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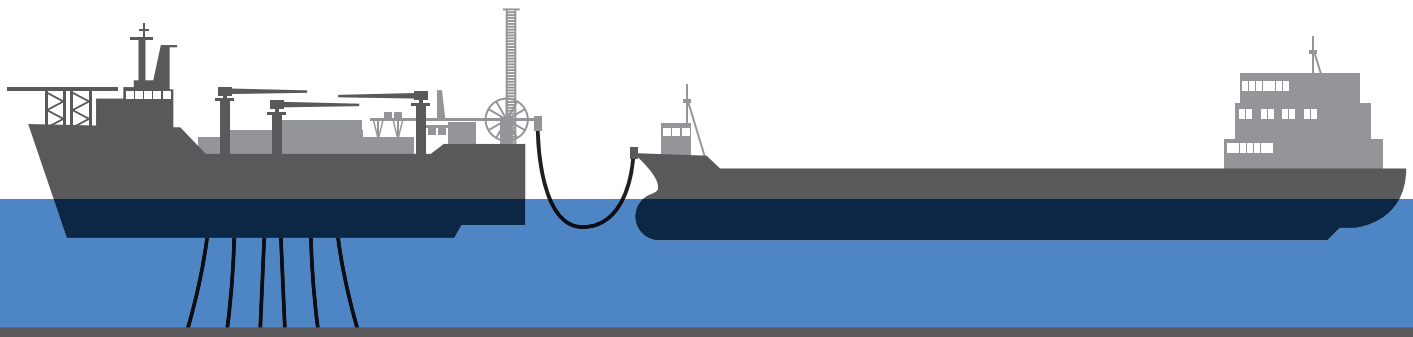

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Contents

***Front cover** - Coldharbour has purposely limited the number of BWTS it will be able to manufacture per year as a means of focusing on the larger installations, once the serious demand phase kicks in.*
The larger vessels will face particular problems with high ballast tank capacities and long voyages, which could lead to invasive species re-growth and as a result, some systems may not be up to the job.
The company has invested heavily for the future in terms of training and engineering capability worldwide.

A few things to worry about next year

As we come to the end of 2015 what is there to look forward to next year?

Well its the usual array of new rules and regulations coming into play on 1st January, while others will become closer.

For the tanker fraternity, we have inert gas systems and oil fuel blends to worry about, among other things.

For example, statutory requirements for fixed inert gas systems will enter into force on 1st January, 2016, as a result of changes to SOLAS, the Fire Safety Systems (FSS) Code and the International Bulk Chemical (IBC) Code.

In general, this will mean that all tankers of over 8,000 dwt will need to be fitted with inert gas systems instead of over 20,000 dwt as in the past. This applies to all tankers whose keels were laid on or after 1st January, 2016.

Tankers of 8,000 dwt and over, carrying low-flash point cargoes, and with a keel laid on or after 1st January, 2016, must be fitted with a fixed inert gas system complying with Chapter 15 of the amended FSS Code (or an equivalent system - subject to acceptance by the flag administration).

The existing clause in SOLAS Regulation II-2/4.5.5.2 for waiving the requirements for a fixed inert gas system still applies to all gas carriers, but for chemical tankers it now only applies to those constructed before 1st January, 2016.

This simply means that chemical tankers with a keel laid on or after 1st January, 2016 carrying flammable cargoes, such as those listed in the IBC Code chapters 17 and 18, will be required to have a fixed inert gas system, regardless of cargo tank size and tank washing machine capacities.

A new SOLAS regulation (II-2/16.3.3) clarifies the operational requirements for inert gas systems and the sequence of applying the inerting medium into the cargo tanks.

It allows chemical tankers the option to begin inerting their cargo tanks after the cargo tank has been loaded, but before commencing unloading, but only if nitrogen is used as the inerting medium. In this instance, the nitrogen inerting should continue until the cargo tank has been purged and freed of all flammable vapours prior to gas freeing.

The changes to the IBC Code clarify the operational procedures for new and existing chemical tankers.

Operators of chemical tankers that are required to be inerted and carry products containing oxygen-dependent inhibitors should note the following requirement, specified in Chapter 15.13.5 of the amended IBC Code: "application of inert gas shall not take place before loading or during the voyage, but shall be applied before commencement of unloading."

IMO circulars MSC.1/Circ.1501 and MSC-MEPC.5/Circ.10 should also be read in conjunction with this requirement. *Tanker Operator* is indebted to LR for explaining this.

Oil content meters

Maybe of growing importance going forward, from the beginning of next year, tankers intending to carry biofuel blends containing 75% or more of petroleum oil, will have to have an oil content meter (OCM) approved in compliance with IMO's resolution MEPC.108(49) as modified by resolution MEPC.240(65).

IMO has issued an MEPC circular regarding the issuing of revised certificates of type approval (TAC) for oil content meters intended for monitoring the discharge of oil-contaminated water from the cargo tank areas.

Where the oil content meter (OCM) has been approved before 17th May, 2013, the TAC may be used:

- For OCMs installed on ships not carrying biofuel blends.
- For OCMs installed on ships carrying biofuel blends, until 1st January, 2016 (on the condition that the tank residues and washings are pumped ashore).

For all ships carrying biofuel blends on or after 1st January, 2016, the OCM should have a TAC.

Of course, by the beginning of next year, the dreaded Ballast Water Management Convention's status should be clearer - or will it? With only one medium to large size flag state needed to push it over the tipping point, ratification is highly likely sooner rather than later, setting off a mad scramble to retrofit ballast water systems (see feature on page 24 of this issue).

There is already a mad scramble underway to get ECDIS type specific approval certificates from the OEMs and flag administrations. Several training centres are hoisting the 'full up' signs for courses in the near future.

Also next year, the timeline for the 0.5% worldwide sulphur cap should become clearer, as the IMO is due to debate the issue and maybe give some guidance as to its research into when the refineries and the shipping industry will be ready.

Today, bets are evenly spread between 2020 and 2025 for the start up date, although the ICS has put its money on 2020. Will the EU and or the US force the IMO's hand? Probably.

All that is left to say is to wish everyone the compliments of the season from the *Tanker Operator* team and let us hope that the tanker market bull run continues well into next year and beyond, so that the owners, managers and operators can pay for all these new 'innovations'. TO

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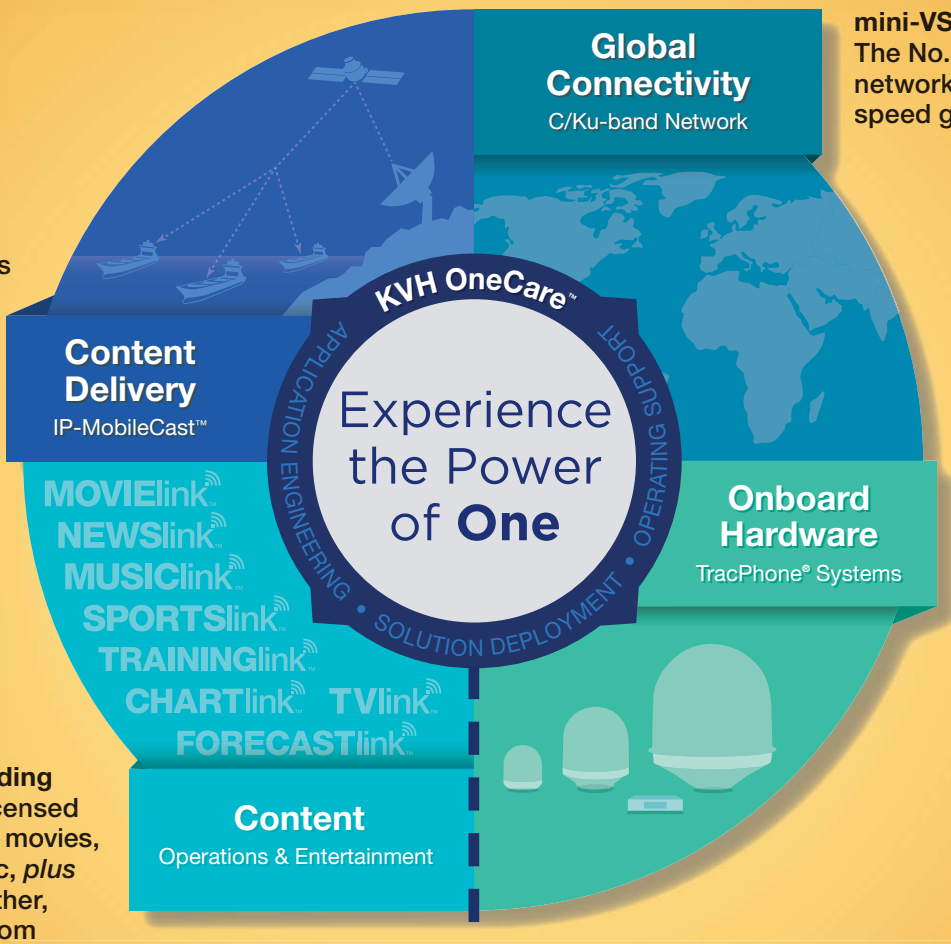

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Where is the Aframax market going?

The fourth quarter of this years started on a promising note for Aframaxes operating in the West, said a leading UK broking house.

This year, this class of vessel has witnessed some spectacular hikes, illustrated by Ice Class Aframax earnings hitting $100,000 per day on TD7 trades in June, according to London broking house EA Gibson.

Rates firmed in October supported by robust trading activity, weather related delays and Black Sea/Mediterranean disruptions, while more recently (mid November), uncertain itineraries in the North Sea helped to tighten vessel availability.

By the time this article is published, we will entering the Northern Hemisphere winter season and rates could rise further on the back of more severe weather and disruptions lead to longer delays, particularly for Ice Class tonnage.

Ice class premiums

The highest Ice Class vessel premium usually develops between February and April when ice conditions are traditionally at their worst. Although the weather in the area has been relatively mild at the time of writing, the Russian Hydro-meteorological Centre forecasts that around the Black Sea and Baltic regions, the weather will be in line with historical averages.

However, looking beyond the winter season a number of factors point to a deterioration in the Aframax market. For example, growth in the numbers of LR2/Aframaxes is expected to escalate next year, while the prospects for recycling are severely limited, Gibson said.

Next year, some 68 Aframaxes are due to enter service and another 60 in 2017, compared to 38 this year and just 19 in 2014. Although most of these vessels are destined for clean trades, if the crude market continues to outperform the clean sector, then - as has been the case this year - many owners are

likely to put their vessels into the dirty trades.

The picture is similar for Ice Class Aframaxes, as the current orderbook for LR2/Aframaxes in this segment stands at 14% of the existing fleet with nearly all of the tankers trading in dirty cargoes. Only two deliveries are expected next year, but then another eight will join this fleet segment in 2017 followed by two more in 2018.

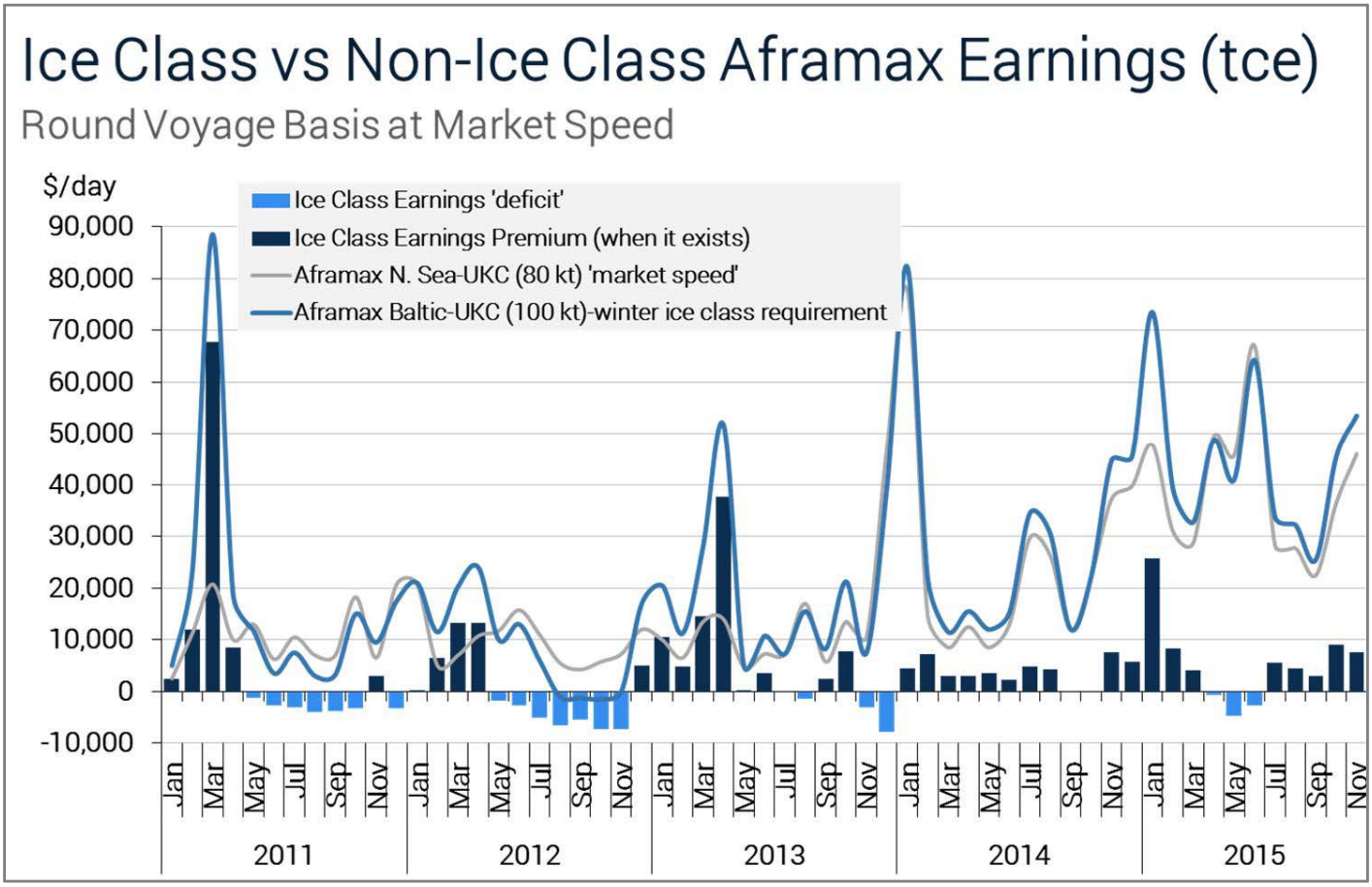
On the near term demand side, Aframax tonnage developments in Northwest Europe and in the Black Sea/Mediterranean are largely dependant on Russian crude exports to the West and events in Libya. It is unlikely that we will see any sizeable increases in crude oil exports from these sources any time soon, as Libya remain highly unstable and Russia will probably export more crude to the East at the expense of Western Markets, Gibson forecast.

Thus Aframax earnings are likely to come under downward pressure, due to the anticipated large increase in supply, coupled with limited growth prospects from the main regional export outlets.

However, this year the biggest factor behind the surge in rates across all the tanker markets was OPEC's decision against cutting production volumes resulting in a huge crude supply overhang, plus delays and inefficiencies in tanker transportation.

With forecasts that the excess crude supply will remain for a while, will this be sufficient for Aframaxes to weather the storm? Time alone will tell!

TO



Source: EA Gibson.

Gibraltar Port Authority (GPA) marketing paying off

"We are now seeing a modest rise in the level of activity across most sectors," confirmed Commodore Bob Sanguinetti, CEO and Captain of Gibraltar Port (GPA).

During the first nine months of this year, around 4,200 vessels have arrived for bunkers out of a total of 6,500 vessels of all types calling in the British Gibraltar Territorial Waters (BGTW), which includes the Eastern and Western anchorages, as well as inside the port.

As for bunkering, during the past 18 months or so the number of bunker slots available in the Western Anchorage has risen to 14, an increase of three. In addition, the number of bunker barges/tankers in operation at any one time now averages 15.

As an extension to this process, the GPA is continually looking at ways to identify how best to manage the anchorage, and maximise the utilisation of these spaces. Furthermore, the GPA, working in conjunction with the local agents and the suppliers, has been conducting a marketing campaign to highlight the advantages of calling at Gibraltar for bunkers and the many other services on offer, such as the transfer of stores, spares and crew.

Other ongoing projects include bunkering ex pipeline at both the North and Detached moles with a longer term aspiration to build storage tanks on land. At present, a large storage tanker is being used to store bunkers lying alongside the Detached mole.

The GPA is also working with ship-to-ship (STS) transfer operators to market one of the bunker slots for STS cargo transfers and earlier this year a couple of LNG cargo transfers were undertaken by Excelerate Energy in partnership with locally licensed STS operator Fendercare Marine.

Gibraltar has a framework in place governing STS operations to the standards required by the amendments to the MARPOL Convention and will continues to regulate the activities of licensed STS operators for operations conducted within the BGTW.

The GPA's STS Operations Code of Practice further enhances the levels of safety provided by the regulatory regime already in place, it claimed.

To further supplement the GPA's approach to bunkering and STS operations under the Code of Practice, senior staff routinely undergo relevant training, including advanced courses on oil spill management, among others. As an example, a four day course was recently delivered by Oil Spill Response Limited's (OSRL) principal trainer, Chris Miles. The IMO accredited course, held for the first time in Gibraltar, covered all aspects of a response to a major oil spillage, including contingency planning, equipment, training, logistics and environmental considerations.

GPA's Bob Sanguinetti.

The number of bunker slots available has been increased to 14. Photo credit - Francis Ferro.

Eastern Anchorage

Turning to the Eastern Anchorage, for the past 18 months, the GPA has been offering vessel owners, managers and operators fee reduction incentives for short term stays. Sanguinetti told *Tanker Operator* that he was keen to extend this scheme to those vessels wishing to anchor for longer periods and had already received a few inquiries and expressions of interest.

Another initiative underway is the tendering for the supply, development, installation,

Tankers of all types and sizes are catered for in the Western Anchorage. Photo credit - Francis Ferro.

commissioning and maintenance of a VTS and surveillance system.

This is linked to a new building to house the system, which is expected to be ready by the Spring or the Summer of next year and at present, the bids are being evaluated, Sanguinetti explained.

The GPA is to relocate the coastal surveillance and VTS system from its current harbour location on the North Mole to new purpose-built offices at Lathbury Barracks, Windmill Hill Road at the south end of Gibraltar, which offers extensive views over the busy waters of the Strait of Gibraltar and entry lanes into the bay itself.

Those companies intending to operate the facility have been invited to supply proposals for the complete system in a turnkey operation, including all necessary hardware, software, required sensors, communications systems, training and support, while retaining the existing radar antenna and associated transceiver hardware.

Once installed, the system will provide improved radar display and control, Automatic Identification System (AIS) and Electro-Optic (EO) surveillance of BGTWs from the new GPA VTS centre.

In line with its drive to consolidate its environmental credentials, the GPA was recently granted Ecoport status by the European Sea Ports Organisation (ESPO), in recognition of its efforts to mitigate environmental impacts and to promote sustainable development.

Speaking at the time of the award, Sanguinetti, commented: "I am delighted to see that Gibraltar has gained Ecoport status – this represents the first step in the Port Authority's pursuit of improving its environmental management with certification under the only port-sector specific environmental management standard, which is independently verified by Lloyd's Register."

The Port has also been a member of the Green Award scheme since 1st April, 2013 and offers a 5% reduction in tonnage dues to sustainable ships entering BGTW and calling at the Port with a Green Award certificate.

Flag State

Apart from activities in an around the port and the anchorages, Gibraltar is also a thriving flag state, which is a member of the Red Ensign Group.

According to Richard Montado, Maritime Administrator, Gibraltar Maritime Administration, in general terms, tankers make up around 25% of the Gibraltar flag fleet and about 23% of the total gross tonnage.

Montado explained that the registry is strong in chemical/product tankers and that he was targeting owners and operators from both

Gibraltar's repair facilities can cater for vessels of up to Panamax size (see page 9). Photo credit - Francis Ferro.

central and northern Europe, as they were the flag's strongest markets.

He explained; "As a British registry within the EU, with a long history of tankers in the fleet, we have the experience to handle technical queries and expertise to service tanker operators. We also have access to an international network of experts under the British umbrella.

"Furthermore, Gibraltar offers financial securities for mortgagees and is a 'low risk' flag; white-listed across all international PSC regimes, including US Coast Guard (USCG) recognition. We are now expanding into online services over the next 12 months, starting with seafarers' certification,"he said.

Speaking about the plethora of rules that have entered into force or are due to come in force soon, he said that any new international and regional standards affect all flags in the same way.

"Gibraltar is in a strong position to handle these dynamic situations, as we have close links with the UK, IMO and other international bodies," he said. The Administration actively participates in high level and technical fora on a regular basis and uses the British Red Ensign group as a platform for discussing, analysing and implementing any new requirements.

Montado also advised that he was presently recruiting; "We have two marine surveyor vacancies at present and these will be advertised in the very near future," he said. "We have a total of 13 surveyors, most of which are based in Gibraltar, but we also have some based in Germany and Hong Kong. Five have tanker experience."

"There are always opportunities to increase tonnage on the fleet," he said. "Gibraltar is focused on quality ship operators and tanker owners fit the bill, from our perspective.

"Our goal is to be the best commercial maritime registry in Europe. I must admit that there is healthy competition between the British registers, but we are not actively seeking to poach tonnage from the UK as such. We will be increasing our marketing presence in Germany, the Netherlands and Scandinavia over the next 12-18 months. Some of these marketing drives will be in collaboration with our other British colleagues," he explained.

He listed the key features being developed both for the commercial and pleasure vessel registries in Gibraltar as:

- Expert technical support (in English), available 24/7.
- Advanced online services.
- Straightforward procedures.
- Competitive pricing models.
- A secure and low risk registry

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Tankers registered

Type	Number
Oil/Chemical	59
Oil	26
Chemical	6*
LPG	4

*plus another two being processed.

Gibdock wins landmark EGS retrofit contract

Gibdock has secured a breakthrough exhaust gas scrubber (EGS) retrofit project covering five vessels operated by shipmanagement concern Norbulk Shipping and owned by shipping group Vroon.

The contract represents a sizeable debut in specialised EGS work, the yard said. With all five ships also undergoing special survey drydocking, the job represents Gibraltar yard's largest single assignment this year. The project is also the first ship-series SOx abatement technology retrofit win for any Southern European shipyard.

Using EGS, shipowners can continue operating on heavy fuel oil instead of more expensive marine gas oil (MGO) to meet IMO rules on SOx emissions that came into force in ECAs on 1st January, 2015.

"We are the first yard in the region to win a major exhaust scrubber project," said Richard Beards, Gibdock Managing Director. "Our ideal location means that we are always attractive for owners considering this area. Gibdock's competitiveness, high quality workmanship and on-schedule redelivery has led to this breakthrough deal, which opens a new chapter in the industry's EGS installation work options."

Gibdock's workload included the 37,500 dwt product tanker *Great Eastern*, the third of the five Norbulk vessels being fitted with Alfa Laval's PureSOx main engine, auxiliary engine and boiler EGS units. The hybrid PureSOx system is claimed to remove over 98% of SOx emissions from exhaust gases and up to 80% of particulates.

EGS installation work on board *Great Eastern* included 90 tonnes of newly fabricated steel, the laying of 12,386 m of electrical cabling and 1,134 m of GRE pipes, involving 800v flanges and elbows.

Special survey work required hull washing, spot grit-blasting and coating job, overhauling of the sea valves, propeller withdrawal, bonding of stern seals, rudder clearances, bow thruster overhauling, windlass winch bearing renewal, overhauling of boiler safety valves, pipeworks, insulation works and various other routine drydock works.

This work was undertaken at the same time as the EGS installation, with the ship redelivered on schedule and on budget in 20 days. Beards said the time taken for vessel redelivery to Norbulk had been shortened, as projects progressed.

To optimise EGS retrofit processes, Gibdock undertakes prefabrication for smaller blocks in its workshops, with transfer to the Pad 1 area, completed in 2014, allowing further structural and assembly work to be completed alongside Drydock 1 in time for

The Alfa Laval EGS seen fitted above the engine room.

The Handysize *Great Eastern* was the third of five Norbulk-managed vessels docked.

drydocking. "Pad 1 was pivotal in optimising work flow," said John Taylor, Gibdock's operations director. "No other regional yard has a comparable purpose-built zone for EGS foundation and structural work before vessels arrive.

"This has been an intense collaboration, involving different Gibdock departments, naval architects, the Norbulk project team, Alfa Laval and our electrical and piping systems sub-contractors. Optimised planning, materials purchasing, equipment deployment and job sequencing for EGS work are now part of Gibdock's competitive advantage," he claimed.

Beards added: "This is a significant project for Gibdock in 2015. We have added dedicated EGS facilities and expertise to our natural competitive advantages of location and weather and our hard-earned reputation for quality work delivered on time and on budget."

Electronic services

One of the electronics supply and servicing companies active in the area is Sandvik Ship Electronics.

The company's John Kong told *Tanker Operator* that business is good with lots of sales, as owners seem to have money to buy new equipment. The company's shore-based maintenance (SBM) service has also seen more owners sign up.

"We know have over 100 on SBM and we have also added BV and RINA to our list of approvals for radio surveys," King said. "In addition, we are now covering Navico, Totem and FURUNO equipment for servicing."

Sandvik recently opened an office in Singapore, due to high demand.

Goodwood on track for fleet expansion

By the end of 2016, Singapore-based Goodwood Ship Management expects to manage around 45 vessels.

Today, the third party shipmanagement concern has 36 vessels in its portfolio, mainly tankers, with another six newbuilding VLCCs to come between the end of this year and next, plus LR/MR newbuildings at the end of 2016, managing director Capt AR Sabnis explained.

He stressed that despite being partially owned by shipowners, Goodwood remains a truly independent third party shipmanagement company. Since it was established, Goodwood has grown steadily from one ship in 2008 to 36 ships today, a portfolio that includes all types of tankers. He said that Goodwood's objective is to offer independent third party shipmanagement services to the shipowner's requiring quality operations.

Capt Sabnis also outlined the company's future by saying; "Our expertise going forward will be on all type of tankers, which will include chemical, MR and gas tankers. However, we do have the expertise in the dry sector as well and will be able to continue providing management services for containerships and bulkers."

Goodwood is primarily a tanker manager with several large tankers on its books. Capt Sabnis said that in recent years, tanker management had become a more value-added service by way of having to deal with increasing volumes of regulations, audits and vetting procedures in order to operate the vessels to the required international standards. "We have focused on this segment of the market since we began operations and we now have a good track record in safe and cost effective tanker management," he said.

Goodwood's managing director Capt AR Sabnis.

Regulatory increases

Given the increase in regulations, etc, Capt Sabnis said that he thought that by just increasing the company's personnel to handle the extra workload was not necessarily the right way to address the issue. "First of all, we feel that familiarisation and a clear understanding of the applicable rules and regulations by our own staff running the vessel(s) is important so that the requirements can be clearly conveyed to owners for compliance and implementation can be carried out effectively on board our managed vessels. We also arrange relevant talks and presentations given on these issues by the relevant authority for our staff," he said.

On the perceived shortage of experienced shore staff, Capt Sabnis was of the opinion that it was harder to retain people than to recruit them. "On staff retention in Goodwood, I am proud to say that it is almost at 100%. Our turnover is low – because aside from salary, we have reasonable expectations of our staff and we understand each other well. I'm proud to add that in the last six years, only one of our office staff has left," he said.

As for the arguments over the use of KPIs, he said that it was certainly a good idea, provided that everybody involved projects the right figures and, if they do, then it can be beneficial to the industry.

He did not wish to be drawn on M&A in the shipmanagement sector other than to say that it has a few advantages but many disadvantages. He did stress, however, that Goodwood was not looking for any partners at this point in time.

A sore point with many third party shipmanagement concerns was the level of remuneration for the increased workload necessary today. Capt Sabnis agreed that higher remuneration was certainly on a manager's wish list. "However, it will be difficult to expect any standards in remuneration levels owing the competitive nature of the shipmanagement industry. We believe that owners will be open to giving higher remuneration only if it commensurate with the quality of services and performance of the shipmanager," he said.

Being based in Singapore has its advantages. Capt Sabnis explained; "While there are many comparison between Singapore and Hong Kong, I feel that Singapore has grown a lot in the last 10- 20 years and it is now a mature maritime hub. The Maritime and Port Authority of Singapore has done a good job in developing Singapore as a maritime hub, providing great support to the companies active in the shipping industry with tax benefits under ASL Scheme & other incentives offered by the various other authorities, Singapore today perhaps has overtaken Hong Kong" he concluded.

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Door security - a passive yet positive deterrent

With the downturn in the number of armed guards used many vessels are not 'hardened' with the training and understanding of 'method of entry' (MoE).

The improvised door door securing devices fabricated on vessels are not tried and tested resulting in no knowledge whether they will work during a piracy incident.

While working as a security team leader on board many vessel transiting the High Risk Area (HRA), Easi-Chock founder Wayne Harrison spent several years working on a method to deploy a door chock that can be put in place in seconds by ships crew and that can be removed just as easily for a non-pirate-related emergency.

In addition, with an understanding of a company's requirements and current standard operating procedures, a gap analysis can be conducted regarding the existing security provision on a vessel. A detailed audit report is then generated, which contains immediate and future improvements required to protect a vessel.

While surveying a vessel, the company can undertake crew training on hostile environments and threat awareness.

Upon the audit report's approval, Easi-Chock will ship the relevant security products to the owner/manager. Installation is claimed to be easy and the products can be fitted by the crew.

Easi-Chock offers a lightweight door security system that will work with the existing doors fitted throughout the vessel. It has been designed to deny access through the doors both internally and externally to the superstructure and also provides a safe passage from the bridge to the citadel/safe area.

The company claimed that it can be installed in 30 seconds and removed in three seconds by a crew member. Doors are secured in-situ against anybody trying to gain unlawful entry at anchorages in piracy hotspots. They are shipped as a vessel pack in quantities specific to the ship to be fitted.

Another deterrent offered is the Easi-Gille porthole protection grille. It has been designed to be fitted internally to portholes located throughout the superstructure. Once the fasteners have been fixed in place, the grille can easily and quickly be removed.

Extensive testing has proved that an Easi-Grille will exceed over 1.5 tonnes of direct pull, meaning an aggressor could not exert enough forward force using conventional methods.

It is claimed to take only about 30 minutes to install per porthole and removes the necessity to fabricate improvised bars and plates, which can offer little protection.

In addition, Easi-Block is a lightweight design meant to secure and protect vision panels of emergency exit doors that are typically located throughout the accommodation decks. They are fitted to stop access to the door locking mechanism and/or Easi-Chock fitted. Plates will also assist in the vessel blackout plan.

Door retaining bars are also offered, which are a lightweight easy to deploy and remove door security system. They are designed to work independently from existing door furniture with a flexibility to allow the provision of sets for all key entry points, including bridge stairwell, emergency exit doors and engine access.

For lockers fitted on board vessels containing ships spares and equipment, the Easi-Block can supply padlock protection system provides security to all external storage areas where padlocks are normally used to secure them. These systems have been designed to help lockdown these locations when a vessel is in port or at an anchorage, while also restricting access by any potential stowaway. Another feature is that they can be used to secure a door open to prevent anybody being locked in

storage areas. The company offers both fixed and removable types.

IE sandwich plate

Elsewhere, a new lockable sandwich plate system (SPS) security door has been introduced by Intelligent Engineering (IE).

Whereas the citadel access protection (CAP) SPS panels, which is in effect a door, are clamped in place from the inside to form a safe haven for the crew, these lockable doors are secured from the outside to protect sensitive areas of a vessel, in the event of hostile intruders.

With no visible lock, the SPS security doors have a clean flat surface. SPS doors and panels provide six times the protection from impact loads, explosions and projectiles than equivalent steel and 75% more ballistics protection, IE claimed.

Ian Nash, SPS Marine and Offshore business manager, said, "This innovation was in response to a client's request to protect vulnerable areas. The permanently fitted security doors take seconds to secure from the outside. This allows the crew members to shut down areas of the vessel before taking refuge. About 80 vessels have been fitted with SPS CAP security panels and doors to date."

The security doors and panels can be made to suit individual requirements – size, weight and door thickness can all be tailored. By changing the thickness of the SPS panels (steel and polyurethane) their performance can be altered to meet specific safety criteria, IE said. TO

Easi-Chock's door restraining equipment.

Other illicit activities to be countered

An international agreement, which was claimed to be instrumental in repressing piracy and armed robbery in the western Indian Ocean and the Gulf of Aden, is to broaden its scope.

Signatories to the Djibouti Code of Conduct, which was originally adopted under the auspices of the IMO in 2009, have agreed to work towards extending its remit to address other illicit maritime activities that threatens safety and security in the region, such as marine terrorism, environmental crimes, human trafficking and illegal, unreported and unregulated fishing.

The signatories recently adopted a resolution expressing concern at the increasing risks from organised crimes at sea and other threats to maritime safety and security in the region. They also agreed to encourage information sharing on all illicit activities at sea.

Training and other activities implemented under the Code have been credited with contributing to the reduction of piracy, alongside the efforts of vessels to implement IMO guidance and best management practices, naval forces continuing to deter and disrupt pirate activities and states continuing to prosecute suspected pirates and increasing their maritime law enforcement capabilities.

But the signatories recognised that piracy in the region had only been suppressed and its root causes were yet to be addressed. They agreed that there is now a window of opportunity for IMO member states in the region to implement capacity building programmes to prevent a resurgence of piracy and to address wider maritime security issues, as a basis for the maritime sector's sustainable development.

Those involved met between 11th-12th, November in the newly completed Djibouti Regional Training Centre, which was formally opened on 12th November. The centre will play a key role in regional capacity-building initiatives under the Code of Conduct, the IMO said.

The meeting also approved the 2016 plan for regional training for the Code's countries.

Construction of the centre was funded by Japan, through the Djibouti Code Trust Fund, with equipment provided by Denmark and South Korea.

IMO said that it will continue to support states to implement the Code through its Integrated Technical Co-operation Programme (ITCP) and through the Code's Trust Fund. It also has a presence in the region by way of two staff members based in Nairobi, Kenya, whose primary role is training.

Armed guards question

At London International Shipping Week, Graeme Brooks, CEO, Dryad Maritime said that he listened to senior to senior military people air their views on Somali piracy.

The message was -

- The threat of Somalian piracy remains, if currently latent, and is very real indeed.
- The three legged stool of naval presence, adherence to BMP 4 and the use of armed guarding by credible PMSCs, led to the successful containment of Somali Piracy in/around 2012.
- The three legged stool requires all three legs to remain in place in order to maintain the status quo - keep the navy, keep the BMP 4 measures and keep the armed PMSCs.
- International forces will be committed to the region for the foreseeable future.

Brooks said that he was surprised to hear institutional endorsement of armed guards as they were not welcomed by Governments when the number of PMSCs escalated in 2008, but times and attitudes have changed.

Despite the official advice to 'keep taking the medicine' and the judicious reduction of the HRA, Dryad is seeing shipowners, operators and cargo interests discussing the de-escalating from armed guards, since it was claimed to be difficult to justify the costs in light of the lack of attacks.

"it is an interesting time; it is not possible to recommend one all encompassing policy all the time," Brooks said. The key is to conduct a risk assessment to review the current and specific circumstances. "But isn't that where we should have been all along?" Brooks asked.

Dryad has also published the Mediterranean Special Advisory report, which looks at the complex threat currently facing shipping in the Mediterranean. The security company said that it had been written to provide a better understanding of this important area, which currently faces political instability, mass migration and the threat of maritime terrorism.

Ian Millen, Dryad Maritime COO, said; "On reading this special advisory, provided free of charge to our readers, it will be seen that, while complex, chaotic and sometimes dangerous, the overall situation in the Mediterranean is not as apocalyptic as some reports would have people believed.

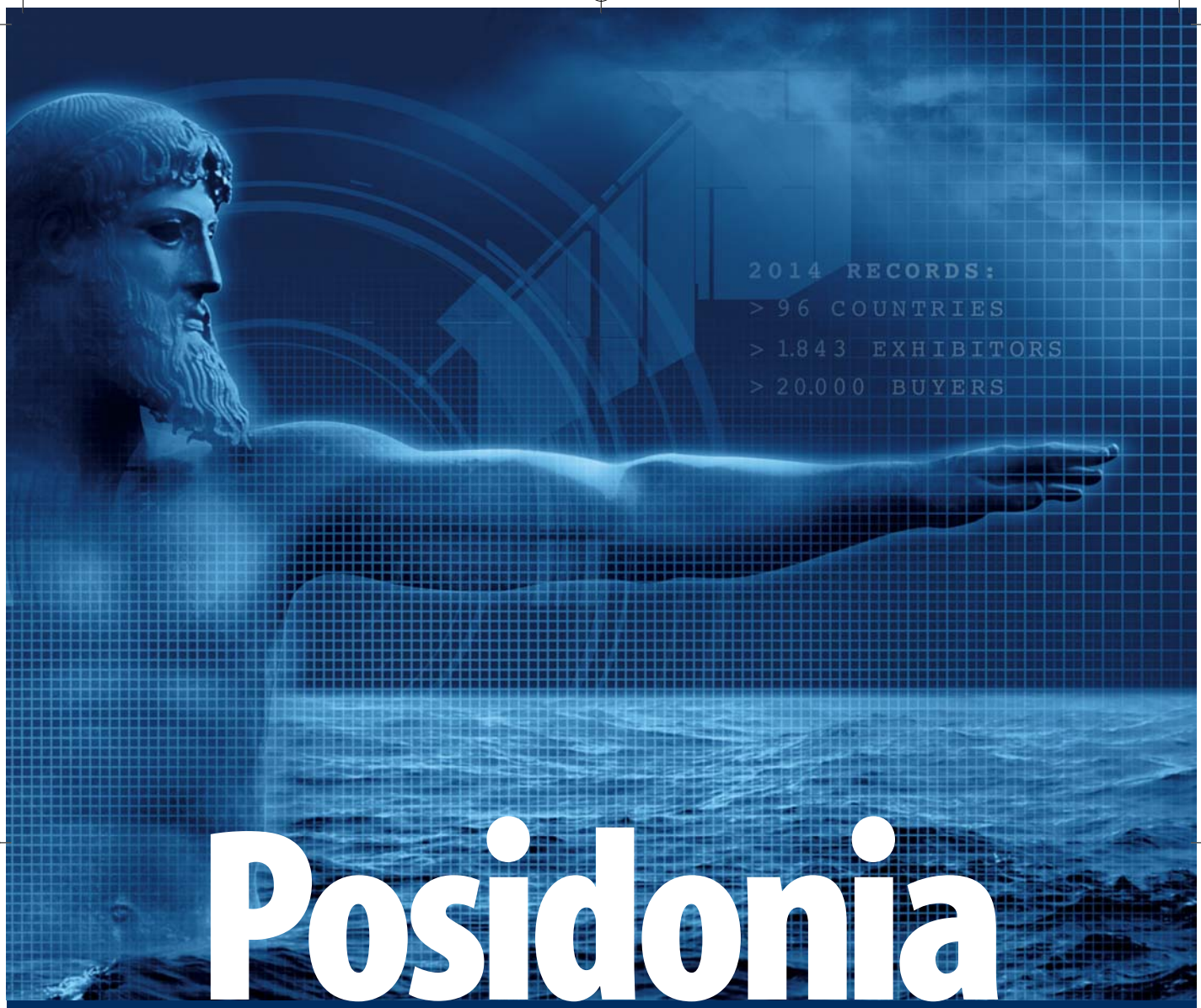
"Careful consideration of all available information is a key step in assessing and mitigating risk and, by sharing the thoughts of Dryad analysts, we hope that this special advisory will make a contribution to reader's overall understanding and to the process of risk management, keeping seafarers safe and trade flowing," he said.

**Attendees of BIMCO's Annual Conference in Hamburg were shown three scenarios outlining the possible risks and the methods of prevention for a cyber attack on ships' systems.

Andrew Fitzmaurice, CEO of Templar Executives, commented:"The maritime industry, with an increasing reliance on technology and diverse human elements, must be prepared to rigorously protect its business, people, vessels and reputation from a determined and rapidly evolving cyber threat."

In addition, fellow speaker Capt Alexander Soukhanov from the US Maritime Resource Center (USMRC), commented on recent research carried out by his organisation:"Our initial [research] findings show significant potential for cyber disruption, including malicious takeover of engineering controls, widespread exposure of critical data and systems and corrupted electronic navigation charts, to name a few."

BIMCO – with other industry associations – will soon publish guidelines on cyber safety and security to provide clear information and support to the shipping industry on how to avoid being vulnerable to cyber attacks. TO



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Beware the rolling effect

A near miss was recently reported on DYNAMRINe's OSIS onlineSTS.net service regarding a ship-to-ship (STS) cargo transfer operation off Southwold on the UK's East Coast.

At the time, the weather conditions were moderate to rough. The STS transfer was a reverse lightering operation between an Aframax, the manouevring and discharging vessel and a Suezmax.

During the operation it was noticed that the Aframaxes closed chocks were not greased, which resulted in the parting of the Suezmaxes two mooring tails, plus a fender pennant line from the Aframax.

The weather conditions and swell resulted in the Aframax experiencing increased rolling when her displacement was reduced during the transfer. Because of the rolling and the freeboard difference, the forces on the mooring lines were increased, thus increasing the friction on the chocks. As a result, the mooring lines parted in way of the chocks.

In order to reduce the tanker rolling, the Person in Overall Advisory Control (POAC), changed course towards the swell, but did not promptly advise the Masters to warn of the possibility of the lines breaking. The fender pennant lines should have been adjusted, relevant to the discharging and manouevring vessel's freeboard increase.

Lessons learned

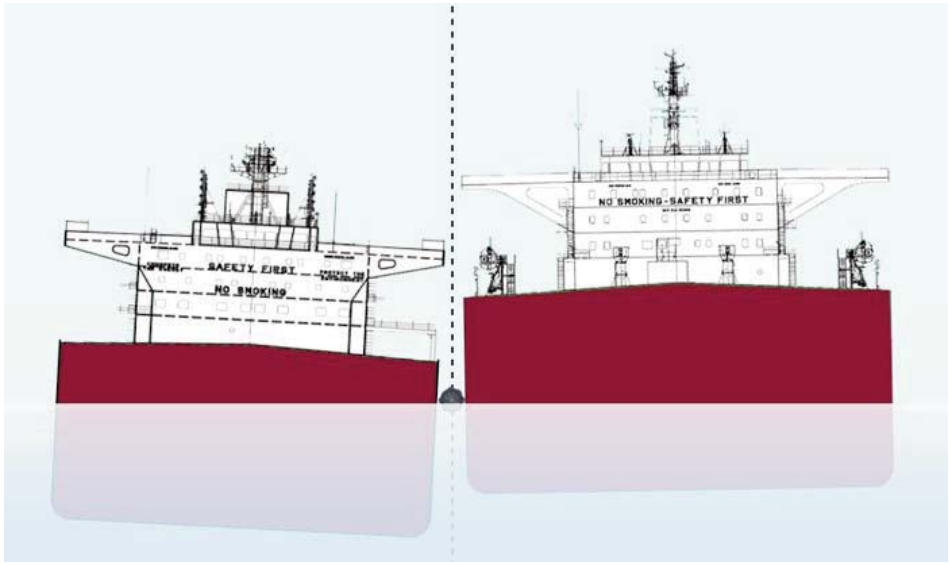
During the planning phase and prior to the commencement of the STS operation, both Masters should have ensured that the utilised chocks would be sufficiently greased. The use of protective sleeves will contribute to maintaining the mooring lines' sound condition.

Both Masters and the POAC should have also ensured that confirmation of the proper chocks preparation was agreed in the joint plan.

Chocks showing scratches and friction marks should be ground and properly greased, as they could damage the mooring lines.

During the vessel's change of freeboard, the mooring lines, as well as the fender pennant lines, should have been adjusted accordingly to conform to the changed deck heights. The POAC should have actively monitored the changes and advised both Masters to take action promptly.

The risk assessment conducted prior the STS operation should have accounted for such issues and flagged up risk mitigating actions to the Master. Generic risk assessments usually do not include rolling and fender assessment.



The Aframax left and the Suezmax right undergoing reverse lightering. Source: DYNAMARINe.

Closed chock and wire not properly greased. **Source: DYNAMARINe.**

MARITEC

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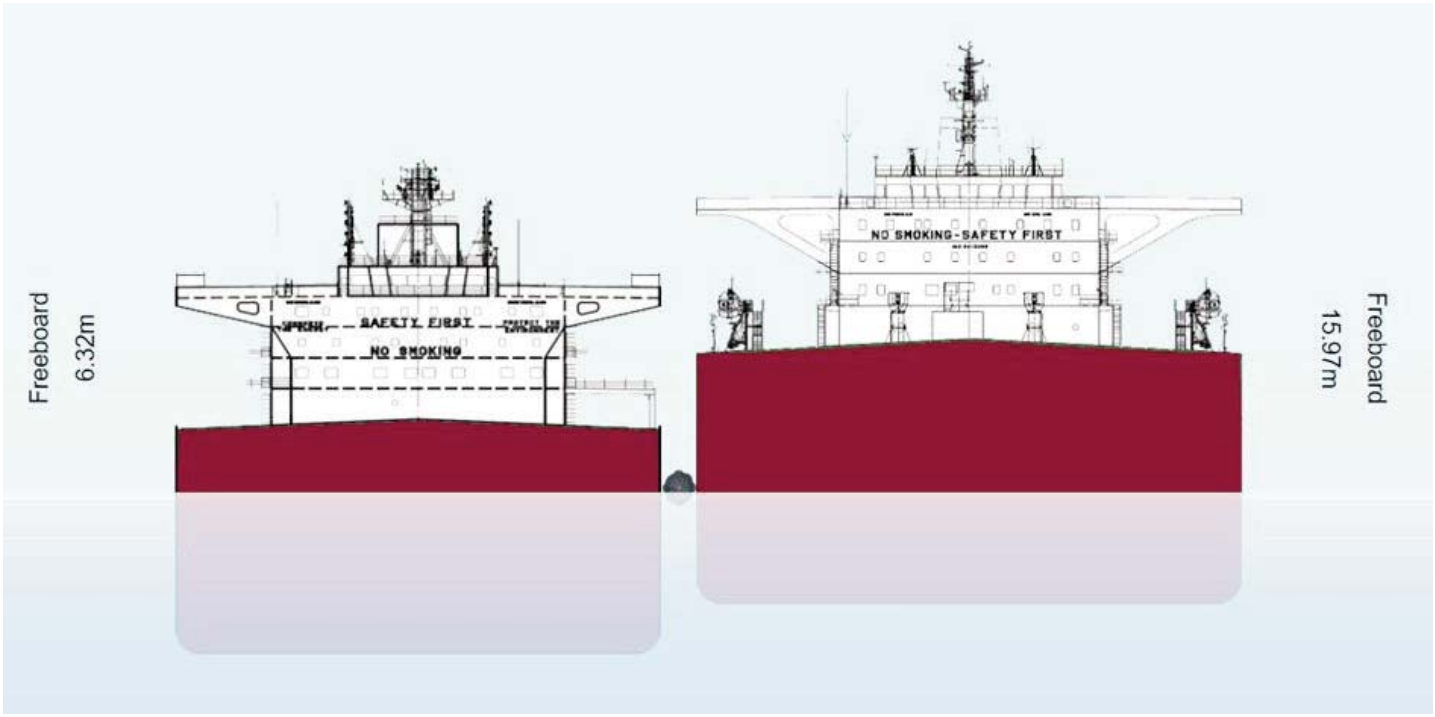
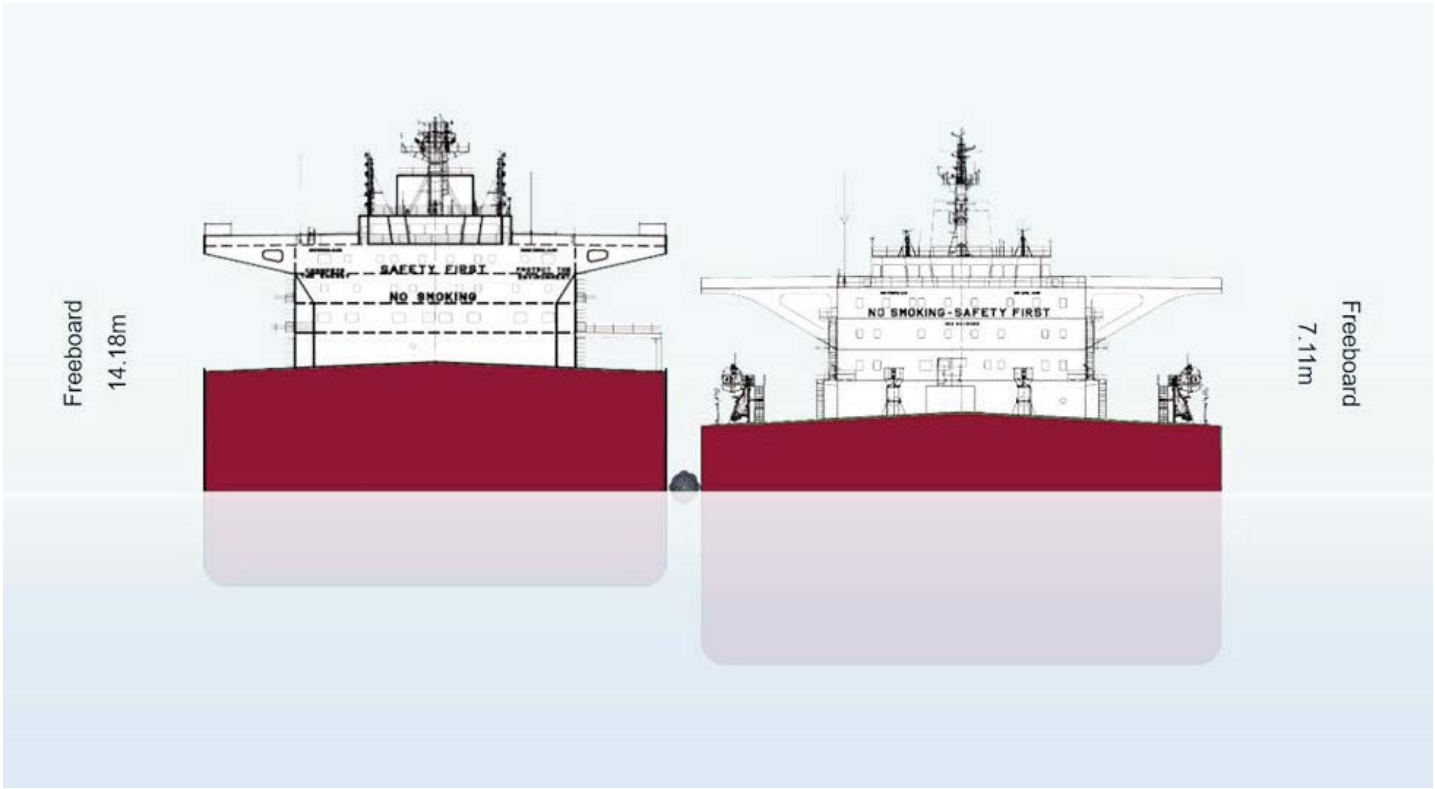


Freeboards before the STS operation. **Source:DYNAMARINe**



Freeboards after the STS operation. **Source:DYNAMARINe.**

OCIMF guidelines latest edition makes explicit reference (ANNEX K2, page 144) to causal factors contributing to increased risk. Large rolling angles, fender breakdown or inadequate fendering are among the causal factors, which should be accounted during an STS operation, DYNAMARINe said.

It is considered that both 'proper incident management' and 'consolidation of STS knowledge' within an organisation are also important factors that may assist in dissemination of STS experience gained by the Masters and reduce the incurred risks in STS operations. This is one of the scopes of the onlineSTS.net service, DYNAMARINe explained.

Vulnerable

Offshore STS operations are vulnerable due to increased risks caused by weather conditions. Sometimes such operations may result in excessive delays and unforeseen damage to both vessels. A reliable forecast and experienced POAC, as well as well-trained crews, are required in order to ensure safety and handling of abnormal situations.

In port STS operations, or operations at sheltered water are more safe, due to absence of such risks, DYNAMARINe concluded.

ECDIS Ltd adds another MCA approval to its list

ECDIS Ltd's 'Train the Simulator Trainer & Assessor' course has recently received approval from the MCA.

The IMO 6.10 Model course was interpreted and written to what was claimed to be a high industry standard by ECDIS Ltd and was delivered to, audited and approved by the MCA.

This latest approval cements the company's position in the market as the centre for instructor training, it said. The training centre is now able to deliver the complete package of IMO Training Courses for Instructors.

Instructors of all grades can also benefit from completing both the IMO 6.09 (approved September, 2015) and IMO 6.10 all under one roof at ECDIS Ltd's premises near Fareham, Hampshire, UK.

With this completion and 6.10 course sign off, the growing deck and navigation training centre now has six full MCA approvals and recognitions:

- ECDIS Generic.
- HELM (management).
- HELM (operational).
- 6.09 Instructor Training Course (theory).
- 6.10 Train the Simulator Trainer & Assessor.
- Bridge Team Management (MCA recognised).

Richard 'Joe' Sloly, instructor for 6.09 & 6.10 courses, commented "It is always an accolade to receive MCA approval for our courses, but to receive two for both the instructor training courses back to back has been quite special. We can now specialise and pride ourselves in making a difference to training in the industry as we make sure trainers are well equipped with the skills and knowledge they need to become effective teachers."

Robyn Harrigan, production and training manager, added "It can be a long process toward approval for training centres, so receiving the official certificate is a hugely gratifying moment. I am extremely proud of our MCA approved course list and the milestone we reach with each one. Our growth has been substantial over the last two years and the MCA stamp for the instructor training courses has grounded us as a centre for delivering high quality trainers."

ECDIS Ltd told *Tanker Operator* that it was currently running type specific courses week in, week out. The training centre covers about a third of the ECDIS OEMs available including: Transas, JRC, Sperry, OSI, Kelvin Hughes (both manta digital and widescreen), PC Maritime and one of the most popular at the moment - Furuno.

The company said that it was the only official Furuno recognised and approved type specific training centre in the UK and teaches two Furuno courses per week. These are fully booked until 2016.

The Generic ECDIS training courses, run each week, are also MCA approved and ECDIS Ltd also holds an ECDIS generic training course every month in Singapore, which is MPA approved. In addition, the ECDIS type specific courses are approved by The Nautical Institute (NI), as well as having a Furuno endorsement for the Furuno course. Students will receive two certificates – one from ECDIS Ltd and the other from the OEM.

Type specific courses are becoming more of a concern to ship operators as they must ensure that all relevant seafarers have completed a type specific course before joining a ship. "We have had examples where Masters have been in contact desperately seeking type specific training, as their ships had been detained because of a lack of qualifications," the company said.

MCA approval cannot be obtained for type specific training, as there is no IMO Model course in existence. However, ECDIS Ltd approached NI and presented its course & content and the Institute appended its logo to ECDIS Ltd's type specific certificates as a mark of quality.

VSTEP receives DNV GL certs

Maritime simulator developer VSTEP has received DNV GL accreditation for the recently introduced new generation of GMDSS Simulators.

This certification is the latest addition to VSTEP's range of DNV GL certified NAUTIS maritime simulators following the GMDSS, Dynamic Positioning, Tug and Class A FMB simulators, which are fully DNV GL certified for training in accordance with STCW and IMO requirements.

The new VSTEP NAUTIS GMDSS simulators come in two set ups, a full hardware version or a virtual GMDSS system with touch screens.

The GMDSS simulator is based on modern software technology and built in co-operation with professional mariners. It includes new features not previously available in the market, including the showing of four GMDSS peripherals (out of a possible 13) on screen simultaneously and the option to connect multiple handsets to the simulator, the company said.

Pjotr van Schothorst, VSTEP CEO: "We are proud to have received DNV certification for another of our key maritime simulator products. Acquiring this accreditation for GMDSS by the leading certification body for simulators always involves a very thorough evaluation process. Each DNV certification we receive is a confirmation of the quality and training value of our simulators for our customers and we are delighted to add this latest certification to our maritime simulator range."

Both the hardware and virtual GMDSS simulator set ups can be used either separately, in a classroom configuration or can be

integrated into any existing NAUTIS ship bridge simulator.

In addition, VSTEP and Philippine simulator developer Poseidon have teamed up.

VSTEP and Poseidon Asia, Inc (PAI) have formed an alliance to bring NAUTIS maritime simulators and training apps to the Philippines.

Poseidon Asia is the local office of Poseidon Simulation, which is part of the Poseidon Group with a head office in the Lofoten Islands in Norway. The company specialises in the development of user-friendly and cost-effective PC-based maritime simulators.

Through Poseidon Asia, VSTEP has made NAUTIS maritime simulators available to major stakeholders in the Philippine maritime industry, including maritime institutions, maritime training centres, as well as local shipmanagement and crew manning companies.

PAI Chairman Bjarne Pedersen said that the partnership with VSTEP is another testament to the company's commitment to the Philippine maritime industry, as it continues to strive for ways to raise the country's maritime education and training level to international standards.

Poseidon Asia recently celebrated the official opening of its NAUTIS simulator demonstration centre in Manila to complement its existing showroom and laboratory in Makati.

"It is our way of showing our clients that we are not just in the business to compete with other providers but to provide the international maritime industry with the best maritime-related educational and competence products, solutions, and services that are available in the market today," said Lea Alquinto-Medrano, PAI president.

The PAI showroom and laboratory is able to show actual demonstrations on product set up and features and provide customers with after-sales and support services. Through the demo session, prospective clients are able to see and analyse PAI products, solutions and services.

VSTEP NAUTIC GMDSS console.

Transas Simulation 2016 user conference

More than 200 experts from all around the world will attend Transas' simulation user conference (SimUC 2016) 'Simulation and Training without boundaries', which will be held in Singapore on 28th January, 2016. Transas SimUC is a regular international event, that gathers the company's simulator users and its partners to exchange experiences and ideas about maritime simulation and training.

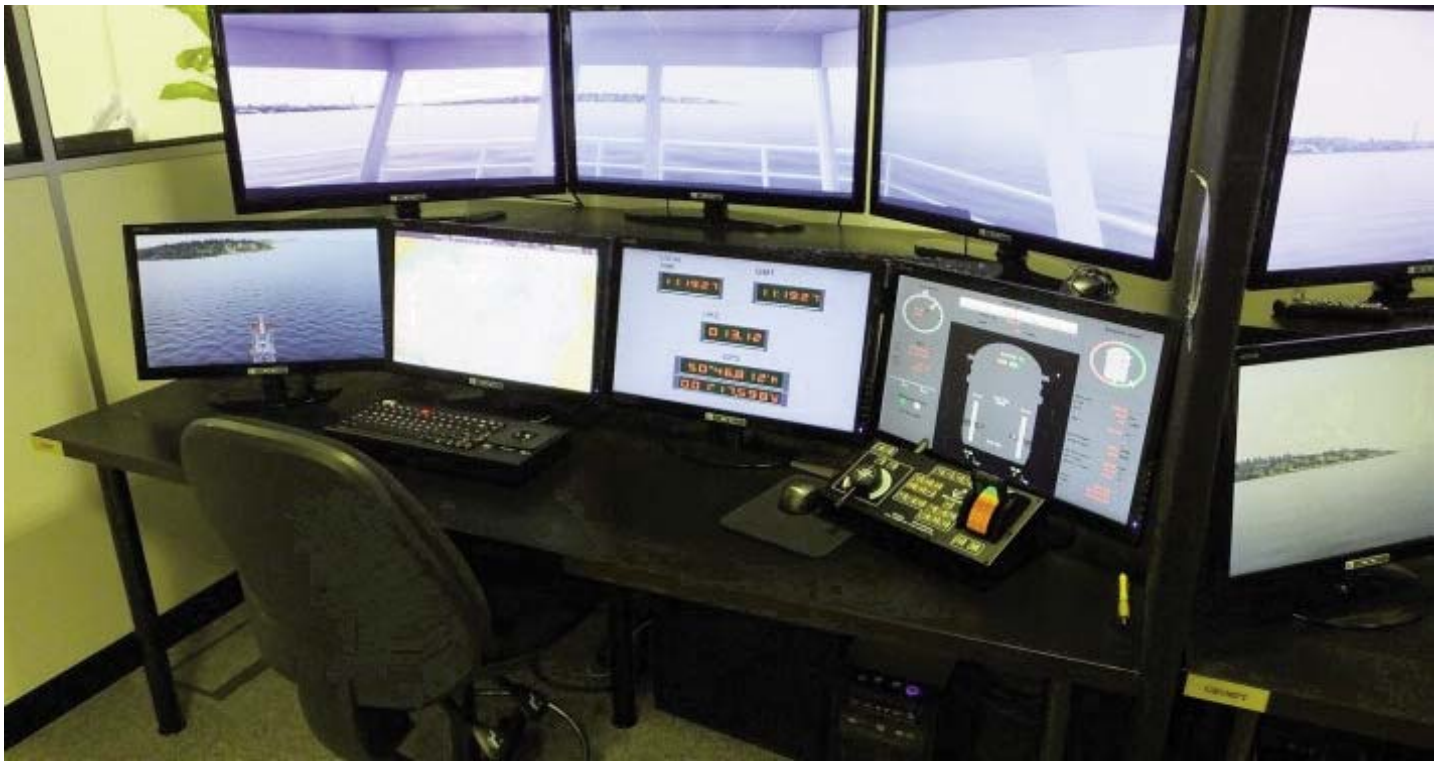
The 'Simulation and Training without boundaries' theme will embrace subjects, such as e-Navigation and cloud simulation; human element, leadership & management (HELM) training; STCW requirements for engineer training, on board simulation solutions, R&D applications of the simulators; innovative HW approach; naval simulation and training, automated assessment advances, ECDIS and navigational skills training, cargo handling training, offshore and DP simulation, polar code introduction and more.

At the beginning of November, 67 papers were confirmed, and more than 200 participants from 41 countries registered to attend the event.

Among the SimUC 2016 speakers will be Capt Hans Hederström, CSMART managing director, Capt Reto Weber, Simulation Manager at the Chalmers University of Technology, Assoc Prof Dr Selcuk Nas, Vice Dean at the Dokuz Eylul University, Georg Haase, Nautitec managing director, Serdar Dundar from Piri Reis University and John Wright, Managing director of WrightWay, an active contributor to the IMO's coming requirements for HELM.

Ralf Lehnert, Transas Simulation business division director, commented: "We aim to create an effective balance between conference sessions and informal discussions during social events. One of the key benefits of events like this is the opportunity to meet and share professional knowledge and experiences of our peers."

TO



An ECDIS Ltd training workstation.

A bridge too far - reducing complexity*

At the recent *Tanker Operator* conference in Hamburg, I gave a presentation about complexity on the bridge of today's merchant ship.**

I compared the average saloon car of 50 years ago with that of today paying special attention to the controls for driving – basics such as steering wheel, direction indicators, gears, windscreen wipers and lights.

It is quite obvious that there has been a huge increase in technical complexity but in parallel an equivalent reduction in operational (driving) complexity.

However, far from reducing the operational complexity, the modern ship's bridge has increased both technical and operational complexity. Sadly, the controls in place to prevent this situation have been either overlooked or ignored (SOLAS V.15).

One of the basic requirements of a ship's bridge is to facilitate the keeping of a good lookout. A wheelhouse from the 1950s usually had a flat fronted bridge and windows and then in the 1960s, the three adjacent sides of an octagon became the norm.

This shape has now been adopted as a 'blimp' on the front side of the bridge. What has not been taken into account is that on the 1960s design, there is a space between the three sided front windows and the forward edges of the bridge consoles (normally in line with the front edge of the bridge wings). The officer or Master conning the ship would stand in this space (the conning position) and be afforded an angle of view from 22.5 deg abaft the beam on each side to right ahead (SOLAS V.22.1.3).

Today, we have modern consoles encroaching in to our three sided 'blimp' and with ARPA, ECDIS, and all other information sources grouped together, the conning position has moved to this location.

Refraction problems

The angle of view from this position is seriously affected by refraction, due to the angle of incidence on the flat windows forming the rest of the bridge front. It is further exacerbated by large window posts, doors and even the columns around the chart table. On totally enclosed bridges, the situation becomes worse and for such ships fitted with a transmitting magnetic compass (not all types), it is impossible to comply with SOLAS V.19.2.2 (to take compass bearings over an arc of the horizon of 360 deg).

Mark Bull tries to reduce the complexity.

On ships retrofitted with new equipment, little thought has been given to Regulation 15 of SOLAS Chapter 5. We now have ECDIS being 'parked' in any available space. Masters and officers are now having to increasingly move around the bridge, simply to extract information and make navigational decisions. The plethora of alarms and the location of the cancellation buttons is unbelievable at best and schizophrenic at worst. All the objectives of the advantages of ECDIS, AIS and ARPA have been lost.

Today, a communications computer is needed for ECDIS updates as a minimum and perhaps another as a planning station. It is essential that these are not used for administration or for cargo work to distract from safe navigation. In addition, ECDIS and ARPA monitors are now appearing in the Master's office. This is negative, navigation mission creep. If the Master needs to look at the ECDIS or ARPA he/she should be on the bridge.

Other basics that are being overlooked include the position of navigational sidelights, bookshelves that do not spill their contents when the ships roll, something to hold on to when the ship rolls and decent chairs.

We can reduce Masters and navigation officers complexity just by following existing rules and guidelines for bridge design and equipment and also ensuring SMS procedures take bridge design into account.

Finally, over the past year, I have attended 20 ships to conduct navigational assessments; not one had a correct Form E of the Safety Equipment Certificate. In a similar way that a radio technician is required to issue a report prior the issuance of a Safety Radio Certificate, so to should a qualified navigator issue a report confirming that the navigational equipment is correct prior to issuing a Form E.

TO

Footnote:

** A bridge too far is an act of overreaching-going too far and getting into trouble or failing.*

***This article was written by Mark Bull, an Independent marine consultant and a Fellow of The Nautical Institute.*

He spent 27 years at sea, of which five were in command, spent 10 years ashore with Columbia Shipmanagement, the last years as QM & DPA. He then moved to the London P&I Club as its Loss Prevention Manager and finally assisted a new start up shipmanagement company before becoming an independent marine consultant in 2012.

Much of his current work involves carrying out 'Navigational Assessments under Voyage Conditions' and Bull has developed his own system to ensure tanker operators fulfill their TMSA 5.4 objectives.

m.bull@bullmxb.com www.bullmxb.com

Three for the price of two

Two radically different Simrad ECDIS solutions are now available to help ensure that shipowners and managers comply with international rules.

Compliance with the SOLAS Convention regarding ECDIS reached a watershed on 1st July, 2015. After that date, all tankers of above 3,000 gt are now required to make ECDIS provisions in time for their first subsequent survey.

The rules includes the need for navigators to be trained on type-specific systems fitted on board a given vessel, but also for ECDIS-equipped ships to have back-up arrangements for navigation should the main ECDIS be compromised. While there are sound safety-based arguments supporting these requirements, both call for an additional commitment for owners, beyond the usual requirements when regulators impose new technology, Simrad warned.

Simrad recently launch a 'Zero Downtime' paperless navigation offer, to deliver three of its newly launched Simrad ECDIS E5024 packages for the price of two. The type-approved system was introduced this year and offers an entirely new user interface that simplifies usage, whilst meeting IMO requirements, the company claimed.

The 'Triple System' Zero Downtime offer allows owners to keep a spare ECDIS shoreside or on board ship that can be swapped out easily so that the vessel is always SOLAS-compliant.

"ECDIS was made mandatory for safety reasons, but shipowners are also entitled to expect paperless navigation to be attractive on commercial grounds," said Jose Herrero, managing director commercial marine division, Navico. "A combination of competitive pricing and the Zero Downtime offer covering Simrad ECDIS E5024 is the company's answer in a market where compliance is now critical. At this point in the enforcement cycle, it is crucial that owner choices include a solution that achieves lowest total cost of ownership."

The Simrad E5024 is available in 24 inch widescreen display and has the option of radar overlay with the company's radars via Ethernet cable connection. It operates with Navtor chart support for SENC, S-63, and S-57 charts from UKHO (AVCS), PRIMAR, IC-ENC and NOAA ENC.

"Simrad E5024 ECDIS is the ideal solution for vessels required to retrofit ECDIS at the lowest cost of ownership. It is modular and can be installed simply in either single-station or dual-station (PLECDIS) configurations. It features a wireless trackball controller with on-screen keyboard, offering quick access tiles and simplified route planning with drag-and-drop manipulation of waypoints," Herrero said.

Simrad ECDIS E5024 complements the established Simrad MARIS900 ECDIS that has already achieved a significant share in the newbuilding sector. Both systems are available worldwide and supported by a global network of service engineers.

"Our ECDIS solutions have been developed to meet our customers' needs. Earlier this year, we migrated the Simrad MARIS ECDIS900 MK5 and MK15 to an entirely new high-performance hardware platform with updated software," explained Herrero.

Simrad has added to its ECDIS offering.

They are both based on a standard Windows interface using common controls, including toolbars, tabbed panels, hotkeys, and right-click context or 'pop-up' menus. Both facilitate universal radar overlay, multiple layers display, additional route planning functions, precise navigation tools and multiple add-on functions. Add-ons include route optimisation, dead man alarm, BNWAS interface, approved TCS and conning display.

Navico's Jose Herrero.

Herrero further explained; "The system has its own integrated chart management solution, which includes Pay-As-You-Sail and is distributed and managed via email or internet, through our MBA for ship chart management and the MCP customer portal for ship and fleet monitoring.

"The MK5 and MK15 give shipping owners the flexibility to meet bridge design constraints and comply with additional regulations set by flag states, Port State Control, and the OCIMF Ship Inspection Report Programme (SIRE)," he said.

Existing customers who have already opted for the Simrad MARIS ECDIS900 option, or new customers preferring its broader range of add-ons, can take advantage of type-specific training. Herrero added; "For this solution, training is available online, via computer-based training and at 127 certified learning institutes, in line with IMO requirements.

"The period between 2015 and 2018 will be one where the remainder of the IMO fleet will have to be made ECDIS-compliant, without exception. Our job as a supplier is to make compliance as efficient and palatable as possible," he concluded.

Securing a long term future?

With the numbers required to trigger the introduction of the IMO Ballast Water Convention fast approaching, concerns are emerging about level of equipment supply and the customer support available to the shipping industry.

Concerns range from whether there will be enough supply of the best systems, whether there will be adequate engineering capacity to satisfy demand for what many see as a significant engineering project, and whether or not there will be sufficient yard capacity for retrofit installations. To these concerns was recently added the spectre of uncertainty following the recent US Court of Appeal ruling.

Coldharbour Marine's CEO, Andrew Marshall, believed that while there may be some logic behind the concerns, there are ways in which owners and operators can mitigate the impact on their companies and protect themselves through the introduction phase for BWT systems and thereafter into the future.

Once the IMO BWM Convention enters into force, rather than it forcing a rush to the wire, the process allows for older ships - those built before 2012 - to have a BWMS retrofitted and installed on the first intermediate or during the first renewal survey after delivery.

This allows owners and operators time to do their homework to establish the most appropriate technologies for their vessels and then to identify and contract with their suppliers of choice. Provided this is undertaken early enough there should then be enough time to ensure that all the detailed survey and engineering planning is complete before the drydocking - thus minimising costs and the risk of disruption.

Owners and operators, cognisant of the heavy investment in BWTS that they will be making for the future, will legitimately be looking for a partner that they can work with for the long term. As Marshall said, "Owners are investing millions in new systems and they will want the comfort of knowing that should things go wrong, they have access to informed, expert engineering support, even years down the line when the kit is out of warranty. Furthermore, they need to be comfortable that their choice of BWTS vendor has the in-house skills, competence, personnel and facilities to diagnose faults and complete urgent repairs.

"There is a real risk that the initial bulge of retrofit orders will test suppliers capabilities and as a result there will be some casualties," he warned.

Marshall has always believed that engineering skills, coupled with high levels of technical and operational understanding translate to excellent customer service. It is also important that vendors do not over reach or overcommit themselves in their quest to secure valuable market share. Better to have X-number of happy customers than to have X+1 unhappy customers! This, Marshall believed, is the secret of success and long-term sustainability in the BWTS sector.

Limiting equipment supply

To this end, Coldharbour Marine has adopted the unusual business strategy of limiting the number of sets of BWM equipment it will install post BWMC commencement, to 148 orders per annum. Marshall explained the thinking behind this approach; " There will be 40 to 50,000 vessels demanding BWMS retrofits once the Convention clicks into place, which will create a huge bulge in the market with people jostling for hardware, for engineers and possibly making promises they will not be able to keep.

"We have decided to be here for the long term, we also decided to focus on the particular specialist needs of large tankers, LNG carriers and bulk carriers who face particular problems reliably handling up to 300,000 tonnes of water at high ballast flow rates within critical timetables and port operations. These vessels also frequently undertake long voyages where the risks of organism regrowth are exacerbated and as a result, some ballast water management systems may struggle to deliver the discharge standards required by both IMO and USCG.

Coldharbour's Andrew Marshall.

"It was to support the needs of this customer base that we designed an in-tank, in-voyage approach to ballast water treatment. For the future, we have invested heavily to ensure that we can support our customers with training and engineering facilities both from our UK head office and also from our worldwide agent network.

" Owners are making a long term investment in BWTS and Coldharbour recognises this by offering all our customers a comprehensive 10-year service and warranty contract that not only gives them confidence, as to the long term viability of the equipment from a service and reliability standpoint, but also cements our commitment to ensuring that as BWT regulations get tighter in years to come our customers will be able to meet those challenges.

"Our R&D effort never stops and through continuous product development we are working to ensure that our systems are as 'future proof' as possible.

"The Coldharbour BWTS was designed from the outset to be upgradable as far as possible so as to meet future standards without significant change being required to the original installation. This, we believe represents a commitment to the long term support that our customers can rely upon," he concluded. TO

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Coldharbour GLD™ BWTS is specifically designed and optimised for large tankers, LNG/LPG carriers & large bulker/ore carriers

- No disruption to port and terminal operations — GUARANTEED
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Ballast water - an ambiguous issue

Confusing US legislation is leaving shipowners and operators all at sea when it comes to environmental compliance, said Matt Granitto, Evoqua Water Technologies' business manager.

While the industry waits for the IMO's convention to be ratified, which will see the installation of ballast water treatment systems on board ships become mandatory, in the meantime, other bodies – most notably the US Coast Guard (USCG) – have introduced their own regulations concerning ballast water.

The USCG's Homeport 2015 regulation links back to two legislative acts, 1990 - Nonindigenous Aquatic Nuisance Prevention and Control Act and 1996 - National Invasive Species Act. Under US federal rules, ships must have a USCG type approved system installed by the ships' compliance date, starting as early as 2013, if they wish to sail US waters.

However, the USCG type approval process requires stricter testing than the IMO equivalent. Whilst the expected standards from each regulation are the same, the testing conditions for USCG approval are more tightly controlled.

As a result of waiting for ratification and the absence of USCG type approved systems on the market, the majority of operators are reluctant to install equipment.

Ballast water treatment also falls under the remit of the US Environmental Protection Agency (EPA) as part of the Clean Water Act (1972). The EPA's requirement to regulate ballast water discharges is different to the USCG rules (*USCG, 2008*). This is where the confusion begins.

New rules required

EPA has recently been ordered to write new rules for the treatment of ballast water in ships, following a lawsuit initiated by environmental groups in the US Court of Appeals (Natural Resources Defense Council et al v EPA et al, 2nd US Circuit Court of Appeals, Nos 13-1745, 13-2392, 13-2757).

The New York Court held that EPA had failed to explain why stricter technology-based effluent standards should not be applied and that it had not given thorough consideration to onshore treatment options (*Findlaw, 2015*).

In addition, EPA was held to have acted in an arbitrary manner by issuing the Vessel General Permit (VGP) to international standards and that it had not justified why some ships were exempt from compliance (*The Waterways Journal, 2015*). It must now include these previously exempted vessels in a new set of rules, investigate onshore treatment facilities and explore imposing stricter discharge limits before the next VGP is issued in 2018.

This isn't the first lawsuit that has been initiated against the EPA on this issue and it is unlikely to be the last. In 2009, the Stanford Environmental Law Clinic filed the suit in the 9th US Circuit Court of Appeals in San Francisco on behalf of the Center for Biological Diversity, Northwest Environmental Advocates and People for Puget Sound. The groups claimed that the EPA's new permitting rules, issued in December, 2009, were not stringent enough to meet the requirements of the Clean Water Act (*Greenwire, 2015*).

As far as shipowners are concerned, the process through which they must meet USCG

Evoqua's Matt Granitto.

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and EPA regulations, can be construed as ambiguous and confusing (*The Naval Architect, 2012*). Shipowners have filed extensions to receive more guidance in how best to conform to these regulations.

Nevertheless, this does not protect them from being held accountable for a violation of their VGP under the Clean Water Act. If such a case were to be pursued in the courts, this could leave shipowners who haven't installed an on board BWTS at risk.

Evoqua's patented SeaCURE system is now approaching the later stages of USCG approval testing. This means that there will soon be at least one system on the market that fully meets the needs of all regulations.

Non-compliance with USCG regulation means that a vessel will be liable for civil fines for each violation and not allowed to enter or conduct ballasting in ports. Furthermore, each day of a continuing violation constitutes a separate violation.

By implementing a solution that is undergoing testing sooner rather than later, owners will be helping to reduce the risk and costs associated with the invasive species incidents, such as that caused by the zebra mussels back in the 1980s.

In commissioning an already proven solution, such as Evoqua's SeaCURE system, owners will be purchasing a solution that will comply with regulations for the lifetime of their vessel.

Footnotes:

American Zoologist (1996), The physiological ecology of the zebra mussel, Dreissena polymorpha, in North America and Europe (36:339-363).

Waterways Journal (2015), Judge orders EPA to rewrite vessel general permit - http://waterwaysjournal.net/Magazine/ThisWeeksTopNews/JudgeOrdersEPAToRewriteVesselGeneralPermit.aspx

The Naval Architect (2015), Regulations float in confused seas - http://www.rina.org.uk/Regulations_float_in_confused_seas.html

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USCG (2009), Memorandum of understanding between the US environmental protection agency, office of enforcement and compliance and the USCG, office of marine safety security and stewardship: http://www.uscg.mil/hq/cgcvc/cvc1/general/vgp/CG_EPA_MOU.pdf

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http://www.biologicaldiversity.org/news/media-archive/BallastWater_Greenwire_1-13-09.pdf

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USCG moves the goal posts

The US Coast Guard (USCG) has issued a policy letter that streamlines the process for vessel owners and operators to apply for an extension to their compliance date for installing ballast water treatment systems (BWTS).

According to US law firm Blank Rome, vessel owners and operators may save costs due to the delayed compliance date, which would allow time for the approval of USCG type-approved BWTS before other systems are installed.

Owners/operators should therefore review the compliance dates for their vessels and consider applying for an extension if they will face a hardship coming into compliance with USCG's Ballast Water Management rule in light of the fact that there are no type-approved systems thus far or any practical alternatives, Blank Rome said.

Notable updates in the policy letter include removing the five-year limit on cumulative extensions, clarifying 'batch' and supplementary applications, deleting the requirement to submit vessel ballast water management plans (BWMP) with extension requests and allowing extensions to vessels that choose to install 'alternate management systems' (AMS) accepted by the USCG.

Under the original 'Final Rule', vessels have five options to achieve compliance:

1) Installing a USCG type-approved BWMS.
2) Installing an AMS.
3) Use water from the US public water system.
4) Use shoreside reception facilities.
5) Not discharge ballast water in US waters.

At present, none of these options are practical for most vessels, apart from the installation of an AMS, but this comes with financial risks that the particular AMS will not USCG type-approval in the future.

In response to the difficulties faced by industry, the USCG was challenged to design a compliance policy that was both feasible and conforms to the 'Final Rule' and the organisation worked closely with the industry to come up with practical solutions, Blank Rome said.

As mentioned, there are no USCG type-approved BWTS, although three manufacturers have submitted formal applications for approval and more than 20 manufacturers are thought to have systems under test. With regard to extensions, more than 1,600 have been granted, with many more pending approval.

It is key to determine when the vessel in question must be in compliance, as the USCG must receive the extension request within 12 months of a vessel's original compliance date, absent detailed justification as to why the request was submitted late.

To facilitate this process, batch requests may be made for all vessels between 12 and 24 months from their applicable compliance date, provided that the reasons for the inability of each vessel to comply is the same.

The Policy Letter further said that extensions were available to vessels currently in compliance through the AMS programme. BWMPs no longer need to be submitted with extension requests. Rather, a statement must be made that the vessel has a BWMP that it will follow for discharges in US waters. It also removes the five-year cumulative limit on extensions, Blank Rome said.

Optimarin ahead of the pack

Ballast water treatment (BWT) specialist Optimarin has claimed to become the first UV system supplier to meet the most stringent USCG marine water requirements, positioning the Norwegian company for full USCG approval in 2016.

In a series of land-based tests, both the standard MPN (regrowth) method and the more exacting FDA/CMFDA, or 'instant kill', benchmark were successfully assessed.

Optimarin's has sold more than 350 units out of which 270 have been installed. The BWT utilises environmentally friendly UV irradiation and back-flushing filters to wipe out

Radio-Holland BIO-Sea BWTS - see page 32.

invasive organisms.

Systems employing UV lamps have so far proven their ability to meet the MPN standard, rendering organisms unable to reproduce, but, until now, none has achieved the instant kill capability demanded by USCG.

"This is a great endorsement of our system's effectiveness and the expertise of our team," commented Optimarin CEO, Tore Andersen. "We've been developing our system since founding the company in 1994 and we believe, and testing shows, we have a market leading solution for vessels in our segment.

"USCG approval is crucial, so we're happy to be so far down the line in achieving it. Without a USCG approved system ships won't be able to discharge ballast water in US waters. For shipowners with global fleets and route networks, not having such a system would impact massively on their operational footprint and overall fleet flexibility. It really is a must,"he explained.

Testing of Optimarin's system was carried out by DNV GL at the NIVA test facility in Norway. Further tests of remaining water salinities are now scheduled for the spring of 2016, after which approval is expected later in the year. The company is investing some $3 mill in the approval programme.

Optimarin's type approved Optimarin Ballast System (OBS) is certified by a range of class societies, including DNV GL, LR, BV, MLIT Japan, and ABS.

VLCC drydocking surge

US tanker broker Charles R Weber recently warned in a report that for VLCCs, which are in the highest ballast water capacity range, the convention schedule calls for tankers built before 2011 to install BWTS by the first renewal survey after the anniversary date of delivery in 2016.

VLCCs built after 2011, must install BWTS by the first renewal survey after the convention enters into force on 1st January, irrespective of their building anniversary date.

Although the convention still needs another 1% of the world's tonnage in GT terms to sign up through their flag states to become ratified, it is expected that the figure of 35% needed will be reached by the end of this year.

According to Charles R Weber, this has

already led to a surge in large tankers undergoing special surveys and/or drydockings to delay their installation date given the costs involved.

This is particularly true of older vessels, for which the installation of systems may not be viable given their shorter lifespan, as the cost could be anywhere between $1 mill and $3 mill per installation.

Fitting a BWTS will also increase opex, due to the extra auxiliary consumption needed for the common types of systems during cargo operations, or increase maintenance costs with filtration systems.

In the case of drydockings, this means removing large tankers from the market for up to 20 days, the broker said.

Filtersafe supplies many BWTS OEMS with filters.

Filters

Filtration equipment manufacturer Filtersafe recently made its first delivery to China from its new Hong Kong Facility.

The company, which has Chinese Classification Society (CCS) certification for its range of filtration systems, delivered a set of BS-1004 filters to an unnamed customer.

The delivery was made from Filtersafe's 5,000 sq m assembly and service centre in Yui Lian, Hong Kong. Established earlier this year to shorten delivery times and allow the company to get closer to its customers, the Hong Kong centre has been designed to cope with the expected growth in the market.

Filtersafe produces a range of ballast water filters, from those for extremely large vessels, such as oil and gas tankers, down to systems for small cargo vessels. They are designed to handle flow rates of between 50 to 4,000 cu m per hour.

The company's customers include BWTS OEMs; De Nora, Wärtsilä, Oceansaver, Evoqua, Optimarin, Mahle, Sunrui, Erma First, Evonik, Ecochlor, BIO-UV, Auramarine, plus others, meaning it is active in Europe, Middle East, North America and East Asia, the company told *Tanker Operator*.

Co-operative venture

Elsewhere, Radio Holland and BWTS manufacturer BIO-SEA have joined together to provide worldwide integration solutions.

Radio Holland provides the installation and service expertise, while BIO-SEA provides its ballast water treatment UV based system range.

This disinfection is undertaken by means of UV-C light. "This happens at 254 nanometers, the optimal wavelength for UV-C light to render micro-organisms inactive. The light penetrates the core of the DNA, and subverts the metabolism of the cells," explained Xavier Deval, business director, Bio-Sea."What is most important is that the correct UV dose is applied. Otherwise the ship will not comply with regulations, because the water is not correctly treated."

The partnership helps to ensure that the BWTS are easily fitted in any type of vessel, newbuildings, as well as retrofits. The projects are conducted by in-house specialists, from 3-D scanning, reverse/forward engineering to installation and commissioning. The global Radio Holland network provides after sales service and maintenance.

Michiel Veen, managing director of Venteville, part of Radio Holland, explained: "These ballast water solutions are available in skid form, but are also modular for integration in existing engine rooms. Besides our existing disinfection solutions based on chloride, these UV-C light systems complete the Radio Holland portfolio. This enables us to provide a cost effective solution for every vessel with a ballast water system. Something we realise is very important because of the extra costs that the new legislation entails."

Radio Holland told *Tanker Operator* that the systems were not explosion proof and if fitted on board tankers, must be placed in the engine room or pump room.

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From engine jacket water heat to electrical power

Claimed to be a promising technology to reduce fuel consumption, with the added benefit of reducing emissions, is waste heat recovery.

Calnetix Technologies, working in close co-operation with Mitsubishi Heavy Industries Marine Machinery and Engine Company (MHI-MME) has developed a patented system called Hydrocurrent, which uses an organic rankine cycle (ORC) heat transfer process and a patented turbo-generator power conversion system to convert thermal energy from heat in the engine's jacket water into mechanical power to generate electricity.

It can produce up to 125 kW of electrical power from a temperature source as low as 80 deg C, saving up to 200 tonnes of bunker fuel and reducing carbon monoxide emissions by 18 tonnes per year by reducing the load on the ship's bunker-burning diesel generators.

The ORC technology is derived from similar systems developed by Calnetix for land-based industrial heat recovery applications.

The Hydrocurrent system has been approved by ClassNK and Lloyd's Register, following extensive tests and inspections of the system's turbo-generator, electrical, piping, controls and ORC components. The tests were witnessed by class surveyors and conducted in Calnetix's manufacturing and test facilities in Cerritos, California. The final acceptance tests took place in March, 2015.

A typical general cargo ship requires approximately 1 MW of electrical power when underway. A modern LNGC carrier may require power in excess of 12 MW. Ship electrical power is typically provided by a combination of main engine-driven generator(s) and auxiliary engine-driven generators. International maritime regulations require at least two generators as part of the ship's main electrical system. In addition, at least one generator needs to be independent of the speed and rotation of the main propellers and decoupled from the associated shaft.

Additional power generation capability can always be achieved by fitting more main or auxiliary engine generators. However, this adds significant operating cost, as well as adding to existing engine pollution. A better solution is to use the waste heat generated by the engines, to power a heat recovery cycle. Heat from engine exhaust is already used on many ships for steam generation. To date, however, it has been difficult to extract heat from lower-grade heat, such as the engine coolant.

Hydrocurrent technology aims to tap into the low-grade jacket water heat to generate additional electrical power without incurring any additional fuel usage. It is designed for use with vessels' engines ranging in size from 10 to 30 MW output with a range of engine jacket water temperatures of 80 to 95 deg C, and with sea water cooling ranging from 10 to 32 deg C.

In this article, an operating point of 85 deg C heat source at 209 cu m per hour and 27 deg C coolant water temperature is assumed throughout.

The system consists of three primary components:

- A closed-loop ORC module.
- An integrated power module (IPM).
- An electrical cabinet.

Hydrocurrent utilises the ship's main engine jacket water and sea water to facilitate evaporation and condensation of an organic working fluid with a boiling point lower than that of water, flowing through a closed loop. (See Figure 1).

The cycle begins with the liquid working fluid stored in a receiver tank at a pressure slightly above atmospheric and a temperature only a few degrees above sea water. The liquid is pumped to a higher pressure and circulated to an evaporator, where it vaporises, absorbing heat from the engine jacket water. The pressurised vapour is then expanded through the IPM's turbine, which produces electrical power with its integrated generator. The working fluid is then cooled to a liquid state in the condenser, rejecting heat into sea water which is pumped overboard. The liquid working fluid is finally returned to the receiver tank to repeat the cycle.

The working fluid pump is of centrifugal multi-stage design and is mounted horizontally to aid in achieving compactness of the skid. A special feature of the pump is its low suction head, which accommodates particularly cold condensing conditions encountered in colder oceans. Driven by a variable frequency drive, the pump is capable of varying the cycle flow and pressure to compensate for varying heat source conditions and desired power

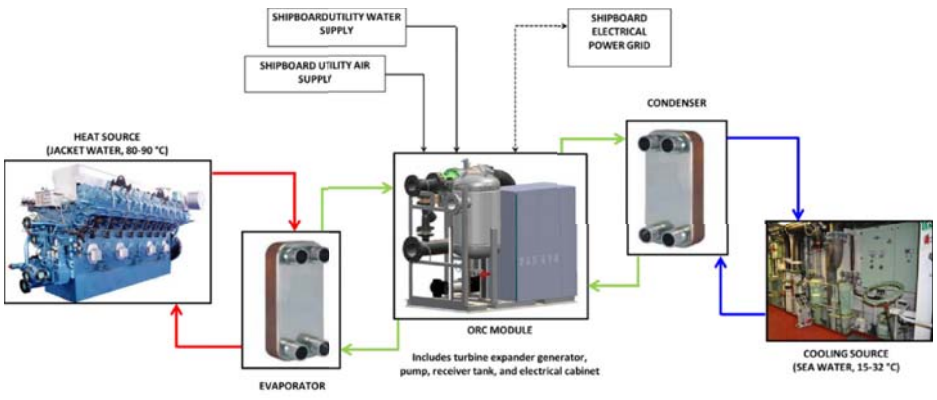


Figure 1. ORC system flow and ship interfaces.

generation settings.

Electrical power produced in the IPM is converted to meet the power quality and specification requirements of the ship. This is accomplished in an active converter within the Hydrocurrent unit. The electrical output power automatically synchronises with the ship's grid voltage and frequency and maintains this synchronisation irrespective of ship grid fluctuation or heat source changes.

The core of the Hydrocurrent system, the IPM, provides the means to convert pneumatic power into electrical power. The IPM is a combination of a radial turbine and a permanent magnet (PM) generator. A cross-section of the IPM is shown in Figure 2.

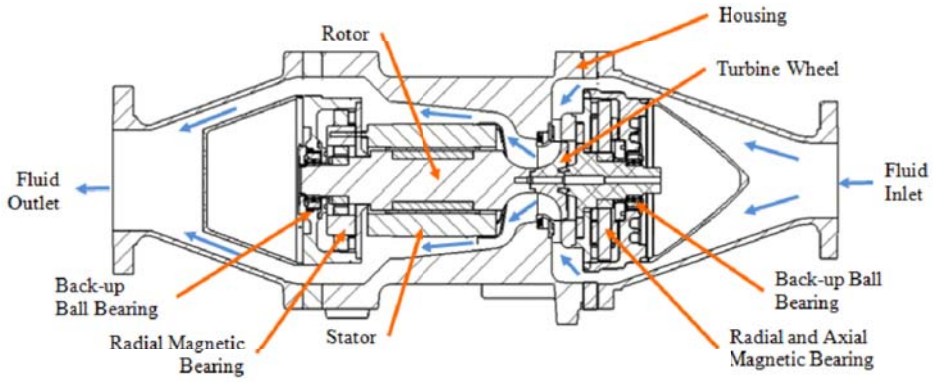


Figure 2. IPM cross-section.

The turbine and permanent magnets of the generator are integrated into a single rotor shaft and supported by active magnetic bearings. This fundamental design feature brings numerous advantages over typical turbo-generators:

1) The PM generator provides higher efficiency and smaller size over other types of generators.
2) Magnetic bearings enable frictionless operation eliminating energy loss, wear and maintenance associated with otherwise lubricated bearings.
3) The integrated turbine and PM rotor eliminates a coupling and penetration between a turbine casing and generator eliminating associated mechanical shaft losses and working fluid leakage potential.
4) The integrated generator immersed in the working fluid flow eliminates a need for an external generator cooling system which reduces system cost and maintenance significantly.

The turbine consists of a stationary nozzle and a radial wheel integrated into the rotor shaft. The turbine operates at an optimal speed of about 16,500 rev/min at a rated terminal power of 137 kW. At the nominal pressure ratio of 3.0, the isentropic turbine efficiency (total to total) is about 90%. In addition, the turbine design accommodates off-design conditions with efficiency no less than 88% for pressure ratios ranging between 2.0 and 4.0.

The rotor is supported by five active magnetic bearings. The magnetic bearing design provides sufficient load capacity and load margin to ensure stable and robust operation under a variety of load sets. Sources of loading include the shaft weight, shaft unbalance, static offset (due to manufacturing variation), aerodynamic thrust and external vibration.

The multi-functional electrical cabinet has three primary sections:

- Power electronics (PE).
- Programmable logic and magnetic bearing controls.
- Power distribution.

The PE is a fully digitised motor controller with an active rectifier front end. It takes the variable, high-frequency power from the IPM generator and converts it to a regulated power that is synchronised to the ship's grid. Using insulated gate bipolar transistors (IGBT), the power of the IPM generator is converted from AC to DC. DC is then converted back to AC to match the grid voltage and frequency. The digital controls of the PE control the speed of the IPM, as well as monitor the temperatures of the IGBTs and inductors.

Speed and temperature limits are programmed within the firmware. Requiring minimal cooling water (less than 30 L/min), the PE delivers up to 125 kW of grid quality power at 440 VAC/60 Hz or 380 VAC/50 Hz with a conversion efficiency greater than 93% and a power factor 0.98 or greater. Total harmonic distortion (THD) of PE output power to the grid is no greater than 5% at 125 kW.

The programmable logic controller (PLC) allows the ORC unit to operate autonomously. It monitors the temperatures and pressures necessary for proper operation, as well as controls the automated engine jacket water and sea water source valves. Using temperature monitoring and the source valves the PLC ensures ship functions are unaffected when the ORC is offline. During operation, it also actively prevents the ORC from cooling the engine jacket water below 75 deg C or heating the sea water above 32 deg C in order to safeguard the operation of the ship's fresh water maker.

The magnetic bearing controller (MBC) provides five-axis control of the IPM's active magnetic bearings. The MBC continuously monitors the rotor orbits and currents. Under adverse conditions, such as high levels of unbalance or vibration, the MBC sends a message to the PLC, and the ORC system is shut down in a controlled and safe manner.

The power distribution unit (PDU) is the point of interface to the ship's electrical power supply. This section contains the necessary circuit breakers, contactors, filters and fuses to distribute power to the ship's grid and ancillary ORC components.

The system comprises a number of commercial off-the-shelf components (COTS), particularly in the electrical cabinet and power converter. The reliability of such components is governed by industry standards.

Since the IPM's generator uses the expanded working fluid as coolant, and the magnetic bearing system does not require any additional cooling, the entire IPM assembly is hermetically sealed. There are no rotating seals that require periodic maintenance. A hermetically sealed module together with non-wearing seals or bearings provides an inherently reliable, long lasting power module.

As for testing, several aspects of the ORC system are tested as individual components before the system assembly is completed. Further testing is done at the system level to ensure conformance to system level requirements. The PE is also tested independently from the ORC system, whereby the active rectifier and inverter are tested to maximum load capacity and temperatures at the heat sink are monitored and recorded. Once these sub-assemblies have been tested and validated, the ORC system assembly takes place.

Thereafter, the system is tested at the Calnetix ORC test facility with representative heat source and condensing conditions. To validate turbine performance, the ORC system is operated at conditions which replicate engine jacket water using a closed loop of high pressure hot water.

It is expected that ship trials will begin in the second half of this year.

Silverstream gears up for more orders

Following *Tanker Operator*'s article in the March issue (see page 30) the patented Silverstream Technologies has recently started to ramp up its operations following its first order for its air lubrication technology.

The company recently appointed Stephen Potts to the new position of Head of Supply Chain. CEO Noah Silberschmidt explained that his job was primarily to streamline contract framework agreements with all of the company's suppliers and taking a firm stance on the pricing, especially when negotiating for a series of newbuildings.

"We are not a startup any more, we are an engineering company," Silberschmidt told *Tanker Operator*, explaining that he had also hired two more naval architects last year.

He said that among the 200 or so companies offering fuel saving equipment and/or software only about four or five would survive. He thought it was difficult to measure savings and efficiency, as heavy weather could change the calculations by 25%.

Extensive trials have been carried out, including the Shell, LR tests on the 40,000 dwt product carrier *Amalienborg*, which first alerted the world to the air lubrication systems potential. Tank tests were also carried out by Hamburg-based HSVA. BMT SMART is also analysing the results. In addition, both LR and HSVA helped the company with computational fluid dynamics (CFD) calculations.

Basically, the system saves power when switched on while the vessel will travel faster, due to the air bubbles creating a smooth reaction between the water and the bottom of the hull. It was found that typically, a vessel's speed would be reduced by 0.2-0.4 knots when switched off, meaning a fuel efficiency change of around 4-5%.

When switched on the engine power saving is claimed to be in the range of 4-5%, while the compressor used to operate the system takes around 2% of power. A propeller is very difficult to monitor, Silberschmidt said but claimed that the patented Silverstream system does not cause any cavitation.

Tests were held over three days at the same engine rev/min and the vessel in ballast sailed at an average of 11.8 knots when the system was switched off and 12.8 knots when switched on. At the faster speed, the vessel was using less energy. When laden at 10.5 - 11 m draught, the tanker will use a greater amount of air thus more compressor power but the fuel savings would be greater, as the vessel will be using more power to push through the water.

After 12 months in service with the system, there was no sign of any growth on the hull, despite spending three weeks idle in Brazil.

Silberschmidt said that he was marketing the system to 'blue chip' owners who cared about the environment and whose charterers were also keen to be seen as 'green'.

Short ROI

For a vessel at the higher end of the power range, the return on investment (ROI) can be between two and four years. However, for a vessel slow steaming for say 200 days per year, the ROI would obviously be much longer. He claimed that the system was not expensive when compared with other fuel saving technologies.

Silberschmidt also explained that the company would undertake everything in-house and not sub-contract or license the system out, which is one of the reasons for the increase in employees. "There is no margin for error when fitting the system, so our engineers will be on hand at the shipyards when some of the parts are installed," he said.

Silverstream will gradually build up a network of service stations worldwide as more orders are received. Silberschmidt claimed that the system needed very little maintenance and that the software was included. He said that shipboard officers would only need around half a day's training, as it was easy to operate and a manual would be provided with each system.

He said that the company had worked very hard on funding but Silverstream now had cash flow, as a result of the first order for a system, which will be fitted on a newbuilding cruise vessel at Meyer Werft.

Silverstream founder Noah Silberschmidt.

The original trials with a system fitted to the *Amalienborg* was funded by Shell and was independently verified by Lloyd's Register Ship Performance Team. The trials showed a net average energy efficiency savings of 4.3% and 3.8% for the vessel in ballast and laden conditions, respectively.

Based on the trials both Silverstream and Shell said following the results, that a fully optimised system had potential to deliver more than 5% efficiency savings on an ongoing basis when deployed on a full-bodied vessel with a large flat bottom.

A BMT SMARTACCESS and SMARTVESSEL performance monitoring system was fitted to *Amalienborg* to record data from the trials and to continue to monitor the system's performance for 12 months during normal shipping operations.

The company was previously known as DK Group, which pioneered air lubrication in the shipping sector around 10 years ago. In 2010, the company was restructured and last year changed its name to Silverstream Technologies and global patents were applied for.

Turning compliance into profit

With Tier III NOx limits entering into force in North America and the US Caribbean in January, 2016, shipowners should choose their method of compliance.

Exhaust gas recirculation (EGR) on MAN B&W engines has strong advantages, but combined with Alfa Laval's new pressurised EGR economiser, it also offers the potential for massive fuel savings.

"EGR provides Tier III NOx compliance with a very compact footprint, but compliance itself is only part of the full potential," said John Pedersen, Alfa Laval's business manager, boilers, combustion & heaters."Working closely with MAN Diesel & Turbo to optimise the EGR technology, we saw additional opportunities through our expertise in marine boilers. The result is the Alfa Laval Aalborg EGR-HPE economiser, which paves the way for extraordinary energy and fuel savings."

Developed by Alfa Laval in close co-operation with MDT, the new Aalborg EGR-HPE is enclosed in a pressure casing. Placed in-line ahead of the pre-scrubber sprayers in the EGR circuit, it has several advantages. If connected to a conventional waste heat recovery system, for example, waste heat recovery becomes substantially more efficient, while it is possible at significantly lower engine loads.

The source of all these benefits is the heat that would otherwise be lost during EGR. In the EGR process, around 30% of the exhaust gas is directed back into the engine, which reduces the combustion temperature and thereby the production of NOx. Since only the remaining 70% of the gas reaches the traditional exhaust gas boiler after the turbocharger, in addition waste heat recovery is reduced by 30%, the company claimed.

The Aalborg EGR-HPE is integrated with conventional waste heat recovery after the turbocharger by means of its steam drum, which is shared by the traditional exhaust gas boiler. With the output of the traditional economiser feeding into the shared drum, the Aalborg EGR-HPE produces high-quality steam with a temperature of just above 400 deg C, bringing the waste heat recovery system to a much higher level of efficiency.

"The difference in steam quality has a direct effect on the performance of the steam turbine," said Pedersen. "Installation factors play a role, but a substantial increase in power generation can be expected."

Integrated system

Of more importance, using the Aalborg EGR-HPE in an integrated system allows waste heat recovery to occur at lower main engine loads than would be possible with a traditional waste heat recovery system in Tier III operation.

"The EGR economiser makes waste heat recovery beneficial at far lower engine loads, down to around 30%" explained Pedersen. "This means that vessels can steam even slower, with huge fuel savings as a result. A vessel performing EGR and using the Aalborg EGR-HPE will be not only compliant with Tier III, but also substantially more fuel efficient."

MAN 2-stroke engine with Alfa Laval's EGR fitted.

In a project supported by the Danish Energy-Technological Development and Demonstration Programme (EUDP) and developed in co-operation with Aalborg University, the EGR boiler was tested on board Maersk Line containership.

However, Alfa Laval told *Tanker Operator* that the system was designed to be used on all kinds of vessels, including tankers and other types fitted with 2-stroke engines. In the smaller engine sizes there are other systems equally suitable. "So far, we have only installed one and the test installation and the operational performances have been our main focus area for validation of the concept," a company spokesman said.

Alfa Laval has also introduced Alfa Laval PureNOx Prime, a streamlined version of its EGR water treatment system for EGR engines operating with low-sulphur fuel.

As shown above, EGR is already the technology front-runner, due to its significant space savings and low total cost of ownership. But with the introduction of Alfa Laval PureNOx Prime at Kormarine, EGR's advantages are claimed to be even stronger.

"Alfa Laval PureNOx technology has always met the strict legislative demands on EGR water treatment," said Kristina Effler, business manager, water treatment exhaust gas emissions. "With Alfa Laval PureNOx Prime, we put additional emphasis on the tough market demands of low investment and operating costs."

For use with low-sulphur fuel, PureNOx Prime is a highly streamlined water treatment system. "EGR is a compact technology in which most components are built into the engine itself," says Effler. "PureNOx Prime further diminishes the EGR footprint, and it has a more modular design that makes installation even more flexible."

The leaner design also reduces the investment cost. "The more hours spent in ECA operation, the more economical EGR becomes," Effler said. "With PureNOx Prime available for less, that low lifecycle cost becomes even lower."

Ship's emissions inspection procedure weakness

Under the authority of the IMO, a number of Emission Control Areas (ECAs) have been created with the intention of protecting atmosphere close to land.

Since 15th January, 2015, it been mandatory for ships visiting an ECA to burn ultra-low sulphur fuel oil (ULSFO), the sulphur content of which must not exceed 0.1%. Currently there are ECAs that encompass waters around North America, the European Union (EU), and the US Caribbean, writes Brian Warshaw.

The first official indication came in October that discharges from some vessels sailing in ECAs were exceeding the 0.1% sulphur limit. An information notice issued by the California Air Resources Board (CARB) highlighted that some of the ocean-going vessels it had inspected were burning fuel with a sulphur content in excess of the ECA regulations. Violations were noted in vessels calling at both the Southern and Northern California Ports.

CARB inspectors boarded 25 vessels to check the fuel delivery documentation, finding that all of them had loaded certified 0.1% ultra-low sulphur fuel oil (ULSFO). They also drew samples of the oil from the final filters before the injection of fuel into the engines, which, on analysis, showed that several samples contained an excess of sulphur.

A spokesperson for CARB said that the bunker delivery notes (BDN) were not indicative of what actually goes into the engine. Even if fuel switchovers are done correctly, contamination can occur between marine fuel oil (MFO) and ULSFO.

Ultra-low sulphur fuel oil is 11.7% more expensive than MFO. For economic reasons, operators of ocean-going vessels will load both ULSFO, and MFO, burning the latter in the open sea, where it is permitted to use a bunker with an allowable sulphur content of up to 3.5%,.

The penalties for violation of the regulations that can be levied by the US Environmental Protection Agency (EPA) have been designed to deter future violations, whereby the civil penalties are likely to progressively increase, '…taking into account the nature, circumstances, extent, and gravity of the prohibited acts committed and, with respect to the violator, the degree of culpability, any history of prior offences, ability to pay, and other matters as justice may require.'

Costly penalties

Civil penalties can be levied up to $25,000 per violation, per diem. The penalties are not limited to sulphur content violations; but include not maintaining BDN on board for a period of three years from the date the fuel was delivered and not maintaining sealed bunker samples on board for a period of 12 months after delivery.

It has taken nearly a year since the commencement of the MARPOL Annex VI emission standards, before the issuance of CARB's Marine Notice 2015-1 exposing a weakness in the inspection procedure that has been adopted by the national maritime authorities.

The current European enforcement procedure requires member states to review logs and BDN on 10% of vessels docking at ports within the member state. From next year, the procedure will be augmented to include fuel analysis on 40% of the 10% of vessels subject to checking.

CARB found that all the BDNs were on or below the 0.1% sulphur content and there is little reason to expect this to change, even when samples are taken from dedicated shipboard ULSFO bunker tanks. The area where contamination between ULSFO and MFO is likely to take place is in the fuel lines from the bunker tanks to the engines, as was found by CARB.

The Marine Notice suggested a possible solution was that the vessel should switch from HFO to ULSFO while still some distance away from entering an ECA. 'Operational staff,' it said, 'should be able to recommend an appropriate amount of operating time on ULSFO for any given vessel, taking into account contamination from any mixing tanks, pumps, filters, or heaters where applicable, and the actual percentages of sulphur in both fuels.'

Corroboration, to some extent, of the CARB's findings has come from one of the Baltic states, which has established violations in the order of 5% from vessels tested in port. The method used to draw samples was similar to the US procedure, ie to take the sample as close to the place of its use as is practically possible.

The UK's Maritime and Coastguard Agency (MCA) said that it had not yet undertaken any sampling and testing of fuel on board ships. However, the MCA will be ready to start sampling by the end of this year and the results will be entered into a database that will eventually provide an indication of compliance. The agency also confirmed that it has not received any 'Note of Protest' of non-compliant fuel being delivered to ships.

If the maritime authorities are sincere about wanting to catch violators, then they will need to switch their inspections from port inspection to boarding the vessels as they enter the ECA, and take fuel samples from the point of injection into the engines. TO

Footnote:
Price based on Rotterdam bunker prices, 6th November, 2015.
http://www.arb.ca.gov/ports/marinevess/documents/marinenote2015_1.pdf

IBIA meeting discusses many issues

IBIA vice chairman Robin Meech has called for a "level playing", once the global sulphur cap of 0.5% comes into force in 2020 or 2025.

In a speech at the 2015 International Bunker Industry Association (IBIA) Convention held in Cancun, Mexico, Meech suggested that IBIA should propose to the IMO that countries signatory to MARPOL Annex VI should enforce a new regulation prohibiting vessels from carrying on board fuel, which they cannot burn in compliance with MARPOL.

Introducing a wide range of topics, the chairman Jens Maul Jorgensen said that quantity and quality remained an area where as an industry "we never learn." "We have to,"he added.

This year's event focused on 'The Americas: A Continent of Opportunities'. In her report on the market in Mexico, Leonor Mondragon Lopez, director General Navalmex Combustibles, explained how regulation has effectively prevented the country from taking advantage of it position as a substantial producer of crude oil and refined products.

State-owned oil company Pemex retains a dominant position but has little interest in selling bunkers. However, Ms Lopez said that reforms now being pushed through offered a promising future with much greater freedom for private companies to own and operate bunkering faculties.

Niki Vukelja, vice chairman, Panama Maritime Chamber and CEO of Maritime Advisors & Developers, said that the country had a storage capacity reserve, with only about 10% being used. He explained that the Panama Bunkering Procedure was one of several major bunkering projects underway, to coincide with the opening of the new locks next year.

While Suez had taken some bunker sales away from Panama, Vukelja, said sales were up about 25% in 2014 over the previous year. He said, however, that fewer, larger vessels would use the canal but what effect that would have on bunker sales remained to be seen, although some observers expected a dip in volumes.

Presenting an overview of the Caribbean market, Anne Ghent CEO of Ventrin Petroleum, of Trinidad, noted the region had a small bunker market but had a strategic position on important trade routes. She pointed out that there was a fair amount of storage but little refining capacity.

Independent consultant Nigel Draffin stressed that financial difficulties were causing business failures in Europe. Some companies had failed but other problems were bubbling along under the surface. He also said that the major oil companies were expanding their bunkering operations, reversing a trend seen since the 1970s.

Muchamed Elfian Harun, assistant director (bunker services), Maritime and Port Authority of Singapore (MPA) said that the MPA's mission was to promote Singapore as a "safe and trusted" bunkering port.

He said that the move to mandate the use of mass flow meters (MFM) by 2017 would make the market more transparent. A technical reference report on MFM will be published in January next year, he said.

Residual fuels

Residual fuels had not reached the end of the road yet, Intertek Shipcare's Michael Green told delegates. He spoke of how the make-up of fuel samples submitted to Intertek for testing had changed since the introduction of the 0.1% sulphur in fuel cap for ships in ECAs in January this year.

The most dramatic change had been the almost complete disappearance of 1% sulphur fuels, which had previously been ECA compliant. Green said that this had been accompanied by a significant increase in fuel quality, due to the blending and/or treatment of residual fuel to meet the limit had led in some cases to: high levels of cat fines within fuels, increased stability related issues and chemical contamination.

Immediately after the introduction of the new ECA limit the proportion of distillate samples increased considerably. Clearly, this coincided with increased use of distillates to comply with the 0.1% limit, he said. At the same time, samples of 'hybrid' fuels started being submitted in increasing numbers. These

Robin Meech addresses the delegates.

fuels meet ISO 2817 specification for RMD 80 and have few quality issues, as they are produced by the oil majors in the refineries.

Based on the experience of continuing use of residual fuels in ECAs, as hybrid fuels and the prospect of the widespread use of scrubbers to meet the likely introduction of a global 0.5% sulphur cap, Green said residual fuel use was not about to die. He posed the question,"Is this the end of the road for residual fuel?"and answered with an emphatic "No".

Jorgensen, who is the director of Oldenforff Carriers' bunker department, asked: "Do we get what we pay for?"He added:"The quality is bad."

With Oldenforff's large timechartered fleet of drybulkers, he said that a third of the problems lay with the ship, caused by mistakes often down to inexperience. The same issue was why another third of problems were down to the surveyors. He said: "There are too many inexperienced surveyors who do not know what they are doing."

But the remaining third of bunkering issues, according to Jorgensen, were caused by suppliers. Under supply was a problem, as was poor quality caused by blending. He said that the ISO specification system was not effective and he repeated a call he has made on previous occasions for an IMO regulation on fuel quality. TO

Overcoming the cat fines problem

At *Tanker Operator*'s recent Hamburg conference, Dr Frank Bernier, director sales and marketing at CM Technologies (CMT) highlighted the dangers of cat fines.

These are mainly aluminium and silicon compounds catalysts, which are used for cracking purposes to produce gasoline and other fuels from a refinery run.

However, cat fines are very abrasive and have to be removed from the oil residues following the refining process to avoid severely damaging engines running on residual fuel oil.

He said that there was not a completely effective way of filtering out all the cat fines from the cracking process. For marine bunker fuel, the cat fine concentration limit is a maximum of 60 ppm, according to the latest ISO 8217 standards. Diesel engine manufacturers have a lower limit of 10 ppm before the fuel enters their engines.

The primary fuel oil cleaning method on board ship is the centrifugal separation. The equipment must be able to separate most of the water, other relevant impurities and cat fines by more than 90%, according to the engine OEMs requirements.

Although the amount of cat fines in fuel oil bunkered is known from the documentation provided by the supplier, the amount in the fuel oil before it enters the separators and the engines is usually unknown.

Due to their accumulation in storage or day tanks on board ship, over time the cat fine concentration may deviate significantly from the value demanded, especially during rough sea passages.

To measure the actual and current concentration in the fuel on board with a reasonable degree of accuracy has not been possible, thus far, Dr Bernier said.

CMT offers a test kit, which is claimed to be capable of determining the cat fines concentration in fuel. Dr Bernier said that testing was easy to perform and affordable and the kit displays the measured values in ppm with high accuracy.

Due to the short testing time, several tests can be performed in a short space of time, enabling users to test fuel samples at different points and different significant moments during an engine's operation.

Dr Bernier, second on the left, discusses the test kit in Hamburg.

By using a test kit, an engineer can protect the engine's components, such as injection pumps and nozzles, cylinder liners, piston and piston rings, against excessive wear caused by cat fines and helps to save money on engine wear parts, repair and maintenance, Dr Bernier claimed. TO

CMT's test kit is claimed to be quick and inexpensive.

Look to your seafarers

At the recent Singapore and Hamburg conferences how to manage the human element both on board ship and onshore dominated proceedings.

For example, speaking in Singapore, Arvind Sharma, Managing Director, Platinum Ship Management and formerly with Bernhard Schulte Shipmanagement posed the questions - Do the crew add to the complexity or are they the victims? Are we really utilising our human resources effectively? Can we harness the 'power of many' to reduce complexity and make our lives easier?

He said that increasing complexity is normal. Complexity on board ship and in every part of life, has been increasing from ancient times and will continue to grow. We need to facilitate increased capabilities in our people to better handle this increasing complexity, so that inefficiencies are avoided.

He described efficiency as the sustained delivery of services of high quality, using the minimum money, resources, and time. "It means reducing operating costs in every area of ships operations without compromising on quality or standards," he said.

"If we agree that the critical cog in the wheel in our drive for greater efficiency and reliability, is the human element and can we also agree that it is vital that we learn how to motivate and manage that vital resource to get the best out of it ?" he asked the audience.

There is a tight relationship between employee motivation and organisational efficiency.

Employee motivation is enhanced by empowerment and recognition, he said. A good organisational culture, driven directly by the top leadership, positively impacts staff retention, motivation, ownership and the desire for continuous improvement.

A positive and no blame culture of respect, empowerment and recognition will lead to transparency, trust, dedication and ownership in employees and results in -

1) Long term retention.
2) High staff satisfaction rates.
3) Improved job performance.
4) Improved safety and loss prevention.

Once created, a positive culture needs to be maintained with continuous monitoring and intervention.

- It requires high retention and increasing number of staff rising through the ranks.
- It requires continuous education, of ship and shore staff, not only in technical subjects, but also in soft skills.
- It requires conscious empowerment of employees in every position.
- Finally, it requires regular recognition and positive reinforcement of jobs well done.

To increase efficiency and cost effectiveness in today's increasingly complex environment, skilled, experienced and motivated staff on board and ashore are essential.

The starting point is a positive culture in the organisation, which respects and empowers their employees at every level and gives recognition and reward for good results.

Once created, this culture needs continuous efforts to maintain its level, including regular interventions to improve attitude and soft skills of both ship and shore staff.

"Our challenge as managers and operators is not to manage the ships directly, but to manage the seafarers. These motivated, capable and committed seafarers will then manage the vessels in the best way possible," he concluded.

In Hamburg, Martin Shaw, managing director of Marine Operations and Assurance Management Solutions (MOAMS) explained the dangers of over complexity.

He said that a complex organisation would reduce revenue, increase costs, thus reduce profitability. In addition the risk factor is increased and complexity will also cause confusion and de-motivate the staff, possibly leading to a company collapse.

He then asked - can you deal with complexity?

The oil market, tanker market and regulatory structure are complex - you have to deal with it. You have choices and options at the company level.

Leaders need to think strategically and maintain situational awareness, so leave the space to think and direct, lead and manage.

In dealing with complexity, manage the external parts and structure your business for simplicity, designing it into the organisation. You need to be able to change things quickly, so you need resilience, good communications and understanding and importantly, get the right people, train them, retain them, motivate them, believe in them.

Finally, take a look at yourself - are you adding complexity?

Alex Kahl addressed SMS problems in both Singapore and Hamburg.

Involve the crew

Serving officer, Pascal Geisen, who has been a Chief Officer on board oil and chemical/product tankers since 2011, posed the question in Hamburg- can we involve the ship's crew in drafting new procedures and improving the ISM system? He advised the use of cloud-based systems offshore and facilitating communications with head office and avoid prejudices.

It is often heard that - 'managers don't know the reality on board' and conversely - 'seafarers don't care enough'.

Taking the shore staff, Geisen asked; "How many of your Captains and senior officers do you know personally? Do you know the daily routine on board? Do you know the hierarchy of ranks on board and their responsibilities? What is your preferred means of communication?"

Turning to seafarers, he posed the questions; "Do you know the key personnel in the office? Do you know how standard processes are handled ashore? Do you know how the office is organised (departments)? What is your preferred means of communication?"

When new procedures are introduced, shipboard operations manuals tend to grow and result in an increase in administrative workload. Procedures are often designed to comply with regulations and to provide evidence of compliance. He described this as - procedures versus seamanship and common sense.

He thought that the acceptance of newly introduced procedures among seafarers was often very low, as they were not included in the original drafting. Crew feedback is often too late, as the procedures have already been approved.

Geisen recommended that the crew should review new procedures on board during operations. The involvement of seafarers could be established during meetings ashore, superintendent visits on board and/or via electronic media.

Communications is a key issue due to the crew's different backgrounds. There are often difficulties in communication in a non-native language. The processes, structure and responsible persons ashore are often not well known by the seafarers. Another problem is a loss of motivation due to responses taking too long, while the crew is sometimes scared of reporting problems to the office or superiors on board.

The means of communication can also cause problems, such as email where there is limited access, the exchange of larger data packages often failing or only usually accessed by the Master. By phone there can be language barriers, different time zones/weekends and it is often very expensive at sea. Instant messaging is rarely used, usually on private devices but is the first choice for private communications with relatives/friends.

By using cloud-based communications a seafarer can work offline and synchronise whenever a connection becomes available. Different modules/applications can be implemented and by using this method, the user can create the content, as well as reducing paperwork. There is a risk of redundancy when not properly incorporated in a company's ISM and it also depends on powerful IT infrastructure/broadband internet.

There are many modules in use that can be saved in a cloud-based infrastructure, including:

- Noon reports.
- Bunker orders.
- Crew list and planning.
- Crew assessment reports.
- Rest hours records.
- Payroll.
- Disturbance reports.
- Near miss reports.
- Risk assessments.
- Blogs.

Useful functions include:

- Purchase orders and stock control.
- Weather reports and routeing.
- Rest hours with overtime records and watch planner.
- Risk assessments with work permit.
- Forum or port database.
- Document archive.
- Instant messaging and/or chat function.

SMS problems

In both Singapore and Hamburg, Alex Kahl, of Chemical Marine highlighted the problems with the Safety Management System (SMS).

SMS procedures and policies were of a reasonable size at the beginning but have since been growing, he said. Illustrating the growth pattern he outlined adding procedures, inspections, management reviews, audits and new regulations.

An SMS is compiled by the shore team but when was the last time that person sailed on a company's vessel to verify that procedures were correct and practical?

When writing or updating an SMS, use easy and simple language. It must be taken into consideration that an SMS is written for the people on board company vessels and not for a third party. Avoid duplications - duplications have been noted in many SMS, which makes updating of procedures very difficult and will cause contradictions over time. Avoiding contradictions - contradictions and conflicting statements must be avoided as they will force the crew to deviate from the procedures.

If the crew is forced to deviate from a procedure because it is not correct, you are loosing control over the SMS, he warned. There is a danger in just copying and pasting, as some important items might be copied and included in the SMS. However, in general it is important to include the company's interpretation into the SMS, rather than just a simple copy/paste of the documents, also due to the wording.

Likewise, copy and pasting of industry guidelines should be avoided for the same reasons, while the copying/pasting of others and third party procedures should also be eradicated as it is essential to understand that procedures are written for the individual company's, vessels and trade. Although similar procedures might be applicable to a certain extent, they will never completely fulfill your company requirements, he warned.

Electronic SMS can be a great system if it is user-friendly and if it is controlled. If not, the system becomes out of control, leading to contradictions and duplications. What about the size? It might be useful to print it out annually to measure its size. If it looses focus then there is a need to conduct a risk assessment. In addition, a company circular has only a short time value if not embedded in the SMS.

Why are procedures not followed?

- Manuals and procedures are too complex.
- Procedures are disconnected from the work on board.
- Wrong interpretation of industry guidelines.
- Too many forms or poor layout of forms.
- Too many changes of the SMS, due to inspections, audits, reviews, etc.

- Lack of training in the company's SMS.
- Procedures are too difficult to understand.
- Lack of adopting guidance from the seafarers.

The following could be taken into consideration to refresh the SMS:

- Masters' review.
- Consolidating procedures.**
- Simplify and reduce forms.**
- Embedding circular letters in the SMS.
- Third party management review.**
- Re-write the SMS.**
- Keep it simple.**
- A company hazard register.**
- **Might require support from a consultant

A Master's SMS review, performed annually, is a very valuable input to the SMS if done correctly (unfortunately, it is not always undertaken seriously).

During the time that more and more procedures are included in the SMS, a review of the system and consolidating procedures could reduce the SMS by some 100 or so pages in some cases. In addition, simplify forms in order that they can be completed and understood easily and review the forms annually to see if they are still needed. Circular letters are a popular method of including new guidance and processes in a short space of time. However, after 12 months the circulars should be either embedded in the SMS or removed.

A third party management review performed by a consultant might provide an independent view of the SMS. After a couple of years, the SMS has been updated several times and at a certain point in time, a company might consider re-writing it.

Keep it simple with procedures covering a couple of pages, Kahl advised.

Operating risks

Capt Kuzman Popov, MSQ & operations manager, DS Tankers outlined some of the risks involved in operating vessels. He started his list with the Polar Code before moving on to ECDIS being used as the primary means of navigation. He stated that the training standards are an area of risk, as is data misinterpretation and an over reliance on e-navigation. He said that manual navigational aids and the skills to use them were still crucial today.

Another problem looming was cyber security, which, if a vessel's technical systems were attacked, could lead to a catastrophic disaster. Ports and terminals were also potential targets, Capt Popov said. Companies must identify appropriate strategies to ensure their business continuity.

As for best practice, he said that embarking on a comprehensive company restructuring project was usually not practical. Success can be achieved by adding ad hoc measures of good practice.

In a recent survey, some 77% of the respondents claimed that they were implementing organisational or structural changes, while 90% said they were actively seeking best practice. Two thirds of the companies were comparing operations with their competition, while 38% were hiring external consultants.

He then gave examples of best management practice in crewing, saying that investment should be made in culture and teamwork and in crew welfare packages. Successful safety culture projects are essential in providing the highest safety standards on board. Such projects may become successful only after good training and an understanding of the crew. Proactive crew with regards to implementing highest safety standards is the key to success. Therefore, the shipmanagers should develop a strategy and best practice to organise training, seminars, conferences and briefings for the crew, in order to verify their compliance to the market and oil majors' demands, plus the right knowledge and proactiveness in implementing the best safety culture standards on board.

Appraisal and training should be integrated and management systems developed. Training should be undertaken by using a combination of personal and CBT systems. Finally, he said that an integrated crewing solution should be adopted both on board and onshore.

As for technical issues, Capt Popov said they should be organised around processes, such as a state-of-the-art planned maintenance system. Master data should be harmonised and centralised. Managing drydockings is a key element of a maintenance budget, as is paying attention to hull maintenance and the embracing of condition based monitoring.

Other Key elements for success of the shipowners and management companies today are positive outcomes of SIRE inspections on board and office TMSA audits. Positive results are achievable after implementing the best management practices and prioritising the enhanced safety culture standards on board and in the office. Proactiveness and motivation are the key words and elements for this. Proactive and motivated crew on board and proactive and motivated office personnel will succeed in satisfying any standard imposed by the oil majors and international or local legislations. Such personnel will succeed in achieving high maintenance standards and positive vetting and PSC inspection results even on old ships and within the available budgets.

Owners and managers just need to respond to the challenges of the market in an appropriate way. It is the same way of thinking as the old Samurais -'The Sword has to be more than a simple weapon, it has to be an answer to life's questions!' TO

Human Performance and Limitation for Mariners

The Nautical Institute's (NI) latest book, *Human Performance and Limitation for Mariners*, builds on a concept first introduced in the aviation industry, which was responsible for a massive reduction in accidents.

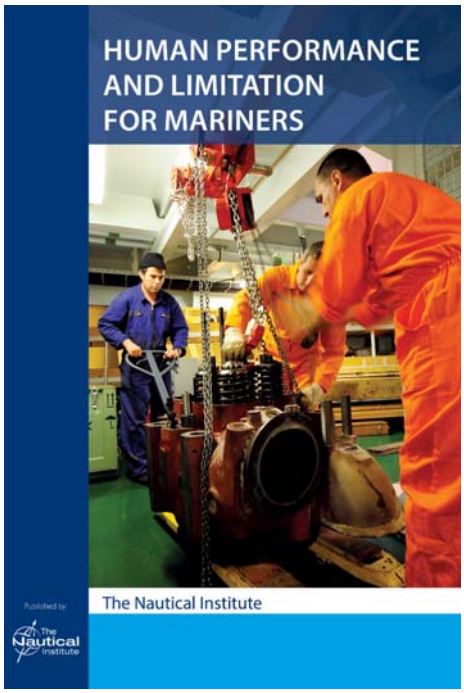
This concept will enable seafarers to make the best use of their physical and mental abilities in the challenging shipboard environment. Launching the book in Manila, Capt Robert McCabe FNI, the Institute's President, said; "It will give mariners insights into physical and psychological difficulties they may face.

"In aviation the concept of human performance and limitation (HPL) has been credited with great advances in safety," he explained. "Pilots came to understand the realities of human limitations and their implication for delivering consistent overall performance. This publication will help seafarers to benefit from those advances.

"Although we seek to learn and benefit from these lessons out of the aviation industry, we recognise two major differences with the maritime industry. First, on vessels we are subjected to different motions and effects such as noise, heat, and vibration. The second, and more significant difference that this book describes, is the ship is home for our maritime professionals for many months at a time. There are challenges to life on board, including living in a multicultural environment.," he said.

One of these challenges is fatigue, which is often implicated in casualty reports. "This book sets out exactly what is going on if mariners face fatigue and the dangers it can put them in. It has been written to help individuals gain an insight into physical and psychological traits and help mariners understand the limitations of their bodies and minds in this special environment.

"These insights will help to protect mariners and ensure that they are able to contribute effectively to the special team that is the ship's crew," he said.



There are practical examples of HPL in the book, from explaining the effects of fatigue to the time it takes eyes to adjust to the change from light to dark – particularly crucial for reading the bright displays on bridges. "If this sounds intimidating and technical, then I can assure you it shouldn't be. The book's style is personal and written in seafarer language," added Capt McCabe.

All crew members have a part to play in the safety and commercial success of their vessels. Crews are responsible for the lives of all those on board, for millions of dollars of company assets in the form of the ship itself, hundreds of millions of dollars in cargo value and billions of dollars in terms of liabilities and environmental impact.

The NI said that it felt that happy, healthy, well-trained and motivated seafarers will ensure the safe conduct of ships and the safe and timely arrival of the world's cargoes. All mariners need to be aware of how to protect themselves physically and mentally and to make the best use of their physical and mental abilities to manage modern ships in what we all know is an increasingly complex and dynamic maritime environment.

Human Performance and Limitation for Mariners is available from The Nautical Institute price: £40; ISBN: 978 1 906915 34 6

www.nautinst.org/pubs

Meteorology for Seafarers, 4th Edition

Published by Brown, Son & Ferguson and co-authored by Lt Cdr RM Frampton and PA Uttridge, this 4th edition is 157-page hardback and is a result of the number of advances made in the field of meteorology and of text book presentation.

It has been completely re-written as a technical book, which aims to explain the complexities of the atmosphere and provide the information needed for professional seafarers aspiring to first class certificates of competency.

If, at the same time, it encourages the seafarer reader to investigate and understand more clearly the forces of nature, which affect his/her daily life, then it will have achieved the full ambitions of the authors, the publisher said.

Brown's Guide to Survival at Sea

This 314-page hardback also comes from the Brown, Son & Ferguson stable and was written by Capt C MacSweeney.

It takes the reader though all of the relevant rules and regulations for survival at sea, as well as specifying the survival equipment available on board in operational terms. It also examines the factors that will affect survival during an abandonment and the preparation needed.

There are many illustrations and graphics and at the back of the book can be found the IMO life saving appliance symbols and signals in use, plus the distress signals.

The book also explains the different types of lifeboats and how they work, which is very relevant today with release hook problems seemingly still occurring.

ROOM ONBOARD FOR ALL

NOAH SHIP MANAGEMENT

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