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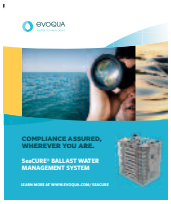

***Front cover** - Evoqua Water Technolgies has introduced what it claims to be one of the smallest electrochlorination systems on the market, capable of treating flow rates of up to 6,000 cu m per hour.*

The patented SeaCure BWMS is a skid-mounted 'plug and play' unit, which is 76% smaller and 85% lighter than earlier versions.

It can also double up as a marine growth prevention tool, which will give shipowners a return on investment instead of just purchasing a BWTS.

Evoqua also claimed to be in the final stages of the USCG type approval process, having already gained IMO approval.

Why has Shipping got it so wrong ?

Currently, there is no spring in the step of the shipping industry, as it moves into another slow summer.*

The recent spring gatherings in New York and Stamford (Conn) produced the false view that the drycargo markets were booming when in fact they were barely breaking even.

All of this while shipping continues to carry more than 90% of physical world trade and will do so for the foreseeable future.

Shipping is the world's largest service industry with hundreds of shipowners competing on a global basis to be paid to transport billions of dollars' worth of cargoes across the oceans and waterways around the world.

The huge rise in demand for shipping services in the last decade, led by the Chinese industrial boom commencing in 2004, caused a significant surge in freight rates for drybulk and containerised cargoes. This attracted a large number of new owners and investors from the various private equity and hedge funds in the US and Europe.

It is clear that the objectives of many investors in the publicly quoted companies were to chase short-term gains in ship values while cutting costs in all directions. However, most of the funds that have invested in the last 10 years have shown little or no return except for some day trading on shipping rumours.

The investment surge focused on building new ships to meet the perceived increased demand, with a view that the ship values would increase enabling them to be sold for a profit as soon as they were delivered.

This philosophy ignored the fact that ship values are driven by the revenues earned from carrying cargoes, the quality of the shipmanagement and the capacity of the shipyards to build new ships and deliver them in a short timeframe.

The Chinese boom lasted less than five years but the new ship orders continued to deliver into the second decade. The tanker fleets were also over-built as investors switched their attention away from the loss-making dry markets and also climbed into the OSV sector.

The result is a grossly overtonnaged industry with depressed freight rates and reduced ship values. Many quoted companies face insolvency as the unavoidable costs of classification surveys loom and the balance sheet values of the ships are overstated.

Many of the new investors rely on statistical projections of ship values rather than a factual analysis of the freight markets and ignore the fact that charterers will not fix longterm charters with owners that are likely to sell the ships at any time.

Funds have rarely done well when investing in service industries that use expensive assets that are high maintenance and inherently depreciating.

Most of these facts are known to traditional shipowners who have faced similar excesses in the past 30 years, but none of such a serious size.

These owners, who value close relationships with cargo owners, form the hard core of shipping that focuses on operating their ships efficiently on period charters that generate modest profits after bank financing and depreciation but provide a longterm revenue stream.

A well maintained ship properly managed can earn as much as a new ship, as there has been little change in the ship's fundamental technology. The ships must be properly certified and the costs of these statutory surveys must be budgeted for.

New regulations covering air pollution and ballast water treatment will slowly be introduced but are costly.

Given the substantially private nature of ship ownership, it is not surprising that the majority of charter fixtures go unreported and the so-called indexes, such as the BDI, are a worthless gauge of market activity. Only the publicly quoted companies publish some details of charters and the prices of ships bought or sold,

The result of the short-term approach to ship values is that a majority of ships now trade in the spot markets, do not achieve even 300 days annually of paid activity and have to pay for their own fuel.

Recently, we have seen a surge in newbuilding orders in both wet and drybulk and more surprisingly in large containerships. By funding the construction of large numbers of ships of all types without securing their employment is a huge mistake as we have already seen.

The enormous losses in the German equity and debt markets will be repeated elsewhere and probably in the Chinese and South Korean Exim banks, as they work to support their shipbuilders.

The outlook for crude oil demand is stable with no growth in production and low prices. But the introduction of new fleets of Iranian and Saudi VLCCs and the decline of US imports suggest a weak future for ships not fixed on period charters.

Overall we can expect shipping to return to making marginal profits from the services it provides and the operational longevity it can obtain from using well maintained and well managed ships. TO

**This Comment piece was submitted by Paul Slater, chairman and CEO of First International Corp.*

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At sea storage makes a come back

Oil traders are resorting to storing more oil at sea amid swelling output in the Atlantic region.

This is a sign the market is far from the kind of re-balancing act that OPEC would have hoped for when the group set out last year to bring down global stockpiles, said Bloomberg in a report.

The amount of oil stored in tankers reached a 2017 high of 111.9 mill barrels in early June, according to Paris-based tracking company Kpler SAS. Higher volumes of storage in the North Sea, Singapore and Iran accounted for most of the increase.

The build-up occurred, as OPEC and 11 other nations led by Russia cut supplies. Since the beginning of this year, these producers have attempted to trim nearly 1.8 mill barrels a day from the market, though higher output in the US and Africa and sluggish demand in Asia helped to undermine their efforts.

"If anything, it shows that OPEC cuts still aren't having enough of an impact," Olivier Jakob, managing director of consultant Petromatrix, said of the buildup at sea. "The pressure is coming from the Atlantic Basin," where there are additional supplies, he said.

Companies, including Trafigura and Vitol, have recently chartered older large tankers for as long as eight months, and some of the vessels are likely to be used for floating storage, according to a recent research note from Pareto Securities.

As a result of the persisting surplus, spot prices for oil are being pushed lower than those for supplies months and years into the future. Such a structure, known as contango, can make it profitable for traders to store oil in tanker ships for delivery later, although data compiled by Bloomberg and Gibson Shipbrokers indicated that's not the case thus far.

As recently as 1st May, the average volume was about 74 mill barrels, according to Kpler. Floating storage in Singapore rose by 23% this year and 32% in the North Sea, the company estimated.

The return of West African and Libyan crude "could be a reason for the build in the North Sea," said Jorge Antequera, a crude oil market analyst at Kpler. Because the Brent benchmark is priced in that region "even if it's a small build, it will have a significant impact on oil prices."

In early June, Shell lifted export restrictions on Nigeria's Forcados crude, which had been closed for more than a year after a militant attack on a sub-sea pipeline. Forcados exports are expected to average about 285,000 barrels a day in August, almost a quarter of the volume that OPEC pledged to cut from the market.

In addition, Libya's biggest oil field, Sharara, has restarted after intermittent shutdowns and is now pumping about 270,000 barrels a day, the level before the recent halt, according to the state-run National Oil Corp. Libyan output is the highest since 2013 after a deal with Wintershall enabled at least two fields to resume production, Bloomberg said.

UK coast storage

Tanker tracking by Bloomberg showed almost 9 mill barrels of key crude grades - Brent, Forties, Oseberg and Ekofisk - are now loaded on Aframaxes and other large tankers off the UK coast. The tankers have been anchored for periods of between less than a week to over two months. The region's inventories on ships last increased in March, before receding again.

In the US, crude oil production has been on an upward trend since October and in May it reached 9.34 mill barrels a day, the highest level since August, 2015. Rig counts have increased for a record consecutive 22 weeks, as shale producers boosted output, according to data from Baker Hughes. In addition, US crude exports reached a record 1.1 mill barrels a day in February.

Global crude inventories are likely to decline to some extent later this year, but "a return to five-year average stock levels remains elusive for some time to come," Morgan Stanley analysts, including Martijn Rats wrote in a recent research note. Oil in floating storage has been building at a rate of about 800,000 barrels a day since early May and continues to increase, the analysts said. More than 52 mill barrels a day have been loaded onto tankers in June, a record since at least 2012, they estimated.

While oil appears to be flowing into floating storage, estimates from Gibson and exchange data compiled by Bloomberg, showed that keeping barrels at sea wouldn't normally be profitable currently. For three, six and 12 months, traders would lose money by storing either in the North Sea, the Mediterranean, or Asia. Floating storage isn't viable, David Martin, an analyst at JPMorgan Chase & Co, wrote in a note.

The back up of crude in the North Sea will not probably clear without it being discounted for buyers in Asia. "Anecdotal trade reports indicate that although Asian refinery buying has been muted in recent weeks, it is picking up momentum," he said, Bloomberg reported.

Storage increasing

In a recent weekly report, Charles R Weber agreed that floating storage appeared to be increasing, as the number of VLCCs laden and idle for longer than two weeks has risen by 30% over the past month.

At the beginning of June, 26 VLCCs appeared to be employed on storage duties, based on AIS data and proprietary information and the number is poised to rise, as some cargo owners struggle to find onward buyers, while others are taking advantage of spot crude price discounts to make contango plays profitable.

In addition to vessels already storing, several tankers were reportedly fixed recently for short term timecharters with storage intentions. Weber said that units in charterers' internal programmes or on spot voyages were likely to join the tally through exercised storage options.

TO

Positive signs for MRs

Some positive dynamics have been observed in the MR segment, despite disappointing market performances.

Spot earnings are weak, yet MRs have faired somewhat better than their larger counterparts in recent weeks, Gibson Shipbrokers said in a recent report.

Since November, 2016, average MR earnings for representative voyages in the East and the West have been above those for LR2s and LR1s trading on Eastern benchmark routes.

Support has primarily come from the Atlantic Basin, while typical delays and disruptions during the northern hemisphere winter months provided opportunities for the temporary firming of rates. The market was also helped by robust FSU clean petroleum products exports and strong chartering demand into West Africa.

In addition, there was occasional transatlantic arbitrage, although this was challenged by European and US high stocks. Finally, US CPP exports continued to increase with the growth largely due to gasoline.

For the coming months, the anticipated US gasoline demand increase due to the summer driving season could help domestic production and imports into the US Atlantic Coast ports. However, stocks remain at very high levels, which could limit tanker trades, Gibson said.

High Inventories

EIA's weekly data shows that since April, gasoline inventories in PADD 1 (East Coast) were running above or close to the upper limit of the seasonal average range.

In the US Gulf (PADD 3), both gasoline and distillate stocks were also close to or at their five year highs for this time of year (mid-end June).

Distillate exports to Europe tend to be stronger during the summer months. This could support MRs trading out of the US Gulf, but could also lead to a build up of tonnage in the UK/Continent and the Mediterranean, particularly if the gasoline trade from Europe to the US Atlantic Coast remains weak.

Russian CPP exports slowdown during the summer/early autumn could threaten the Northwest European market. Furthermore, there are indications that there will be an increase in LR stems out of the Baltic at the expense of MR cargoes in the coming months.

Although these potential developments do not look positive for MRs trading in Europe, strong West African product demand could prevent or at least reduce the risk of tonnage availability build up. TO

Newbuildings becoming a worry

There has been an increase in newbuilding contracts in the tanker sector thus far this year.

Figures produced by BIMCO's chief markets analyst, Peter Sand, show that up to June, some 22 tankers have been ordered, totalling 2.6 mill dwt.

Thus far in June, the crude oil segment ordering consisted entirely of Suezmaxes. Around 0.7 mill dwt of products tankers were also contracted during the month.

Sand said; "BIMCO expected newbuild activity to pick up, so the recent development is not surprising. It is, however, not what the industry needs given the present challenges in the market, as earnings give little incentive for adding more capacity.

"The low level of contracting, as seen in 2016, is necessary in order to restore the fundamental balance between supply and demand in the shipping industry.

"As the crude oil and product tanker shipping sectors are all struggling with very low freight rates, it is important that the recent development in contracting activity reflects a short term trend. A continuous high level of newbuild activity will halt the current slow progress of improvement in the shipping markets," he said.

In the first half of 2017, a total of 11.8 mill dwt of tankers were ordered. VLCCs grabbed the lion's share with 27 vessels of 8.5 mill dwt contracted.

The VLCCs were ordered between January and May, which was the highest level seen in the first five months of a year since 2008. In addition, 2.2 mill dwt of Suezmaxes and 1.1 mill dwt of Aframaxes were ordered.

The net VLCC fleet growth reached 8.1% in February of this year, which was the highest level since September, 2009. VLCC deliveries in the first five months of 2017 were the highest since 2011, while only two VLCCs left the fleet in the same period.

This surge in deliveries has affected the supply side, as demolition activity was close to zero in 2015 and 2016, thereby causing the fleet to grow.

"If the situation doesn't ease off, we might see the same fundamental imbalance for tankers, as seen in the drybulk shipping industry, which will take years to overcome," Sand concluded. ■

How technology might change on board software use

Dimitri Lyras, Director, Lyras Shipping examines how technology might or might not change software design*.

He briefly outlined the factors driving technological change before addressing how this was going to effect non-liner shipping. He explained in his paper that there has been a vast collection of data for several years, which was a by-product of other processes, such as retail and banking transactions, data taken from sensors and electronic cameras.

Computer processing power has increased and will continue to increase enabling vast multiple calculations to be done fast enough to create many new value propositions. Likewise, storage capacity and load balancing has been enhanced through the cloud.

Lyras said that there had been a "lot of talk" about technology in shipping, for example ships without crew, artificial intelligence, etc. The effect of general IT related trends to shipping depends on how shipping primary costs and revenue can be affected by these trends. The main costs are fuel, environmental, operating and capital costs. The main revenue is dependent on supply and demand.

Fuel efficiency was a huge factor for several years with shipyards and engine manufacturers focused on this issue several times in 35 years. A vessel's hull form was "most important," he said. However, the design, speed and main engine was difficult to change. Yet there is even more benefit to be gained. But since fuel has been such an important cost, the shipping world, with respect to fuel efficiency, has not been waiting for IT to save it.[1]

Fuel cost can be reduced by better monitoring and better voyage and route management, as well as better IT, for the efficient use of the fuel.[2] However, through human attention to major causes of better fuel efficiency, much of this has already been exploited.[3]

Cargo logistics could be more efficient by computerisation, planning and co-ordination[4]. Reorganising the world's cargo logistics by products co-ordination could have a disruptive influence reducing ship utilisation, thus reducing fuel and environmental costs. For example, less arbitrage trading of oil products could be achieved by better analysis of supply and demand trends in the short one to three-month time frame.

Although not good for shipping demand, this would help the environment. Similar changes could be made to parcel size optimisation.[5] Yet more could be done in rationalising the economic multiplier of prompt transport of goods. However, most of these trends are not good for shipping demand and are also not currently in the interest of any particular influencing party.

He said that many smaller increments of co-ordination enhancements can make shipboard and related land-based processes much more efficient. For example,

- Co-ordination of new processes on board and ashore.
- Procurement of goods and services in port.[6]
- Crew.[7]
- Machinery management.
- Classification.

Shipping is a mature industry and as such, over the long haul, profits get squeezed. Much more precision therefore, is likely to be applied to making processes efficient. Since most shipboard and shore processes involve skilled people, the design of these processes needs to evolve and match the way people think and work.

Everything, from planning to avoid fatigue, to co-ordinating with port authorities and agents, to knowing peoples' location on board, can be improved saving time and money. But all this needs to be intuitive and not bureaucratic.

For example, knowing seafarers position on board via local area network (LAN) that operates in the steel structure using electrical cables. In addition, shipboard processes analysed from beginning to end minimising unexpected work via realistic planning, which allows the benefit of predicting work rest hours and predicting when external labour services or other physical resources are needed.

Better co-ordination can lead to important improvements in the cost of goods and services in ports. No industry can survive unpredictable demand for these services, thus there is a need for planning and predictability that is intuitive. Procurement and delivery should be analysed closely and tightly co-ordinated with vendors to reduce vendors' costs. This will also largely benefit ship operators.

There could be much better ways to organise shipboard skills availability to match demand, while providing far better careers for the skill providers than is currently available[8]. Lyras thought that the current manning process is broken. IT combined with good management and leadership is ideal for significantly improving the manning process. For example, the close analysis of the crew's skills and experience being co-ordinated with on board work planning and better methods of ensuring good crew collaboration.[9]. "Are the common skills on board enough? We could augment the skills set from the shore," he explained.

Changes can be instituted as to how machinery is acquired and maintained. Currently, the business model is archaic and costly with a lack of co-ordination in financing, maintenance skills and asset status[10].

The shipping industry will benefit from improved models for maintaining machinery on board, predicting maintenance and finding better ways to design and finance machinery at the newbuilding stage. [11] [12].

Classification includes many services, which perhaps no longer need to be combined in the same way. Rethinking the core class competences can lead to greater efficiency.

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With the advent of better access and better condition assessment technologies, the certification can be separated from the verification process, as they involve different skills, which means that certification and verification intervals change, so planning on board work can be co-ordinated based on these new intervals.

Capital costs are primarily determined by supply and demand and to a lesser degree, by construction costs, plus interest rates.

Construction costs may change, due to one disruptive event during the next 20 years, as traditional shipbuilding or propulsion methods change. Material science is likely to have an influence but not to the extent of other heavy industries, as materials used to build ships are not on the same critical path, as say materials to construct aircraft.

Capital availability is not a huge part of capital costs, but it is an important part of the propensity to invest. Availability of capital will be influenced by IT, as banking changes, due to the current breakup of power bases.

Supply & demand

One of the main drivers of supply and demand is the economic activity of countries furthest from their raw material sources. This is a huge area requiring intense analysis, so much so, that nobody has managed to provide reliable investment analytics.

Cargo logistics and tonne/miles are another huge area and certain co-ordination related aspects can change with IT sources co-ordination. Nonetheless, tonne/miles are more dependent on economic activity, which is too complex to model. For example, geopolitics is an important tonne/mile driver. Thus far however, few geopolitical models are used by investors.

Supply is determined by an owner's ability and willingness to invest in new capacity, which is mainly dependent on investor skills and training of the worldwide shipping investment pool. This changes from investors' generation to generation and how their careers started. It also changes as investment opportunities arise or disappear.

Maritime execution risk changes have also influenced investments - as in 1992, following OPA 90. IT can improve the prediction's sophistication but the influence is small compared to others. Cycles could perhaps be shortened and new investment classes provided to support faster reactions to changing investment conditions.

Taxation has not been an influence on shipping investments or any other investment recently, except for subsidised sectors, such as wind farms. However, far in the future, this could change, as the economic multiplier becomes one of the key elements in corporate taxation.

Risks

Cyber security, similar to all security issues, is a concept that involves people competing for goals, such as a competitive advantage or illicit profit, etc. Therefore, methods of combating this risk are as diverse as the scenarios of illicit behaviour with respect to cyber systems. Whereas we have been conditioned to believe that cyber security involves passwords and good practices when using computers, it is as diverse and driven by common sense as any other security issue.

Ensuring cyber security in non-liner shipping requires a distributed stakeholding, involving mostly hardware manufacturers and class looking at key machinery on board. For these multi-million dollar development and manufacturing undertakings, such as dynamic positioning systems, main engine automation, navigation electronics, etc, the relative cost to ensure cyber security is small. "Adding $50,000 to the cost of machinery is no big issue," he said.

The most vulnerable are pure software systems that contain a lot of data and serve personal productivity. In this case, the cost of enhanced cyber security measures can be high in relation to the overall cost.

Fortunately, the high risk systems, such as ships control systems, can be made secure from cyber attacks at a low relative cost compared with the main products and can be tested using well established institutions, such as class, who have ample methods and experience to conduct this. For example, a cyber attack simulation test is a miniscule undertaking compared to full physical component load tests.

Another factor is the use of widely distributed computing methods, such as commercial databases and widely used coded components, like access authentication. The less pervasive use of widely distributed software, the less likelihood there will be of cyber infiltration. To avoid cyber security risks on personal and corporate productivity applications, for example with email, hand held computing and marine management applications, we need to focus on the actual risks magnitude, hacker motivation and also on how not to make it easy for hackers to understand the systems' vulnerabilities.

The most popular discussion today is 'big data'. There is not enough existing data in non-liner shipping to concern us with the issues that have contributed to 'big data's' high technology. Remote monitoring of machinery on board could produce 'big data', but only if there is a paradigm shift. This change would involve keeping track of the machinery from ashore. This currently is neither necessary or wanted. "'Big data is all about Amazon but not enough for tanker operators," Lyras explained.

However, things could change, for example, propulsion by multiple generator power packs in a diesel-electric installation could be set up to be monitored ashore. But this requires a new paradigm in vessels' powering.

This leaves data only in the form of management applications, both on board and ashore. For example, for purchasing, personnel, accounting, email and hand held device co-ordination, etc. If this is the information to be monitored, it is neither big and is often not unified. If the information is not unified you cannot run reports on it, unless the information is re-unified, which is an enormous undertaking, he said. It is far more effective to try to remember data inflection points as a domain expert and take action than to run BI systems in order to find inflection points and cause and effect relationships.

"Let's sit on our chairs and discuss problems, not buy analytics," Lyras suggested.

TO

**This article is taken from a paper written by Lyras and from his presentation given at Tanker Operator's Athens Conference on 3rd May.*

Footnotes:

[1]https://www.dgmaritime/associates/meteo-group-spos
[2]http://www.awtworldwide.net/products/voyage calculator.asp
[3]http://www.marorka.com/products+marorka-onboard
[4]http://www.quintiq.com/industries/maritime-logistics.html
[5]http://www.cargomanagement.autoship.com/productsservices/offshoreplatform/overview.htm
[6]http://www.imarinesoftware.com/
[7]http:// www.searoc.com/what-we-do/seaplanner/personnel-manager/
[8]http://www.crewtracks.com
[9]http://www.seacrew.com/?long=en
[10]http://www.spectec.net/maintenance-materials-manager
[11]https://www.dnvgl.com/services/shipping-procurement-software-management-procurement-1532
[12]http://www.cat.com/en_us/by-industry/marine/vessel-monitoring-and-analytics.html

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New Element included in latest TMSA

At a recent webinar given by DNV GL's principal consultant, shipping advisory, Germany - Jan Haul - and cyber security service manager - Patrick Rossi - TMSA3 was dissected.

TMSA3 was introduced on 10th April this year and will replace the 2008 TMSA2 at the beginning of 2018.

The two major changes are a revamp of Element 7 (Management of Change) and a new Element 13 covering Maritime Security.

Overall, the updates included-

- Expanded best practice guidance to complement KPIs.
- Revised best practice guidance to remove ambiguity and duplication.
- Streamlining and merging of elements to improve consistency and make the conduction of self-assessments easier.
- Removal of the option to mark KPIs as not applicable.
- Introduction of updated rules and regulations.
- Revised Element 6 and 6A- cargo, ballast, tank cleaning, bunkering, mooring and achoring operations with additional KPIs and best practice guidance.
- A new element on maritime security.

Basically, these changes could affect the levels a company has attained under TMSA2. Many oil majors require at least a level 2 before a

vessel is chartered. Haul warned that every KPI would need to be looked at, as many had changed.

In an effort to tighten the Management of Change, Element 7 saw the most changes, as cyber security KPIs have been added, thus -

7.1.1 - A documented procedure for an element of change.

7.1.2 - Procedure in place to ensure that the impact of any proposed change is assessed.

7.1.3 - Management Procedure- clearly defines the levels of authority needed for the approval of any changes.

7.2 4 - Management of change identifies all documentation and records that maybe affected by the change.

7.3.3 - Software management procedures cover all shipboard and shore systems.

The new Element 13 includes -

13.1.2 - Documented procedures in place to identify security threats applicable to vessels trading areas and shore-based locations.

13.2.3 - Policy and procedures include cyber security and provide appropriate guidance and mitigation measures.

13.2.4 - Company actively promotes cyber security awareness.

13.3.2 - Security procedures updated taking into account current guidance.

13.4.5 - Company is involved in testing and implementation of innovative security technology and systems.

Haul said that not all managers have cyber risk policies in place or the software to counter it.

He warned that the timeline for change was until the end of December this year when TMSA2 will be archived and on 1st January, 2018, TMSA3 will kick in and will be the only procedure that can be uploaded.

Although cyber security audits have not been included, Haul said that he expected this to happen in the future.

Rossi said that more and more incidents are being identified via remote connections, for instance the crew arriving and departing, which can affect the IT networks and operations technology. Malware is re-inventing itself bringing more vulnerabilities as around 390,000 new malicious programs are being identified each day, according to Germany's AV-TEST Institute. He also thought that a lot of attacks go unreported.

Vendors culpable

Companies often rely on their suppliers for security. Rossi thought that this was not that difficult to overcome this by looking at the process, the people and technology. A policy should be issued by a company to its vendors and spot checks undertaken periodically. A supplier should be asked - how long will the software be maintained and serviced?

Companies should also practise drills of system loss, as software has to be tracked and treated the same as physical components. For example, as hot work on board ship needs to be approved, so should software changes, he said. A software change form should be required.

There are different opinions as to whether a shipping company should employ a dedicated cyber security department or person. It is more important that the job gets done, Rossi said, adding that leadership comes from the top.

Cyber certificate

There is a possibility that officers will have to have a cyber security certificate, but this is at an early stage. The IMO is involved in cyber security but is relying on IACS to come up with a way forward, Rossi said. The first requirements for cyber security is on newbuildings where flag states should dictate policies.

TO

Proactive approach helps Danish shipping

The Danish Shipowners' Association has changed its name to Danish Shipping (Danske Rederier).

The Danish Shipowners' Association, Shipowners' Association of 2010 and Danish Car Ferry Association together represent all areas of Danish shipping. The three organisations already share a joint secretariat and now have a shared visual identity. The Danish Car Ferry Association has also changed its name to the Danish Ferry Association.

Since the Danish Shipowners' Association was established in 1884, it has gradually developed with the shipping industry, the organisation said.

"The change is part of our overall strategy to continue to develop as a modern business and employers' organisation, which serves as the voice of Denmark's largest export industry and a focal point for Danish shipping companies. Danish Shipping will continue with this important task in the future and to improve our impact we have chosen to make our name more straightforward and clear," said Claus Hemmingsen, Chairman of Danish Shipping and Group Vice CEO, AP Møller - Mærsk.

Danish shipping tends to work together better than most of the other maritime nations' shipping companies and organisations. For example, last April, after almost a year's work, the Danish Government's maritime task force presented its policy recommendations to the Danish Minister of Industry, Business and Financial Affairs.

The maritime task force's main agenda was to strengthen Denmark as a global maritime power house by securing even better framework conditions for shipowners and other maritime industry sectors working out of Denmark. A series of concrete proposals was presented that touch upon all areas of the competitive framework for the Danish maritime industry.

Proposals welcomed

The Danish Minister for Industry, Business and Financial Affairs, Brian Mikkelsen, welcomed the proposals. He said at the time of the presentation; "The recommendations from the maritime strategy team is a great starting point for our work with a new maritime growth plan - a plan that will help to maintain and develop the international competitiveness of maritime industry. This is important for the creation of jobs and economic growth in Denmark."

The task force was chaired by Jesper Lok, Chairman of Esvagt and J. Lauritzen. Other members included CEOs from the shipping community and maritime business, scientists and union representatives.

"Denmark has a proven track record, when it comes to delivering quality shipping in a competitive environment. With our recommendations we expect to attract a broader cross section of the maritime industry to Denmark and we will be better positioned to reap the benefits from the digitalisation that is bound to affect our industry, " said Lok.

Director General of the Danish Shipowners' Association now Danish Shipping, Anne Steffensen, saw the policy recommendations as an ambitious starting point. It set a high standard for the forthcoming political negotiations on the Government's maritime actions, which are expected to be presented in the Autumn.

"Shipping and the maritime industry yield a

very important contribution to the Danish economy as the maritime cluster all together represents 25% of Danish exports. The new recommendations set the course for keeping Danish shipping at the forefront. They highlight the fact that Denmark is an attractive place to do business for shipowners and maritime companies, among other things, due to the broad political backing in Denmark, which promise well for future growth," she said.

Digitalisation

In another move, the Danish Maritime Authority (DMA) has launched a pilot project to examine the long-term possibilities of digitising the entire ship registration process.

Shipowners are still required to fill in and handle documents, manually, the DMA said.

"The maritime strategy team has recommended full digitalisation of, inter alia, the register of shipping. By means of an entirely new technology, such as blockchain, this pilot project may pave the way for a more open, secure and efficient registration of ships on the Danish registers. This is important in an industry with a distinct focus on keeping costs low and where trust in all the parties involved is a necessity," said Mikkelsen. "In order for us to retain our maritime position of strength, Blue Denmark must seize and develop the potentials of digitalisation. Therefore, we must be frontrunners when it comes to using new technological solutions."

Users will be involved in the pilot project aimed at clarifying whether blockchain technology could support the DMA's digitalisation efforts positively and help bring about an open, secure and more efficient approach to the date recorded in the registers of shipping.

The new technology would mean that everyone who is part of the 'chain' has a full overview of the processes at any time and nobody can amend or forge documents without others being made aware of it. Therefore, documents such as mortgage deeds can be handled in a safe manner, the DMA said.

The Maritime Strategy Team made 11 recommendations including -

- The accelerations of digitalisation and the testing of new activities at sea to ensure Blue Denmark has a competitive edge.
- Denmark's position as a shipping nation should be maintained and developed.
- The public service should make it easier to communicate with public authorities and to reduce the administrative burdens imposed on enterprises. In this connection, a task force should secure co-ordination with the partnership for digitalisation of Blue Denmark.
- Efforts should be made to promote Danish marine equipment industry's production and development of high-tech and energy-efficient solutions for the international market.
- Denmark should work for quality shipping and for strengthening the maritime industries on open markets with equal competition, investment capital and global regulations.
- A higher degree of co-operation should be ensured in order to have coherent training/education offers in the maritime field.
- There should be a critical mass of maritime

competences that can be brought into play in both the shore-based and sea-based part of Blue Denmark.

- Efforts made to ensure that Blue Denmark and knowledge institutions create benefits from new business-related and technological knowledge should be strengthened.
- Efforts should be made to develop a strong sense of entrepreneurship in Blue Denmark in order to strengthen the potential for development.
- The role of regional maritime clusters as drivers for growth across business areas should be strengthened.
- Focus should be on the potential for utilising new business opportunities for Blue Denmark.

Recently, the Maritime Fund allocated DKK25 mill as a follow up to the recommendations.

"The maritime sector is facing a rapid development in these years, which requires that the shipping companies are well equipped and adaptable to continue to be among the world's best," said Steffensen.

Blue INNOship has, for example, successfully found fuel-saving solutions for Torm and J Lauritzen using newly developed software solutions. The idea of Blue INNOship II is to strengthen work on big data and digital solutions based on the 'smart ship of the future', which will be characterised by greater automation, autonomous systems and ultimately the autonomous ship.

"With the idea of 'smart ships of the future', Blue INNOship II will help develop technology, business models and clear regulatory barriers. It requires good effort from universities, institutes, equipment manufacturers and shipping companies. In the Blue Denmark, we have a common interest in maintaining and strengthening co-operation," Steffensen said.

Behind the application to the Danish Maritime Fund stands Maritime DTU, Danske Maritime, Force Technology, the Danish Maritime Authority and Danske Rederier.

The money has been made available for activities in a number of specific areas among the recommendations published by the Maritime Growth Team on 21st April, outlined above.

Support for EU

Danish Shipping also supported EU Ministers of Transportation when it sent a strong signal of continued support for the European maritime sector at a meeting of the Council of Ministers, at which the ministers adopted the priorities for the maritime transportation policy until 2020.

The EU Ministers expressed clear support for the IMO as the central international body for regulating shipping. The council stated clearly that climate change and environmental protection call for a global response. The ministers especially welcomed the concrete roadmap of the IMO, which will sets out steps for an emissions reduction strategy for shipping in spring 2018.

"We are very pleased with the Ministers of Transporation's support for the ongoing process in the IMO of reducing greenhouse gas emissions from shipping. Danish Shipping calls for an ambitious global agreement with a clear system in place to secure reductions. We believe that the European Parliaments' calls for inclusion of shipping in the emissions trading system is an inappropriate approach, which will create more bureaucracy and less reduction of emissions than a global agreement," said Casper Andersen, Director of EU Affairs at Danish Shipping in Brussels.

Danish key issues reflected in the priorities were the provision of a clear focus on competitiveness and digitalisation as the points of reference. In addition, the Ministers clarified that there is full agreement with regard to the maritime state aid guidelines and their importance in ensuring a continuously successful European maritime hub that contributes to the European economy.

"There are visible imprints of Danish key issues in the conclusions of the ministers on a range of topics such as digitalisation and sustainable shipping as an efficient mode of transport, which we are very content with.

"We are especially pleased with the explicit recognition of the maritime state aid guidelines as a prerequisite for maintaining a competitive maritime hub in Europe. The next step is for the Commission to speed up on a new comprehensive EU-strategy for the maritime sector to replace the current one, which will expire by the end of this year," said Andersen. TO

Danske Rederier's director general Anne Steffensen.

Danelec pioneers fresh approach to ship electronics

When Danelec Marine, a Danish marine electronics company, decided to develop its next-generation voyage data recorder (VDR), the company took a fresh approach to product design, with the idea of creating a unique integrated product-service solution.

VDRs are mandatory on all SOLAS ships. Since the life expectancy of a typical VDR is about 10 years, many of the installed VDRs are due for replacement and all new VDRs must be type approved under the new performance standards. As required kit, VDRs are often treated as commodities to be bought strictly on the lowest cost minimally compliant product.

Danelec Marine realised that the data stored in ships' VDRs could have commercial value if it could be accessed from ashore. Accordingly, the company designed selective remote access capability into its second-generation VDRs. Whilst some other VDRs were capable of remote playback, the large size of the data files made it impractical and expensive to transmit to shore via narrowband satellite channels. Danelec's approach was to provide for selective data downloads, eliminating for example the large audio files from the bridge microphones. This made it practical to transmit the desired data sets via satellite.

The company's remote access capability has evolved over the last two years and now interfaces with a wide range of shipboard systems and sensors, as well as the VDR. Branded as DanelecConnect, the company's new telematics platform is designed to serve as a universal data hub for the ship. The first ship installations of the new platform are currently underway.

DM700 ECDIS main unit with monitor and keyboard **(see page 17).**

CEO Hans Ottosen.

Danelec claimed that the development of its new intelligent remote management platform is bringing the Internet of Things (IoT) to the maritime industry by providing easy, low-cost access to data from ships.

Third-party software providers

The company is working with third-party software application providers to use the DanelecConnect application programming interface (API) tool to capture key performance indicators (KPIs) from shipboard systems and sensors into their specialised software packages, such as analytical programmes and decision support tools.

One of the first software companies to sign up was Hamburg-based Hanseaticsoft, in which Lloyd's Register recently made a considerable investment. The company is integrating the DanelecConnect API into its suite of cloud fleet manager applications for shipping companies.

The API allows shipboard data to feed from the DanelecConnect onshore server automatically, capturing a large array of data into Hanseaticsoft's cloud-based analytics platform. "As a software company, accessing good-quality timely data from ships has been a challenge," said Hanseaticsoft CEO, Alexander Buchmann. "It is difficult and expensive to install and maintain a custom data collection network with hundreds of data points on each ship. Danelec overcomes that barrier with a universal interface that provides a seamless data flow into our advanced analytic tools, allowing us to do what we do best, providing decision-support tools for our customers."

Hanseaticsoft said that following the purchase, the company will remain an independent open platform but will leverage LR's global network to build its capability. Three new Hanseaticsoft sales offices are planned to open in Athens, Copenhagen and Singapore in 2017 with at least five other branches to follow next year.

To access data, a small DanelecConnect vessel remote server (VRS) module electronic interface box with a very small footprint is installed on board to connect with the ship's VDR, as well as other data sources. The VRS collects and processes the datasets required for transmission through the ship's satellite communications system to a Danelec server, where it can be shared with authorised users.

Datasets can be pre-selected for transmission at programmed intervals under software control. The intelligent software allows event-driven or condition-based rules to control the selection and frequency of data transfer. It can also provide immediate notification of alarms or out-of-tolerance conditions in on board systems. Authorised shoreside personnel can also request specific data files for on-demand downloads.

"DanelecConnect is the enabling technology for a wide range of IoT applications, including emissions monitoring, ballast water treatment, main engine performance, auxiliary systems and weather routing," explained Hans Ottosen, Danelec Marine CEO. "We're working closely with Hanseaticsoft and other third-party companies who are integrating our remote access management solutions into their systems. We will have several important announcements coming soon."

Ottosen also said that DanelecConnect had been optimised to facilitate ship-to-shore data transmission over narrowband maritime satellite channels. "For typical large data transfer scenarios, the satellite costs are as low as $1 per day," he claimed, adding that the data could be transferred amounting to just 1 Mb per day.

This data gathering software can be used with any VDR make and not just with Denelec equipment, the company stressed, adding that it was currently collaborating with a leading main engine manufacturer to include data from the main propulsion systems, as well as the auxiliaries.

Retrofit conversion kits

In addition, Danelec Marine is offering conversion retrofits for older VDRs. It has been found that down the years, many VDR suppliers have gone out of business and as a result, the equipment is no longer supported by way of servicing and spare parts.

As a result, the company has developed a large number of conversion kits for more than 30 different legacy VDR models. A new box can easily be slotted in, which is able to access any signal, Danelec claimed. The company's distribution partners have reported significant savings on VDR retrofit installations using the conversion kits.

For example, earlier this year, Swedish marine electronics company CA Clase Marinelektronik, recently conducted VDR retrofits on two product tankers, 'Stella Orion' and 'Stella Virgo', for Swedish shipowner Tarbit Tankers.

The existing VDRs were found to be at the end of their service life and were no longer supported by their manufacturer. Tarbit agreed to replace them with new Danelec Marine DM100 VDRs.

DanelecConnect for third party software screen.

Normally, removing an obsolete VDR and replacing it with a new unit would involve many hours of labour for the installing technician, since the existing components are often not compatible with the new technology. However, the company was able to take advantage of the range of conversion kits available and said that the Danelec retrofit package had saved at least one to two days of installation time per vessel.

"We provide the hardware and software conversion kits totally free of charge," said Ottosen, speaking at the time of the Tarbit retrofit. "Feedback from installing service dealers reveals that the retrofit kits can reduce the installation times by 25-50%, saving time and money and minimising downtime for the ship."

Next generation ECDIS

In addition to its VDR product line, Danelec has introduced a new generation of ECDIS products meeting the latest IMO and IHO standards. The deadline for shipowners to comply with the new standard is this September. After that, all new and existing ECDIS installations must be in compliance. This piece of legislation has no 'grandfathering' clause meaning that any ECDIS not up to the new standard must be replaced.

Danelec has introduced a G3 software patch which can upgrade old systems to meet the new regulations free of charge. The software is claimed to be easy to install by the crew without the need for a technician.

Danelec is also following closely the latest guidance from IMO regarding training and familiarisation requirements for ECDIS operators. While the requirement for type-specific familiarisation has been somewhat relaxed, crew members must still be able to demonstrate competence in operating the specific ECDIS installed on the ship.

Ottosen said that Danelec Marine has designed its new-generation ECDIS with intuitive software with simplified operating procedures using only three levels of drill down on the screen. This will make it much easier for shipboard ECDIS familiarisation training to be accomplished.

Overall, to enhance its product line, Danelec invests around 20% of its revenue in R&D. The company's product strategy is to bring down return on investment (ROI), increase the lifespan of its products and add extra value on the services and products offered.

The company subscribes to a unique concept called servitisation, in which products and service are fully integrated. For instance, Danelec's VDR and ECDIS products are built with exclusive SWAP (software advanced protection) technology, which puts all of the operating system and configuration files onto a memory card that inserts into the unit's front panel.

In the event the unit needs to be repaired, the service technician can remove the card, insert a new box and reinsert the card. The old unit can then be removed from the ship for repair at a Danelec authorised facility, without delaying the ship's departure.

In addition, Danelec Marine has service facilities with factory-trained personnel in more than 50 countries and certified service centres at strategic locations worldwide. TO

Piracy risk to tankers

When the 74,997 dwt 'Navig8 Providence' was attacked by armed pirates in the Gulf of Oman on 1st June, it marked the second attack on a product tanker in the region that week*.

On the same day at Nor-Shipping the Nigerian Trade Minister, CR Amaechi, pledged $186 mill to combat piracy and promised, "… in six months you will no longer be harassed in our waters."

Skills shortages, disruptive technology and a growing regulatory burden are commonly cited as the most pressing issues for shipowners. Piracy, despite figures from the International Maritime Bureau (IMB) showing that the risk has remained relatively constant in recent years, has been a much more intermittently conspicuous concern. Yet, according to recent estimates, militant groups from the Niger Delta region cost Nigeria more than $7 bill in lost revenue in 2016 alone.

Piracy arises most commonly where there is a failure of law and order. In many cases this is exacerbated by a lack of co-ordination among enforcement agencies, volatile geopolitics and growing links between piracy and religious extremist groups. So far in 2017, the regions in which piracy has occurred remain broadly similar to 2016. In Southeast Asia, more incidents were reported on vessels at anchor, while in the African region more vessels were targeted while underway.

For North there are three locations in which owners need to be most vigilant; in the Gulf of Guinea, where the threat level tends to follow the political situation onshore; in the Western Indian Ocean Region, where the recent upturn in the threat has been linked to the return of illegal fishing fleets to Somalian waters; and in the Sulu and Cebes Sea, where Abu Sayaff in particular has long been a thorn in the side of local commerce, but has also recently begun to attack international trading vessels.

Calculating the threats posed by pirates to the ships, seafarers and the smooth flow of international trade can be an exacting mathematical exercise. Then communicating this risk effectively takes more than a spreadsheet. Scholars like Baruch Fischoff and Richard Zeckhauser have shown that combining numerical estimates and probability expressions can lead to confusion among decision-makers, so it's vital to ensure that guidance is comprehensible and doesn't lead to any distortion of understanding. To do so requires considering the likelihood of an event within the context of other facts, as well as the trade-offs that one course of action will have over another.

To assist with this, North offers comprehensive briefings on maritime security to its assureds that cover both general and regional specific risks. North is also a member of the CSO Alliance, a global coalition of shipping organisations that have come together to share information and drive best practice among members to combat maritime crime. North has arranged for its members to join the CSO Alliance for a reduced membership fee.

Operational best practice is most successfully implemented when the lines of communication between experts and operators are kept open. Sharing information on what has worked so that it can be disseminated to other mariners facing similar perils goes to the heart of the concept of mutuality that North is founded upon.

North also strongly encourages Masters and owners to report all actual, attempted and suspicious piracy and armed robbery incidents to the IMB's Piracy Reporting Centre as well as any regional reporting facilities. Transparent statistics are vital to raise awareness and encourage authorities to tackle piracy and armed robbery firmly. Moreover, unless there is comprehensive reporting, it's difficult to know which measures have been most effective in deterring pirate attacks.

Certain vessels, like those with low freeboards moving at low speeds such as fully laden tankers, are more vulnerable to pirates, Vessel hardening measures, such as razor wire, pressurised water hoses and other physical measures can be taken by Masters to help prevent pirates from boarding. CSOs should work in tandem with their vessels Masters to produce a voyage risk assessment prior to a vessel entering any high-risk area. This should include identifying vessel vulnerabilities and capabilities, complying with any reporting requirements and control measures, such as using the internationally recommended transit corridor in the Gulf of Aden

Shipowners and Masters are encouraged to follow advice set out in BMP4 and follow their own security procedures. This includes partaking in voluntary reporting schemes when operating in a high risk area. Voluntary reporting is now established in all of the aforementioned high risk areas examples include the UKMTO in the Western Indian Ocean Region, MDAT-GoG for the Gulf of Guinea and Singapore IFC/Recaap for the SE Asia region. Taking part in these reporting schemes allows governments to co-ordinate assistance quickly in the event of an attack.

Simply knowing about pirates and risks from piracy isn't enough, and nor can we just plug numbers into a model and expect a solution. It takes consistent vigilance, advance planning, information sharing and practical action. Despite improvements in the global response to piracy, risks remain in many regions and shipowners must continue to be watchful.

Recent events have shown that there is no room for complacency. When it comes to minimising the security risks faced by today's tanker fleet, time and resource invested in planning, training and intelligence is rarely wasted.

TO

Colin Gillespie.

**This article was written by Colin Gillespie, Deputy Director (Loss Prevention), North of England P&I Club.*

Easi-Chock now firmly established after four years

Increase in piracy attempts on tankers has refocused efforts to deal with the threat both on board and ashore with multiple defence layers now needed on the ship.

Easi-Chock founder Wayne Harrison, has come a long way since his brush with Somali pirates in Somali pirates while employed as an armed guard on a chemical carrier. Harrison was on his first anti-piracy mission, first reported in an earlier issue of *Tanker Operator Magazine*.

To recap, on the 31st October, 2010, at the height of the Somali piracy attacks, Harrison was part of a security team that was sailing on a chemical tanker from Beira, Mozambique to Dar es Salaam, Tanzania.

During the early morning handover, the OOW identified a contact at 3.5 nautical miles on the radar. The Master went to the port side to look for the unidentified vessel using binoculars – it was then he noticed a skiff fast approaching and it immediately became clear that a pirate attack was imminent.

With the safety of the crew a priority and time running out, the general alarm was sounded and the crew made their way to the engine room, as previously practised. Harrison and his security team then began to confirm that all entry points on the ship were secured with the improvised hardening equipment, which consisted of items fashioned from materials they had to hand, including planks of wood, steel bars and grates. These were attached to the doors and portholes.

The vessel was already fitted with razor wire as per with industry guidelines, but the security team installed additional layers. Despite this, the pirates were able to board the ship within minutes.

Gunshots could be heard as the pirates boarded. They proceeded to the bridge where they attempted to shoot through the first door allowing access to the main stairwell, which led directly to the engine room entrance. Harrison then climbed up the funnel casing to call for help using his own satellite phone.

Thanks to the crew's improvised hardening methods, the pirates were unable to breach the first door. After several hours of being locked in the engine room and the security team confirming all cabins and decks were clear of any pirates, the crew escaped shaken but unscathed.

Easi-Chock is born

Having witnessed first-hand the ease with which the pirates were able to bypass the vessel's exterior security measures, it was clear to Harrison that further action had to be taken to prevent future attacks. He realised the need for security products that would delay the time taken for pirates to gain control of a tanker. As a result in 2012, he founded Easi-Chock.

The idea behind Easi-Chock was to provide products that could fortify the various entry points on tankers to:

- Slow down attackers.
- Create as much time as possible for rescue.
- Demoralise the attackers by obstructing their progress.

Four years on, Harrison has developed a range of low-cost, easy-to-install products that are claimed to be effective deterrents against acts of piracy, theft, and kidnap and ransom, mitigating the need for expensive armed guards on tankers, which cost anything between $10,000-$15,000 per transit.

The following products are now available:

- The Easi-Chock – a tubular gadget which prevents a door handle lever mechanism from being depressed. This can be fitted to internal and exit doors in under 30 seconds and can withstand up to 80 KG of force. It can be removed in under five seconds.
- The Easi-Block – a steel plate designed to protect the portholes of emergency exit doors situated throughout the accommodation decks. It can withstand 800 KG of pull and only takes 20 minutes to fit.
- The Easi-Block Padlock Protection Box – a simple metal box that shrouds the padlock from attack.
- The Easi-Grille – a lightweight grille designed to be internally installed onto portholes situated throughout the superstructure of a vessel. It can withstand more than 1.5 tonnes of direct pull.

He made a deliberate decision to create a range of practical products to protect the crew wherever they were trading. These require little training to use, no welding and can be installed without the need for drydocking – to ensure increased security that can be delivered simply and effectively.

Multiple defence layers

Current security measures deployed on tankers, such as razor wire and water cannons are heavily focused on preventing boarding, but fail to deter attackers once they are on board. For this reason, tankers require multiple layers of defence upon boarding.

Since Easi-Chock was established, the products have been fitted on around 150 vessels, including tankers. To install Easi-Chock equipment throughout a tanker costs on average £7,000. This draws a stark contrast with the price of an armed security team, and the £20,000 spent per year to replenish razor wire, which is often easily bypassed by pirates.

There have been no reported attacks on vessels fitted with Easi-Chock's products in four years that the company has been in existence, it was claimed.

TO

IMO should finalise BWTS implementation dates

The ICS has called on the IMO to back a proposal submitted by a group of flag state members, concerning BWTS implementation dates.

"If this pragmatic proposal is agreed, this would allow shipping companies to identify and invest in far more robust technology to the benefit of the marine environment," said ICS Secretary General, Peter Hinchliffe.

ICS said that this IMO decision on dates, to be taken by MEPC 71 during the first week of July – just two months before the entry into force of the IMO Ballast Water Management (BWM) Convention on 8th September, 2017 – will be critical, having significant implications for around 40,000 existing ships.

The BWM Convention, as currently drafted, requires existing ships to retrofit the complex new systems by their first International Oil Pollution Prevention (IOPP) survey following the global entry into force of the new regulations.

Under a proposal by Brazil, Cook Islands, India, Norway, Liberia and the UK, implementation would be delayed for existing ships by pushing back the date they are required to start fitting ballast water management systems by a further two years to the date of their first IOPP renewal survey on or after 8th September, 2019. This would extend the date by which all ships must have installed a system to 2024 from 2022.

This proposal is fully supported by ICS and its member national shipowners' associations.

ICS has insisted there is no logic, from an environmental protection standpoint, in requiring thousands of ships in the existing fleet to comply until they can be fitted with systems that have been approved under the more stringent type-approval standards, which were only adopted by IMO in 2016 - and which are about to be included in what will soon become a mandatory Code for Approval of Ballast Water Management Systems.

These more environmentally robust standards will not become mandatory for new system approvals until October, 2018 and that only systems being installed into ships from October, 2020 will be required to have been approved in accordance with the new Code.

In addition,because of a lack of confidence in the existing IMO type-approval process and the previous uncertainty as to when the Convention would enter into force, very few existing ships have so far been retrofitted with the required treatment systems, creating a log jam in available yard capacity.

Apart from the possible shortage of shipyard and manufacturing capacity to retrofit around 40,000 systems, many shipping companies – through no fault of their own – face difficult decisions.

TO

How to ensure you have a BWTS on board that works

The ratification of the Ballast Water Management Convention and the announcement of the first US Coast Guard Type Approved BWTS, saw many shipowners rushing to drydock their vessels at the beginning of the year, or de-harmonise their IOPP certificates in an attempt to delay fitting a BWTS on board their ships*.

Others have already installed a BWTS on board or have decided to install one. Much has been written on the various constraints that are to be faced for selecting and installing a system, but not much has been heard about the systems installed on board. Do they work? And by work I am not referring to if they treat the water to the desired level, I mean whether or not they are operational. The answer to this is that unfortunately many don't, at least not in such a straightforward way, as many manufacturers would like us to believe.

Within the Wallem-managed fleet we have more than 40 vessels with BWTS installed; either during the newbuilding stage or retrofitted. These are systems involving five different treatment technologies and various manufacturers. Only two thirds of the systems installed were fully operational on board within the first six months - on some vessels they were not fully operational even after a year.

The problems weren't inherent to a specific type of technology or manufacturer; although I have to mention that one type of technology had a 100% success rate for problem-free operations, despite different manufacturers. I don't have any official numbers from the industry but it is understood from informal chats that issues with the installed systems is something commonly experienced.

At Wallem, when we realised the extend of the challenges that the crew and the superintendents faced with the operation of

some of the BWTS, we decided to follow a centralised approach and have one person focusing on making sure that the systems on board had become fully operational, before handing over responsibility to the fleet superintendents.

Our approach to this compromises the three key elements for achieving operational excellence, which are people, assets and procedures. We are focusing on crew training by the manufacturers, both on board and ashore. We also offer familiarisation courses at our training centres as part of the pre-joining training. Lastly, we rotate some of our senior officers who are experienced with certain systems to enable them to share their knowledge and experience on board.

On the BWTS equipment front, we are in close contact with the manufacturers in order to resolve the issues faced. I have to mention that the response and support by all manufacturers has been superb. There are inevitably issues with components or new issues (even new to the manufacturer) which crop up, but we are always working together to bring the system to full operation in the shortest of time.

Finally, we have generated specific job routines in our planned maintenance system based on manufacturer's instructions and our experience. We have also created ship-specific operating instructions and troubleshooting advise. Even if it is not required yet, our policy is that the BWTS is operated regularly in order for the crew to be familiarised with the operation and that we maintain the system in full operational condition for when we are required to use it.

At Wallem we have experienced that good planning, execution and focus; as well as close co-operation between the BWTS manufacturers and the shipmanager, can minimise the burden to the owner.

**Written by Ioannis Stefanou, Group Technical Director, Wallem Shipmanagement.*

Ioannis Stefanou.

Manufacturers gearing up for the mad rush

For example, systems integrator, Alewijnse Marine, piping specialist Leemberg and 3D (EX) scanning company Medir International have entered into a framework agreement for the delivery of BWMS for several leading manufacturers in Europe.

For these worldwide BWMS suppliers, using electrolysis, UV, chemical and other technologies, **Alewijnse** is responsible for integrating the system into each ships'existing systems, including cabling. Leemberg is responsible for integrating the BWMS components and piping into each ships' existing ballast systems and Medir will scan the engine and pump rooms 3D (EX) of client vessels prior to installation to determine the optimal positioning and layout.

Kristina Effler, **Alfa Laval**'s Global Business Manager PureBallast explained that Alfa Laval started the initial development of BWTS 20 years ago and sold its first system in 2006.

"Over the years, we have developed the system to give the perfect fit to all different kind of installations. We have now reached our third generation of system, PureBallast 3.1," she said.

"The system can be built for a wide range of flows and with EX execution. It is also possible to deliver it in components for those installations that have a scarcity of space, as well as building it on a skid for ease of installation.

"We also offer deck solutions which are suitable for tankers that do not have pump room available," she said.

What Alfa Laval would like to see from the July IMO MEPC meeting where BWTS will be addressed is clarity, she said. As a supplier of BWTS, the company will deliver the solutions requested by the customer and when the customer requires it.

On April 25th **Damen**'s IMO certified InvaSave BWMS was unveiled at Delfzijl and Eemshaven, The Netherlands.

This marked the culmination of a seven-year programme to develop an effective mobile BWMS for use in ports.

This was a joint presentation between Damen Shipyards, the designated operator MariFlex and Groningen Shipyards, as well as shipowner Royal Wagenborg.

The IMO-approved Damen InvaSave is claimed to be the world's first external BWTS designed primarily for use in ports. The system receives ballast water from inbound vessels and treats it to IMO D-2 standard to eliminate potentially invasive marine micro-organisms. It can also deliver water treated to the same standard to outgoing vessels. Its mobile, containerised format means that it can be operated from the dockside or from on board a vessel alongside.

The new unit is now operational at Delfzijl and Eemshaven for vessels either without, or with malfunctioning, on board BWTS capability. MariFlex also planned to have a second operational in Rotterdam ahead of the BWMC September implementation.

As for **Ecochlor**, a review of the company's USCG type approval application is ongoing. The USCG is in discussions with the Ecochlor team and DNV GL to clarify engineering questions and testing protocols.

For tankers, although the Ecochlor unit is a simple system, there are many factors - such as flow rate, size, hazardous zones, etc - that can increase a retrofit's complexity.

Shipowners should hire engineering firms and shipyards that are experienced in BWTS installations and should expect delays with class society and flag approvals, as they are beginning to receive more and more requests to review detailed design engineering drawings.

If key stakeholders put in the right amount of pre-planning, choose the right technology, gather an experienced support team, the installation process will be more efficient, timely and cost-effective for everyone, the company stressed.

Typically, the shipowner will hire the integration engineers. Ecochlor has an engineering department and, as needed, will contract third party marine engineers experienced in the installation of its BWTS to assist the team.

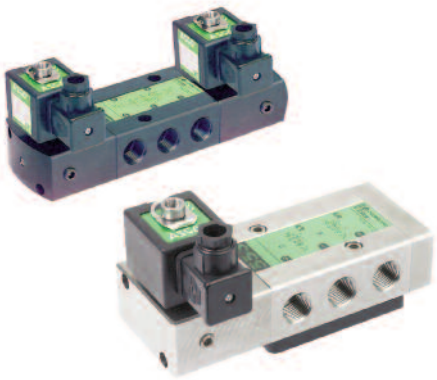
"We have already seen a lot more activity from shipowners who are interested in securing the Ecochlor treatment technology prior to the BWM Convention entering into force. Our pending approval for USCG type approval has also played a significant part in the increased activity in our line of treatment systems.

"Since summer of 2016, Ecochlor has completed the installation and commissioning on 11 MR, Aframax or Suezmax tankers, another one is currently in progress, with nine more in the planning stage for completion by the end of 2017," the company said addressing the question of demand.

Ecochlor targets vessels with mid-to-high ballast water flow rates, typically 1,000 cu m per hour or more. The higher the flow rate, the better. For vessels with ballast water flow rates of 3,000 cu m per hour up to, and including, 16,000 cu m per hour, the advantages of the Ecochlor design (small size, low power) become more obvious, the company claimed.

For tankers, Ecochlor has developed engineering solutions that allow for the installation of the system on vessels with hazardous spaces. Typically, ex-rated filters are installed in a Zone 1 hazardous area. The treatment system is situated within a non-hazardous area on the vessel. This approach has been approved by both LR and DNV GL during recent Ecochlor tanker installations.

Engineering group **Emerson** has gained DNV-GL approval for its ASCO 551 and 553 series solenoid valves. As a result, the valves comply with the BWMC. From September, all valves used for treating and managing ballast water on board ships must comply with the new standard.



Emerson has gained DNV GL approval for its solenoid valves.

ASCO DNV-GL approved solenoid valves are available with aluminium and stainless steel valve bodies and with many solenoid options. This enables them to be used in safe areas and Ex zones. The 551 and 553 Series are certified for use in functional safety loops, such as those found on LNGCs and tankers.

ASCO is an Emerson company, which offers comprehensive fluid automation solutions, including fluid control and fluid power products, for a wide range of applications.

Erma First became the first full flow electrolysis BWTS vendor worldwide to have filled the USCG's type approval application, which occurred on 11th April, 2017.

The company's FIT BWTS, type approved by IMO and several class societies, remained without any changes or modifications throughout the USCG type approval process.

Konstantinos Stampedakis, Erma First's managing director, stated, "It has been a long and demanding journey towards the USCG Type Approval and having submitted the application amongst the first, proves our ability to deliver a high quality and well-designed BWTS but also justifies the efforts and methodical work of our team of experts towards this objective."

The system performed perfectly in a variety of challenging marine environments during the tests in Morocco, Spain, Netherlands, France, New York and Savannah. The testing period lasted 30 months having finished in autumn 2016. Tested at three water salinities, FIT BWTS offers a reliable, simple and effective solution for all types and sizes of vessels, the company claimed.

The next certification step will be the application for IMO Type Approval according to the revised G8 Guidelines. This was planned for early summer 2017.

The was the sixth type approval application received, the USCG confirmed. The Maritime Safety Centre will review the application for compliance with USCG regulations in 46 CFR 162.060.

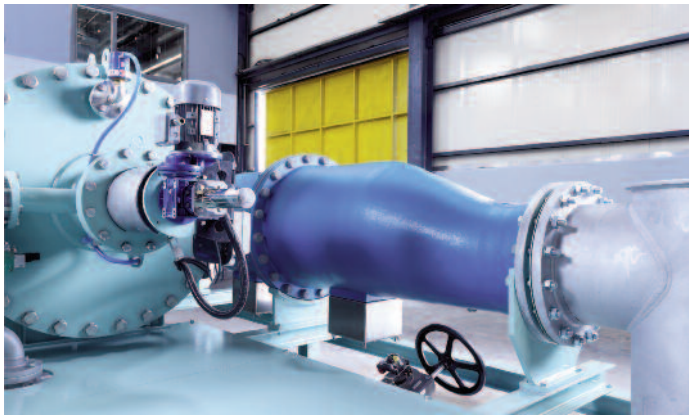
Once it has been determined that the application meets the requirements, the MSC will issue a type approval certificate, the USCG explained.

Using the same approved electrochlorination technology, **Evoqua Water Technologies** has re-modelled its patented SeaCURE BWMS to provide optimum high flow rate performance from what is claimed to be one of the smallest electrochlorination system on the market.

Introduced at Nor-Shipping 2017, the SeaCURE system is a skid-mounted, plug-in-and-play BWTS that is 76% smaller and 85% lighter than earlier generations of the system.

Speaking at its introduction, Matt Granitto, business manager for Evoqua's ballast water business, said: "Without reducing the high flow rate capacity of the existing SeaCURE system, we have dramatically reduced the number of components to create a modular system mounted on a 2 m x 1.5 m, easy to install skid. It is one the of smallest ballast water management solutions available capable of treating flow rates of up to 6,000 cu m per hour. I don't think anyone can treat the flow rates we can in the space we can."

With installation and operational simplicity a key factor behind the updated design, the upgraded SeaCURE system can fit through standard hatchways and can be installed by riding crews, reducing substantially pre-installation work and time required during drydock.



Erma First claimed to be the first full flown electrolysis BWTS manufacturer to have filled the USCG type approval application.

Ian Stentiford, Evoqua Water Technologies' global vice-president, Electrocatalytic business, said: "The development of our core electrochlorination technology, which can now generate up to six times more output from the electrolyser is the main driver behind the remodelled SeaCURE system.

"The advancement has enabled our manufacturing and design partners to standardise the system, developing multiple dose lines capable of treating three ballast lines from a single skid, as well providing marine growth prevention for up to four sea chests. What they have created is a universal enclosure that can be assembled rather than fabricated. Not only is the re-modelled system simple to install, we have (also) been able streamline and reduce the maintenance requirement," he said.

Using the same technology in its patented Chloropac marine growth prevention system, the electrochlorination cells used in the SeaCURE system can be increased or reduced depending on ballast water flow rate and treatment capacity. The cells are self-cleaning, resulting in reduced maintenance time and costs. No chemicals are required. In addition, the SeaCURE system obviates the need for an additional heat exchanger, even when operating in extreme Arctic environments.

Another key feature, and one that is likely to prove an incentive for shipowners, is the dual functionality of the system. Based on the company's 50-year experience developing electrochlorination technologies, a SeaCURE BWMS can be configured to also work as a vessel's marine growth prevention system, protecting against the build-up of biofouling in seawater in critical machinery and cooling systems.

"This means that if the shipowner needs to replace or update an MGPS, then we can layout the SeaCURE system to provide combined marine growth prevention and ballast water treatment capability. This dual functionality can provide a return on investment on the system as shipowners no longer need to invest in two separate systems. I don't know of any other system that combines ballast water treatment with marine growth prevention," said Stentiford.

The IMO-approved system is currently in the final stages of USCG testing at Netherlands-based Marine Eco Analytics (MEA-nl). The SeaCURE BWMS is expected to submit for USCG type approval this summer.

Optimarin recently signed contracts with Wisby Tankers and Hoëgh Autoliners to install its Optimarin Ballast System (OBS) on five vessels. This agreement came six months after the Norwegian BWTS specialist became the first company to win USCG type approval. Optimarin will install units on three Wisby bitumen tankers and two Hoëgh Autoliners car

carriers.

With a fleet of 19 vessels, Wisby Tankers uses smaller tankers for European trades and larger vessels, including the bitumen carriers, for worldwide routes.

Bearing in mind the trading patterns, Optimarin CEO, Tore Andersen, said that complete global compliance was of paramount importance "Any shipowner looking for optimal flexibility for their fleets must install BWT systems that are compliant with the very strictest regulations, which, in this case, are those of the USCG.

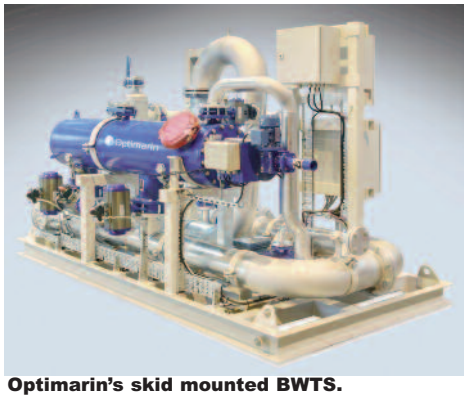
"Our technology leads the way in compliance, as well as effective and environmentally friendly operation, and that is a key selling point for forward thinking shipowners.

"In addition, the modular nature of OBS makes it easy to retrofit on any vessels – even those where space is of an absolute premium, such as it is on these specialist ships. That was crucial for both Wisby and Hoëgh Autoliners, as it will be for all companies looking to ensure their ships comply with the IMO's ratified BWMC.

"The retrofitting of systems is a business area that is going to explode very soon. Industry sources expect over $45 bill to be spent in the sector in the coming five years. And we, in conjunction with our global engineering partners, know it like no other," he claimed.

When completed later this year, the fittings will take the total number of Optimarin retrofits beyond the 110 mark. The three Wisby Tankers will have 500 cu m systems installed. All systems use powerful 35 kW UV lamps to ensure the elimination of all potentially invasive waterborne organisms.

Optimarin works in partnership with Goltens, Zeppelin Power Systems and shipyards worldwide to install OBS on both existing vessels and newbuilds. The firm has so far received orders for over 500 systems, with more than 400 already delivered.



Optimarin's skid mounted BWTS.

"The market is now fully aware that installing BWT systems is not an option, it's a must," Andersen added. "To ensure that fleets sail safely, shipowners must identify technology that is compliant, trusted, easy to install, operate and maintain and fits their individual needs.

"This is the time to move on this key decision, thus avoiding any potential installation bottlenecks. I'd urge companies to

Export Credit Norway to finance vessel retrofits

Export Credit Norway is now offering financing to international shipowners who purchase retrofit equipment from Norwegian suppliers.

The Norwegian export credit agency Export Credit Norway has assembled a specialised team and tailor-made financing solution to support vessel owners who need to retrofit equipment, such as gas exhaust cleaning systems, ballast water treatment systems and new coating systems.

Analyses show that as many as 60,000 vessels worldwide will need to retrofit scrubber systems by 2020 and ballast water treatment systems by 2021.

"Money is tight and access to reasonably priced capital is a challenge for many players in the international shipping and maritime industries at the moment. Hence, attractive financing of retrofit equipment could make the investment less demanding for many vessel owners," said Olav Einar Rygg, Export Credit Norway's Director of Lending – Ocean Industries.

Export Credit Norway can finance up to 85% of the contract value for retrofit equipment that international vessel owners acquire from Norwegian companies. Norwegian content must account for minimum 30% of the amount of the Norwegian supplier contracts.

"The Norwegian shipping and maritime industry has a number of world leading technology suppliers within ballast water treatment systems and other required retrofit systems. What we provide is attractive financing for vessel owners who are interested in purchasing this technology," said Rygg.

The maturity of the retrofit loans will be between five and eight and a half years per single loans, depending on the economic life, amount and type of investment. Fixed interest loans are offered through so-called CIRR loans (commercial interest reference rate), which are set by the OECD once a month.

From mid-May to mid-June, 2017, the CIRR was at 2.28% for loans in NOK and 3.02% for loans in USD. All loans must be guaranteed by the Norwegian Export Credit Guarantee Agency (GIEK) and/or acceptable commercial banks, and the rates are exclusive of guarantee premiums.

For shipowners that have several vessels that need to retrofit equipment, Export Credit Norway can offer a credit frame agreement for the entire fleet. The loans for the purchase of the retrofit equipment will then be structured as single loans under the credit frame agreement. The single loans will be disbursed upon fulfilment of pre-agreed conditions.

"Our aim is to make the financing process as smooth and efficient as possible, so that vessel owners can focus their time on core business. That is why we offer a credit frame agreement which essentially covers numerous vessel retrofits under the same loan facility," said Rygg.

Olav Einar Rygg.

Norwegian shipping companies may also apply for financing of retrofits at Norwegian shipyards, provided that the vessel will be engaged in foreign trade or generate its revenue in the offshore market.

However, shipowners or equipment suppliers must apply for export financing before the commercial contract is signed. ■


A line of Evoqua systems.

plan the best, safest and most compliant way forward for their vessels right now," he said.

Optimarin has been dedicated to the development of BWT systems since 1994, becoming the first ever company to install a commercial system in 2000, on board a cruise ship. Last year was the company's most successful year to date, winning contracts for over 120 BWTS.

Alongside approval from IMO and USCG, OBS is certified by several classification organisations, including DNV GL, Lloyd's Register, Bureau Veritas, MLIT Japan, and American Bureau of Shipping.

Customers include Fincantieri Bay Shipbuilding, Saga Shipholding, The Royal Netherlands Navy, Atlantis Tankers, Vard Group, Solvang and Carisbrooke, among others.

The US Coast Guard Marine Safety Center issued a fourth USCG Ballast Water Management System Type Approval Certificate to **Sunrui Marine Environment Engineering** after a detailed review of the manufactures type approval application determined the system met the requirements of 46 CFR 162.060.

The Sunrui BalClor system incorporates a three step process consisting of filtering and electrolysis during uptake and neutralisation at discharge. This approval covers 14 models with maximum treatment rated capacities between 170 cu m per hour and 8,500 cu m per hour.

Elsewhere, **Trojan Marinex** BWTS, claimed to be up to 50% smaller than others in the industry, now includes inline lamp drivers, enabling a substantial reduction in cabling and electrical panels.

With this innovation, total system footprint has been further reduced by up to 30%.

"Research and science, in combination with rigorous product development, enables continual, meaningful innovation," said Mark Kustermans, Trojan Marinex market manager."We immediately recognised the synergistic advantages of connecting our UV lamp and drivers together. It's an industry first which allows our system to provide consistently lower power draw in an even smaller footprint."

The BWTS has maintained its purpose-built design TrojanUV solo lamp technology, but now integrates the inline lamp driver innovation to further reduce footprint, while maintaining low power draw. Footprint and power draw are two of the most critical parameters for the upcoming retrofit market, the company said. TO

Bilfinger solution for de-sulfurisation of engines certified

After only about four months in operation, de-sulfurisation equipment fitted on board the chemical tanker 'Aurelia' was awarded the International Air Pollution Prevention Certificate (IAPP) by DNV GL on behalf of the German flag administration.

Operated by Bremen-based Carl Büttner, the 24,668 dwt 'Aurelia' was fitted with a new flue gas de-sulfurisation system supplied by Babcock Noell, a subsidiary of Bilfinger.

This technology uses an absorption process to remove the sulfurous flue gases emitted by the ship.

The background was that in autumn, 2016, the IMO adopted a resolution to broaden the rules for maritime environmental safety. Prior to this, the MEPC had conducted a study to determine the worldwide availability of low sulfur fuels and de-sulfurisation technologies or scrubbers.

This study identified a large number of suitable uses for scrubbers. In addition, a decision was made concerning the date on which the international sulfur limit of 0.5 % is to apply, which is 1st January, 2020 when the amended Annex VI to the MARPOL Convention takes effect.

The North and Baltic Seas, as well as North American coastal waters, have already been identified as sulfur emission control areas (SECAs), for which a maximum of 0.1 % has applied since 2015.

"The IMO's decision is forcing us shipowners to either use expensive low sulfur fuel or to install scrubbers on board to filter out the sulfur," explained Lars Bremer, Carl Büttner Shipmanagement's managing director, the subsidiary responsible for ship operations.

In the summer of 2016, the shipping company initiated a pilot project to assess the technological potential of efficient de-sulfurisation at sea. As a result, the 'Aurelia' was fitted with a de-sulfurisation system. Sources of sulfur, such as the main engine, the auxiliary diesel and the boiler, were connected to the system and operated under varying conditions.

The scrubber supplied by Babcock Noell is a hybrid system that operates in different modes, ie in either an open or a closed loop. Andreas Breeger, head of maritime flue gas cleaning systems, environmental technologies at Babcock Noell, explained: "Acceptance testing by DNV GL was completed the first time and free of any reservations. As a result, this project milestone was reached within a very short space of time. For this reason, we are confident of being able to drive forward the technology changeover towards low sulfur ocean shipping."

In particular, the enormous economic efficiency of scrubber systems looks set to generate strong market demand. Payback times are between one and two-and-a-half years, the company claimed.

Babcock Neill's scrubber system.

The scrubber is encased behind the 'Aurelia's' stack.

ShipArrestor to protect Norwegian coast

An improved and upgraded version of the Miko Marine Ship Arrestor system has been delivered to the Norwegian Coastal Administration (NCA).

The system has been developed to give nations the ability to protect their coastlines from the danger of ships that have lost engine power and from the pollution that can result if they run aground.

It uses a specially designed parachute-shaped sea anchor that is connected to a drifting ship by helicopter and secured without any need for crew involvement. The helicopter then deploys the sea anchor, which dramatically reduces the rate at which the ship is drifting and makes it more stable for salvage and for rescue teams to board upon their arrival.

The latest design changes now enable the sea anchor to become effective more quickly, shaving minutes off the time the ship is drifting out of control.

Nicolai Michelsen, Miko Marine general manager, explained; "Thirty years ago the ShipArrestor would have been impossible to make as advanced materials combining strength with lightness are essential for its manufacture. It is only because the special fabrics and metals used are now available that the project was able to go ahead.

"Working closely with the NCA, we have continued to develop the design to improve its performance and efficiency and the Mark 2 version is another landmark in its evolution. We are very pleased to be equipping the NCA with a system with which we all have even greater confidence," he said.

The upgraded version of ShipArrestor incorporates a number of design changes and modifications that will make it easier for the tow line to be picked up by the tug. The principal improvement involves a three-step release mechanism that gives the helicopter pilot greater control over the system's deployment and enables the sea anchor to take effect more rapidly.

With the new version, the pilot lassoes the ship's foredeck winches and bollards with a ring of specially developed lightweight chain, as before. The chain is connected to a high strength tow line, which is paid-out as the helicopter flies upwind a short distance where the pilot presses the new three-step ShipArrestor control button. This disconnects the chain and the first part of the tow-line from the helicopter. After then flying about another 40 m, the button is pressed again allowing the parachute sea anchor bag to drop into the sea and to begin opening.

The final step is to continue flying upwind, helping the main anchor to unfurl in the process, before pressing the button for a third time. This releases a 30 m continuation of the tow-line that terminates with a high visibility buoy and a smaller pilot anchor that serves to keep the tow-line straight.

The Miko development team were advised that the operational ability of modern tugs

makes a long pick-up line unnecessary and that the tug crew can recover and make fast the shorter tow line more quickly. When it is fully deployed, the ShipArrestor will immediately reduce the severe rolling that has been responsible for tankers such as the 'Prestige' and the 'Erica' breaking up, due to the stresses of lying beam-on to the waves.

Once the rescue tug arrives it can lift the buoy on board and use the tow line to lead the ship to safety. Due to the advanced, high-strength materials used by the ShipArrestor, any size of ship from a trawler to a large tanker can be quickly turned into the wind and its speed of drift halved.

Oslo-based salvage technology specialists Miko Marine led a consortium of eight European organisations in the development of the ShipArrestor. Partly funded by the European Union, this included companies from France, Germany, Netherlands and Austria, as well as the Norwegian Institute of Technology and the UK's Ship Stability Research Centre. Coppins Sea Anchors of Motueka, New Zealand also joined the team as co-developers of the system, bringing experience in the development of large sea-anchors to the project.

Ola Jordheim, NCA chief engineer and ShipArrestor project manager, said; "We hope that we will never need to use our ShipArrestor systems but our experience suggests otherwise." He recalled several incidents around the coast of Norway where the system would have prevented ships coming to grief. "A notable one occurred in 2005 when the tanker 'Fjord Champion' caught fire and lost power," he said. "The crew had to evacuate the ship which subsequently ran aground on the southern tip of Norway. This is the sort of situation that ShipArrestor has been designed to prevent." TO

Norsafe in Polar Code tests

The IMO's Polar Code is a 'risk and goal' based code resulting in each project being evaluated separately depending on the requirements of the client and type of vessel, etc.

A risk analysis is then undertaken by companies, such as LSA provider, Norsafe, where specific mitigations are established in order to prove compliance.

Norsafe was the first LSA supplier to have executed full scale tests and trials during the joint stakeholder SAREX (Search and Rescue expedition) in April, 2016 with various stakeholders including the Norwegian Coast Guard, Norwegian Maritime Authorities and ABS.

Using a standard Norsafe Miriam 8.5 lifeboat, the project simulated a full scale escape, evacuation and rescue operation, to accommodate a minimum five-day survival with the lifeboat acting as a habitat,in ice-infested waters, 80 deg north in the Barents Sea. During this scenario, a risk assessment method was established to gain full understanding of the potential issues involved.

Its equipment was tested in both simulated and realistic conditions to help the company find out what modifications would be required for its products to mitigate the risks involved in Polar conditions.

Particular attention was paid to how habitable a lifeboat could be during an extended period for people living on board having had to evacuate the mother ship - eg, are the oxygen levels sufficient, what about heating and food, are there enough survival suits for everyone, etc.

Recently Norsafe finished its second Polar Code trial in Spitsbergen. For this trial, Norsafe made a number of modifications to its lifeboat as a result of the test held in April, 2016 and the results were very positive, the company claimed.

The Polar Code, which entered into force on 1st January, 2017 has brought about a huge sea change for many companies in the shipping industry. It stipulates that the potential risks must be assessed and mitigated to prove compliance with the code for each trip in the Polar region.

Norsafe claimed that it was in a unique position to offer shipowners, shipmanagers and offshore installation clients advice on:

- Project risk assessment of any polar activity.
- Mitigate all possible risks by product adaptations and/or safety instructions (rescue/evacuation/maintenance guidelines)..
- Provide 'Norsafe works certificates' for products documenting Polar Code (or other winterisation standards) compliance based on the Polar water operational manual for Norsafe LSA, which is a project specific document. ■

Drones, crawlers and cleaners vie for afloat repairs

Afloat repair and maintenance initiatives highlighted.

Although there are established players in the market, such as Hydrex and the hull and propeller cleaning and polishing concerns, others have come up with ideas aimed at cutting costs.

For example, Norwegian technology company - Blueye Pioneer- has developed a low-cost underwater drone to allow shipowners, shipboard crew and shipyards to perform hull inspections without the need for divers or expensive ROVs.

The Blueye Pioneer underwater drone was developed by Trondheim-based Blueye Robotics, a company which was born out of the Norwegian University of Science and Technology's Centre for Autonomous Marine Operations and Systems (NTNU AMOS).

Outside of drydocking periods, inspections below the waterline are normally carried out by divers or ROVs. While using divers is inefficient and represents significant HSE risks, ROVs have traditionally been very costly and required extensive training – and in most cases an external operator – to manage.

"We are providing vessels crews with an industrial drone that can be operated by anyone capable of using a smartphone or a tablet PC. Perhaps just as important is that it is priced reasonably at approximately $4-5,000 per drone system. This will allow for several drones on board to make inspections even quicker, which in turn means higher operational reliability and uptime for the vessel," said Erik Dyrkoren, Blueye Robotics CEO.

Vessel hulls regularly require both ad-hoc and periodic inspections during transit and when entering ports. For example to check the vessel´s structural integrity, inlets and discharge valves, rudder, propeller, coating levels and possible corrosion. Eyes under the

A diverse new inspection vehicle was launched by Deep Trekker (see page 31).

New giant repair yard in the offing

Saudi Aramco recently signed a shareholder agreement with Lamprell, the National Shipping Co of Saudi Arabia (Bahri), and Hyundai Heavy Industries (HHI) to form a joint venture partnership to establish, develop and operate a shipyard.

This will be the anchor project within the King Salman International Complex for Maritime Industries and Services, located in Ras Al-Khair, near the Jubail Industrial City on the Kingdom's east coast.

The integrated shipyard will be the largest in the region in terms of production capacity and scale, providing a mix of products and services in the region and enabling Saudi Aramco and its supply chain partners to meet their manufacturing, maintenance, repair and overhaul requirements for vessels and offshore structures of up to VLCC size.

The new facility will have the capacity to build four offshore rigs, over 40 vessels, including three VLCCs, and service over 260 maritime products annually. Major production operations are expected to commence in 2019 with the facility reaching its full production capacity by 2022, Saudi Aramco said.

Lamprell said that this agreement will allow the company to -

- Provide a critical point of entry to the Saudi market with exposure to Saudi Aramco, the world's largest oil company.
- Enable Lamprell to diversify its global reach and to broaden its sector and product expertise.
- Strengthen Lamprell's position as a leading fabricator in the region.
- Increase access to revenue-generating opportunities and production efficiencies:
- Opportunity to pre-qualify with Saudi Aramco to bid from its existing UAE facilities for a significant pipeline of non-rig Saudi work under the long-term agreement and general bid slate programmes.

When fully constructed, Lamprell said that it expected that the shipyard will be the largest in the Arabian Gulf in terms of production capacity and scale. The shipyard's area is expected to be around 4.3 sq km extending along the coast of Ras Al-Khair. It will comprise four main production zones (zones A-D).

Through the provision of personnel and expertise the Group will provide certain services and technical support at the yard. Lamprell will be the technical partner for Zones A and D, being the zones that will provide maintenance, repair and overhaul (MRO) services for jackup drilling rigs and commercial vessels, plus the construction of jackup drilling rigs, respectively.

HHI will be the technical partner for Zones B and C, being the zones that will construct and undertake MRO services for offshore support vessels and that will construct commercial vessels, respectively.

Bahri will enter an offtake agreement with the joint venture to purchase not less than 75% of its commercial vessel requirements over 10 years, being a minimum of 52 commercial vessels (including a significant number of VLCCs) and MRO services based on the prevailing and competitive market prices, subject to certain conditions.

The joint venture will be run by a nine person management board.

Lamprell will invest up to $140 mill over the course of the construction of the yard from existing financial resources and future cash flows and will hold 20% of the joint venture's issued share capital (subject to the terms of the Shareholder's Agreement).

Saudi Aramco is to invest up to a maximum of $350.7 mill, Bahri will invest up to $139.3 mill and HHI to invest up to a maximum $70 mill,. In addition, they will hold 50.1%, 19.9% and 10% of the issued share capital, respectively (subject to the terms of the Shareholder's Agreement). ■

waterline are also required to check the hull for explosives and smuggling of contraband.

Blueye Pioneer's underwater drone was developed by subsea experts experienced in harsh Norwegian offshore conditions. It is designed to satisfy industrial reliability requirements for underwater operations, but with a user-friendliness normally associated with consumer technology products, the company claimed.

The drone is equipped with powerful thrusters that allows it to operate in heavy currents and dive to 150 m water depth. Live video is transmitted via a thin umbilical cable to the surface and thereafter wirelessly to the user, who may either be located on board a vessel or ashore.

It is compact (45 cm x 25 cm x 35 cm) and weighs only seven kilos.

"By providing vessel owners and their crew with easy and cost-efficient access to what is below the waterline, we also give them the opportunity to address potential hull issues before they become a problem. Combined with lower than usual capex, we believe this

Blueye's drone is lightweight and compact.

drone can make hull inspections more frequent and less problematic," Dyrkoren added.

Remaining in Norway, a diverse new inspection vehicle was launched at Nor-Shipping 2017.

The patented Canadian Deep Trekker DT640 utility crawler is the first three-wheeled vehicle of its kind, the company claimed.

Equipped with an HD camera, magnetic wheels and a multitude of application specific add-ons; the utility crawler can perform an array of tasks, making it incredibly versatile and easy to deploy at a moment's notice

Designed by Deep Trekker, the crawler is submersible to 50 m and houses its own on board batteries, making deployment easy and quick for tasks, such as contraband inspections and testing hull integrity or thickness.

Magnetic wheels and various add-ons permit diverse applications, such as scraping away marine growth or power washing the hull or examining for invasive species while in port.

Hull Inspection: With magnetic wheels, the DT640 Utility MagCrawler can crawl along vertical angles to inspect the integrity of ship's hulls even underwater. Instead of drydocking or returning to shore, crew can immediately inspect the hull if they fear something is wrong, via the live video on the handheld controller.

Hull Security Check: When entering ports, authorities or crew can quickly check areas of interest for contraband, invasive species or security threats.

Remote Pressure Washing: Outfit the crawler with a pressure washer to remove dirt, debris, rust scale and more all from piloting with the hand held controller.

Removing Marine Growth: The dozer attachment is designed to remove hard marine growth by scraping surfaces with 50 lbs of force.

Thickness Testing: The MagCrawler can determine the thickness of metal on corroded and coated structure by mounting a thickness gauge probe on its arm. The magnets give the crawler the ability to travel in almost any direction on ferrous metal surfaces.

"Deep Trekker continues to innovate to provide the easiest to use and most portable inspection technologies, without compromising durability or capabilities," said Sam Macdonald, Deep Trekker President. "The new DT640 Utility Crawler product line has been developed by listening to the needs of the industry and our customers."

Deep Trekker was founded in 2010 to create portable, affordable, and easy to use underwater inspection tools. The company is based in Ontario, Canada, with engineering and manufacturing undertaken in house.

Based on a clean sheet design, the first product, the DTG2 ROV was introduced in limited run in August, 2011. Following its success, the company launched the DTX2 ROV in 2015. In 2016, the company expanded the municipalities market by launching a submersible pipe crawler system, based on the same principles of the ROV systems.

Meanwhile, Fleet Cleaner recently introduced its ship hull cleaning service in every Dutch port.

The extended availability was tested with the hull cleaning of the 'Chiquita België' 'in Vlissingen.

The vessel was cleaned during loading and unloading at the terminal, so that the shipping company experienced no downtime from the hull cleaning activities. This saves significant time compared to alternative cleaning methods with divers, where the ship has to be anchored outside ports, thus resulting in extra costs, the company claimed.

Added to the extended availability of the service, Fleet Cleaner also co-operates with various sub-contractors to offer other hull maintenance services. The hull cleaning services can now be combined with propeller polishing, which reduces fuel consumption, as well as class certified under water inspection by divers in order to extend drydocking.

This enables the Fleet Cleaner installation to clean any ship, in any Dutch port, during any cargo handling operation, the company said. TO

Four new Terntank vessels coated with MarineLine

Chemical tanker owner and operator Terntank recently welcomed another new vessel into its fleet, the 15,000 dwt 'Tern Ocean', built at AVIC Dingheng Shipbuilding in Jiangdu, China.

This ship, the fourth newbuilding in a series of eco-friendly chemical/product tankers built under BV class at AVIC, joins its sisterships 'Tern Sea', 'Ternfjord', and 'Ternsund' in the growing Terntank fleet.

These new energy efficient LNG-powered vessels operate in compliance with IMO Tier III regulations, trading in the Baltic Sea region, a designated Emissions Control Area (ECA). They are the world's first LNG-fuelled newbuilding chemical/product tankers.

"We are proud of our company history as an innovator in the maritime trade," said Tryggve Möller, Terntank Ship Management managing director. "These new ships continue our tradition of employing many different and advanced technologies, with a number of 'firsts' in the industry."

The Terntank ships were developed through an EU project called 'Into the Future – Baltic SO2lution' as a co-operative venture between Terntank and several partners under the Zero Vision Tool (ZVT) platform that envisions the higher building cost for vessels are offset with reductions in port costs and fairway dues, because of environmental advancements.

Each of Terntank's four new 147 m length tankers are based on an advanced twin hull design from Rolls-Royce. The ships are powered by a newly developed Wärtsilä 2-stroke, low pressure dual-fuel main engine that drives a large propeller to deliver service speeds of up to 14.5 knots. With the engine operating in gas mode, the ships are Tier III compliant.

Möller explained, "The new ships yield considerable fuel cost savings. Conventional product tankers of this size consume on average bunker fuel of 22 to 25 tonnes per day, however, our newbuildings use just 14 tonnes per day, making them the most modern and fuel efficient tankers in the industry."

Terntank's four newbuildings were coated with MarineLine.

In August, 2016, Terntank's first new ship in the series, 'Ternsund', off-loaded naphtha and gas oil cargoes in at Rotterdam, and was cooled and bunkered with LNG at the Dutch port, the first time a sea-going vessel took on the clean-burning fuel.

STS bunkering

The LNG tank cooling and bunkering culminated in a major event for Terntank, with media, customers, suppliers, industry and government officials, the ship's crew, and representatives from the Chinese shipyard all attending the Port function.

The LNG tank cooling process took about 18 hours taking down the ambient temperature of the tanks at +20 deg C to an operational temperature of -162 deg C for the bunkering, which was undertaken by Shell LNG. It was the first time that a cryogenic fuel had been ship-to-ship bunkered, another first.

The Port of Rotterdam Authority said Terntank was also the first operator to take advantage of a 10% discount on seaport fees available to LNG-fuelled ships called the 'LNG bunkering incentive'. The Port Authority is using this development to position Rotterdam as a major European LNG hub for the future and promote the transition from fuel oil to cleaner LNG as a shipping fuel.

Strong MarineLine relationship

Terntank first employed the patented MarineLine cargo tank coating system from Advanced Polymer Coatings on its 11,259 dwt chemical tanker, 'Ternvind' in 2008.

Möller said, "MarineLine has proven to be the best tank surface coating for cleaning and easily switching cargoes. So we changed from epoxy and phenolic epoxy tank coatings and started specifying MarineLine for all our vessels since that time, including the four new sisterships. We consider MarineLine the best cargo tank coating technology on the market today."

MarineLine fits in perfectly with the eco-friendly nature of Terntank tankers. Typically, tank cleaning takes an extensive amount of

Terntank Tryggve Möller.

time and effort but due to MarineLine's non-absorption, low surface energy and smooth surface features, tanks are quickly and easily cleaned, with some cargoes only requiring venting. This consumes much less bunkering fuel for cleaning, thus lowering emissions, while using fewer cleaning chemicals to reduce cargo slops, both further positives for the environment beyond the LNG benefits of the ships.

Eco-friendly chartering

Environmentally conscious chartering policies for tankers continue to shape the market, as charterers stipulate certain environmental requirements before fixing a vessel. This is a conscientious effort by charterers to reduce emission levels in the Baltic Sea.

Because the new Terntank ships have advanced technology and use LNG as fuel, there are significant environmental advantages compared to conventional tankers using low-sulfur marine gas oil. LNG usage reduces emissions of SOx by 99%, NOx emissions by 97%, CO2 by 40%, and particulate matter by 99%.

"When charterers see these positive numbers, they want to enter into long-term timecharters with Terntank," Möller claimed. "Our analysis shows that LNG-fuelled tankers are right for the industry in the long term by minimising the environmental impact."

Möller pointed out that Terntank has always been an industry pioneer. "We were the first company to build a double hull tanker for Scandinavian trades in 1974. We like pioneering environmental solutions because this is our trade and the Baltic is our backyard. These four new vessels with MarineLine coated cargo tanks continues that spirit of innovation.

"The main reason we like MarineLine is because we think taking care of the environment is going to continue to be a key requirement for the shipping industry in the future and we don't want to do a lot of tank washing, as we are often changing parcels. We carry Methanol especially, so we want to easily clean the tanks after discharge. MarineLine has a smooth hard coating surface that handles Methanol and can then switch to other cargoes," Möller explained.

He added that charterers accept MarineLine-coated ships very easily, and like having the versatile coating as an option for sequencing different types of cargoes.

"Terntank has been very satisfied with the support from Advanced Polymer Coatings inspectors who worked at AVIC Shipyard during the tank preparation, coating application, and heat curing of our four new ships, and also the management of the company," Möller said.

Thus far, all four newbuilding vessels are operating well with the MarineLine coating from early inspections by Terntank personnel. Möller said, "When Terntank builds new tankers in the future, we will again look to MarineLine as our cargo tank coating because of its ease of cleaning and excellent versatility to handle changing market needs. We believe MarineLine will continue to provide a good return on our investment." TO

With MarineLine, tanks are quickly and easily cleaned.

A fleet that continues to grow

Back in 1958, Terntank started as a one-ship company. Today, it operates a fleet of modern chemical/product tankers in the 8,000 to 15,000 dwt range.
Current fleet -

Name	Built	DWT	CBM	Cargo tank coating
TERN OCEAN	2017	15,000	16,559	MarineLine
TERN SEA	2016	15,000	16,559	MarineLine
TERNFJORD	2016	15,000	16,559	MarineLine
TERNSUND	2016	15,000	16,559	MarineLine
TERNVIND	2008	11,259	12,187	MarineLine
TARNBRIS	2007	11,288	12,208	Phenolic Novolac Epoxy
TERNHOLM	2005	14,825	15,808	Epoxy
TERNVAG	2003	14,796	15,808	Epoxy
TERNHAV	2002	14,796	15,793	Epoxy
TERNVIK	2001	14,796	15,808	Epoxy
TARNDAL	1998	8,269	9,007	Phenolic Epoxy
TARNFORS	1998	8,245	8,988	

Case study for on board safety meeting

P&I and insurance concern Gard has recently been involved in a number of cases of cargo contamination as a result of inadequate tank cleaning.

This case study describes one such incident to draw the attention of the ship's crew to their operational practices during regular tank cleaning operations.

On a voyage from Asia to Europe, a chemical/product tanker, was loaded with two different grades of cargoes. The vessel had 20 wing cargo tanks, including slops and the final stowage plan had all tanks loaded, except No 9 P/S wing tanks. No 3 P/S wing tanks were loaded with Split Palm Kernel Fatty Acid Distillates (SPKFAD), whilst all the other tanks were loaded with Vinyl Acetate Monomer (VAM).

The vessel was due to discharge the cargoes at multiple ports. The next cargo due to be carried was lube oil, which required very basic tank cleaning. As the vessel had some slack time between subsequent discharge ports, the Chief Officer had planned to carry out 1.5 hrs of cold seawater wash followed by 1.5 hrs of hot seawater wash during the voyage from one discharge port to another.

The vessel discharged from 3 P/S and 2P wing tanks at the first discharge port. These tanks were emptied and the ship's crew carried out tank cleaning after departure from the port. At the second discharge port, the vessel discharged COTs, 2S, 4S, 5P, 6P and 10 P/S. Finally, the vessel arrived at the last port to discharge the balance of the cargo. All empty tanks were washed during the voyage to prepare them for the next cargo.

Upon arrival at the final port of discharge, the receivers drew samples of the cargo for analysis from the nominated cargo tanks for discharge. It was found that the cargo from the 7P wing tank, which was loaded with VAM, had high chloride content and traces of free water.

The cargo surveyors then withdrew dead bottom samples which were also sent for analysis and produced results similar to the previous sample. The dead bottom samples also indicated a presence of free water. The vessel carried out ullaging of all the tanks containing cargo and noted that the cargo tanks with the contaminated cargo had its ullage reduced by 30 cm.

Relevant facts

Relevant facts were that all cargo tanks had two or three fixed tank washing machines installed on the main deck area. The number and location of the machines depended on tank capacity and internal structures. The ship's crew were responsible for connecting and disconnecting the portable tank cleaning hoses between the tank cleaning hydrants and tank cleaning machines during tank washing operations. They were experienced in this task as they had to do five to six tank cleaning operations every month.

During the investigation of the incident it was discovered that the tank identification markings/stencils on a number of the tank washing machines had become illegible. Furthermore, there was little horizontal separation between the tank washing machines of the tank that was supposed to be washed (6P) and the one that was eventually contaminated (7P).

Based on the case and the keywords below, Gard asked the readers to perform an on board risk assessment of the incident and the factors which led to it, bearing in mind the company's SMS procedures.

The following questions will help to increase awareness;

- Discuss possible causes of the cargo contamination found during the last port of discharge.
- Are all your cargo and ballast valves and associated pipelines adequately and clearly marked?
- Does the vessel's planned maintenance system (PMS) have a job item associated with the maintenance and upkeep of all markings and stenciling of the cargo and ballast system?
- What safeguards are there in place on board to ensure such incidents do not happen on your vessels? List all the safeguards in place.
- Are these safeguards well documented in the vessels cargo operational manual?
- Are these safeguards part of the tank washing checklist and procedures?
- Do you have an item in the shipboard familiarisation checklist to ensure all new joiners are familiar with such critical safeguards?
- What could have been the consequences if the cargo had NOT been compatible with seawater? Name these cargoes with relevance to your trade.
- How can you identify all of the valves related to cargo operations?

TO

A question of competence and reducing paperwork

At Tanker Operator's 6th Athens conference, the day was split between 'Focusing in on People' and 'Improving Environmental Tanker Performance'.

In this brief roundup, we highlighted two papers.

Panos Kourkountis, Andriaki Shipping's technical director, spoke about 'Competence in Competition'.

He explained that many years ago, there was just a Captain, his or her ship and the crew.

Then the concept of 'competence' came on the scene. This has resulted in crew members having around a dozen certificates, including the cooks.

One of the problems is that some country administrations still do not accept another administration's certificates, although the IMO is trying to regulate this situation.

Certificates are not enough, Kourkountis asserted. We now have safe manning documents issued by flag states based on vessel size, type and trading pattern. This defines the number of crew and the officer qualifications needed.

In an IMO circular A890(21) issued in November, 1999, shipowners may suggest their own management levels, which should be justified by the ship's trading pattern, area of operation, hours of work, etc.

Manning scales and certification are also covered in STCW 1978, amended in 1995 and we have the ISM Code and SOLAS, which is inter-related taking into account crew training and skills in certain areas. OPA 90 covers manning and management of the vessel from both ashore and on board.

In addition, TMSA covers recruitment and management of both shore and shipboard personnel and then the oil majors have had their own officer matrix requirements for almost 10 years. However, there are huge differences of opinions among the oil majors as to their requirements for the officers serving on board the ships being chartered.

There are also specific charterers and terminal operators requirements to consider.

"Do we need all this?" he asked. There has been a lot of progress on safety, however, more than half of the major claims recorded by the UK P&I Club were put down to the human element.

He pointed out that by the end of this year, we should see a 'Competence Management System' developed jointly by Intertanko and OCIMF to replace the Tanker Officers Training Standards (TOTS).

The key aspects are :

- Each officer is individually assessed.
- Those undertaking the assessment must be appropriately trained and assessed for their ability to assess.
- Those verifying must be appropriately trained and, depending on the setup, assessed for their ability to verify.
- The system must be open to auditing or verification.

The competencies include - navigation, mooring, cargo operations and engineering, while incorporation and auditing will take in the assessors and verifiers. The organisational levels will involve - management, operations and support.

The competency framework consists of six competency domains -Teamwork, Communication & Influencing, Situation awareness, Decision making, Results focus and Leadership & Managerial skills. These domains has been defined, with competency elements identified for each.

As for shore staff competence, this was questioned only recently. A company needs to define the personnel qualifications for a specific position. Often people with completely different backgrounds, education and working experience (ex seafarers and university graduates) compete for the same position. "Who is really Competent?" Kourkountis asked.

There are no office safe manning requirements. Between companies there is a large office personnel variation per ship.

Panos Kourkountis.

TMSA and oil major requirements are not always very specific, leaving room for different interpretations. For instance: Top Ranking Personnel should visit the ships periodically. However there are different perceptions on what is a 'Top Ranking' position.

As for crew remuneration, he said that there is only around a 10% difference between companies on average, but for shoreside employees, there can be as much as 100% difference in salaries paid.

The provision of employee benefits is not a common policy in shipping. For example, no more than half of the companies currently offer private pension plans and/or private medical schemes, according to survey conducted by Hewitt 'Shipping Industry Total Compensation survey Greece'.

Training costs have to be taken into account. He said; "In our experience, the training cost of the crew is about $15,000 per ship per year. However, office staff in all positions, the average training cost is about $500 per person per year."

As for Andriaki Shipping, Kourkountis

Theofanis Theophanous.

explained that the company employs Greek officers and Philippine crew. Most of the officers join the company as cadets and remain with Andriaki climbing to the top ranks and remaining until retirement. Presently 71% of the Masters have been with company since cadets, he claimed. The officer retention rate is 97% (2016).

The fleet is in full compliance with the Officer Matrix requirements. For compliance with these requirements, such as 'minimum years in position', promoted officers may join the ship as a super numeral.

Around 82% of the key personnel are developed internally. The retention rate of office staff is 92% and key personnel is 95%. Participation in committees, associations and forums is encouraged.

Kourkountis estimated that the total cost of certification and training for a cadet to become a Master - as per Matrix requirements - is almost $100,000.

He stressed that the basic aspect of competence is skill. "Are certification, experience and evaluations the only proper means to identify the successful employee? Our goal is to develop, attract or poach talent," he said.

Likening it to a successful football team, he said to improve the team, targets should be identified. "The expectations, the competition and the final goal should be clearly defined," he said. "Evaluate which talent is needed. Start by identifying, which talent is needed for a specific position and what the required skills are. Find the right people. Identify who in the team (company) is able to take on the role or search the market for the right individual.

"Create tests. An actual trial period is the best way for the correct evaluation (do not immediately put in the first team). Find more than one right person, as back up personnel should always be available for every position and they must be equally as good. Do not lose time trying to fit the wrong person into the team," he said.

Undertake continuous evaluation, fight complacency and fill the identified gaps immediately. The corrective actions (in addition to training, discipline, etc) should be done as soon as possible. A weak link could be catastrophic, he warned.

Creating the support is also important. Prepare the infrastructure to offer the best training, learning and assistance to specific needs. Make clear just how important every individual/role is. Be proactive and be close to the academies (or create your own) to spot and recruit the talents you need in the future.

"The compensation and rewards should be good. Have a competitive compensation and rewards strategy and evaluate it often. Market the company by promoting achievements and creating a name. The employees must be proud of their job and the company they work for, " he concluded.

Reducing paperwork

Bernhard Schulte Shipmanagement (BSM) Hellas' managing director, Theophanis Theophanous, gave an overview of the company's 'Project Pilot', an initiative aimed at reducing paperwork.

He explained that BSM managed their vessels by using around 200 checklists, used for safety, navigation, etc. "Although we operate a robust safety regime, accidents will happen," he said.

"There are so many procedures that a Master spends more time in his office at sea," he said. "Administration had to be minimised."

BSM quickly discovered that part of the problem was how the manuals were written. It was found that the current manuals/procedures were too complex resulting in their focus being lost and so the company set out to make them easier to follow for the different disciplines on board ship.

However, he explained that there was a lot more to the exercise than just cutting their length, as the company had to ensure that the core critical procedures were not overlooked and indeed highlighted and magnified.

Airline checklists were studied and an SAS pilot employed to identify the safety critical procedures, among others. Three former Masters or Chief Engineers per team, depending on the shipboard manual/procedure discipline, were tasked with identifying how they could be re-written in clear, concise, easy to use English, which could be better understood and read more quickly. Out of 1,700 employees ashore, BSM manages a fleet of 600 ships using 36 teams.

As a result of the 'Project Pilot' exercise, a BSM marine manual was reduced from around 45,000 to about 19,000 words and produced in a smaller A5, spiral bound format, making it easier to use. "Procedural manuscripts must be carefully designed by the authors taking great care not to make the text too difficult to understand or unnecessarily complex to be interpreted by the user," Theophanous explained. "Text that is written in a complicated manner by the authors will consequently be equally more demanding to comprehend by the end user. To obtain better compliance, the text must therefore be written in a more user friendly and understandable manner by the manuscript writers and editors."

He also stressed that 'friendly' procedures improve compliance.

He gave an example of a manual that contained 3,031 words and was found to be 51% passive. Following the editing process, it was whittled down to just 501 words and was described as 100% active.

As an example, Theophanous said that a bridge team member could refresh his or her procedures and tick off the checklists with a marker pen, which can easily be erased from the page ready for the next person to use.

"A human being makes mistakes, but checklists are too complex and there is no standard in place," he stressed.

The manuals have been produced using a colour code with the same format for each procedure. Each procedure, which needs an action and a result marked.

He explained that all of the manuals should be finished by the end of this year and the whole project will have taken four years, once completed.

At the same time, new fully integrated software was developed, which can be analysed on screen giving up to date results on operating costs, financials and the real time crew retention rate, plus other tasks. "This will enable less people to run more ships with greater efficiency," he said.

Records can be analysed immediately, thus receiving an answer almost in real time. This makes decision making much easier and the system is also transparent, he explained.

There were administration challenges attached to designing the software, but the advantages were that the workflow was streamlined, faster, more clarity, organisation, environmental improvements and cost savings to be made. TO

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about meeting oil major requirements (TMSA / vetting)

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