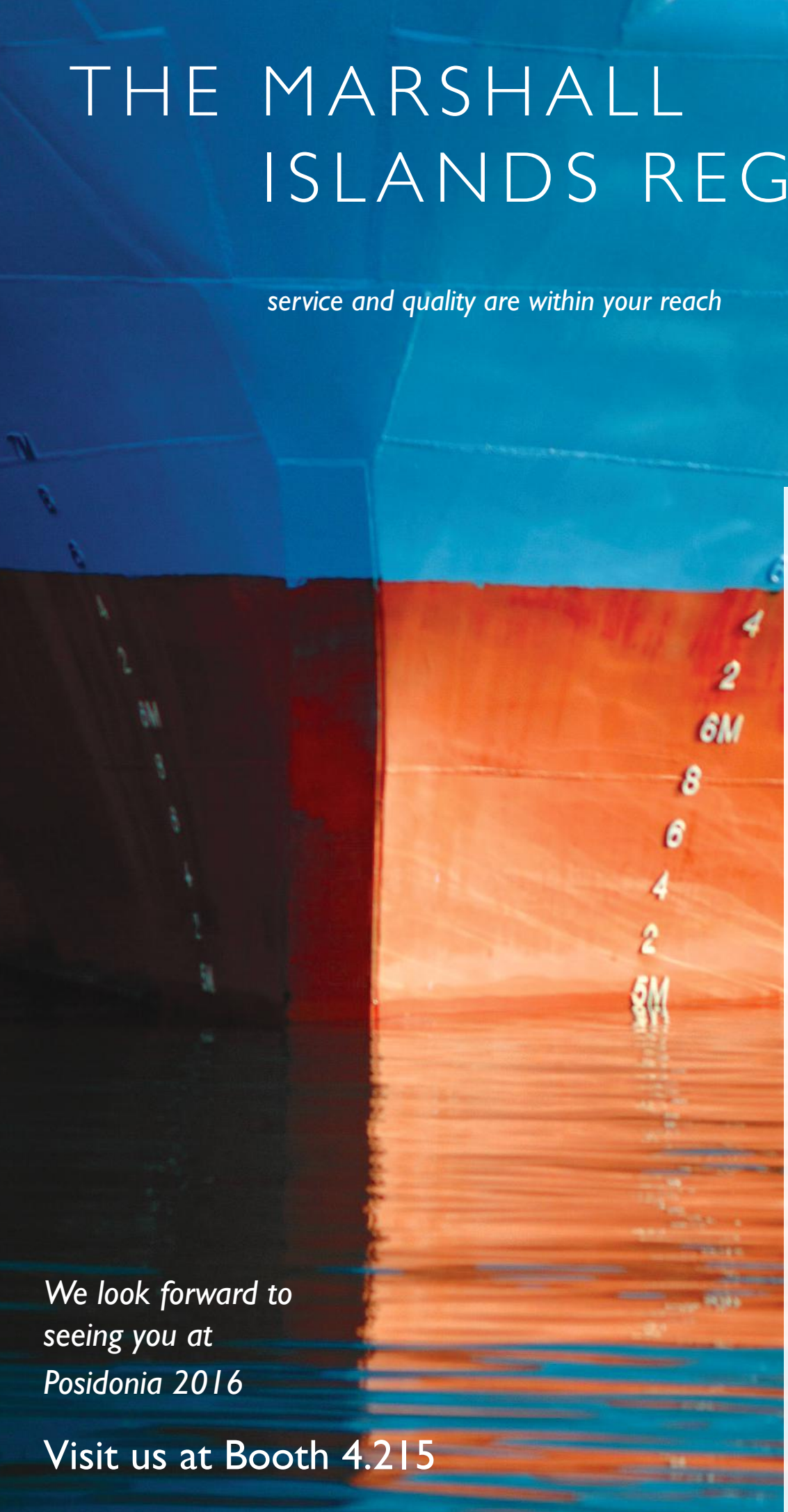

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Reservations now being taken for expanded Panama Canal

The first ship reservation for the expanded Panama Canal was awarded to the Neo Panamax (New Panamax) LPG carrier 'Linden Pride', managed by NYK.

"Today (19th April) marks an important day in canal history because the reservation system is now open for Neo Panamax ships that will start using the new lane starting 27th June," Panama Canal Administrator Jorge Quijano said. "We are pleased with the results of this initial phase of transit reservations and we hope that each day more vessels transit through the expanded canal."

The 230 m long by 36.6 m wide vessel, represented by Panama-based shipping agent Norton Lilly International, was granted one of the four additional slots per day for commercial transits through the canal starting on 27th June, 2016.

These slots for Neo Panamax vessels, with dimensions of over 294.44 m in length or over 32.62 m in beam, were added to the existing 25 slots of the current canal.

The Panama Canal Authority (ACP) launched transit reservations for Neo Panamax vessels a week earlier as the inauguration date for the expanded locks and the commercial operations of the canal approaches.

ACP said that Neo Panamaxes will have a strict arrival schedule, and in case of late arrival, the vessels will be required to pay penalties of an additional fee of 25%, 50%, 75% or 100%, depending on the late arrival time.

Once the first period of competition closed, 25 larger vessels had reserved transits through the new locks from 27th June, 2016 to 30th September, 2016. The new locks will allow between 10 and 12 Neo Panamax vessels to transit the canal per day in about 40 daily transits through the canal.

Draft restrictions

ACP had also recently introduced three draft restrictions for all vessels transiting the canal, with the latest, at 11.59 m Tropical Fresh Water (TFW), being effective from 9th May, 2016, due to lower water levels of the Gatun Lake, caused by a drought.

Previous draft restrictions were introduced at the beginning of April and in March, due to dry weather conditions brought about by the El Niño and lower water levels in the Gatun Lake.

The Panama Canal Authority (ACP) announced in March that the canal expansion will be officially inaugurated on 26th June, 2016.

In March, the canal's scale model manoeuvring training facility was opened, which provides additional hands-on experience to pilots and tug Masters to operate in the expanded canal.

"The Scale Model Training Facility will allow us to continue providing world-class service to the global maritime industry, while guaranteeing safe and efficient transits through the soon-to-be inaugurated Expanded Canal," said Quijano at the inauguration ceremony. "The dream of expansion will become a reality when we inaugurate the biggest infrastructure project in the history of the canal and the country of Panama."

The 35.3-acre training facility features two lakes connected by a channel modelled after the canal's Culebra Cut. The new facility features docking bays, replicas of the new and existing locks, gates and chambers, at a scale of 1:25.

The facility is equipped with a number of specially created scale model Panama Canal tugs, as well as ships built in France at Port Revel, including bulk carriers and a container ship. In addition, an LNGC model will be delivered by September, 2016.

The facility features wave and wind generators to provide a realistic, hands-on training experience for Canal pilots and tug captains to prepare them for the opening of the expanded waterway. It complements the training already provided at the Centre of Simulation, Research and Maritime Development (SIDMAR) through 360 deg training simulations and courses.

Last year, Panama's Cabinet Council approved a new toll structure for vessels transiting the Panama Canal.

The new tolls, which will apply to the two existing lanes of the canal and the new, third lane, updated the pricing structure for most canal segments and established a new segment specifically for LNGCs -- a key new market for the canal once the expansion is completed.

Tolls on most vessel classes and market segments will now be priced based upon different units of measurement, the ACP, said in a statement.

For example, tolls on dry bulkers will be based on deadweight tonnage capacity and metric tons of cargo; LNG and LPG carriers will be based on cu m capacity and oil and product tankers will be measured and priced on Panama Canal Universal measurement system (PC/UMS) tons and metric tons of cargo, the ACP said.

TO

Panamax vs New Panamax

	Panamax	New Panamax
Length	294.13m (965ft)	366m (1,200ft)
Width	32.31m (106ft)	49m (160.7ft)
Draught	12.04m (41.2ft)	15.2 (49.9ft)

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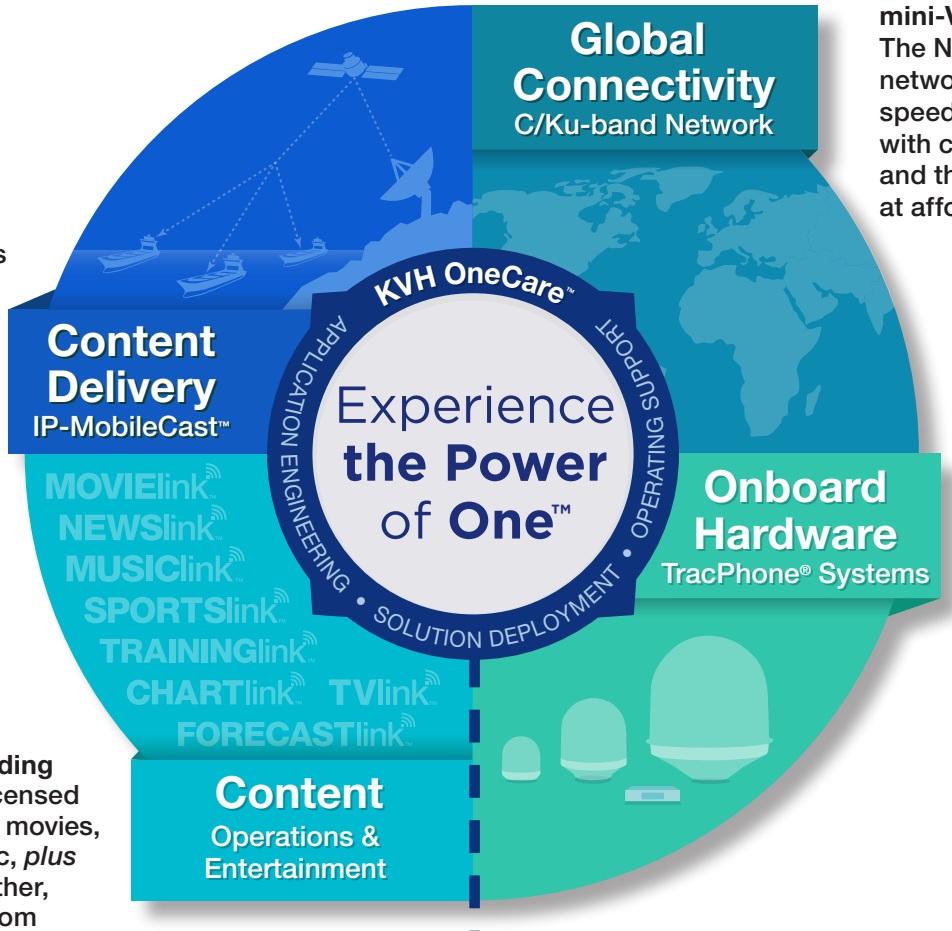

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Greek shipping finance at the crossroads

In general, Greek banks have been badly hit by a number of factors, not least the failing domestic economy, capital controls, reduced liquidity and non-performing loans.

Shipping banks have had the added problem of some miss-performing sectors of the shipping industry.

This has led to the value of the total loans for Greek shipping falling by 2% last year, according to the latest annual report from Petrofin Research.

The overall value now stands at $62.7 bill, down from $64 bill at the end of 2014. According to Petrofin, drawn loans are down by 3.25%, however commitments are up by 9.62%, the latter prompted by the high Greek purchase activity and large orderbook.

All five Greek banks fell in terms of lending. For example, National Bank of Greece dropped by 9.99%, Aegean Baltic by 21.33%, Eurobank by 9.05%, Piraeus bank by 22.08% and Alpha bank by 13.22%. The overall Greek bank exposure is down by 15.22%, while Greek banks' share in Greek ship finance dropped from 16.9% to 14.63%.

Similarly, international banks with a Greek presence continue to reduce their exposure last year, by 7.94%, compared to a reduction of 4.23% in 2014, 9.35% in 2013 and 3.9% in 2012, the report said. Interestingly, the top two lending banks swapped over with Credit Suisse attaining first place in Greek ship finance, raising its portfolio by 13.53% with RBS coming second with a fall of 13.58%.

European banks continued to account for the vast majority of total loans, although their share is steadily dropping. During 2015, they held 81.36% of the total Greek portfolio, compared 85.44% in 2014 and 90% the year before.

Zero tolerance

Most, if not all banks were badly hit by the plight of the containership, drybulk and offshore sectors, as owners and operators experienced negative cash flows, leading to the number of defaults escalating. Banks tended to act differently to the crisis, depending on the relationships with their clients, some even going down the 'zero tolerance' road.

The report said that this year, the decline will continue and may even accelerate, as banks adopt a harder line across both existing and new lending.

Over the past year, lending to medium or small owners largely disappeared, rendering the ship finance market a one tier market. The trend to be very strict when reviewing new loans forced medium to small owners to look for alternative forms of finance from private equity funds or specialised financial boutiques, which usually involved much higher capital/borrowing costs.

Quite often, private equity players got their fingers burnt and this became very selective and wary of entering into new agreements.

Some cash rich owners resorted to buying vessels outright, albeit for low values.

Despite, these problems, some Greek banks were careful to keep a minimum of fresh lending to core clients and have maintained their faith in Greek shipping, the report said.

Due to the continuing Greek crisis, now in its sixth year, a number of banks decided to move their Greek business to offices in

London and elsewhere.

Although Greek ship finance is not directly affected by the domestic crisis, it is nevertheless indirectly affected via the reduced lending ability of Greek banks and the possible departure of Greek owners to other more friendly shipping centres, which may well signify a move away from the traditional Greek ownership model.

"Currently, Greek shipping is under threat, not only by the markets but, also, by the declining confidence in shipping by some banks, as well as the economic and tax instability of Greece. Up to now, Greek owners have taken protective steps by opening offices elsewhere but relatively few have left Greece altogether.

"This position will be tested over the next year, as Greek owners look for ways not only to protect themselves but to also move closer to sources of capital and finance," Petrofin's Ted Petropoulos said.

Tax regime

Greek domiciled shipowners and managers have been on a bit of a roller coaster ride as to the Greek Government's next move over their tax status, as a result of possible tax regime changes.

Towards the end of April, Greece resumed talks with its creditors in Athens over the reforms needed to conclude a drawn-out review of its bailout progress and unlock more than €5 bill of financial aid, according to a Reuters assessment of the situation at the end of last month.

Reforms that were discussed included changes to pensions and taxes, plus additional measures that Athens will have to put in place for use in case it misses the budget targets set out in a multi-billion euro bailout agreement signed last August.

Those 'contingent measures' will apply only if the regular measures are not enough to generate a primary budget surplus of 3.5% of GDP by 2018.

However, these measures, which are meant to produce budget savings of 2% of GDP, have not been identified thus far and the Government has said that Greek law does not allow such policies to be legislated in advance.

Shipping revenues rise

As for the Greek shipping sector, according to a report to the Greek Parliament by Deputy Finance Minister, Trifon Alexiadis, total revenues from merchant shipping rose to €63 mill last year, up by 17.5% versus the 2014 figure.

In particular, Greek vessel tax revenue grew to €17.62 mill last year, up from €13.15 mill in 2014 and €14.01 mill in 2013, while tax revenue from Greek shipowners, under a voluntary scheme signed between the Union of Greek Shipowners and the State, grew to €45.43 mill in 2015 from €40.55 mill the year before, Alexiadis reportedly said.

He was responding to questions made by Communist Party who requested information on taxes paid by Greek shipowners during the last three years, according to a report in the Hellenic Shipping News.

Merchant Shipping and Island Policy Minister Thodoris Dritsas, in a written response to the four deputies, also noted that a total of 524 shipping companies (representing more than 90% of total fleet capacity) participated in the shipping community voluntary tax payment scheme.

However, the rise in tax revenue will not stop the country's lenders imposing new rules in the shipping taxation framework. According to the draft paper of the preliminary agreement on the evaluation of the Third MOU between Greece and its lenders, the Greek government agreed to review and phase out preferential tax treatments for the

shipping industry, in line with the advice from the European Commission.

In addition, Greece has agreed to extend the voluntary shipping taxation scheme by one year to 2018, the Hellenic Shipping News report said.

Greek shipowners account for over 4.500 vessels with an estimated value of $92 bill. As Greek shipping operates a very young fleet with an average age of 11 years, some two years less than the world average, a great percentage of the $8.6 bill invested by Greek interests in newbuildings will be spent on new technology.

Flag states

As for the flag states wooing Greek shipowners, figures released by the Greek Shipping Co-operation Committee (GSCC) show that Liberia was the leading open registry for Greek owners.

The GSCC statistics show that, in the year to end-March 2016, the tonnage of Greek-controlled ships in the Liberian Registry increased by 995,781 gt.

Liberia, with 744 vessels aggregating 54.74 mill dwt, is second only to Greece itself in terms of the number of Greek-owned ships flying its flag, and comfortably ahead of the Marshall Islands in third place.

In percentage terms, 18% of Greek-controlled ships are registered under the Liberian flag, again second only to Greece (20%).

Scott Bergeron, Liberian International Ship & Corporate Registry (LISCR) CEO, the US-based manager of the Liberian Registry, said, “There can be few stronger and more mutually successful relationships in international shipping than that which exists between Greek shipowners and the Liberian Registry. It is, moreover, encouraging to see that that relationship endures through good and bad times alike for the industry and for the global economy.”

Tanker newcomer

A relative newcomer to the Greek shipping scene is NASDAQ-quoted Pyxis Tankers.

The company owns six MRs of which five are employed on timecharters.

Pyxis has taken advantage of the current firm market and reported TCE revenues of $7.6 mill for the first quarter of this year, which resulted in net income of $1.1 mill,

Commenting on the 1Q16 results, Valentios Valentis, Chairman and CEO, said; "We are pleased to report our unaudited financial results for the first fiscal quarter of 2016.

“Five out of our six tankers were employed under time charters during this period, providing approximately 85% of our voyage revenues. For the balance of the year, 53% of our available operating days (59% with charterers' options) were booked as of 31st March, 2016. This is consistent with our mixed chartering strategy of time and spot employment with first class counterparties, which secures visible cash flows while also retaining upside optionality to participate in periods of market strength.

“In the quarter, daily operating expenses per vessel for our eco-modified and two eco-efficient MRs were $6,553 and $6,334, respectively. These operating results combined with our daily ship management fees of $750 and general and administrative expenses of $1,209 per day per vessel, generated total daily operational costs of $8,512 and $8,293 for our eco-mod and eco-efficient vessels, respectively, in the quarter." he said. TO

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Assuming responsibility and safety leadership

The ultimate goal for safety is the ability to solve problems when hazardous situations occur! Problem solving & assuming responsibility are two inseparable issues.*

Furthermore, senses are the 'doors' leading to our inner self.

Situational awareness starts from the signals, stimulus we receive from our environment and it helps the operator to predict unsafe results before they come out into the open, giving enough time to take corrective actions.

Situational awareness & assuming responsibility are also two inseparable issues.

Though it is accepted that we do not have control over everything that happens in our lives, it is still our responsibility on how we decide to respond to what is seen as unmanageable in a human perspective. In other words, there are situations that we cannot avoid but the attitude we adopt to get through these situations safely is in our control.

From this point of view, attitude is more crucial when we are facing an unsafe challenge rather the unsafe challenge/situation itself. Responsible individuals have the right attitude towards unsafe situations.

These responsible individuals possess an independent mind that can assess the subjectively perceived information objectively. Only a person who believes that he or she has control over a situation can think independently and produce the desirable result/outcome named safety.

The critical question is who or what is the cause of failure? Someone or something from the outside world/my environment or me. Am I interacting with it improperly? The real question is - are you an internally or externally focused person?

Are you blaming internal or external factors regarding the outcome of an unsafe situation? In which area do you put the responsibility for hazardous events? What are we searching for? We are searching for stable patterns of behaviours, ie in whom/what would we rather always attribute the cause/responsibility of what happened, eg, unsafe omissions or commissions.

If we cannot avoid the bad results because of external, unpredictable or unchangeable reasons, then why try at all, why try to improve ourselves, why try to change and correct our actions (externally focused person)?

Since corrective actions make the future possible, always blaming any failure upon someone or something else than ourselves creates, generates and maintains a cycle of the same mistakes repeated over time again and again.

Yes, we are not responsible for everything happening around us. But responsible individuals believe that they are in control of their success or failure; so, they will try their best when the need arises.

Life Management's Effie Sarigiannidou.

For these reasons, attitudes and behaviours at all levels of an organisation, be they latent or active, are built everyday by a continual improvement produced by independent minds, which take responsibility for their mistakes and make all the proper corrective actions without the fear of change.

A change always needs a leader - a person who does not feel threatened by change and is ready to pay the cost of it because they know that denying change costs more.

This is the major expression of responsibility!!

Finally, an internally focused person assumes responsibility and so, solves problems, has the right attitude towards challenges, is aware of the present times and causes changes.

Assuming responsibility is the key to efficient safety leadership! TO

**This article was written by Effie Sarigiannidou, Greek Country Manager at Life Management Centre.*

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Repair yard's close ties with Greek owners

Nakilat-Keppel Offshore & Marine (N-KOM), the joint-venture shipyard of Keppel Offshore & Marine, has continued to see strong interest for its services from the Greek market.

A variety of tankers, gas carriers and bulk carriers called for repairs at the facility over the past year. Not only has N-KOM surpassed its 500th project but also, the shipyard successfully tripled its tanker repair business over the past 12 months, which mainly comprised of Greek clients.

N-KOM also signed an agreement with the Angelicoussis Group to be the preferred shipyard in the Middle East for the repairs of all the vessels managed by Maran Gas, Maran Tankers and Anangel Maritime Services.

Among the shipyard's growing list of Greek customers are Maran Gas Maritime, Maran Tankers, Euronav, Dynacom Tankers, Eurotankers, Sun Enterprises, TMS Tankers, Prime Marine, Samos Steamships, Chandris Hellas, Chartworld Shipping, Charterwell Maritime, Navios Shipmanagement, Aegean Bunkering and Consolidated Marine Management (CMM).

Other international clients include Odfjell, Mideast Shipmanagement (Bahri), V Ships, Donnelly Tankers, STASCo, Teekay, MOL, NYK, Victoria Shipmanagement, Pacific International Lines, Shipping Corporation of India and Anglo Eastern, among others.

In 2015 alone, 10 tankers were drydocked and repaired at N-KOM for Greek client Dynacom, making the company the top customer for the year. Dynacom's Aframax 'Giannis' was the 500th project to be undertaken at N-KOM and coincided with the yard's fifth anniversary in November last year.

Typical repairs undertaken for tankers involved main engines, as well as other routine machinery and mechanical jobs (eg turbochargers), overhauling of cargo pumps, valves and alternators, hull blasting and painting, steel renewal, overhauling of ballast, cargo pump and motors, inspection and renewal of various piping systems (eg HFO/MGO piping modifications), as well as propeller and shafting jobs.

Fuel saving initiatives, such as Schneekluth, Propeller Boss Cap Fins (PBCF) and MEWIS duct installations are increasingly popular among Greek tanker clients, and have been installed on VLCCs, Suezmaxes and Aframaxes within a very competitive time frame. Schneekluth and MEWIS ducts are known to significantly reduce vibration and fuel consumption of vessels, thus enhancing their propulsion efficiency and voyage performance, N-KOM said.

Repeat customer

Since last year, repeat customer Eurotankers has awarded two crude oil tanker dockings to N-KOM, the 93,723 dwt 'Genie' and 105,212 dwt 'Eurostrength'. They will undergo routine repairs, such as engine overhauls, hull treatment and coating, as well as other general refurbishments.

Schneekluth ducts were installed on Marine Management Services' Suezmax 'United Emblem' and Maran Tankers' VLCC 'Antonis I Angelicoussis', with a PBCF retrofit also carried out on the latter. Blasting and painting was also carried out over an area of 17,625 sq m for the VLCC, within a tight time frame of eight days.

Drydocking and repairs were undertaken on three Springfield Shipping crude oil tankers last year - 'Olympic Liberty', 'Olympic Future' and 'Olympic Sky'. Apart from routine repairs, other work carried out included the replacement of the vessels' bow mooring stopper, fabrication and installation of 650 m of pipelines, as well as heating coil repairs spanning 1,178 m in 14 cargo tanks.

Drydocking and repairs were also undertaken on several of Norway's Odfjell Management chemical tankers. Earlier this year, full tank blasting and coating work for four cargo tanks and routine drydocking repairs were carried out on the 46,047 dwt chemical tanker 'Bow Lind'. 'Bow Riyad' underwent routine drydocking maintenance repairs, primarily for her stainless steel cargo tanks and turbochargers. 'Bow Star' on the other hand, underwent pipe fabrication and installation for its bunker tank conversion from HFO to MDO, ballast tanks steel repair, cargo piping manifold modification, cargo and bunker lines pressure testing and complete servicing of its shaft generator compensator motor, amongst others.

The shipyard has commenced operations in its new VLCC-size floating dock - the world's largest floating dock - measuring 405 m x 66 m and with a lifting capacity of 120,000 tonnes. This is in addition to the already operational two VLCC-dimensioned graving docks (400 m x 80 m and 360 m x 66 m), berthing capacity afloat of 3,150 m, mobile boat hoists (300 tonnes and 1,100 tonnes) and comprehensive workshops and facilities, thus increasing N-KOM's docking capacity and enabling both the shipyard and its clients greater flexibility in scheduling drydockings.

Gas carriers make up about 25% of the ship repair business at N-KOM. The shipyard undertook the world's first MEGI (main engine gas injection) conversion of a Q-Max LNGC to run on LNG as an alternative fuel, and has also completed two ballast water management system (BMWS) installations for electrolysis-type BWMS units.

The BWMS installations involved extensive pipe work and installation of about 300 spools of varying diameters and lengths and equipments along with the installation of power and control cables termination and breaker with switchboard modifications.

N-KOM has also carried out extensive cargo tank membrane (GTT MKIII) repairs on five LNGCs, including the scaffolding and welding work inside the cargo tanks. The shipyard has

Ras Laffan Qatar-based N-KOM has signed a long term ship maintenance deal with the Angelicoussis Group.

an in-house team of GTT-certified welders to carry out welding works for GTT Mark KIII and No.96 containment systems, as well as a flying repair squad capable of undertaking repairs during a vessel's voyage or at anchorage.

Several such repairs have already been carried out by the yard's flying squad for LNGCs, including the installation of an N2 generator for a Q-Flex vessel and ECA modifications for four Q-Max LNGCs.

An agreement was signed earlier this year with Goltens to co-operate in providing services, such as overhauls and repairs of main engines, turbochargers, fuel equipment and engine controls. N-KOM also has an agreement in place with Wärtsilä enabling the latter to provide a wide range of services through its workshop on-site, such as main engine piston crown reconditioning and chrome plating.

Wärtsilä is now a resident sub-contractor at the facility, along with other resident service providers, such as MAN Diesel & Turbo, Wilhelmsen Services, Turbo Technik and Cargotec to name but a few.

In an effort to enlarge its footprint as a global LNG solutions provider, N-KOM also has an existing agreement with DNV GL to co-operate on LNG and gas-related projects, with the class society providing its R&D consultancy services for LNG applications to complement the shipyard's sizeable gas-related business. TO

The art of management

At *Tanker Operator*'s Athens conference last month, Stylianos Mavrelos, Capital Ship Management's technical manager gave advice on how to operate vessels in today's ever changing world.

Today, we are faced with local wars, geopolitical conflicts and political unrest worldwide. In addition, the world's population is ageing and uncertainty, ambiguity and complexity are increasing more than ever. There is also a weak global economy and a change of climate to contend with, he said.

Commodity super-cycles are a thing of the past as coal, ore and crude oil prices are all likely to remain depressed for the next few years. As for tankers, Mavrelos thought that the market would stay strong in the short term. Oil demand growth is forecast to average 0.6% per year through 2040. Going forward, the world will increasingly adopt alternatives to hydrocarbons and vessel fuel efficiency will be further enhanced.

In a tough market, a company needs to achieve a competitive advantage while at the same time, implement a plethora of environmental regulations - energy efficiency; Monitoring, Reporting and Verification (MRV) regulation; Ballast Water Management Convention (BWM) and trading in NECAs and SECAs.

As for the ships, the more technically advanced systems are fitted on board, the more skilled resources will be needed both ashore and afloat. Seafarers must learn new skills and integrate new technology. The problem here is that seafarers worldwide are becoming older and fewer younger graduates are joining the industry.

Shipowners are faced with a number of class and statutory certificates, increasing number of vetting inspections and increasing costs. Changes are also occurring to management system standards, such as TMSA, VIQ, etc.

"How do we cope with all these challenges?" he asked. "By evaluating and understanding the big picture." He urged delegates to study Sun Tzu's 'The art of War'.

Competent people

Cost effective and sustainable shipmanagement should be implemented and competent trained people should be employed. Use management systems that are fit for purpose and integrate all aspects of the safety programme into a single comprehensive management system - POLICE (Plan, Organise, Lead, Inspect, Correct).

Risks should be analysed and managed and dynamic performance strategies should be developed and implemented. IT tools and other infrastructure should be provided and performance should be measured hands on. Effective planned maintenance with no short cuts should also be implemented.

In striving for operational excellence the top management should be actively involved and set measurable goals and targets, effectively transmitting a realistic set of expectations.

The management should understand the consequences of their decisions and they should plan, act, measure and benchmark. Human behaviour and attitude should be managed and management should be working within the capacities and limitations of the staff. Optimise the amount of expertise available.

Compliance with rules and regulations should be assured and operating cost results should be continuously evaluated. These should reflect accurately the context of measurement. Also benchmark against industry standards taking in the systematic measurements of relative changes (variances) but not only against yearly budgets.

Review the company's processes for identifying improvement areas. Implement changes (process re-engineering, work alterations, etc). Re-measure to reflect the achievement (measurement of outcome effects versus implemented courses of action).

Training and professional development and assessing and verifying competence is also important, he said. Recognise the difference

Capt Mavrelos outlines best management practices.

between managing and leading. Develop technical and non technical skills and share information.

Improve the ability to recruit - provide for better selection methods, develop and implement policies for retaining employees both on board and ashore. Manage human behaviour and attitude and prevent or reduce conflicts internally and externally.

Implement loss control management principles and methods for continuous improvement.

Finally, Mavrelos stressed; "People in shipping are the secret of success and the victims of its failure."

TO

Posidonia 2016 on course for a record

This year's Posidonia is on course to be the biggest ever.

This is despite unfavourable market conditions, plummeting oil prices, slowing economic growth in key economies and problems at home, claimed the organisers - Posidonia Exhibitions.

With floor space demand said to be at unprecedented levels, this year's event is expected to break the previous record set in 2014, when Posidonia attracted more than 1,840 exhibitors and 19.000 visitors.

Leading the way in terms of floor space demand is China, which will once again feature its shipyards, equipment manufacturers, shipping services and financial centre providers.

Also from the Far East, South Korea and Japan will have national stands featuring their shipbuilding and equipment manufacturing industries, as competition with China intensifies against a backdrop of falling demand for new orders.

Traditional maritime centres, such as Singapore, Hong Kong, Cyprus and Malta will again participate with national pavilions. At the same time, Posidonia will welcome niche newcomer Luxembourg who will be making its debut with a national pavilion featuring Cluster Maritime Luxembourgeois.

Other maritime services centres at this year's event include Dubai Maritime City, Canada's Vancouver International Maritime Centre and Shanghai Maritime and Finance Excellence Centre.

Posidonia's central corridor will once again be packed with shipping folk come June.

Banking returns in the form of the National Bank of Greece, Saxo Bank and Deltec Bank amongst the financial institutions coming back to Posidonia following this sector's lengthy absence.

The organisers said that they were also finalising the most comprehensive conference and seminar programme in its history with over 30 confirmed presentations covering most aspects of the industry. To meet demand for seminar rooms, the organisers have set-up an extra room, with the help of a sponsor - UKHO.

The conference programme is spearheaded by the Tradewinds Shipowners Forum, which will tackle a wide range of topics, including the major issues of oil prices and the Middle East, the 'China effect' and ship supply.

The Japanese Ship Exporters Association

(JSEA) will again present technological solutions in a seminar at which all the major Japanese shipyards will try to persuade Greek shipping companies to place new orders, as they benefit from the currently weak Yen, which makes Japanese shipyards more competitive.

The hottest issue in the maritime industry currently is Ballast Water Treatment. With the Ballast Water Management Convention expected to come into force this year and system manufacturers applying for US Coast Guard type approval, over 15 BWTS manufacturers have already confirmed their participation at the exhibition.

Posidonia will also host the Ballast Water Management Summit, organised by Newsfront/Naftiliaki under the auspices of Greece's Marine Technical Managers Association (MARTECMA), followed by an Argo Navis workshop on the retrofit engineering studies and installation planning of a BWTS.

ICT interests

Probably reflecting the times we live in, more than 80 global Information and Communications Technology (ICT) companies will participate at Posidonia 2016.

Satellite communications, cargo tracking, navigation and crew management are some of the key areas that ICT innovations can help improve, as indeed is energy efficiency, which is mandated by the IMO, whose new secretary general Kitack Lim will attend the opening ceremony.

"Even a small percentage drop in fuel consumption can amount to hefty cost savings for the Greek-owned fleet, which ranks first globally with almost 20% of the world's total transport capacity," said Theodore Vokos, executive director, Posidonia Exhibitions. "Information and communication technology is of prime importance for all shipping companies on board and ashore, due to the availability of more data that can and will be collected, analysed, cheaply stored and integrated into decision making mechanisms at various levels."

From communications to procurement and from safety to vessel reporting, financial accounting and navigation, ICT providers for every shipping operation segment will be exhibiting at this year's event.

For example, Denmark's cargo control equipment manufacturer and supplier API Marine will be displaying ballast and cargo tank monitoring and integrated automation systems. From Finland, marine technology specialist Eniram will be displaying its its fourth Posidonia.

Bangalore, India-based BSOL SYSTEMS software products and services specialist will be making its debut launching two new products, a vessel inspection app and a demurrage calculator.

Australia's RightShip will launch its new online risk management platform, RightShip Qi later this year and is using Posidonia as a pre-launch pad. "We expect Posidonia 2016 to provide yet another opportunity to meet Greek shipowners and senior personnel from the wider maritime industry. As we are on the cusp of launching our new online risk management platform, Posidonia 2016 presents a timely opportunity for us to socialise this with key stakeholders prior to the launch in Q3," said Warwick Norman, RightShip CEO.

Greek ICT companies will also be participating, including Athens-based Mobile Technology, a distributor of electronic equipment and network communications systems. This company is planning to launch a solution for maintenance & inspection in the maritime industry based on voice commands, as well as a global tracking system, which can locate, track and monitor vessels, sending multiple daily position reports and an inventory system for monitoring the vessel's spare parts.

Software solutions provider DANAOS Management Consultants plans to launch three new products. The Piraeus-based

company will showcase its proprietary DanaosONE platform, a collaborative e-servicing tool in addition to its WAVES fleet performance management tool and a suite of maritime mobility native apps.

In addition, Fortune Technologies is to launch the new Microsoft Dynamics NAV 16 Web & Mobile Based functionality at Posidonia 2016, where it will be making its sixth appearance.

SRH Marine, a Piraeus-based company offering full sales and technical support services for navigation, radio communication, safety and other marine equipment will launch its COBHAM network solution and its SRH BTITEM service agreement.

SetelHellas is to present the SetelHellas MRV solution, which has been developed as what it claims is a natural extension of SeeMBox-V in respect to the new MRV Regulation (EU) 2015/757 that requires shipowners and operators to monitor and report their carbon emissions (CO2) on all voyages to, from and between EU ports.

The list also includes large multi-nationals, such as Microsoft and Vodafone, which plan to present a secure, scalable and user-friendly business cloud solution that allows business customers to effectively organise and cover their needs in computing power storage space, and back-up solutions.

ICT industry experts will also be giving talks on technology. The conference programme includes ICT-related topics, such as smart ship solutions by HEMEXPO, maritime VSAT by Gottlieb and Speedcast, shipping telemedicine & assistance by Allianz Global Assistance and a presentation on supply chain security for ports from Singular Logic.

In the navigation sector, FURUNO will be showing the FMD-3x00 ECDIS series and the recently launched Voyage Data Recorder - VR-7000.

The company said that the ECDIS series offers a new and improved intuitive user interface; 'Task Based Operation', which enables the user to navigate the menus much more easily to operate the ECDIS efficiently. It comes with seamless zoom and an easy chart management tool, which fully supports ENC, ARCS and CM-93 chart formats and makes chart/permit updating, loading and erasing easy and efficient, FURUNO claimed.

In addition to the hardware, FURUNO will present its programme for its type specific ECDIS training: This training programme consists of class-room based training, either at FURUNO training centres or through the FURUNO NavSkills network of training centres worldwide, including the GMC Maritime Training Centre in Piraeus.

As a supplement to classroom training, FURUNO type specific ECDIS training can also be obtained through the NavSkills CAT (computer aided training) system. FURUNO also offers computer based training (CBT) for the ECDIS FMD-series only. FURUNO said that it also planned to present its VSAT-services.

Among other exhibitors, listed below in no particular order is NAVTOR, which will be exhibiting its NavStation, claimed to be the world's first digital chart table. Attending its third Posidonia , the Norwegian company will showcase NavStation's software designed to integrate all digital navigational data for optimal on screen presentation to plan and organise a safe, secure and economical voyage.

"NavStation is a giant leap in the evolution of e-Navigation," claimed marketing manager, Willy Zeiler.

Ship Electric Marine Automation (SELMA) will use its first Posidonia to demonstrate energy saving technologies, such as the ship energy efficiency system based on VFD (variable frequency drives) control switchboards for auxiliary machinery, which reduces the power of the vessel by 100-150 kW, resulting in annual fuel savings of 150-200 tonnes.

Zacharias Klados, managing director of the Athens-based manufacturer of marine electrical and automation/control systems, said: "SELMA is very proud to participate for the first time at Posidonia where we can present our innovative applications related to modern marine control technologies. We will primarily focus on SEES (ship energy efficiency system), which is already installed on more than 60 ships with real recorded data of energy saving in the last two years."

TNL Group, a Greek maritime navigation & Satcom group of companies, is using its third Posidonia to demonstrate a new charting 'Pay as You Sail' solution signalling the arrival to the global market of the only 'Pay as you Sail' solution made in Greece.

Publicity, brand awareness and recognition, as well as product promotion, are claimed to be some of the benefits, which marine lubricants provider Elinoil has enjoyed from its presence at the previous six Posidonia exhibitions.

"The exhibition provides us with an excellent opportunity to promote our company's products, meet customers, enhance our relationship with them, and further improve our business network. It is a highly significant international exhibition which offers an interactive platform to exhibitors and visitors alike," said Odysseas Dimopoulos – marine lubricants sales manager.

Dubai's lubricants and technical support services supplier, ENOC Marine, will showcase new high quality cylinder oils and technical services capabilities. ENOC has an extensive portfolio of application-based lubricants, each designed to address the specific challenge of achieving optimum performance.

ENOC is currently exploring the possibility of blending its marine products in Greece through one of the largest marine lubricants blending plants.

Service providers

One of the world's leading maritime and logistics service provider, Inchcape Shipping Services (ISS), is planning its first visit at Posidonia as an exhibitor.

"Trade shows are extremely important and something we are looking to do more of, hence the first time we have taken space at Posidonia, which is important for customer engagement, brand placement and promotion of ISS products and solutions, as well as those of our group companies," said Chris Whiteside, ISS CEO. "Posidonia represents a unique business platform for the global shipping industry and Inchcape Shipping Services is delighted to be exhibiting at the 2016 event."

Also exhibiting is RescueSim, who recently won orders for its advanced fire fighting simulators from Greek owners.

For example, a RescueSim simulator was purchased by containership manager Danaos Corp and by tanker concern Prime Marine, as an addition to their current NAUTIS bridge simulators.

The new simulators will allow both shipping companies to add STCW AFF training to their current curriculum. The simulators will be delivered and installed by VSTEP engineers at the offices of Danaos and Prime in Athens during the third quarter of this year.

Each AFF Simulator comprises a RescueSim trainee station and a fire panel to be installed on the current NAUTIS simulator. In addition, VSTEP will develop virtual 3D models of a container vessel and a chemical tanker.

The RescueSim AFF simulator will be linked to the existing VSTEP NAUTIS ship bridge simulator for additional incident command training for bridge personnel. TO

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Sail Safe

Recruitment trends in the tanker market

The tanker market is faring much better in terms of recruitment activity than many others we focus on at Halcyon Recruitment, a specialist recruiter to the shore based maritime and shipping sectors.*

We have seen an uptake of tanker positions this year, particularly amongst shipowners, managers, operators and broking firms.

Whilst the demand for candidates is increasing, this does not mean that employers' standards are dropping. The recruitment requirements are stringent and performance remains at the top of the agenda for employers. Key to this is the preservation of operating margins and a focus on cost control as well as driving out inefficiencies. The focus is on finding candidates who can deliver these targets.

Visa and work permit restrictions continue to impact on the ability of employers to recruit suitably experienced individuals, particularly those with a seafaring background. The US, UK and other EU countries already have extremely tight visa restrictions in place that deter employers from considering applicants without the necessary work permits.

With the ongoing uncertainty in the global economy, the influx of refugees across Europe and the political pressure this is bringing, this is not set to change.

Another widely recognised issue is the lack of experienced seafarers available and an ageing workforce, particularly in the UK. India and Eastern Europe provide a healthy pool of ex seafaring candidates, but they are often unable to secure work permits.

Many large organisations are taking steps to address the shortage and rotate their senior crew ashore to see how they might transition to an office based role. Governments are also looking at initiatives to explore what skill sets are required ashore and how to ensure seafarers understand the breadth of positions and career paths available to them upon coming ashore. This takes time and in the interim, companies need to do their utmost to retain their key employees and to adopt an approach that takes into account the psychology of people looking for personal development and a work-life balance.

Over the last two years, we have also seen an increasing trend to move non-commercial functions - for example, technical superintendents - away from more traditional shipping hubs, such as Singapore, London and mainland Europe with India in particular benefiting from this change, especially in Mumbai and to a lesser extent Chennai. The reason behind this is that India has an extensive pool of seafarers from where candidates can be sourced.

With many locations experiencing stringent visa restrictions and rising wage costs, employers have had to evaluate where the most cost effective locations are and also where they can find talent that supports continued growth and development.

Commercial functions

At the moment commercial functions have not seen the same level of change, but whether or not this follows suit in the future remains to be seen. Overall, recruitment for commercial roles, such as chartering, broking and operations, is also on the increase but, again, the performance driven approach requires individuals with a proven track record who are perceived as coming with low risk and high potential.

Outside of broking firms, most operators need to come from a seafaring background and whilst deck officers are more readily available than engineers, good candidates are being readily snapped up.

Candidates with a strong skills set are realising they are in demand and this has put pressure on salary levels with regular and ongoing increases in remuneration occurring. Experienced technical superintendents and experienced vessel operators in particular are difficult to entice away from existing positions, so employers looking for these individuals have to be able to offer something significant in terms of an increase in salary and/or career and personal development opportunities.

Halcyon's Heidi Heseltine.

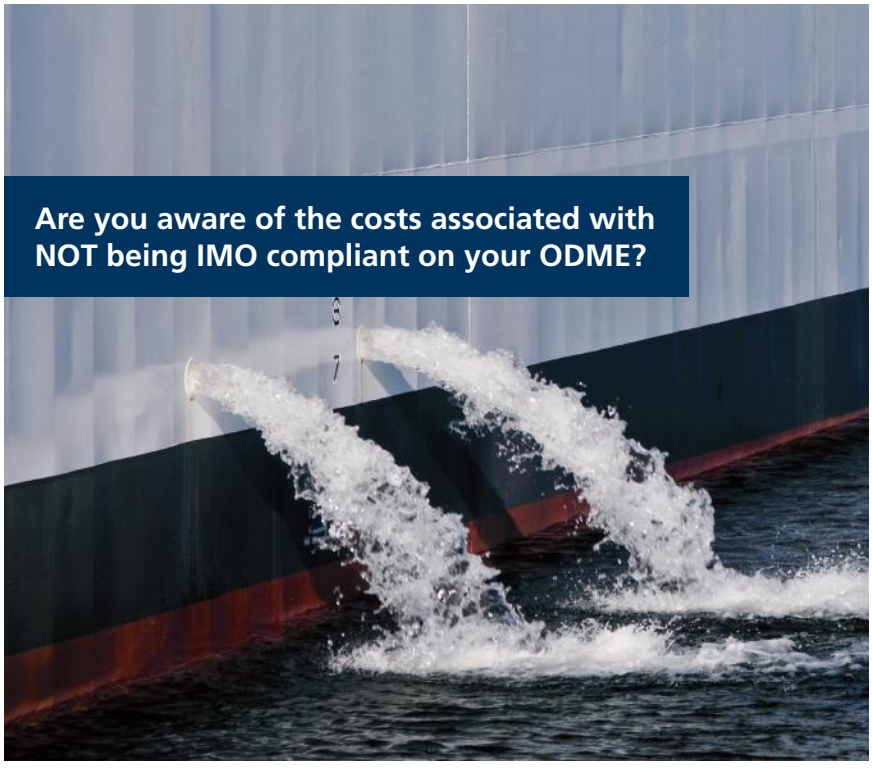
Bonuses this year are better for many than they have been for some time and the tanker sector has seen on average up to three months salary being said, and up to six months in some areas. Technical candidates are increasingly commanding bonuses. This is a recent development in our industry but one that is set to continue. Our research shows that 69% of staff working in a technical role in the shipping industry received a bonus in 2015, compared to less than half of technical staff in 2014.

In summary, recruiting in today's tanker market is a challenge. Employers have to have a strong reputation and be able to offer potential employees a genuine reason to make a move, which will usually take the form of career and personal development and improvements in remuneration. Just as employers are looking to hire individuals who are low risk high return, employees are looking to work for organisations who are themselves low risk and high return. TO

**This article was written by Heidi Heseltine, Managing Director, Halcyon Recruitment.*

***The BIMCO/ICS Manpower Report was due to be published after this issue went to press.*

People. Ideas. Solutions



MARINE

When Downtime Is Not an Option

Oil Discharge Monitoring Equipment is an on board requirement - the detention threat is real, and can result in delays and unplanned costs for the operator. No matter how good your ODME is, it is not worth anything if not installed correctly, it malfunctions, or the crew does not know how to operate it properly.

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Making STS safer

There have been a number of legal claims involving ship-to-ship operations, Clyde & Co's partner Ed Mills-Webb said at a recent conference.

Speaking at the International Forum on Ship to Ship Transfer Operations 2016 held at Clyde & Co's offices in London organised in co-operation with DYNAMARINe, he warned that there was a lack of focus in the London market and that the legal framework was lagging behind.

STS operations are increasing worldwide for example, Tsakos Columbia Shipmanagement's Capt Panagiotis Drosos said that his company was involved with 88 STS last year and Maran Tankers Management's (MTM) Capt Georgios Asteros said that MTM was involved with around two per week.

Clyde's Senior Master Mariner, Martyn Haines said that according to the law firms statistics, breakdown of mooring lines were by far the most common causes of incidents during an STS operation.

He posed the question - who has a contract - the discharging ship, service provider and or receiving ship in place with the charterer/cargo owner? He called for 'knock- for - knock' type agreements to be more widely used, as they were in the offshore industry.

P&I clubs and hull insurers were familiar with the standard BIMCO wording on STS. Each vessel's risk is transferred to the charterer, so what is the problem? He asked.

Owners often request Letter of Indemnity (LoIs) prior to an STS operation. Does the charterparty require a separate LoI? However, Haines stressed that any LoI signed should not interfere with the principle that the Master has sole responsibility for the safe navigation of his/her vessel.

Clyde's Mills-Webb.

He warned shipowners not to take responsibility for the service providers, as this could prejudice their P&I cover.

Capt Asteros outlined six documented near misses, which he said although statistically insignificant, showed a worrying trend. In four near misses, a breakdown in communications was the overriding factor and in two, the crew could not communicate with the bridge team. The use of English appeared to be the main problem.

Aborting operations

He said that at MTM, the Masters were advised to abort the operation, even when unsure and avoid STS operational areas where language could be a problem, Where possible or considered necessary, a company superintendent will attend an operation. Superintendents should attend pre-ops meetings and in some areas, their attendance was a requirement. "Such practices should become more widespread," he said.

Capt Asteros called for all STS service providers to be self-regulated and said that STS advisors/POAC standards must become much higher. The performance of all parties involved in an STS should be disseminated widely to help everyone involved improve standards, he said. Assistant mooring Masters must also become a standard. The cost increase is negligible, he claimed.

Capt Drosos said that there were problems with the visual inspection of hoses. He claimed that TCM's screening procedure was "over and above" that of the OCIMF checklist.

The shipmanagement company takes into consideration a vessel's past STS ops performance, her statutory class and P&I details are scrutinised, as is the vessel's and manager's Port State Control record.

For any STS operation involving a TCM managed vessel, two Masters are appointed and a library of operations and incidents is kept. However, Capt Drosos warned that this should not be rigorously followed, as every STS operation should be risk assessed independently.

TCM's Capt Drosos.

He stressed that the OCIMF checklists were guidelines only and the operation needs careful planning, looking out for hazards, etc and be aware of commercial pressures.

TCM uses DYNAMARINe's onlineSTS.net OSIS checklist database but also has a series on in-house KPIs, which are used separately.

Capt Drosos gave an example of escort and mooring boats not being up to standard in certain parts of the world. He also said that bunkering vessels should also be involved in STS operational checklists but this needed the bunker industry to buy into the concept. He said that sometimes an MR size vessel would come alongside to transfer fuel oil instead of a smaller bunker tanker/barge.

He cited the case of West Africa where the standard of equipment can be poor, despite being certificated. He said that in one case, it took three days to change a hose resulting in those days being lost and demurrage being paid but he said this was a better solution than facing a pollution claim.

As for operations in the hours of darkness, this was down to a risk assessment and the Master's experience. "Don't deny it, but don't promote it," he advised.

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OCIMF - Working on industry improvements

Updates to mooring guidelines, TMSA, human factors and security – some of the activities currently going on at OCIMF - were outlined by OCIMF director Andrew Cassels at *Tanker Operator*'s Athens conference last month.

One major activity for OCIMF this year is updating the Mooring Equipment Guidelines (MEG), in particular to take into account lessons learned from the serious accident with the LNGC 'Zarga' at Milford Haven in March, 2015, when a mooring rope snapped, causing serious injuries to a deck officer.

"I'm relieved to say he is recovering, he is lucky to survive," Cassels said.

The incident has attracted particular attention from investigators, as the deck officer was standing in what was considered a 'safe zone' at the time of the incident, and the mooring rope was classified with a 137-tonne minimum breaking load, but failed with a 24-tonne load, measured by a load cell on the jetty.

The UK's Marine Accident Investigation Branch (MAIB) is expected to produce a final report on its investigation into the incident in mid-2016, and its insights will be taken into consideration in the MEG update.

MAIB has already published two safety bulletins on the incident, one (January, 2015) covering rope 'snapback' and the other (January, 2016) covering UHMWPE.

The investigation showed that there is various languages used by rope manufacturers, such as 'nominal working load'(NWL), which don't necessarily align with the terms used in the guidelines, Cassels said.

This means "it is very difficult to buy something which fits the mooring equipment guidelines." The calculation models are sometimes not easily applicable to complex mooring arrangements.

It can sometimes feel that shipbuilders think about mooring arrangements as an afterthought, Cassels said. Mooring arrangements tend to be designed around the steel structure, it's not as human focussed as perhaps it should be," he said.

One idea put forward by Denmark is to place winches against the ship's rails which would lessen the crew's exposure to the stored energy in mooring ropes.

"The current plan is that MEG4 should be produced by the end of next year (2017). OCIMF is working together with rope manufacturers, regulators and Intertanko on the re-write to MEG. The project has a steering group and four working groups. "It is a great demonstration of industry working together," he said. "We'll try to harmonise that and create something, which is easy to use."

TMSA 3

The third version of Tanker Management Self Assessment (TMSA) is currently being developed. It will be updated to recognise changes in legislation and best practice guidance, and also growing concerns security.

It will also be extended to include barge operations.

Some of the language will be clarified. "We found that people's interpretations were different," he explained. In some cases it will increase the bar required to get a certain stage, "but not a massive raising of the bar," he said. "Occasionally we've moved something from 2 to 1 or 4 to 3, etc."

There will be "more detail in some elements especially around cargo. Cargo is quite a significant aspect of tanker operations," he said. A new chapter on security will also be included.

"It may look like a lot of changes but when you look into the details It's probably not so big," Cassels said."We're aiming for a January 2017 release."

Inspection programme

OCIMF is perhaps best known for SIRE (Ship Inspection Report Programme), which aims to harmonise the inspections made on ships by oil company vetting inspectors, and enable companies to access each other's inspection reports.

OCIMF's Cassels outlines his priorities.

Currently, each ship is inspected around every five months. The data of average inspections per year is fairly stable, at around 2.4, he said, corresponding to an average of five months between inspections.

That seems about right, if the vetting organisations consider that a SIRE report is valid for six months, and shipping companies don't want to wait until the six months is up before getting another vetting inspection. "You need to be sure you can trade your ships," he said.

OCIMF gives free access to its reports to Port State Control authorities around the world. "They are broadly pulling reports, something you need to be aware of."

SIRE is to be introduced into the barge sector. "That's quite an active area," he said. "It is very much in the early stages. There's a big activity there and more work to do."

Security

On piracy, for West Africa, OCIMF set up an information sharing centre in Accra, Ghana, covering the Gulf of Guinea. It receives

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around 8,000 reports per month from ships coming into the region. “If there's something of interest going on we give warnings to ships in the area” he said.

“We work with regional navies. The hope is that they’ll be able to respond.”

For East Africa, OCIMF keeps a close relationship with naval authorities active in the Indian Ocean, around Somalia. “We’ve done a lot of advocacy to retain their presence,” he said.

“Partly as a result of OCIMF’s work, we hope the EU Council will agree to extend the mandate of EUNAVFOR around Somalia until December of this year.”

There are concerns that tanker companies might start to lower their guard, since there has been no successful pirating of a vessel in the Indian Ocean for about four years.

“We don't believe [Somali] piracy has gone away,” he said. The pirates may be “distracted by smuggling sugar, people and arms.” The risk is that “as soon as one ship gets taken, they will say, that was easy, let's have another go.”

OCIMF was part of an international collaboration that produced the Best Management Practices for Protection against Somalia Based Piracy (BMP), the current 4th edition is available to download from www.ocimf.org. “I implore you to ensure the best management practises apply to your vessels as you cross that area,” he said. “It is good information when you are transiting anywhere.”

“If tanker companies show they are looking after themselves, they are more likely to get the support of the military when they need it,” he said.

Human factors

OCIMF ran a two day human factors workshop in March, 2016.“The human is the next big leap forward,” he said. “We've done all the technical stuff.”

The question is, “why does a person who is perfectly qualified, competent still make mistakes?”

At the conference, on the first day, OCIMF invited human factor specialists from other industries, including nuclear, aviation, medical and academia. “That reinforced that this is a massive subject,” he said. On the second day, OCIMF members discussed how they could apply it to the organisation.

OCIMF does not plan to write a publication on human factors in general. “But we'll try to find a way to influence our technical publications that will at least engage with human factors,” he said. The plans are “a bit vague because we're not there yet.”

“We're also working with Intertanko on a joint safety initiative, which is very much about human factors,” he said. “We’re looking at competence, incidents, learning lessons.” OCIMF also employs a security representative, to look at the piracy issues.

Regulators

OCIMF works with the IMO and EU to try to guide the development of regulation in a good way.

The organisation has a permanent representative in IMO. “We have what I call a trusted status in IMO, because we do not stray into commercial territory, just safety, environment, security,” he said.

OCIMF also employs a company in the European Union “to represent us, keep their ear to the ground, and drag us in when we need to be there,” he said, to try to encourage the EU to avoid creating Europe-wide regulation and instead try to get regulation developed internationally through IMO.“The EU are getting more and more active [in shipping],”he warned.

It is better if the industry can manage safety by itself (self-regulation), rather than have accidents and then be told by regulators how to manage safety.

“Regulations are never good shipmanagement,” he said. “Good shipmanagement comes from people like yourselves, practical people running ships to a good quality.”

On environmental issues, industry regulators are starting to get pro-active, Cassels said. OCIMF is re-convening its CO2 emissions

committee to look at ways vessels can reduce emissions.

OCIMF has about 100 publications made up of technical books and free to down load information papers. Its flagship publications being ISGOTT (International Safety Guide for Oil Tankers and Terminals) and the MEG (Mooring Equipment Guidelines).

It also works together with a number of other organisations on publications, for example ISGOTT is co-produced with the International Chamber of Shipping (ICS) and the International Association of Ports and Harbours (IAPH).

The International Safety Guide for Inland Navigation Tank-barges and Terminals (ISGINTT), a joint project with CCNR, is currently in the process of being updated and OCIMF is also working on a publication on manifolds, which is a joint publication with the Chemical Distribution Institute (CDI).

OCIMF has a book available called 'Single Point Mooring Maintenance and Operation Guidelines' and published a paper in September, 2015 called the 'Hazards of Snap back', following the Milford Haven incident.

In OCIMF, "we have quite a few people that read these documents to make sure they're right. All the documents go through a lot of iterations to try to make sure we've got everything right and it's as clear as possible," he explained.

OCIMF is also working on a document about personnel transfer by crane. "It will only go out when I'm satisfied it is the right OCIMF position," he said.

Following the MEG update and it is a large piece of work, there will be a new edition of ISGOTT. "At the moment we are collecting information on what needs changing," he said.

Terminals

Online, OCIMF is developing a Marine Terminal Information System (MTIS), an online guide to information about terminals, which tanker operators can use, with information provided by terminals. "Convincing the terminals to use it has proved difficult," he said. "I think there are about 500 terminals in the database at the moment. We need more terminals in there."

OCIMF's reason for being is all about safety and environment. "So we don't steer into the commercial stuff - it is a bit distracting for our core objective," he said. "It is written into our constitution."

Its aim is to use all the knowledge and expertise from a base of oil companies to put into publications and programs, and create recommendations.

OCIMF currently has 98 members, with the numbers changing slightly every year – for example when an oil company member gets acquired - Shell acquiring BG, Repsol acquiring Talisman.

"We've got two prospective members awaiting discussion at executive board meeting in June," he said. "Overall there's a gradual increase."

OCIMF represents super major oil companies, many other oil companies, some national oil companies - eg, Saudi Aramco is on the board. Other than being "a bit thin in China", it has global coverage, he said.

There are also oil storage companies and chemical companies with oil subsidiaries as members. "The strength of OCIMF is in that committee structure, that broad church of members setting up working groups and feeding into our publications," he said. "That's where we get a lot of our knowledge."

"We work with Intertanko, ICS, BIMCO, others, but OCIMF's strength comes from that committee structure."

TO

Oceanfile releases Version 7

Major upgrades to Oceanfile has added business intelligence, day-to-day workflow activities and fleet officer management, measuring risk and performance, increasing efficiency and driving constant improvement, the company claimed.

Dublin, London and Athens-based tanker vetting and Inspection software concern, Oceanfile recently released a new version of the program which was highlighted at last month's *Tanker Operator*'s Athens conference.

Announcing the release, director David Savage quoted a tanker operator who said that while some of their people dealt with inspections effectively, others are too often associated with results that damage our reputation and business.

The operator asked if Oceanfile could provide tools to highlight these shortcomings and identify where corrective actions were needed. The company knew where the bad results were occurring, but searching for common cause and application of corrective actions proved to be not so easy.

Oceanfile's V7 Business Intelligence (BI) analytics was developed to deal with questions such as this. In the above case, the operator used Oceanfile BI, discovered where and why problems were occurring and applied corrective actions.

The "How can Oceanfile help with…" query, illustrated by the above, has been raised consistently ever since Oceanfile was launched in 2012 and this seventh upgrade demonstrates the efforts that have been made to provide intelligent reporting to measure risk, performance and drive continuous improvement, Savage said.

Since its introduction in 2012, more than 1,500 vessels controlled by around 16% of the world's tanker operators, including TMS Tankers, TMS Cardiff Gas, Tsakos Columbia Ship Management, Euronav, KGJ OBO and Tankers Fleet Management have enrolled in Oceanfile.

Among tanker management and vetting software providers, Savage claimed that Oceanfile provided the most comprehensive tools to manage tanker vetting, inspection, risk management and personnel performance.

New features and enhancements included in Version 7 are:

- Fully revised user interface to utilise screen space most logically and efficiently.
- Four degrees of risk measurement using Observations count, Potential Risk, Assessed Risk, with a Final Risk value now added.
- New inspection workflow, tasks, allocation of responsibilities and reminders from arranging inspections through to close-out of all corrective actions.
- Major reduction of the workload associated with compliance with oil companies officers' experience by testing consequences of assigning specific officers to specific vessels PRIOR to assignment.
- Powerful new business intelligence to deliver in-depth analysis, including use of pivot tables.
- Integrated Tasks Manager synchronising with Observations to quickly show corrective actions requiring close-out.
- On/off-line self inspection templates for SIRE VIQ, navigation audits and bespoke in-house SMS and other audits.
- Personnel performance and accountability.

Key enhancements include -

Precision risk measurement tools - V7 includes a fourth measure to quantify the risk associated with each VIQ question and its accompanying observations.

Additional to the count of observations, potential and assessed risk measures, V7 adds a 'Final Risk' value that takes into account all of the contributory factors, the operator's comments including root causes, corrective and preventative actions associated with every observation.

These risks are clearly indicated by Oceanfile with colour-coding measures associated with the observation, the report, vessel and the entire fleet. The final risk measure aligns Oceanfile with the techniques used by certain oil companies who take into account operator comments to apply 'final' adjustments to the risk assessment for every inspection.

Inspection workflow - Full workflow tracking is now included, from commissioning of inspections, self/pre-inspections, publishing of reports and thereafter, initial and subsequent operator comments, through to final close-out.

Observations are identified to indicate whether or not they comprise an SMS non-conformance and also whether the observation was preventable – in other words, if it was caused by human carelessness, omission, etc, rather than issues associated with the structural design of a vessel.

Officers matrix - Oceanfile Version 6 included automatic updating of the SIRE On-Line Officer matrix and this has proved to be a hugely valuable tool that saves a great deal of time.

The addition of each officer's name and payroll number (not exported to SIRE) permits data related to fleet personnel to be maintained both while at sea and ashore. Oceanfile V7 adds further improvements to ease the admin burden with inclusion of an assignment planning tool. Crewing personnel are thus able to test and check how assigning an officer to a vessel will impact on the oil company experience requirements PRIOR to assignment.

If the requirements are not met, a simple red or green coloured icon indicates whether or not the officer meets the expectations of each specified oil company.

Business intelligence - The new business intelligence (BI) built in to Oceanfile V7 identifies and uses data contained in SIRE, self-inspections and superintendents audits, and associates these with personnel and other factors to deliver analysis.

Moreover, the Oceanfile BI delivers report output to PDF, Word, Excel or PowerPoint using virtually any parameters that are defined by the user. Creating regular complex management reports now requires only a few clicks of the mouse.

Tasks manager - Keeping track of tasks,

David Savage outlines Oceanfile's new version.

arranging inspections, corrective action target dates and close-outs is complicated and time consuming.

Oceanfile 7 adds further refinements to its tasks manager with a new task list, synchronisation with the observations manager, diary views with colour coding of item status, target and actual close-out dates, and workflow queues. Remedial actions entered into the observations manager automatically create a task item.

Many problems arise during oil company audits, due to the fact that observations not closed out at the time of publication of reports are overlooked and operator comments that indicate intentions to rectify observation are often forgotten. The impression conveyed is that of negligence. The V7 Task Manager tracks target dates, displays reminders and actual task completion dates.

Self - inspections- Oceanfile includes report editors for on-line and off-line self-inspections and audits. Superintendents, Masters and other officers can complete self inspections or audits even when there is no internet connectivity.

Reports can be uploaded whenever internet access is available. Standard report formats, such as VIQ6, may be used or bespoke report templates created to meet any company/SMS processes.

Fleet officers and management performance and accountability - Assignment of responsibilities for both shore management and seagoing personnel is expanded in Version 7. Thus, performance analysis for all key personnel can be conducted and benchmarked as required.

What's next? - There is always more to do and it is certain that subscribers will continue to present Oceanfile with challenges to drive excellence and reduce risk.

Import of PSC reports will be added later this year and a consistent quantitative measure of risk values will do much to reduce the subjective approach to defining risk.

Oceanfile is also now working with a major classification society to extend the collaborative approach to tanker safety and pollution prevention among more stakeholders.

Capt George Bogris, QA manager TMS Tankers, has been using Oceanfile since 2013. He said "Oceanfile is at the heart of our quality and vetting management. We know precisely where problems are occurring and what we need to fix them. Oceanfile's reports and graphs are of great value for our management reports and TMSA reviews.

"Day-to day management of vetting, inspections, observations and dealing with updating the officers' matrix have been greatly simplified using Oceanfile and reduced the workload of our QA department. Regular upgrades to the program respond to our suggestions and greatly support our quest for constant improvement," he said. TO

Are we ready for the new ECDIS standards?

One of the most important issues currently ongoing with ECDIS is the technical revision of the S-52 standards.

Tom Mellor, UKHO head of OEM support & digital standards and also the Chairman of the IHO's ENC working group, explained: "Much is being written about the mandatory carriage of ECDIS, but one of the most important initiatives currently underway is the revision to the technical standards for ECDIS.

"Shipowners are encouraged to contact their ECDIS manufacturer and to plan early for the transition to the updated ECDIS standards, in order to ensure a smooth switchover and to take advantage of the benefits that the new editions will bring to the bridge.

"The upgrade requirements will vary between different ECDIS makes and models, so it is important that owners work together with their ECDIS manufacturers to identify the steps that need to be taken for all ECDIS systems across their fleet," he stressed.

In addition, the UKHO said that problems with counterfeit ENCs had been encountered.

Damian Bowler, UKHO Chief Commercial Officer, warned: "The UKHO has recently observed an increase in the number of counterfeit ADMIRALTY charts and publications. While some of the counterfeits are very easy to spot, others are more difficult to detect.

"The UKHO continues to urge all purchasers, users, inspectors and regulators to look out for counterfeit ADMIRALTY charts and publications. Counterfeit versions have not been through the same rigorous checking procedures as official ADMIRALTY charts and publications and cannot be trusted for voyage planning or navigational purposes. They are unsafe, unofficial, non-compliant with SOLAS and illegal to carry or sell. Buyers also carry the considerable risk of failing port state inspections.

"We are continuing to seek and stop the production and sale of counterfeit copies of ADMIRALTY products and have raised our concerns with the IMO, the IHO and flag states. We also encourage anyone that suspects they may be in possession of counterfeit products to get in touch with us," he said.

On recent flag state approvals, Christine Trickett, senior product manager (software and publications) at the UKHO, commented: "We are delighted that Italy has become the latest flag state to approve the use of e-NPs and ADP to meet SOLAS carriage requirements. This means that all ships under an Italian flag can now benefit from e-NPs and ADP, and the speed, security and accuracy they provide to bridge crews.

"Furthermore, 81% of the global fleet can now draw upon the benefits of the digital versions of these vital publications, further reinforcing the UKHO's commitment to supporting safe and efficient navigation around the world," she said.

The UKHO is continuing its successful seminar programme this year. Mellor explained: "Over the last four years, the UKHO has provided ECDIS advice to

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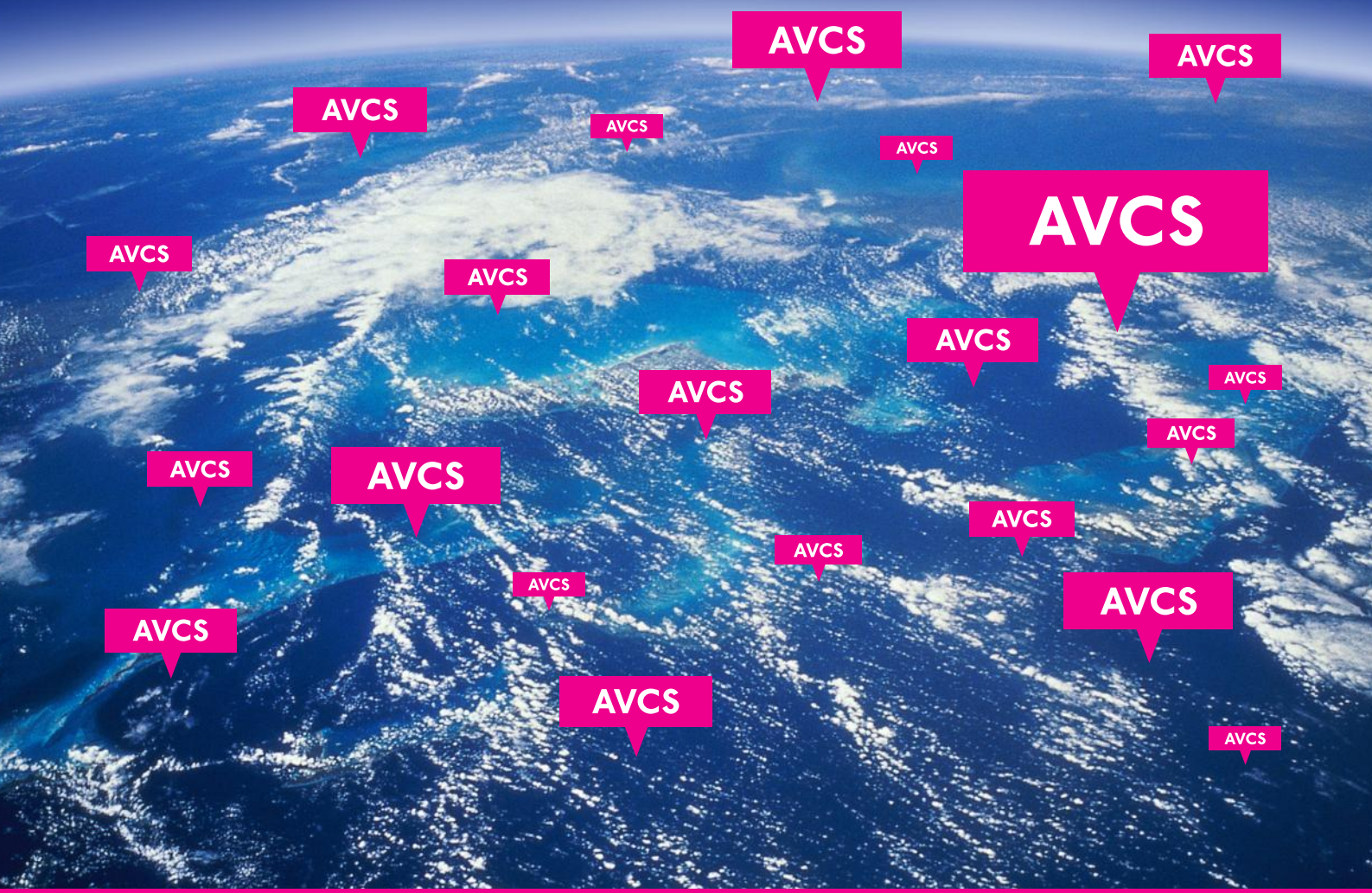

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UKHO's Tom Mellor.

thousands of people around the world. From our first 'Are You Ready for ECDIS?' seminar to the latest 'Living with ECDIS' seminar, we have sought to ensure that the guidance we offer reflects the progress that shipowners and operators have made in their own use of ECDIS and the challenges they face at each stage."

At this year's Posidonia exhibition, the'Living with ECDIS' seminar will address the constant awareness needed to the changes in legal requirements and maintenance issues.

Presented by Capt Paul Hailwood and Mellor, the seminar will highlight the responsibilities of the shipping company in relation to key issues.

The issues include -

- Legal requirements.
- ECDIS maintenance.
- Chart data considerations.
- ECDIS management.

In another move, the UKHO and the Maritime and Port Authority of Singapore (MPA) have inaugurated a new bursary training scheme in Marine Cartography and Data Assessment.

Organised jointly by the UKHO and MPA over a five-week period, it started on 18th April, 2016 at the MPA Academy in Singapore. The course will train attendees on compiling and maintaining navigational charts.

Drawn from 10 countries, the attendees will comprise employees of their national hydrographic offices, port authorities and/or related national agencies involved in the production and maintenance of navigational charts.

The course will equip students with skills to create and maintain paper and digital charts utilising computer-aided cartography applications, the UKHO said.

Rear Admiral Tim Lowe, National Hydrographer and UKHO deputy CEO, explained:"The UKHO and MPA have a well-established relationship on hydrographic training and we are very proud of this bursary training scheme in partnership with MPA. Our support for this course reflects the UKHO's deep commitment to raising the standards of hydrography, cartography and hydrography around the world.

"The course will bring together employees from government hydrographic offices within Southeast Asia, Australasia and the Pacific Island Community who will undoubtedly benefit from this professional development opportunity," he said. TO

ECDIS laid bare

One of the major problems with ECDIS is that today there are some 38 manufacturers producing systems with no standards.

Many of the systems are totally different in how the displays are shown and what level of knowledge is required to operate them.

At a seminar organised by ECDIS Ltd, managing director Mark Broster explained that due to the influx of suppliers, by 2010 it had become evident that type specific training had become more important than generic training in the company's training portfolio, mainly due to the IMO mandate.

Broster had started the company a year before seeing a niche in the market for ECDIS training.

In 2011, mobile training was introduced whereby the company would offer its service wherever it was needed worldwide and today very little is conducted in the UK, partly due to the decline in the number of UK flag vessels. The vast majority of training is now conducted overseas.

This year, ECDIS Ltd is looking at computer based training (CBT) methods, but Broster said that the company was not too comfortable with this type of training just yet.

In general, the technology to train navigators, such as the use of simulators, is becoming much cheaper, as are the ECDIS and ENCs themselves, as the industry embraces the new technology. For example, an ECDIS can cost between €7,000 and €20,000 per unit, while ENCs have come down significantly from around €22 per cell while the cost of sending ENCs and other information to vessels has also reduced dramatically on the back of VSAT and Fleetbroadband.

Broster warned that the use of ECDIS breeds laziness as many navigators copy routes when voyage planning or just download plans from the office. Not all the ECDIS are intuitive with navigators having to drag certain information out of some systems, which is often not easy to find.

The IMO has advised on four steps as to how to reduce groundings and collisions through route planning on an ECDIS. Basically this is -

- Appraisal- Gathering of information.
- Planning - Route creation and checking (signing off a chart).
- Execution - Interpretation.
- Monitoring - Cross checking.

Broster said that grounding principles have not changed by using an ECDIS. One of the problems is that despite being introduced as long ago as 1987, the ECDIS will only show what is dangerous for you when checking a route.

It will not take into account the most practical route when voyage planning or the environmental conditions that could be faced en route. He asked; "Have the supporting appraisals been introduced into an ECDIS?" He showed an example of a safety contour but said this was only for use in coastal waters.

"Can you show an inspector how to insert a pencil alarm on an ECDIS? They all have this additional function, but some are better than others to understand," he said. "Has the system been designed by software engineers or navigators?"

Assisted collisions

He said that groundings were becoming less of

ECDIS Ltd offers type specific training at its Hampshire UK headquarters as well as worldwide.

The company has also become involved in simulator design and installation.

a problem with an ECDIS, however, collisions were more likely, as everyone uses the same sea lanes as shown in the system going back to the comment about the most direct route. “The system can work if it is set up properly,” he stressed.

Turning to the threat of Port State Control detentions- ECDIS Ltd is currently training MCA and OCIMF inspectors, among others. There are instances where an ECDIS is no longer an ECDIS with the wrong ENCs inserted. Broster said that some systems give no indication as to which ENC is being used at a particular time. “Once again no standards are in place,” he said.

Seafarers need to be able to prove that chart corrections have been included to PSC inspectors. With the new S-52 version 4 IHO standard, will the system be able to tell a user that chart corrections have been included? The IMO has given the new version another year - to 2017 - before it is mandated on a new ECDIS, as some systems won’t support it.

The UKHO advised that from August, 2015, the new edition of S-52 will be the reference for the type approval of new ECDIS. Existing ECDIS will have to be now upgraded to the latest Presentation Library by August, 2017.

It is worth noting that the IMO stated in Circ.266/rev1 ‘ECDIS that is not updated for the latest version of IHO Standards may not meet the chart carriage requirements as set out in SOLAS’, the UKHO warned.

Broster also warned that since about 2013, PSC had been and still is taking more of an interest in the use of ECDIS/ENCs. In response, ECDIS Ltd started a global PSC course in 2014, which is becoming more popular with organisations and administrations.

Today most countries have different ENC standards while before most people followed the UKHO. Temporary and Preliminary (T&P) ENCs might or might not have been highlighted in the Admiralty Information Overlay (AIO) system on an ECDIS. “Some don’t have it and if they don’t have an AIO, then navigators won’t know what changes were made to the ENCs,” Broster said. “The navigators will have to interrogate each ENC cell individually.” The AIO can be switched on or off as necessary, he advised.

He asked; “Do we have the capacity to take in several overlays on an ECDIS?” He thought operating an ECDIS is sometimes more of a generation problem in that today’s younger generation were used to mobile devices with apps, etc, while the older navigators were more used to looking out of the window and using paper charts.

Trials are also underway to gauge how easy it is to mount a cyber attack on navigational software at the company’s Hampshire, UK headquarters. Broster warned of the dangers of putting a voyage plan on a USB stick, which is then inserted into an ECDIS and also of third party information downloads. ECDIS Ltd is currently compiling a paper on the subject. Malware could close down a navigation system or cause a complete blackout. “Should we be concerned?” Broster asked.

Inspectors course

As mentioned above, fast becoming one of its most popular courses, ECDIS Ltd recently welcomed the 400th student to attend its Inspectors Course.

This course has evolved over the last five years to be exactly what the inspector needs, namely relevant questions to ask, and reasonable expectations from the bridge teams on the practical understanding of their navigation system, the company said.

It aims to give the inspector the right level of understanding of the minimum standard expected over all 38 ECDIS manufacturers and practical questions to ask the team ensuring the ship can safely use its ECDIS, regardless of what certificates are being held.

It was recently summarised by Harry Williams, an inspector during an OCIMF course, as "The best practical training course relating to the job I have ever attended."

Broster commented "Our key focus on the Inspectors course was to pro-actively help the industry learn what specifics to look for when dealing with observations, detentions and recent groundings that could have been avoided. We have seen considerable take-up from all sectors of the industry as they have seen the true potential in this course as a means of helping mitigate risk"

ECDIS Ltd now offers 30 STCW courses and has a wide portfolio of courses, ranging from deck to security, The company has a growing client base of 150 large commercial shipping companies, governments and military clients worldwide.

Broster advised those involved in the operation of an ECDIS to visit www.ecdisregs.com where comprehensive lists contain various information on the manufacturers, rules and regulations pertaining to systems operations.

The Safety Management System (SMS) manual has around 500 pages so he advised the use of a flip chart outlining the salient points, which could be placed next to an ECDIS with page references to the manual. About a dozen or so procedures could also be housed near the ECDIS.

Of the 38 manufacturers, in a few years we will probably be left with just six or seven, Broster said. TO

ROOM ONBOARD FOR ALL

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ENC downloads becoming more competitive

Last month, Nautisk launched a new service - FlatFee.

This is a new, premium service, which enables customers to take advantage of an annual price to simplify budgetary planning when ordering ENCs.

The FlatFee concept is based on offering a fixed price for ENCs (AVCS or Primar) with a single invoice per vessel issued once a year. Using FlatFee, customers can download charts and permits, export to the ECDIS and sail without having to check that licenses are up to date or pay for ENCs on a per-voyage basis.

Peter Pran, Nautisk head of global sales, said: "Shipping companies have a wealth of administrative tasks which have to be completed on a daily basis. Add these to management of operational schedules, crew and ships services, voyage planning, vessel maintenance and regulatory compliance and officers both on board and ashore have very little time. We are constantly looking for ways to make working processes more efficient and FlatFee does just that."

Using FlatFee, customers can choose flexible voyage options with the option of a primary zone, additional zones or worldwide license.

Pran explained: "As well as ENCs, FlatFee can be purchased alongside NaviTab with the service, meaning that they will have access to the industry's first information library and data portal on a single, hi-spec hand-held tablet.

"FlatFee strengthens our commitment to provide the mariner access to compliant data quickly and efficiently. Combining transparent invoicing and giving customers the ability to pre-budget allows us to help them make their operations more effective, whilst at the same time growing our own voyage planning portfolio."

Nautisk has been supplying maritime charts and publications to commercial shipping since 1896, since its beginnings as the chart division of NHST.

In conversation with *Tanker Operator*, the company said; "In general, there is an increased demand for predictable costs. FlatFee allows us to offer this to our customers. Many customers are currently operating with day rates, so the introduction of FlatFee means that the purchase of charts (and by the end of the year, publications) can now be a part of their fixed budget for up to three years in advance.

"In addition, our customers are looking to reduce the number of invoices they have to deal with. With FlatFee, we can issue one invoice per vessel or company per year," Nautisk said.

Protocol developed

To cater for downloads, Nautisk has developed a protocol that resumes the downloads from last drop out, known as ECTP (efficient transfer protocol). "Many customers have satellite communications and black outs can occur in certain areas, for example behind cranes, buildings, mountains, under bridges or from solar interference.

"We have incorporated this protocol into our Neptune software to reduce the amount of data the vessels need to download. Customers can choose to download ENCs, publications or even paper chart corrections. In addition, Neptune gives customers the opportunity to decide what area they want ENCs for and can be customised to any customer need," the company said.

As for download costs via satellite, Nautisk said; "VSAT capacity is increasing and the market is quite competitive, so communication prices and download options are getting better and better for customers. Some VSAT suppliers are now offering download services for ENCs, but ENC downloads can easily be done via the standard VSAT trunk that customers are already paying for.

"Getting the most cost effective solution is more the down to ENC distributors than VSAT providers, by reducing data download. We think the future will bring an even greater demand for higher communication speeds with the emerging eNavigation solutions. More data is expected to go both out- and inbound from the vessels," the company explained.

As for the service providers. Nautisk said that it believed that is it up to the customer whether they use the company for the provision of all digital charts, digital publications, paper charts or paper publications, or a combination of providers. "That said, customers that deal with us exclusively can benefit from a very favourable pricing structure," the company added.

"By offering AVCS and Primar, Nautisk offers 100% coverage, so it is really down to customer preference as to what product they have on board. We work closely with our customers to guide them through the advantages and benefits of each solution," the company concluded. TO

Nautisk's Peter Pran.

Navico beds down MARIS

Navico Holding, owner of the Simrad brand of navigational marine electronics, significantly expanded its service offering last year by acquiring MARIS.

With more than 10,000 navigation systems delivered, MARIS is one of the leading suppliers of ECDIS systems worldwide. This acquisition was described as a significant milestone in Navico's continued investment in the commercial marine sector.

MARIS ECDIS, radar/ARPA overlay to ECDIS, and VDR solutions complement Navico's Simrad commercial vessel product portfolio. In addition, MARIS electronic chart distribution, chart management, navigation and fleet management data solutions are used by some of the leading shipping companies worldwide, the company claimed.

With the acquisition, MARIS brought an extensive service network of more than 70 locations and more than 100 certified ECDIS training centres worldwide to Simrad's network of over 150 certified dealers.

The full MARIS product portfolio and the brand is now integrated into the Simrad product portfolio as the Simrad MARIS series, significantly increasing the company's inroads into the commercial deepsea shipping sector.

At a recent presentation in Egersund, Norway, Jose Herrero, executive vice president and managing director of Navico's Commercial Marine Division, said the group could now offer the full marine electronics value chain. He claimed that Navico was now in second place behind FURUNO in marine electronics sales. Today, companies need scale, as some suppliers were suffering through a lack of orders, which could result in more consolidation in the sector.

In the commercial shipping division around 55% of Navico's sales concern navigation equipment, around 70-80% of which is manufactured in Mexico but with a global distribution system in place.

He also said that he firmly believed in equipment integration and being a "full competence" company although using some third party products as integrators. He admitted that the company did not have an IBS/INS offering, resulting in integration with other manufacturers equipment if asked to supply a full bridge layout."We need to control our costs. Third parties add up," he explained.

By acquiring MARIS, today, Navico has more than 4,000 ECDIS in service, plus around 30,000 radars - not all of which are being used on commercial vessels - and 40,000 autopilots.

Ageing systems

Some ECDIS are becoming old so the software needs upgrading or programmed anew. There could also be problems with the hardware, much as the same as a PC, as being at sea, an ECDIS can suffer more from wear and tear.

Herrero explained that operators do not need extra training if the ECDIS is just upgraded as the license is transferred, although several ECDIS will need replacing, due to new regulations and the fact that there is a seven to 10 year recycling market for earlier systems.

Navico supports all ENC suppliers, which is something of a hotbed in Egersund, as apart from Navico, Jeppesen- recently sold- and Navtor are based in the area.

He thought that the ECDIS market was fragmented between the early adopters and those leaving the fitting to the last minute. He described the market as being three-tiered.

- Tier 1 was the high end of the spectrum whereby owners saw the necessity to fit a third ECDIS for voyage planning and back up purposes.
- Tier 2 involved shipowners who wished to be compliant with twin ECDIS.
- Tier 3 were the non-complaint ships whose owners still wanted ENCs. These vessels are fitted with only one ECDIS and create a potential for sales growth going forward.

Tier 3 owners tended to be those with only a small fleet of say five to seven vessels or below, Herrero said.

He agreed with ECDIS Ltd's Mark Broster's comments (see page 35) that it was the younger generation who adapted more easily to ECDIS use, as they had little experience with paper charts and were more used to modern electronic systems. He also agreed that viruses was a major problem, as most ECDIS are run on Windows, similar to PCs at home.

Herrero believed that ECDIS was becoming more important, as they can be fitted with radar and or AIS overlays, plus other voyage enhancement systems.

Navico's Jose Herrero.

He estimated that around 50% of the world's fleet had ECDIS fitted but thought that the transfer of ENCs was still inefficient. How to manage the downloads would will take on greater significance in the future.

Geir Lyngheim Olsen, acting manager of MARIS marine data services (MDS) chart service said that Navico had integrated ENCs from Primar, UKHO, C-MAP and Navtor. A new fleet management portal has been introduced for ENC tracking and to provide an easier approval process for any ECDIS worldwide.

Last year, this service handled the fully automated ordering of 35,000 ENCs, he said with more than 1,700 active vessels/end users with 400 plus weekly update transfers and 50 orders per day for other products.

He foresaw fully automatic voyage planning using ENCs coming soon and shoreside support is already available online for any Navico applications.

One of the latest offerings is the MARIS ECDIS900, which has a familiar user interface with Windows, comprehensive features with interfacing options, chart management via email and the Internet, plus the MARIS bridge assistant and customer portals. Training is also offered. TO

Artemis sensor system gains a new owner

The patented Artemis (automatic ranging theodolite eradiating microwave signals) system, first introduced to the offshore market in 1972, is today claimed to be the world's leading, long-range microwave position reference sensor.

It is typically used for dynamic positioning (DP) of tankers manoeuvring against major infrastructures at sea.

The development of DP operated shuttle tankers represents a significant contribution to the successful history of offshore oil loading in the North Sea.

Successful Artemis system trials were held with Statoil in 1981 at a single point loading facility at the Statfjord Field with the tanker 'Wilnora'.

Initially, it was seen more as an experiment rather than a permanent solution. At the time, the system was considered as a stop-gap measure to get oil ashore, the intention being, in the long run, to construct a pipeline from Statfjord to the shore.

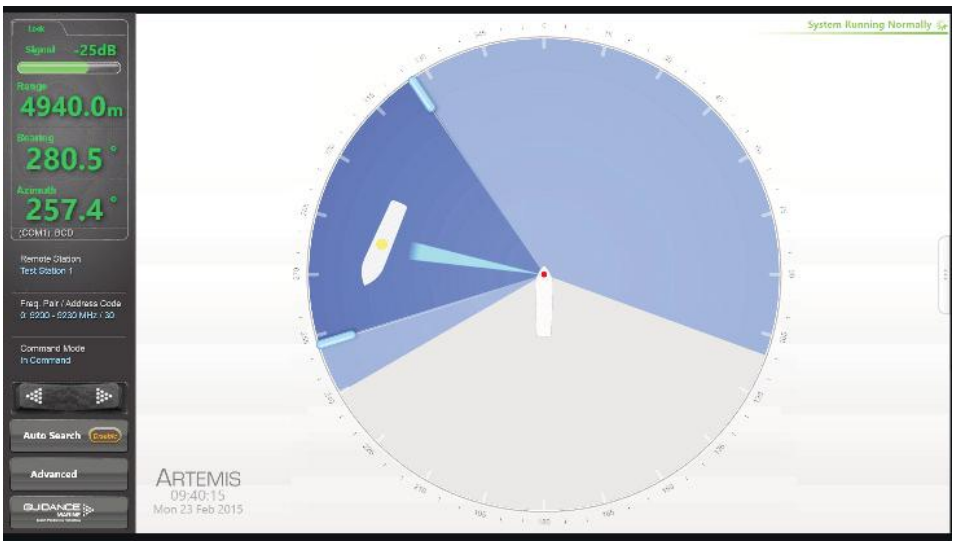
However, the results of the 1981 experiment were sufficiently encouraging for Statoil and then, the industry as a whole, to consider shipments by DP shuttle tanker as a life of field solution rather than a short term interim expedient.

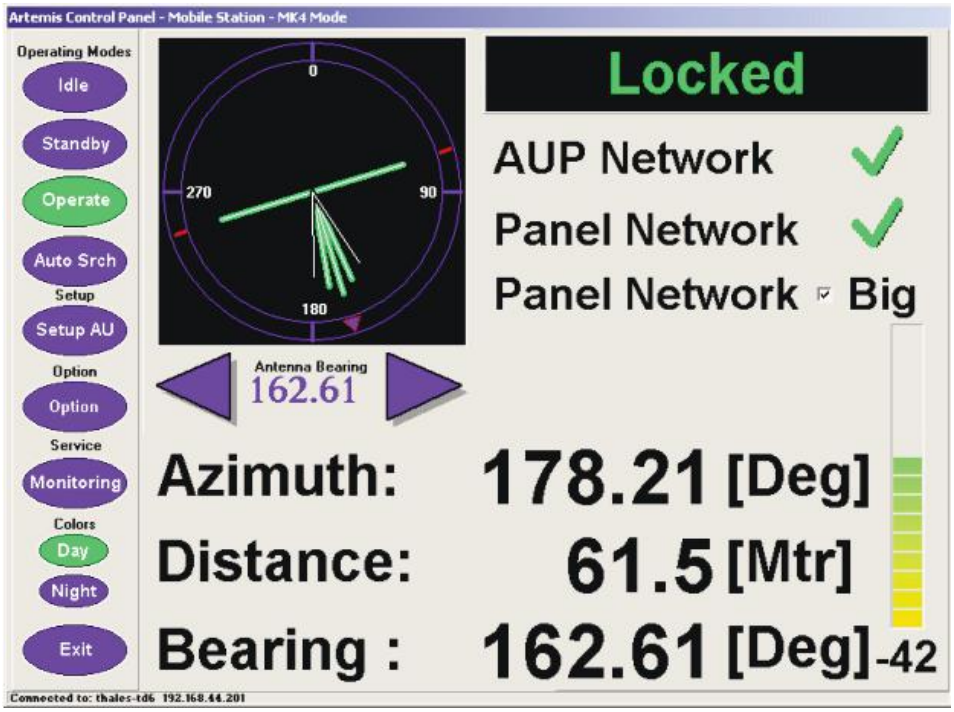
DP operation of shuttle tankers was a significant step in the industry. Single point mooring has now been overtaken by FPSO to shuttle tanker offloading. Today, it is common operational procedure and has become routine practice accepted by the oil industry.

Over 10 years ago, there were more than 50 DP tankers in operation serving more than 40 different oil fields in the North Sea, Canadian and Brazilian waters. Today, this number is growing, as is the evolution of the Artemis sensor under the ownership of Guidance Marine.

Guidance Marine completed the full acquisition of the Artemis product and brand from CHL last year.

"This is a strategic acquisition for Guidance Marine. It extends the reach of our existing





The company has co-ordinated its approach to user interfaces.

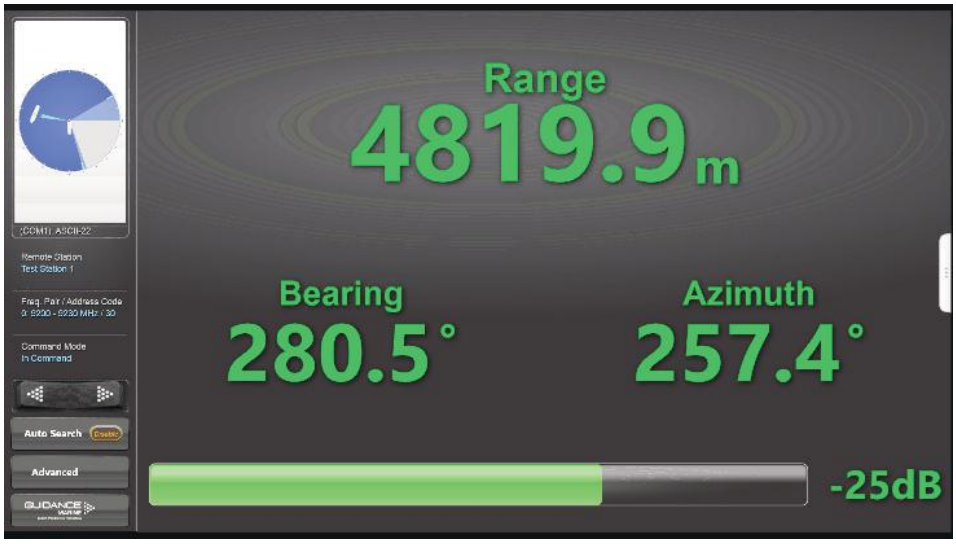
product portfolio of market leading local position reference sensors. Guidance Marine has extensive expertise in laser and microwave technology and a customer centric attitude. This makes us the right people to build on more than 40 years of successful Artemis history. We will bring our technical and commercial skills, processes and innovation to an exciting new generation of Artemis products," Jan Grothusen, Guidance Marine CEO said.

Shuttle tanker package

Building on more than 40 years of history, and now, as part of the Guidance Marine product portfolio, it can be supplied as relative positioning sensors ranging from 10 m to 5,000 m, which includes a package that has been tailored for shuttle tanker owners and operators.

Upgrading and training programmes are available for operators that wish the refine their Artemis system skills, the company said..

Today's users will be more familiar with the old Teledyne RESON BV user interface. Guidance Marine visited a number of shuttle tankers and engaged with end users of the Artemis system to further understand their requirements and add a co-ordinates mode to the dashboard following their comments.



These improvements have also been made in the CyScan and RadaScan dashboards – maintaining the company's co-ordinated approach to user interfaces, to benefit the user in training.

As a result, in line with Guidance Marine's three-year warranty, customers can make use of the latest robust, reliable and proven Artemis sensor with an innovative touch screen dashboard as standard, the company claimed. TO

Examining 4-stroke engines and turbochargers

Large tankers of all types are normally fitted with 2-stroke prime movers. However, some smaller chemical and products tankers are fitted with 4-stroke diesel engines.

The smaller vessels are often found trading in ECAs, such as the Baltic and North Seas, meaning that attention must be paid to low sulphur fuels.

At a recent presentation in Augsburg, Germany, MAN Diesel & Turbo (MDT) outlined the latest technology behind the 4-stroke diesel engine and the two-stage turbocharger, which the company said was becoming popular.

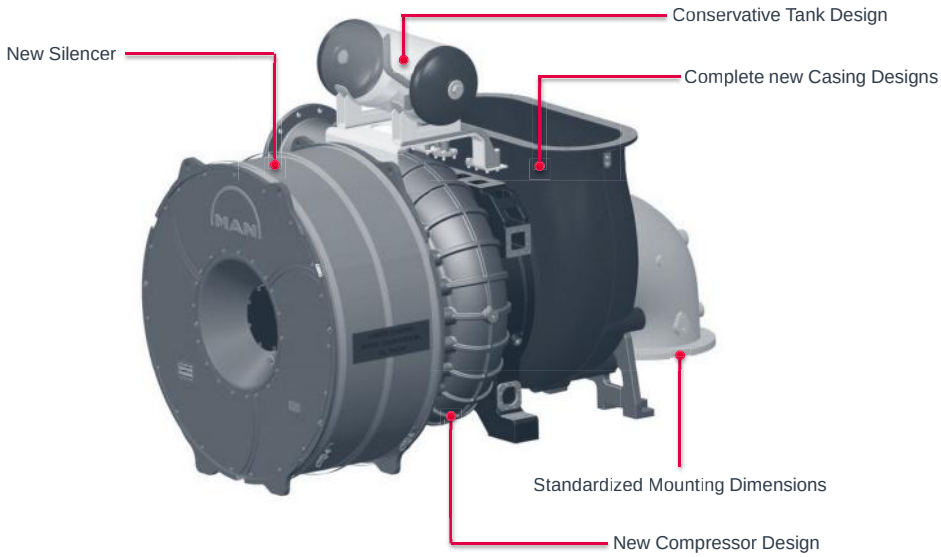
In today's world, emissions control has largely taken over from fuel consumption as the main concern among shipowners and operators, especially given the lower oil prices, which in turn has led to a significant drop in bunker costs.

With MDT's 4-stroke engine family, the engine manufacturer has developed an enhanced fuel switch module (EFS) for the safe changeover from HFO to MGO for low sulphur (SOx) restricted areas, such as ECAs. For NOx restrictions (Tier III), MDT has developed the selective catalytic reduction (SCR) system, while for CO2 and fuel economy, the common rail technology was introduced.

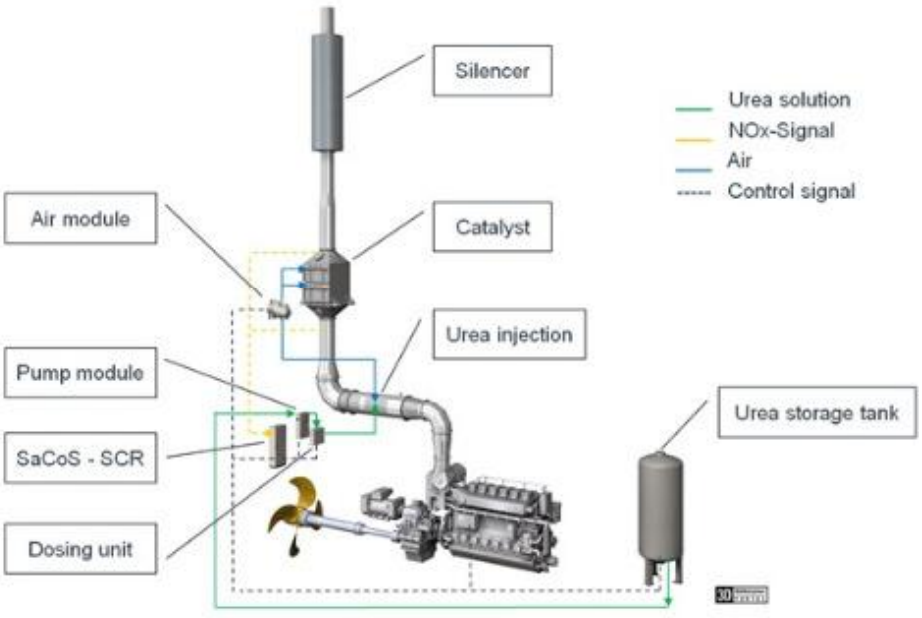
Fuel switching was usually accomplished manually with its high level of complexity. This complexity could lead to operating errors, which in turn could lead to a loss of propulsion. By introducing the EFS, safe and beneficial fuel switching is now possible, MDT said.

The company claimed that by using the EFS, a company will benefit from lower opex due to the lower MGO fuel consumption at the switch over. It is also a fully automated system rather than the manual method and needs less documentation for IMO inspections, plus it has a defined switch over time, which all lead to a more reliable and safe vessel operation.

For Tier III regulations, MDT's common rail, plus an SCR and a safety and control system



TCT design features.



MDT's IMO Tier III SCR system for medium speed engines.

(SaCoS) fitted on the engine enables a vessel to operate at a reduced fuel and urea consumption at the same time. The company said that this combination gives flexible injection rate and injection timing (load independent), plus the potential for multiple injections and optimised urea consumption.

Integration

MDT's SCR solution integrated with the engines is a core competence giving an intelligent exhaust gas temperature control to optimise system efficiency and up to 2.5 g/kWh fuel consumption savings during SCR operations, compared to a third party SCR supplier, the company claimed.

The integration also offers closed loop control to minimise urea consumption. It was released for use with MGO, MDO and HFO containing up to 3.5% sulphur and in combination with dual fuel engines, while a modular SCR components kit optimises flexibility and costs, the manufacturer said.

At the presentation, Dr Sebastian Kunkel, MDT's head of development projects, engineering 4-stroke, explained the company's design philosophy to improve its 4-stroke engine portfolio.

He said MDT uses the latest simulation tools and designs engines to comply with the latest regulations in the best and most beneficial way for the end user. The engines' interface were also designed for standardisation.

The engines consists of three major modules -

- Power Unit- depends on fuel usage.
- Base engine- depends on number of cylinders.
- Turbocharger- also depends on cylinder count.

Dr Kunkel said that MDT's engine portfolio concept leads to lower costs and ease of retrofits. A robust and low friction design also leads to high product reliability and efficiency.

Combustion

For combustion, the target was the behaviour between fuel oil consumption and smoke emissions while fulfilling NOx emission limits. The manufacturer aimed to attain the best trade off between efficiency and emissions though single cylinder engine optimisation, which means optimising the combustion behaviour in such away that the engine's peak cylinder pressure capability is utilised without exceeding the NOx emission limits.

Dr Gunnar Stiesch, vice president, advanced engineering and exhaust after treatment, engineering 4-stroke explained that MDT has developed an SCR Tier III system for its entire medium speed engine portfolio.

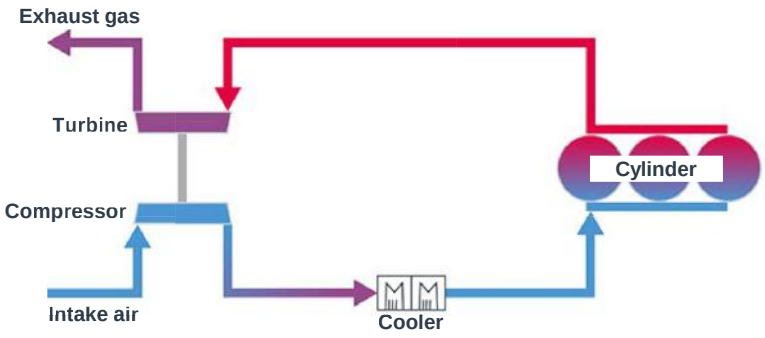
MDT's SCR was designed as a modular system to give minimum cost, maximum flexibility and fast order management. Its core components are -

- Reactor and honeycombs.
- Urea dosing and mixing units.
- SaCoS electronic control system.

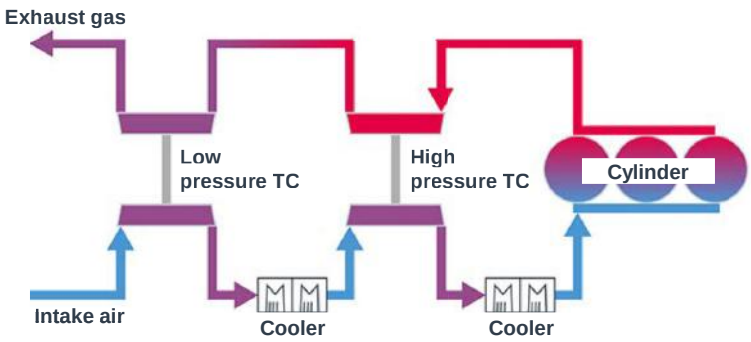
Dr Stiesch also claimed that MAN operates an easy and convenient Tier III certification service, plus the world's first IMO Tier III EIAPP certification as the entire engine portfolio is approved by the class societies.

Training is offered through MDT's PrimeServ academy both for operation and maintenance purposes and client support and

One-stage turbocharging (industry standard)



Two-stage turbocharging



Optimization of turbocharging

- **Higher pressure ratios**

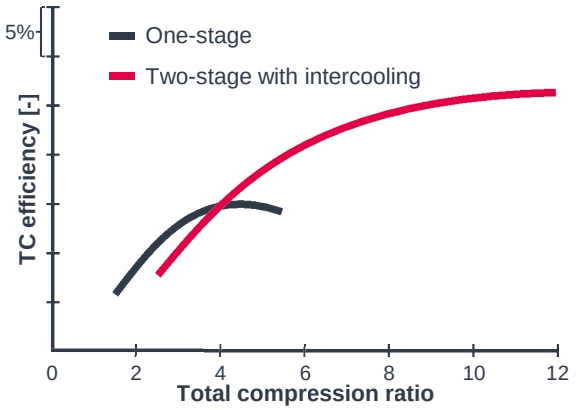
  $\Pi_{2\text{-st, C}} > 10$

  $\Pi_{1\text{-st, C}} < 6$

- **Higher TC efficiency**

  $\eta_{2\text{-st}} > 75\%$

  $\eta_{1\text{-st}} < 70\%$



other services are also available.

Turning to the resurgence of the two-stage turbocharger, Daniel Albrecht, project manager TCX, explained that the two-stage turbocharger had a long history but since the late 2000s, there had been a revival of interest in this particular technology.

There are four MAN two-stage turbocharged engines in the TCX range of which three are new. For example, the 18V48/60 TS was introduced in 2012, while the 18V51/60G TS (gas engine), the 12/20V32/44 CR TS (common rail) and the 12/20V35/44G TS (gas engine) were unveiled last year.

More efficient

Albrecht claimed that the two-stage TCX turbocharger series were more efficient than their single stage counterparts, which was led by new demands, such as EEDI and CO2 awareness. This was addressed by the introduction of ECOCHARGE to reduce specific fuel oil consumption (SFOC) through the use of the two-stage turbocharger.

MDT's experience in the power generation sector has supported the introduction of the to-stage turbocharger in the marine sector, the company explained.

MAN turbochargers are built at three sites - Augsburg (Germany), Velka Bites (Czech Republic) and Changzhou (China). There are also three licensees - STX (South Korea), Mitsui and Kawasaki of Japan

MDT claimed of have the widest range of turbochargers available for 2-stroke and 4-stroke engines with more than 7,000 axial turbochargers in service and more than 9,000 radial turbochargers in operation. An interesting statistic is that some 60,000 have been delivered in 80 years with 30,000 coming in the last 10 years.

Head of turbocharger marketing, Sephardim Koblenz, summed up by saying that today's requirements were scavenging air pressures of 4.2 - 5 bar, a Tier III capability, price and weight constraints, the highest efficiencies and waste heat recovery systems added.

However, the requirements were adjusted to focus on a Pscav of 3.5-4.7 bar as the trend is now for lower scavenging pressures. The Tier III capability is still the highest priority, Koblenz explained. He also said that higher specific volume flows possible - the downsizing effect - and the inclusion of WinGD requirements and more efficiency.

In summary, the TCT main features are -

1) Low CAPEX -
- Recently developed compressor stage with good specific air mass flow enables resultant downsizing.
- Downsizing results in smaller, lighter design and less costs.

2) Easy installation on the engine reduces costs for engine builders.
3) Low noise emissions -
- New air intake silencer developed for TCT being tested with a TCA.
- Air outlet silencer currently under development.

4) Low OPEX
- Downsizing also results in lower operating costs.

5) Easy to service
- Smart design solutions, such as Superbolt.
- Overhaul every 36,000 operating hours, no intermediate inspection.
- Proven design concepts like bearing design or emergency lube oil tank.

The cost differential was put at €400,000 and return on investment (ROI) was claimed to be around 2.5/3 years. Service was said to be not a problem with two-stage turbochargers over the one-stage version.

Another comment made was that the engine and turbocharger design must go hand in hand.

Other new innovations include the electrical turbo blower (ETB), which was developed for exhaust gas recirculation of Tier III 2-stroke engines and is scheduled for first delivery next year. There are two frame sizes covering the entire portfolio of 50 bore engines and above.

Wärtsilä's digital services to enhance performance

Towards the end of last year, Wärtsilä launched a new service portfolio - Wärtsilä Genius Services - to help customers gain opportunities from digitalisation.

Three product families come under Wärtsilä Genius services – Optimise, Predict and Solve – which enable the optimisation of customers' assets in real-time, improve predictability and help solve issues with digital solutions, the company claimed.

Wärtsilä found that in the marine markets, customers were typically looking for increased reliability, ensuring safe operations in harsh environments, maximum uptime, greater operational efficiency and better environmental performance.

As for its three strings -

- **Optimise** is tailored to increase the competitiveness and efficiency of customers' operations. For example, Optimise solutions will enable the monitoring of fuel consumption in real-time and the adjusting the ship's position to the optimum with the help of trim advice.
- **Predict** will improve customers' asset and business availability and predictability with lifecycle maintenance. For the customer, this means better visibility into the coming maintenance need, thanks to which maintenance can be performed based on actual condition and not according to a predefined schedule.
- **Solve** will ensure the safety of customers' operations and allow them to get instant support whenever and wherever they need it. Thanks to Solve services, Wärtsilä's customer can share their computer screen with company experts on shore.

In conversation recently with Sini Spets, vice president, business development and Stefan Nygård, general manager, asset performance optimisation, *Tanker Operator* was told that customer needs varied greatly.

For some, "easiness and peace of mind" comes from dealing with as small number of partners and suppliers as possible. For others, it comes from having full transparency of service, transactions or work done and they are happy to have this kind of piecemeal approach with larger number of suppliers. These different needs require adaptability of solutions and business models.

The piecemeal approach leaves the integration work to the customers, however, they is seldom interested in this work or have the capabilities to carry it out. "So at the moment, we see that customer demand is moving towards more holistic approach that covers the whole vessel. This means that our customer relationships are developing into deeper partnerships with a focus on growing our customer's businesses by creating new ways to utilise data and intelligent solutions.

"This will not only mean time and cost savings, but will also lead to a new level of equipment performance and operational efficiency, resulting in a direct impact on our customers' business top line," they said.

The service is also aimed at third party equipment, which can be supplied by Wärtsilä or by another company. "In order to build up the holistic approach discussed earlier, we need to integrate with all the other equipment on the vessel," they explained.

They also explained that this service is aimed at both the crew on board, as as well as for the shore side technical superintendents. "Both need to be in place because a service targeted only for shore will not deliver the promised value. We need to make sure the on site crew really buys into it and takes the necessary actions. These actions will then be based on relevant, high-quality information and automatic recommendations."

Digitalisation also means that different players in the marine eco-system /value chain come closer to each other. In addition, digitalisation could mean – in a very long term – that human capabilities are leveraged to and used in new types of roles and tasks. Simple, mechanical task that can be automated will be automated.

Explaining the difference between diagnostics and the new service, they said that Wärtsilä had been undertaking condition monitoring and asset performance optimisation in one form or another for 20 years. However, now we are at the dawn of digitalisation. There are many factors by which the new digital services will change the way business is done in the future. Utilising data and information based on analytics can enable better operations and business planning, help to secure and optimise operations and improve the safety and efficiency of equipment.

As the amount of data keeps growing, so does the need for analytical skills. "Condition data as such is useless unless it is turned into meaningful information that can be applied to, for example, maintenance planning or troubleshooting," they stressed.

As the whole, the industry is changing. The goal is to help customers grow their business through value adding digital services and solutions that have been created together with them. "This will mean moving towards a more comprehensive digitalised approach, where we are optimising our customers' business," they said.

Customers are interested in both fuel savings and emissions control today. Fuel is still a very considerable part of the total cost and it does make sense to optimise this. With higher efficiency, emissions will also be decreased, achieving cleaner burning, etc. However, emissions control is mostly driven by legislation.

Sea-routing was mentioned as part of the services on offer. Spets and Nygård said:"We are working on this topic and we have some capabilities in-house. In the future, we might also very well collaborate with some external experts in this area."

These type of services could lead to vessels

being equipped with more and more sensors. “Already today, we have a lot of data available through existing sensors and systems. In addition, we might need to install additional ones. Sometimes we even need to add new cabling. When this is necessary, we use the industry best practices for selecting cables and commissioning,” they explained.

Having run remote operations for 20 years, they said that Wartsila has employed personnel dedicated to monitor, analyse, give feedback and help customers.

Understanding the complex interactions of multiple systems requires highly skilled experts, who can see the big picture and identify the potential needs for additional support, as well as provide hands-on technical expertise.

“What we see happening now is that even though we build more advanced analytics together with the customers, we don’t necessarily need more people to work on the analysis. Instead, more effort is needed in building the models, algorithms and user interfaces that truly benefit the customers,” they concluded.

Measuring services

Wärtsilä has also introduced alignment and measurement services to increase customers' operating time by measuring, analysing and correcting alignment issues in propulsion equipment.

"Problems in alignment can lead to serious damage if not detected and remedied in time. As the misaligned equipment rotates, it causes vibration and stress that can result in breakdown of the shaft assembly or, in the long run, even large-scale damage to struts and hulls. Costly repairs and downtime can be easily avoided by regular alignment inspections and realignment when necessary," said René Bertelsen, global sales manager, seals & bearings alignment & measurement services.

Wärtsilä uses patented gyro laser technology to measure the bending line quickly and accurately. Used together with a jack-up system, it allows the engineer to compare the measured bending curve with the actual load in the bearings. Realignment of shaft lines only takes a couple of hours once the necessary tools are in place. Shaft realignment is also useful in case of a bearing failure: measuring and correction can help bring the ship to safely dock for repairs.

In addition, when a stern tube bearing, seal or shaft fails, finding the root cause quickly is of the essence to the customer's operations. For this purpose, Wärtsilä has developed a portable condition measurement system. With this new technology, health checks of equipment can be carried out flexibly while the vessel is in operation. Service engineers can measure the vibration, temperature, torque and position of the equipment to determine the reason for the failure and make the necessary repairs and adjustments.

"Troubleshooting is now easier than ever. Vessels with constant charter can have the portable measurement equipment mounted while loading or unloading cargo to avoid downtime. Monitoring can be initiated within one day, and the system logs all incoming data from the equipment while the vessel is in operation, helping to detect any abnormalities in the functioning of the equipment," Bertelsen explained. "This is a significant innovation that benefits all ship operators, but cruise and ferry operators and container vessels in particular, as avoiding vibration is very important to them and unexpected interruptions can become very costly."

The alignment and measurement offering has been expanded to cover a wide range of equipment: stern tubes, propeller shafts, intermediate shafts, engines, gearboxes,
shaft generators, rudders and hulls. All work is carried out using class-approved methods. The new service is available worldwide. TO

ABS publishes condition monitoring guidance in two parts

The Guidance Notes and Guide provide information for choosing monitoring techniques and insights for achieving classification, ABS said.

ABS has published two documents to help industry with condition monitoring - Guidance Notes on Condition Monitoring Techniques helps owners choose appropriate monitoring techniques, and the Guide for Surveys Based on Machinery Reliability and Maintenance Techniques provides updated methodologies for achieving classification notations applied to machinery reliability and maintenance management programmes.

The newly issued Guidance Notes include a summary of condition monitoring techniques, guidance for selecting the appropriate technique based on expectations and needs, information on measurement frequency, personnel skill requirements, company resources, and approaches to risk assessment.

It explains the process and requirements for ABS review of design submittals and explains how designs and maintenance plans throughout lifecycle stages of the asset are analysed.

"There have been significant advances in condition monitoring software and diagnostic technologies that have the potential to improve operational efficiency and enhance overall safety," said ABS CTO, Howard Fireman. "These changes are reflected in these newly released documents."

Better system selection

Condition monitoring can reduce the amount of time equipment is out of service for survey activities and can help predict equipment failures, which results in less downtime for service and repair. Applying the guidance provided in these documents can lead to better system selection and streamline the classification process, ABS claimed.

ABS has co-operated with owners to develop and implement preventive maintenance programmes since 1978 and issued its first guide for survey based on preventive maintenance techniques in 1984. The newly released documents draw on the knowledge and experience gained over the course of nearly four decades.

The ABS Guidance Notes on Condition Monitoring Techniques and the ABS Guide for Surveys Based on Machinery Reliability and Maintenance Techniques are available for free download at www.eagle.org. ■

MDT powers Waterfront's methanol fuelled MRs

Last month, Waterfront Shipping, Marinvest/Skagerack Invest (Marinvest), Westfal-Larsen Management (WL), and Mitsui OSK Lines (MOL) took delivery of the first three of seven South Korean and Japanese built methanol-fuelled MRs.

The vessels -'Lindanger', 'Mari Jone' and 'Taranaki Sun' - were each fitted with the world's first MAN B&W ME-LGI 2-stroke dual-fuel engines that are able to run on methanol, fuel oil, marine diesel oil, or gas oil.

This engine type was developed by MAN Diesel & Turbo (MDT) and is based on the company's ME-series, with around 5,000 units in service.

"When operating on methanol, the ME-LGI significantly reduces emissions of CO2, NOx and SOx. Additionally, any operational switch between methanol and other conventional fuels is seamless," claimed Ole Grøne, MDT's senior vice president, head of marketing and sales."MAN developed these 2-stroke engines in response to interest from the shipping world to operate on alternatives to heavy fuel oil and meet increasingly stringent emissions regulations. To hedge the risk of fuel price volatility, the vessels can switch between fuels, and operate cost-effectively."

The three were built by Hyundai Mipo Dockyard ('Lindanger' and 'Mari Jone') and Minaminippon Shipbuilding Co ('Taranaki Sun') on the back of a long term charter to Waterfront Shipping.

'Lindanger' is the first of the seven vessels, which will be chartered by Waterfront Shipping this year to replace older vessels in the fleet. Four of the seven vessels are being constructed to DNV GL class, including two WL owned vessels and two owned by a joint venture between Marinvest/Skagerack Invest and Waterfront Shipping. The remaining three ships, where DNV GL carried out a hazard identification study, will be owned by MOL.

The first three vessels were delivered in April, with the remaining four to be delivered by October, 2016.

"We are very pleased to see the completion and launch of this exciting and innovative newbuilding," said Knut Ørbeck-Nilssen, CEO DNV GL – Maritime. "This is the first time a dual-fuel engine with a low flashpoint liquid (LFL) fuel system has been installed on an ocean-going vessel and it is a testament to the excellent co-operation between all the project partners that we have been able to complete this unique project and gain flag state approval.

"Methanol as a marine fuel is a very promising option to enable owners to reduce the environmental impact of their vessels and to comply with low sulphur and ECA regulations and we look forward to working on many more projects using this innovative marine fuel and technology," he said.

With a MAN designed Hyundai–B&W 6G50ME-9.3 ME-LGI dual-fuel, 2-stroke engine fitted, the 'Lindanger' has been assigned the additional notation LFL FUELLED to demonstrate her compliance with the DNV GL rules for low flashpoint point marine fuels. DNV GL was the first classification society to publish rules covering LFL fuels in July, 2013, to ensure that the arrangement and installation of these systems have an equivalent level of integrity in terms of safety and availability as a

The plethors of equipment and piping along the MR's deck.

MDT's ME-LGI engine being lifted into place.

conventional system.

"We are proud to take delivery of 'Lindanger' - one of the first Korean built methanol-fuelled ocean tankers that's innovative, clean burning and fuel efficient," said Rolf Westfal-Larsen, president and CEO, WL Management.

"It is exciting to be working with our partners to advance this new, clean technology. Investing in methanol-based marine fuel is an important step in the right direction and reinforces our commitment to sustainable proven technology that provides environmental benefits and meets emissions regulations," added Jone Hognestad, Waterfront Shipping president.

"This is just the beginning of our investment in this clean, innovative marine technology. We're excited to explore fuel diversification and provide our customers with options through dual-fuel engines,"said Patrik Mossberg, Marinvest chairman.

"Having the delivery of the tanker with the first dual-fuel engine take place in Japan is a landmark. This is a revolutionary initiative that will move the shipping industry forward and in the right direction," said Yoshikazu Kawagoe, MOL's managing executive officer (technical).

"We are so privileged to become the first shipyard in the world to deliver a methanol fuelled vessel. It will reduce SOx emissions by about 95% and NOx emissions by about 30% compared to conventional marine diesel oil. Methanol could become one of the popular alternative marine fuels in the future as an environment friendly solution with lower fuel costs, easier handling with the existing storage and bunkering infrastructure and lower installation and retrofit costs," said Man Choon Kim, vice president, contract management department, Hyundai Mipo Dockyard.

Waterfront is a wholly-owned subsidiary of Methanex Corp, the world's largest producer and supplier of methanol, and operates a fleet of 22 deepsea tankers of between 3,000 dwt and 50,000 dwt, which are used for transporting methanol worldwide.

'Taranaki Sun' takes her bow.

Methanol is claimed to be a safe, cost-effective, clean-burning fuel. It is sulphur free (SOx) and with lower particulate and nitrogen oxide emissions. It is a promising option for vessels, which are operating in ECAs and for meeting both current and future regulations covering SOx emissions.

It is produced from natural gas and can also be produced through renewable sources, such as biomass, recycled CO2, agricultural and timber waste. The energy content of methanol is roughly half that of standard heavy fuel oil, but as it is a liquid, methanol can be handled by conventional bunkering and storage solutions without extensive modifications.

The cost to build new and convert existing vessels to run on methanol is significantly less than alternative fuel conversions. Also, as one of the top five chemical commodities shipped around the world each year, methanol is available worldwide. TO

Principal Particulars- 'Lindanger'

LOA	186 m
LBP	177 m
Breadth	32.2 m
Depth	19.1 m
Draught	12.85 m
Deadweight	49,999 t
Speed	15.8 kn
Main engine	Hyundai–B&W 6G50ME-9.3 LGI (Tier II)
Output	10,320 kW @ 100 rev/min

Biofuels – meeting today's needs

With emissions now firmly on the agenda for the shipping industry, shipowners and operators are increasingly looking for ways to ensure that both existing fleets and newbuilds maximise their business potential.*

These projects are being evaluated while at the same time keeping up with industry regulations and initiatives to combat climate change.

To support this, a rapidly growing plethora of technologies and solutions have been steadily emerging onto the market, and they are not only providing opportunities for shipowners and operators, as charterers are also poised to both create momentum for, and reap the rewards of a more eco-efficient industry.

For charterers everywhere, the business case for taking vessels that are more sustainable than their counterparts is more powerful than ever.

The tanker sector is no stranger to this appetite for conscientious chartering. Charterers are increasingly seeking the opportunity to transport liquid cargo in a more sustainable way.

These charterers are the vanguard – in many ways ahead of the curve – so it stands to reason that tanker owners are turning to clean technologies to address this growing market demand.

Sustainable marine biofuels are steadily emerging as a one such solution that is able to achieve significant emissions reductions.

Small, specialised tanker fleets already have the potential to take advantage from biofuels, especially those with regular port calls and relatively predictable routes. For shuttle tankers that travel from A, to B, to C, and back to A, biofuels could immediately become a solution to reduce emissions.

And the emissions reduction potential is significant; sustainable marine biofuels offer ship operators a way to reduce vessels' CO2 emissions by 80-90%. They eliminate SOx emissions. They cut NOx emissions by 10% and cut particulate matter (PM) expelled in the ship's exhaust by 50%.

The business case for tankers transiting ECAs and sailing on a regular route between ports is clear. Not only do biofuels enable ECA compliance, shipowners are also able to take advantage of schemes like the Environmental Ship Index (ESI), which rewards greener vessels with a reduction in port dues. More than 40 ports across the world, but especially in Northwest Europe and the Baltic, have adopted the scheme.

Local advantages

The advantages of biofuels also work on a local scale - reducing emissions when at a jetty where gasoil would normally be used. These smaller-scale initiatives also receive support from ports, who want to reduce the impact of GHG emissions to the population living nearby.

Environmentally-conscious chartering policies for tankers have already been seen to reshape the market. For example, Terntank Rederei, a Danish-based tanker owner, has recently reaped the rewards of exercising options on LNG dual-fuel vessels.

Charterer's needs

This move was as a direct result of the specific needs of the charterer, who stipulated certain vessel environmental requirements before chartering a vessel. The vessels were delivered and immediately entered into long-term timecharters.

This was part of a conscientious effort by the charterer to reduce current emission levels in the Baltic Sea's ECA. The Terntank case was just one of many in recent years that display a growing trend towards eco-friendly chartering.

The benefits of biofuels extend further when considering the amount of tanker tonnage already in operation. For the majority of these vessels it does not make sense to undergo a costly retrofit to make a vessel LNG-ready.

This process costs both time and money – costs that operators can scarcely afford to incur given the current market conditions, especially when low oil prices have now elongated payback projections.

Any time spent in drydock is time not spent at sea – and this is notwithstanding any losses in capacity that may come from refitting a new system, permanently diminishing the profit margin of operating the vessel on every future journey.

Dirk Kronemeijer, CEO, GoodFuels Marine.

No investment

Biofuels require none of this investment – all that is required are standard fuel tanks and already existing port infrastructure. This presents a risk-averse, OPEX solution, enabling tanker owners and operators to remain competitive by meeting the needs of today's charterers without a CAPEX investment.

Owners, operators and charterers seeking to keep their options open - particularly given the volatility in oil prices - can turn to biofuels as an interim solution that provides immediate and tangible benefits to the emissions profile of a vessel.

What biofuels provide, then, is surety of mind. They are a commercially-viable solution to meet the needs of today's charterers and current environmental regulations, without the cost or risk of trying to predict the future. TO

** This article was taken from comments made by Dirk Kronemeijer, CEO, GoodFuels Marine.*

Tankers challenged by US regulatory environment

With tougher emission standards and a projected increase in US tanker traffic, engine management issues will be an increasing challenge for tanker operators.*

It's been 16 months since vessels sailing within ECAs worldwide have had to burn fuel with a sulphur content of 0.1% or less. More recently, vessels sailing within the North American and US Caribbean Sea ECA-NOx areas (NECAs), whose keels have been laid on or after 1st January, 2016 – in essence all newbuilds – have been subject to Tier III NOx emission limits. The number of tankers needing to comply with these regulations is on the rise.

We understand that changing oil flows, with an increasing amount of oil being shipped from West Africa to US refineries, and the end of the US ban on exporting crude (which came into effect on 18th December, 2015) means that tanker movements in US waters are projected to increase in the coming years.

Shipbrokers are expecting an 8:1 ratio of newbuilding tankers to tankers being scrapped this year.

Jones Act tankers will be among the newbuildings, and will sail mainly in US waters. The trading patterns of many other new tankers will take them in and out of US waters on a regular basis. The operators of these new tankers will have to comply with SOx, NOx and EPA VGP regulations at all times.

SOx and NOx regulations present a particular challenge to marine engineers, who will have to operate their vessels' modern, demanding 2-stroke engines in compliance with these regulations. Currently, vessels entering and exiting ECAs have to carry several lubricants to enable safe engine operation with high sulphur heavy fuel oil and 0.1% sulphur distillates.

The NOx emission limit constitutes an 80% reduction of current levels of emission permitted outside of NECA zones. This reduction can only be achieved by using NOx reducing technologies – primarily selective catalytic reduction (SCR) systems – as there is no form of marine diesel oil with inherent properties that emits NOx within the emission limits upon combustion.

The composition of conventional high BN lubricants that mainly use calcium carbonate basic chemistry means that if they are used in conjunction with low sulphur fuel and there is little sulphuric acid to neutralise, build-up of CaCO3 deposits can occur. This build-up, along with other by-products of combustion, can cause breakdown of engine cylinders' oil films and rapid engine wear. In addition, SCRs can potentially become clogged, along with other newly developed components of modern 2-stroke engines.

A low BN lubricant can be used to help solve this situation, but this involves changing lubricant at the same time as changing fuel and poses a particular risk when exiting an ECA. Managing several lubricants for a single vessel creates additional process and workload for its crew and shore-based management.

New lubricant

To solve these problems and dispose of the need for ships to carry several types of lubricant, Total Lubmarine has developed and is in the advanced stages of testing a new lubricant, Talusia Optima, which uses ash free neutralising molecules chemistry (ANM), to efficiently control CaCO3 deposits when a low sulphur fuel is being used.

Talusia Optima is a BN100 lubricant designed to lubricate the most modern Tier III 2-stroke engines. It can be used in conjunction with fuels ranging from 0.1%-3.5% sulphur content. In the future, if a deepsea vessel uses Talusia Optima, it will not need to change lubricant when sailing in and out of ECAs and NECAs.

The pending global sulphur cap, which could come into force in either 2020 or 2025, and the focus of OEMs on engine efficiency make the continuing development of flexible, high neutralising potential lubricants essential, to enable straightforward engine operation using a wide range of fuels. ANM chemistry has the ability to facilitate this development in a way that conventional cylinder lubrication chemistry cannot.

While Talusia Optima undergoes the final rounds of development and testing, Total Lubmarine would encourage the use of its Tech'Care iron test kit to help crews manage the use of several lubricants at once.

The portable test kit makes it possible for a ship's crew to quickly and accurately measure iron content in drain oil, allowing for effective feed-rate optimisation and huge cost saving. It can also save up to five hours when testing an average six cylinder engine, compared to other equipment currently available on the market.

Regulation and the design of modern ship engines are certainly complicating the business of shipping.

TO

**This article was written by Serge Dal Farra, global marketing manager, Total Lubmarine.*

Voyage optimisation - all inclusive

Centuries old voyage management systems, coupled with large fleet & tonnage, translate into very large momentum. Changing the course of customary voyage management practices, which have this gigantic momentum, is difficult.

This article will cover the scope of fuel optimisation using Blue Water Trade Winds' optimum speed services (BOSS) without delaying the vessel. This service simulates the voyage for most economic speed/rpm schedule, allowing for all the factors that can affect the voyage earnings.

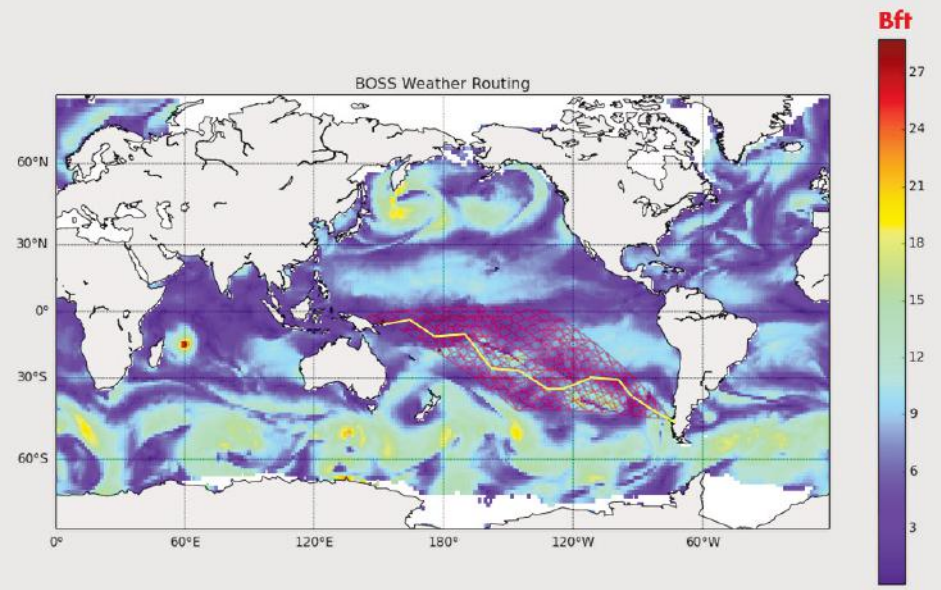
Standard shipping contracts require a vessel to proceed at constant warranted speed on any voyage - WNSNP. But what if a vessel achieves an average warranted speed at the end of the voyage? What if it could be convincingly demonstrated at the commencement of the voyage itself that all stakeholders will benefit by following a most optimum speed schedule? What if the timely arrival of the vessel may be ensured? What if vessel performance could be tracked and compared on the flick of a button? And what if we could also help our planet Earth to be a bit greener?

From a charterer, pool operator or owner perspective, Blue Water said that the expectations from any voyage could be endless. But a very all-inclusive system is required to make those timely informed decisions collectively under our direct control. BOSS is an absolute and yet very flexible voyage management service that will make any manager's wish list only taller, the company claimed.

BOSS uses enhanced data mining techniques and marine hydrodynamics functions to derive intelligence from completed voyage data and vessel test results. Advance algorithms are then applied to simulate the voyage in forecast/historical weather and other crucial factors affecting the voyage.

BOSS by default detects any lost efficiency, for example, from increased hull or propeller roughness, malfunctioning engines, or other causes. Ship maintenance can be scheduled using real performance data rather than an arbitrary period based on past experience.

Blue Water's system.



Weather routing is included.

BOSS at a glance- Blue Water Trade Winds' optimum speed services (BOSS) is a speed optimisation concept built on principles of intelligent speed simulation.

The salient features of this service are:-

- **Customised online access** - Access to the system by shipowner, charterer, cargo owner, terminal and other stakeholders as per client requirement. Personal dashboard to all the stake holders (owners, charterers, receivers, broker) to collectively decide most appropriate voyage plan.
- **Continuous monitoring** - Observation and recommendation by BOSS voyage analysts 24/7.
- **Add-on services** - Interactive negotiation tool, speed - fuel consumption calculator, speed/rpm/ FOC curves and voyage plan comparator (for comparison of voyage earnings/TCE).
- **Vessel Performance Curves** - To view and analyse the trend of vessel performance.
- **Weather Routing** - Latest technology for most optimal weather routing.

Anticipating high fuel prices in years to come and the recent emphasis on reducing greenhouse gas (GHG) emission have resulted in renewed interest in further optimising vessels' operational performance.

Now is the time to deploy state-of-the-art technologies for voyage optimisation. Let us not just manage a voyage but optimise it too - effortlessly at zero capital investment, Blue Water stressed.

TO

Higher cross-link density coatings keep chemical cargoes purer

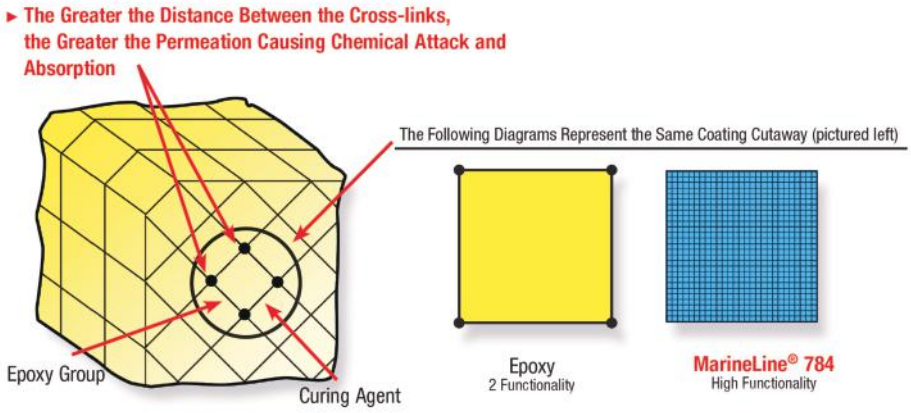
When customers ask how does the patented MarineLine cargo tank coating keep chemicals pure from port to port, the discussion leads to a basic understanding of the chemistry behind polymers.*

These are the basic building blocks used in high performance coatings.

Most coatings have adsorption and absorption qualities based on the cross-link density of the polymer used.

A) Adsorption is a surface condition and can be removed easily.

B)Absorption is the penetration of chemical molecules into the molecular structure of the coating.



Absorption is more difficult to remove and requires long drying times and/or chemical cleaning. Absorption also depends on whether the coatings molecular structure is open or closed. In polymer chemistry this is called cross-link density of the cured polymer.

The higher the cross-link density, the lower the absorption rate. A simple analogy is to compare chicken wire to mosquito screen. The chicken wire keeps the chickens in, but also allows flies and mosquitos to enter. The mosquito screening also keeps the chickens in, but does not allow flies and mosquito to enter.

Thus, a higher cross-link density coating is like the mosquito screen, as it keeps out both large and small chemical molecules, such as acids, solvents, etc, effectively protecting the underlying surface. To get the highest cross-link density, the polymer must be fully cured, as presented in the illustration above, where higher cross-linking density is shown of a cured coating.

Normal Phenol epoxies never really obtain a full cure, even over an extended period of time. The cross-linking density depends on the type of epoxy used and the type of curing agent/hardener used. The higher the functionality of the epoxy, the higher the cross-linking.

Functionality is the number of Oxirane/epoxy end caps that can be cross-linked with the curing agent. The initial reaction between the epoxy end caps and the curing agent creates exothermic heat, which is a chemical reaction that releases heat, which helps molecules rotate around to find unreacted end caps.

As the structure polymerises (hardens), it becomes more difficult to cross-link the epoxy end caps that become unreachable, even over long periods of time. A portion of the epoxy end caps do not cross-link, and this number could be as high as 30% in some cases.

Cross-linking improvements

Advanced Polymer Coatings (APC) research chemists have found that to get the highest percentage of cross-linking in the MarineLine coating (96 to 100%), heat is required to force the hard-to-reach epoxy end caps to cross-link.

Heat curing early in the cross-linking (polymerisation) stage helps in keeping the molecules mobile and forces them to cross-link to form a tightly knit structure.

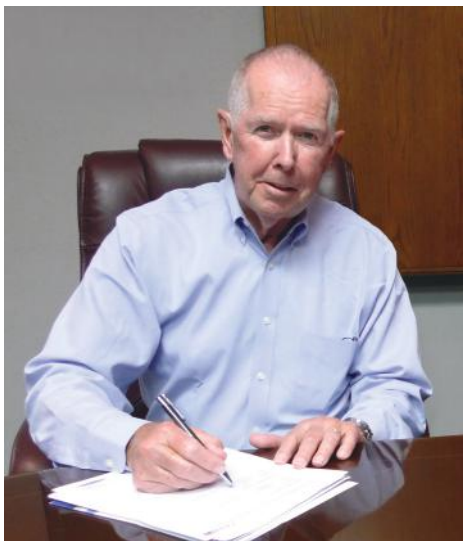
Once the polymer cross-links, at atmospheric temperature, to a certain point (75 to 85%), then over time it becomes almost impossible to force cross-linking unless a significantly higher temperature is used then required in the early stage of polymersation. That is why heat curing during the early stage of polymerisation is important.

APC places a very high focus on proper heating curing of MarineLine in order to create a high cross-link density, thus creating a smooth virtually impermeable coating barrier between the steel tank and the chemicals carried. This is key to maintaining purity of the chemical cargoes carried.

Ongoing coating maintenance and proper tank cleaning (tank decontamination from previous cargoes carried) are also important components of any cargo tank purity discussion. Normally epoxy and Phenol epoxy coatings absorb solvents and other chemicals, and may take a long time to dry out. They may also require extensive use of cleaning chemicals to fully wash the surface of the coating.

However, for the higher cross-link density MarineLine coating, the entire cleaning operation is faster and easier, as cargoes do not permeate coating, according to shipowners using MarineLine cargo tank coatings. When/if needed, approved cleaning detergents are provided on the APC website (www.adv-polymer.com) for MarineLine, as well as a complete cargo resistance list.

In conclusion, selecting the best cargo tank coating is paramount for purity success because - the higher the final cross-link density the less cargo absorption, and the less possibility of cargo contamination. TO



APC's Donald Keehan.

**This article was written by Donald Keehan, Chairman, Advanced Polymer Coatings.*

Tank coating technology discussed

Although often thought of as a commodity, coatings used in the marine industry are highly complex but robust products.

They are developed by the paint manufacturers supported by a large number of high level paint researchers/chemists and in general, they include coatings to protect structures against corrosion; coatings to overcome fouling and coatings to support the operation of cargo tanks on board tankers.

In a continuous process of marine coatings research & development, existing products are being improved and new products created on an ongoing basis to ensure the highest performance and value-for-money.

This article taken from a presentation given by Jotun's Global Director - Tank Coating, Marc Giesselink at the Navigate/IPTA Chemical and Products Tanker Conference earlier this year, looks at the state-of-the-art tank coating technology.

What has changed regarding cargo tank coating, since most of the applied cargo tank coating systems are still based on epoxies, such as -

- Pure epoxy
- Phenolic epoxy
- Bimodal epoxy
- Novolac epoxy
- Siloxirane (epoxy) (1)

(1) Oxirane is the chemical name for the reactive group in an epoxy binder.

Other typical cargo tank coating systems seen are Zinc Silicates and rarely encountered Polyurethane. Zinc Silicate is an ideal cargo tank coating system used typically for regular and dedicated shipment of solvents, such as Methanol and Aceton.

The question is then - what can the various epoxy coating technologies offer, since stainless steel or even uncoated mild steel offers a wider chemical resistance than the typical epoxy systems?

The key word is turnaround time. And whereas well treated stainless steel would be outperforming any coating system depending on the intended cargoes to be carried the cost can prove prohibitive today, despite it being the most versatile form of coating. However, when shipping acids, the cargo owners will normally opt for a stainless steel tank vessel.

As mentioned, Zinc silicates are best for solvents, since they will instantly release any absorbed cargo but this cargo tank coating may be challenging to clean, and is not acid or alkali resistant.

This brings us back to the various epoxy cargo tank coating systems. Giesselink mentioned that the intended vessel's trade has to be well communicated and understood to arrive at the required cargo tank coating system to optimise the use of the vessel. How long will the particular coating perform with different cargoes, ie the coating's life expectation and how many cargoes are needed to be shipped when a coating system is under consideration?

Recovery time

The recovery time in the cargo tanks from a coatings perspective also needs to be taken into account and the maximum temperature that can be accepted by the considered cargo tank coating system, which obviously depends on the cargo.

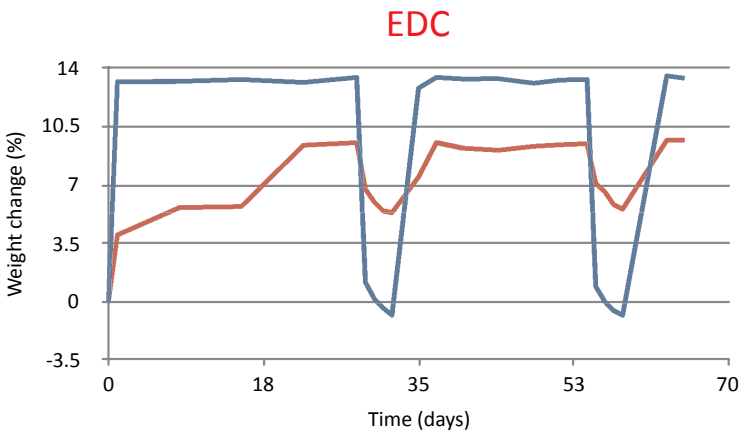
A chemical/product tankers owner or operator will earn money with more cargo flexibility, faster turnaround times, longer stowage times and a longer life time expectation for the coating.

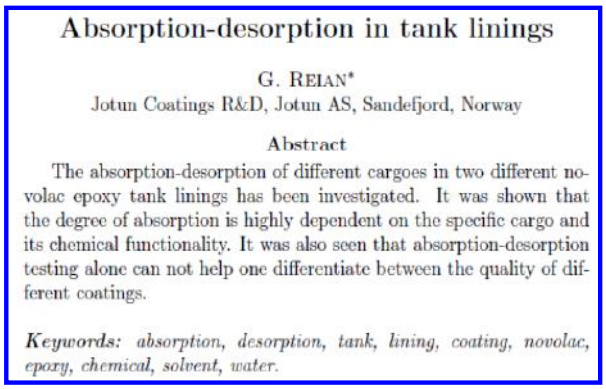
But when looking at the top 15 chemicals being shipped, there is not too much difference in cargo flexibility between the four cargo tank coatings system mentioned overleaf, taking into consideration that cargo owners would prefer strong acids to be shipped in stainless steel tanks. Hence, what are other important differentials when choosing the appropriate cargo tank coating system?

Stowage time, maximum accepted

Turn-Around time

a. Absorption / Desorption





Absorption-desorption in tank linings

G. Reian*
Jotun Coatings R&D, Jotun AS, Sandefjord, Norway

Abstract

The absorption-desorption of different cargoes in two different novolac epoxy tank linings has been investigated. It was shown that the degree of absorption is highly dependent on the specific cargo and its chemical functionality. It was also seen that absorption-desorption testing alone can not help one differentiate between the quality of different coatings.

Keywords: absorption, desorption, tank, lining, coating, novolac, epoxy, chemical, solvent, water.

temperatures etc means that recovery time must be considered. The cargo tank coating systems recovery time has a direct influence on the turnaround time of the cargo tanks.

Often the absorption of cargo is considered the most important key pointer, but as Giesselink explained, the desorption is actually more important. Or, as he jokingly put it: "It is not important how wet my shirt is, but more so when it is dry."

As can be seen on the graph on the previous page, of more importance is how long it takes for the coating system to release the absorbed cargo, which is influenced by the composition of the cargo tank coating system. Typical cargoes that tend to be absorbed by coating systems are, but not limited to - Methanol; Vinyl acetate (VAM); Styrene monomer; Diethyl ether; Water; 1,2-dichloroethane (EDC); Ethyl acetate; Benzene; Toluene; Hexane and Xylene.

Regarding the high-end products, there is no immediate link between low absorption & coatings' life-time cycles. Sometimes, it will work the other way around when a low(er) absorption may lead to an earlier breakdown. Absorption beyond the cargo tank coating's flexibility may lead to an early breakdown (micro-cracks).

A common cyclic methanol/water fatigue test shows that the number of cycles between the four coatings systems mentioned vary from five cycles to more than an impressive 20 cycles.

For example for Methanol cargoes, a direct consequence of today's technologies used in the cargo tank coating systems has led to a pre-wash immediately after unloading Methanol to remove the residue. Rather than having to ventilate the residual Methanol out of the tank, the pre-wash makes it possible to clean the cargo tanks much faster, which could save days.

Challenges

When physically cleaning, overspray, resulting in a rough surface, may create substantial challenges to cleaning certain cargoes, such as vegoils; PFAD and certain fuels. The cause of overspray could be inherent in the cargo tank coating, but even more important is the actual application conditions. However, high-end products that have been introduced during the past 10~15 years, using the latest raw material technologies have mostly overcome this challenge, he said.

Surface roughness could play a role, but microscopic differences do not result in improved cleaning; same can be said for glossiness. Of more significance will be the coatings composition, optimised cleaning procedures; and as Guy Johnson of L&I Maritime explained in his presentation at the same conference, the use of improved technologies to accept cargo tanks away from the wall-wash test.

Methanol use

And regarding the wall-wash test; if it is undertaken with Methanol why is cleaning the tank not also done using Methanol? It is not likely to happen, but it is possible from today's coating technologies, Giesselink said.

Stowage times and maximum temperatures can also strongly influence the choice of cargo tank coating system, although as shown in the table above, the limitations may be manageable.

Giesselink commented that the ease of application also needs to be taken into account, ie two or three coats; the minimum application temperature plus overspray and flow. Two coats may be preferred over three coats, but a three coat application may enable better control to stay within the stringent maximum film thickness limits. Maximum film thickness control is required to ensure speedy desorption of absorbed cargo.

Wide range

In conclusion, Giesselink said that a coating with cargo flexibility was key with a wide enough range to handle the common cargoes shipped. Fulfilling today's requirements for stowage times and the system's life time expectation in that coating flexibility reduces cargo fatigue, hence giving a longer life and finally, the application itself which should give further product optimisation.

Key words in this respect are turnaround time and desorption, he stressed. TO

Top 15 chemicals shipped

JOTUN	IP	PPG	APC	Proper Shipping Names
R	R	R	R	METHYL ALCOHOL
R	R	R	R	LUBRICATING OILS AND BLENDING STOCKS
NR	NR	NR	R	PHOSPHORIC ACID
R	R	R	R	SODIUM HYDROXIDE SOLUTION
NR	NR	NR	R	SULPHURIC ACID
R	R	R	R	METHYL TERT-BUTYL ETHER
R	R	R	R	ETHYLENE GLYCOL
NR	NR	NR	R	ACETIC ACID
R	R	R	R	UNLEADED GASOLINE
R	R	R	R	ETHYL ALCOHOL
R	R	R	R	SOYABEAN OIL
R	NR	NR	R	ACRYLONITRILE
R	R	R	R	XYLENES
R	R	R	R	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE
R	R	R	R	FATTY ACID METHYL ESTER (m)

Key suppliers - Jotun = Tankguard Special Ultra; IP = Interline 9001; PPG = Sigma Phenguard; APC -= MarineLine 784. Based on information in the public domain. Source: Jotun.

JOTUN	IP	PPG	APC	Proper Shipping Names
180 days	45 days	180 days	180 days	METHYL ALCOHOL

JOTUN	IP	PPG	APC	Proper Shipping Names
65ºC	60ºC	60ºC	100ºC	PFAD – Palm Fatty Acid Distillate

Stowage times and maximum temperatures can influence a cargo tank coating.

Software programs save time when compiling reports

The patented ZakosCargoCalcs software programs for cargo ships and tankers have been installed on many of the Greek tanker companies, thus far.

These include - Springfield Shipping (Onassis Group) on 27 vessels, Kristen Navigation (35 vessels), Maran Tankers Management (36 vessels), Alpha Tankers & Freighters (36 vessels), Pantheon Tankers Management (five vessels) and Andriaki Shipping, among others.

Founder Capt Kostas Zacharopoulos explained that as an ex-Master Mariner and following over 30 years service on board cargo vessels and tankers, he developed various ship calculation programs using VB6.

He undertook programming as a hobby for more than 25 years before developing a career from producing various modules. Talking with *Tanker Operator*, Capt Zacharopoulos said that the programs return real money to ship operators & charterers and saves valuable time for the shipboard officers. Each program is tailor made to the client's needs.

Answering the question of why a program is needed with a plethora of radars, tank gauges, etc on a modern tanker, he explained that the loading/discharging port, a cargo survey is carried out therefore the surveyor and Chief Mate will start calculating manually, using the ullage/ASTM standard tables and will compare the cargo reports to see if they agree or disagree.

This process takes time but by using a Zakos program where all the ullage tank tables have been entered, from the time the measurements were taken, the Chief Mate has completed the report in seconds.

Similarly on arrival/departure, surveyors require the bunker report and the C/E has to complete calculation for fuel oil/diesel oil, etc. Again the program has completed the report in seconds.

The programs can result in the cargo calculation time being reduced to just one minute, after the measurements on deck have been completed.

For shipping companies, Zakos offers to write a similar program for one tanker/cargo ship in their fleet free of charge for a test period of three months with no obligation from their side to purchase the programs.

The main programs offered are the Zakos ASTM Oil Calculations report generator, Bunker Survey Report generator, plus a Draft Survey Report generator, Passage Plan Calculator, Nav Tools Calculation, UK/Cont Tide Predictor, Load Zone calculation, a UK/Cont Squat and Overhead Clearance calculator.

Other type-specific reports can be written on an ad hoc basis for a fee. Calculations reports can be sent to an shipping office via an Excel Spreadsheet.

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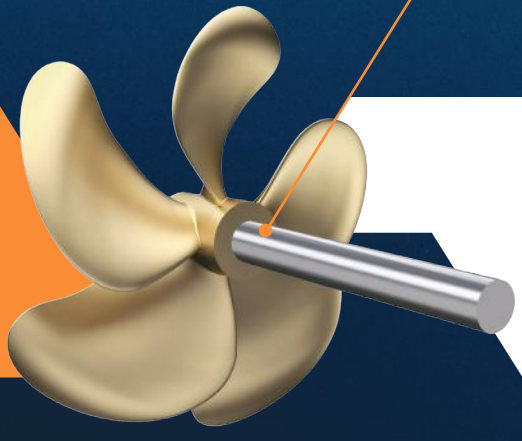

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See what we can do for you at Posidonia 2016, Stand 3.102 – hall 3 & Posidonia conference program at 17:00, 8th June.