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On-line Edition

The Royal Institution of Naval Architects is proud to announce that as of January this year, *Shiprepair and Conversion Technology* journal has gone digital. We are very pleased to inform the maritime industry that each issue will be published online, on the RINA website. Visit www.rina.org.uk/srct and click on the issue cover you wish to view. This means that the entire publication, including all editorials and advertisements in the printed edition, can be seen in digital format and viewed by members, subscribers, and (for a limited time) any other interested individuals worldwide.

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Shifting sands wait for no man

Old Father Time meets the removable object

Apart from mixing metaphors the headline grab at the idea that time waits for no man and that evolution is implicit in all we do is perhaps an apt thought as we head for the airports and take our seats on the flights to Oslo.

In 2009 Schiff & Hafen wrote: "Facing a cyclical downturn, growing concerns about the marine environment and new security threats, the global shipping industry faces significant challenges. But with record numbers of exhibitors scheduled to attend, Nor-Shipping 2009 is shaping up to be one of the most important industry exhibitions of the year."

Inadvertently Nor-Shipping's own website offers us an unexpected insight as to how the maritime world may be shaping up, for even in the midst of one of the world's worst economic crises numbers at the Oslo event increased. This year as the world apparently enters an economic spring we might expect that Nor-Shipping would be bigger. Figures show, however, that growth during the peak of the crisis was stronger than today as the world emerges from its cyclical slumber.

In 2009 the exhibition space increased around 16% over the previous show, while event delegates increased nearly 10% from 31,000 to 34,000 in 2009. This year expectations of growth are far more modest, with exhibition space expected to grow by little more than 2.5% and about 500 more delegates expected, little more than 1.5%.

Compare this to Marintec, China's showpiece maritime event due to take place later this year. Already nearly 50% bigger in area, at 50,000m2 and with more than 42,600 visitors in 2009, growth then was about 20% from a higher base. Growth this year is expected to be around the 10% mark, but projections are hard to come by, though one could imagine that Marintec will easily surpass the growth expected at Norshipping.

Taking a dig at Nor-Shipping is not the point here, neither is making the point that the focus for shipping is moving east, we already knew that, one needs only to look at the growth in shipyards and compare that with the relative decline in Europe and America, the so-called mature economies.

Rather the point to consider is whether the international economic crisis has changed anything? Do Nor-Shipping's attendance figures show a slowdown in the maritime economy of Europe or even one of shipping's great nations? It is difficult to make such projections from events such as Nor-Shipping and Marintec which, although they remain key events in the maritime calendar, must be seen as peripheral to the actual business of shipping and shipbuilding.

Nevertheless, shipping has evolved through the ages from the time of the Egyptians and the Ancient Greeks to Thor Heyerdahl and John Fredericksen. China's great maritime past has also formed the basis on which it is now evolving into a leading maritime power. Evolution in shipping can be traced through the evolution in economics and so while world development was slow from 2000BC through to the 19th century thereafter trade and production began to build at a gathering pace due to the Industrial Revolution. That led the US and Europe to develop as modern shipbuilding nations. Following the great Depression and the Second World War shipbuilding again became a European and US domain.

It was not until 20 years after the war that Japan emerged to challenge the US/European shipbuilding hegemony. Fast forward another 20 years and South Korea has picked up the mantel and another 20 years has seen China challenge Korean shipbuilding dominance.

During these periods there have been at least two oil crises, an Asian currency crisis, several global downturns and now the great 21st century banking crisis. Each time a crisis occurs there is a small but discernable shift from the old to a new reality.

Maritime banking has been making a move eastwards for some time and the banking crisis in Europe and the US has accelerated that shift. Ship ownership meanwhile has evolved, with the Greeks, Danes and Norwegians joined by the Japanese, Koreans and Chinese in the modern era. Effectively these companies operate outside national boundaries, so while Greek owners are considered as such through their nationalities their companies, like many in other industries, have become international players that seek finance from a range of institutions in a number of regions.

Globalisation of the maritime industry since containerisation is an evolution and as we head for Norway to meet and greet the industry's finest minds we can expect the withering of the old guard and we can see the new develop into full bloom. The questions then become, what's the next crisis going to bring, will Chinese hegemony last and who will benefit from any changes?

One could say a new broom speaks louder than words…but I'd be mixing my metaphors again. *NA*

Engines

First Tier III engine unveiled

Denmark-based MAN Diesel & Turbo unveiled what it claims is the world's first International Maritime Organization (IMO) Tier-III-compliant, two-stroke marine engine. Built in Japan the MAN B&W 6S46MC-C8 engine with integrated selective catalytic reduction (SCR) fulfils the IMO's strictest emission standards to date. Tier III regulations are set to be enforced from 2016.

The engine capable of an output of almost 7MW was constructed in the autumn of 2010 by Hitachi Zosen Corporation at its Ariake works in southern Japan. The unit will be fitted to a general cargo carrier, under construction at the Nakai shipyard and scheduled to enter service later this year. The vessel was ordered by BOT Lease Co. Ltd., and will be operated by Nissho Shipping Co. Ltd.

MAN Diesel sent a team to commission the engine-control system – the first in a series of planned visits - to Japan for the first engine-start up which occurred in January. The team also optimised the integration of the SCR system that removes NOx from the engine's exhaust gas. The SCR system features:

- more than 80% NOx reduction based on the load cycle
- more than 70% NOx reduction on each load point in the load cycle
- easy switching between on/off modes for optimal emission performance on high seas and coastal waters.

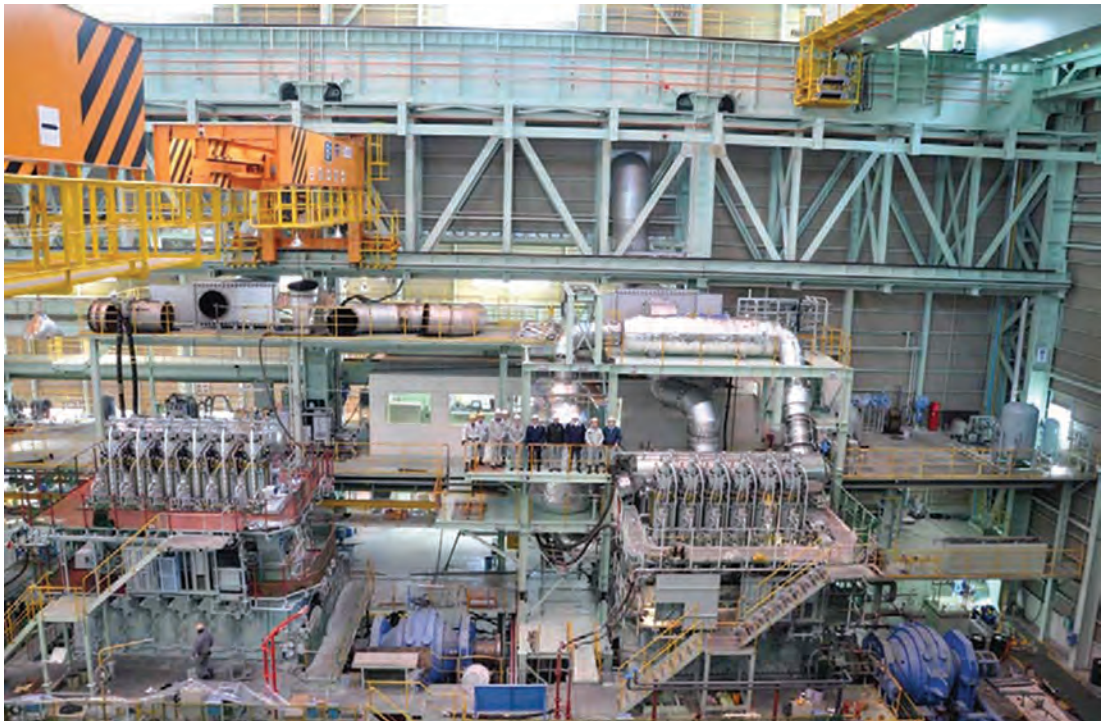
When bringing two-stroke engine performance up to Tier-III standards, MAN Diesel & Turbo considered both SCR and EGR (Exhaust Gas Recirculation) techniques. Based on a general evaluation of its two-stroke engines a high-pressure, urea-based, SCR configuration was chosen by MAN B&W.

Søren Jensen – Vice President Research & Development, Marine Low-Speed MAN Diesel & Turbo – said: "We haven't just provided an engine and added an SCR system to it. On the contrary, we have delivered a bespoke system."

Mr Jensen added: "In the future, MAN Diesel & Turbo wants not only to develop engines but also to design engines with complete, emission-reduction systems. To that end, we envisage collaborating with many other partners in times to come in the same successful fashion as we have seen in Japan."

To achieve the desired, higher exhaust-gas temperature and maximise NOx removal, the different elements of the emissions package are laid out in series, with the SCR system placed before the turbocharger. MAN Diesel & Turbo's engine-control system has a number of different ways to ensure that the exhaust-gas temperature is at its optimum level.

The world's first Tier-III-compliant, two-stroke engine – a MAN B&W 6S46MC-C8 type – pictured at Hitachi's Ariake works in southern Japan



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In recent years the industry has been through a commercially unprecedented period and been subject to major regulatory change. Both commercial and regulatory influences have presented many technical challenges and many more lay ahead.

Operators are looking to future-proof their new designs for potential new technologies, but this later benefit must be traded against initial cost outlay. The level of automation on board is also an area of development, how much should the crew be directly responsible for? Concern for the security of the ship, its crew and cargo is also now becoming a major design driver. Environmental regulation is also moving forward with the revision to MARPOL Annex VI placing further restrictions on emissions of NOx and SOx. The development of the IMO Energy Efficiency Design Index is aimed at stimulating technical innovation in propulsive efficiency as the industry strives to reduce its CO2 emissions.

RINA invites papers from designers, operators, class societies, suppliers and builders on all aspects of tanker design and operation including:

- Cargo Handling
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Newbuildings

WW launches new generation ro-ro

Mitsubishi Heavy Industries delivered the first of the latest generation ro-ro vessels to the Swedish/Norwegian joint venture Wallenius Wilhelmsen (WW) with a second vessel of the same Mark V class expected to be delivered in August. Two more sisterships are expected in 2012.

At 265m long *MV Tønsberg* is the largest ship of its kind with a cargo volume of 138,000m3 over six fixed and three hoistable decks.

The vessel's cargo hold is arranged so that high and heavy cargo such as excavators, bulldozers, wheel loaders and combine harvesters can be handled. Moreover, the 12m wide stern ramp with a safe working load of 505 tonnes allows the ship to load larger units than other vessels of this type. The clear height of the main deck, 7.1 metres, is also unprecedented for this kind of vessel.

Additionally cargo can be loaded on the weather deck, which has a ramp from the deck below. Three decks can be hoisted by electric winches to provide maximum flexibility and utilisation.

The Mark V type ships will use 15 to 20% less fuel per transported unit than its predecessors, thanks to an optimised hull form and a number of energy saving features such as the streamlined rudder design and duck tail. In the engine room an advanced turbo generator produces electricity from the waste exhaust heat.

An Unitor water ballast water treatment system will prevent the transfer of micro-organisms from one region of the sea to another. And all fuel oil tanks are protected to minimise the risk of leakage in case of grounding or collision.

MV Tønsberg will operate in WW's round-the-world service. The ship is a "welcome addition" to the WW fleet said Arild Iversen, president and CEO of Wallenius Wilhelmsen Logistics, "allowing us to carry larger cargo, and more of it, with reduced environmental impacts," he added.

Newbuildings

Graig adds to China newbuilds

Ten 76,000dwt bulk carriers to be built at Jiangsu Rong Sheng Heavy Industries Co Ltd have been added to 13 ships already being built under the supervision of Graig Group's Shanghai office.

The ten ships are scheduled to be delivered by the

The new Mark V class is the largest and most sophisticated ro-ro ship ever built. The first vessel in a series of four ships *MV Tønsberg*, went into operation last month. (Photo: Wilh. Wilhelmsen).

first quarter of 2012. Part of the UK's Graig group the Shanghai office will supervise the building of the ships for the Minsheng Financial Leasing Co Ltd. Graig is already supervising the building of another eight vessels for the same owner at the same yard.

Graig China is also supervising the construction of four 45,000dwt bulkers for Shanghai Xiang An Electric Power Shipping Co being built at Chengxi Shipyard and the79,600dwt bulk-carrier *King Peace*, building at China's Wu Jai Zui Shipyard for Shanghai-based Zhong An Shipping.

In addition to the 23 ships now under supervision for Chinese owners, Graig China is currently supervising around 50 vessels on behalf of 10 owners.

LNG

GTT improve BOG rates

The designer for membrane containment systems, Gaztransport & Technigaz (GTT) said it has improved the boil off gas (BOG) rates for both its systems, the MKIII and NO96.

GTT chairman and CEO Philippe Bertorottiere said that the BOG will vaporise at the lower rate of 0.1% as compared to 0.15% as a result of the new insulation, glass wool or foam that the company is introducing.

"Thicker stronger foam will increase the strength and decrease the BOG levels, this development is particularly interesting for dual fuel systems," said Mr Bertorottiere.

A new generation of insulation has been tested, with final testing completed the intermediate conclusions were presented the day after Gastech Conference in Amsterdam in March.

A new version of NO96 insulation boxes has also been developed: they will be further reinforced in order to improve resistance to sloshing in challenging environments. The new characteristics include thicker internal secondary box bulkheads, and a thicker cover of the primary box. Boil-off characteristics will then be optimised by the use of alternative insulating material such as glass wool, PVC foam or low density PU foam.

For offshore specific applications, GTT has introduced new methodologies such as a Distributed Temperature Sensing Measurement system which combines a real time temperature reading with pre-localisation of eventual defects on the primary membrane. This will make the scheduling of maintenance operations easier and it will lower the down time for concerned tanks.

Other techniques such as the Thermographic Analysis of Membrane Integrity (TAMI) and support systems such as the Sloshing Monitoring and Prediction System (SPMS) were also presented.

Classification

Ueda pleased with IACS progress

Current International Association of Classification Societies (IACS) chairman and ClassNK Chairman and President Noboru Ueda has reviewed his term of office at the association, he will become the second vice chairman in July.

He told *The Naval Architect* that he felt he had achieved three major milestones during his one year tenure as IACS chairman; the further development of the common structural rules; bringing the full support of the maritime industry behind IACS and the association now has far more transparency, he said.

In addition Mr Ueda pointed to the IACS meeting in December 2010 with leading industry figures where the group created a working group that would look to solve issues around greenhouse gas emissions including developments such as EEDI (Energy efficiency design Index).

Mr Ueda said: "Issues with the European Union were the biggest challenge, but now we can concentrate on technical matters."

Meanwhile ClassNK has appointed Dr Abdul Rahim to the role of Regional Manager in charge of European and African operations. Dr Rahim will replace Tetsuya Kinoshita who will return to Japan as the classification society's general manager of the planning department.

ClassNK Chairman and President Noboru Ueda said that IACS must now concentrate on technical issues.

Bridge & communication systems

Navico launches ARGUS

Navico has launched its Simrad ARGUS Radar System, a new International Maritime Organization (IMO) approved Radar incorporating solid state frequency modulating continuous wave (FMCW) Broadband RadarsTM for use on commercial vessels.

The Simrad ARGUS Radar series has been designed for anti-piracy, anti-collision by giving better vision around the vessel by tightening the vessels blind spots. The radar allows for better navigation and for precision docking for larger vessels.

The radar system can detect targets as close as 6ft from the antenna on the shortest scale and can separate targets that are 30ft apart in range on the scales used for navigation.

"Dubbed the anti-piracy radar it is compact and robust and easy to install at strategic locations on the vessel", explained Mr Ryder.

The radar has the ability to merge two radars together, giving better coverage of surroundings. The radar system also allows for three cameras to be fitted onto them, which are all controllable.

The difference of the Argus radar is that is sends a continuous wave and not a pulse. The radar also requires no servicing, claims Navico due to its lack of mechanical parts.

The introduction of ARGUS also marks Navico's strategic breakthrough for its Simrad brand into the SOLAS vessel segment and a prospective ship protection market with an estimated value of up to £12 billion.

Contact Navico GmbH office DK, Baldersbuen 53, DK-2640 Hedehusene, Denmark.
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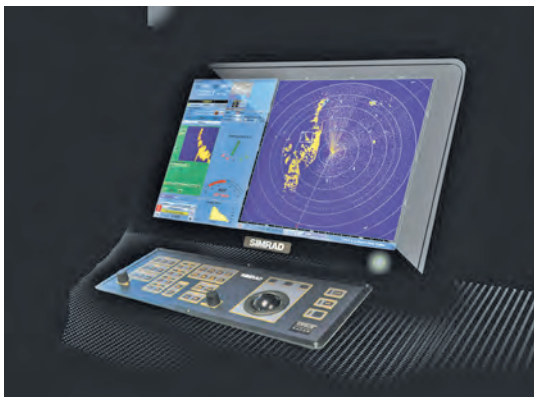
Fax +45 43444899
www.navico.com

Navico launches it latest radar system to aid anti-piracy, anti-collision, and give precision docking.



Ancillary equipment

PEMA delivers first robot

PEMA has delivered a portal-type, machine-vision aided robot heavy welding station for the Chinese Jiangsu Rainbow Heavy Industries Co., Ltd. The station will be used in the welding of tack-welded end and side-plates of MacGregor hatch covers for cargo ships.

The scope of the delivery is a complete PEMA VRWP-5500/1 Vision Robot welding portal including a Yaskawa-Motoman MH6 welding robot with a DX100 controller and a Lincoln Electric PowerWave 455M MAG welding power source. The VRWP portal consists of a sturdy robot welding gantry with three external robot axis, six axis welding robot and the patented Vision System robot programming. The delivery also includes a PEMA fume extraction system, PEMA rails and gear racks, required welding programs, and an installation, start-up, training and service package.

Pema delivers its first machine-vision heavy robot welding station to China.

"We consider this a major breakthrough in our effort on the Chinese heavy metal industry market", said Jukka Rantala of PEMA. "Improvements in cost-effectiveness usually call for more automation. With its high arc time and utility ratios, our user-friendly PEMA VRWP robot portals can significantly raise the productivity in steel structure manufacturing."

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Ancillary equipment

Cargotec receives order

Cargotec has secured orders worth more than €20 million for MacGregor cranes and hatch covers for general cargo ships, together with hatch cover design and key components.

The equipment will be delivered for eight general cargo vessels to be built at Zhejiang Ouhua Shipbuilding Co. Ltd., China for the China Navigation Company Pte Ltd ("CNCo"). The ships will be delivered in 2013. The order includes an option for equipment for a further eight ships.

Each of the 31,000dwt general cargo vessels will be equipped with four fully electrically driven cargo handling cranes with a SWL of 60tonnes for hook operation and a SWL of 37tonnes for grab operation. The hatch cover system is based on special customer requirements and comprises of a combination of hatch covers maximising the ship's cargo space and thus demonstrates Cargotec's cargo system design expertise.

The vessels are rated to carry 208TEU (147 refrigerated), but are also designed to carry general cargo, steel, project cargo, agricultural products and dry bulk cargoes.

"The crane and hatch cover outfits are an integral part of the cargo access and handling ability of the vessels, and the MacGregor cargo handling solution offers an efficient and reliable system for the shipowner," says Per-Erik Nilsson, Cargotec sales and marketing director. "Furthermore, our fully electrically driven cranes are environmentally friendly".

Contact Cargotec Corporation, P.O. Box 61, FI-00501 Helsinki, Finland.
Tel +358 20 777 4000
Fax +358 20 777 4037
www.cargotec.com

Communications

Sailor 6248 sets sail

Radio Holland has announced the launch of the Sailor RT-6248 VHF the successor to the Sailor RT-2048.

The Sailor 6248 VHF will include all the well-known, reliable features of the RT-2048, and more. This non-class VHF is based upon the new Sailor 6222 VHF DSC Class A. Amongst others, the Sailor 6248 will include both the Sailor Replay function and the LAN option for ThraneLINK, a uniform communication protocol that connects all Sailor equipment in a network. The Sailor 6248 will be a solid, innovative replacement for the highly regarded Sailor RT-2048 VHF.

The Sailor RT-2048 will be supported by Radio Holland for another six years, which means that spare parts will be available and repairs can be offered until April 2017.

Contact Radio Holland Netherlands, Eekhoutstraat 2, 3087 AB Rotterdam, The Netherlands.
Tel +31 10 4283344
Fax +31 10 4281498
www.radioholland.nl

CAD/CAM

HHI invests in Aveva solutions

UK-based Aveva has announced a significant new contract with Hyundai Heavy Industries (HHI), further increasing its investment in Aveva solutions.

HHI has fully utilised Aveva solutions since 1988. It has based its engineering and design on AVEVA solutions for the production of its commercial, offshore and special ships. With increasing offshore projects, Hyundai Heavy Industries (HHI) is further expanding its usage of Aveva's 3D design.

"We have a strong working relationship with Aveva, as demonstrated with our past strategic partnerships. Aveva has helped us to continue to achieve technological innovation and become a global leader," said H.Y Kim, general manager at HHI.

"Our relationship with HHI is an example of Aveva's commitment and contribution to the Korean market. HHI has benefited from higher design efficiency and improved project quality when using Aveva solutions," added Peter Finch, president, Asia Pacific at Aveva.

HHI has recently announced the launch of state-of-the-art drill ship 'Deepwater Champion' and a recent order for the world's largest heavy-lift vessel. Aveva solutions were used in the design of 'Deepwater Champion' and will play a major role in the new heavy-lift vessel project.

Contact AVEVA Solutions Ltd, High Cross, Madingley Rd, Cambridge, CB3 0HB, UK.
Tel +44 1223 556655
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Ancillary equipment

ESAB expands MMA electrode range

ESAB has recently announced that is has expanded its range of MMA electrodes which includes industry

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The MMA range covers almost all alloy types from mild steels, through low alloys (high toughness, high strength and high temperature types) to stainless steels, nickel based alloys, repair and maintenance products.

The products are available in packaging suitable to the applications. The smaller diameter electrodes are packed in small inner boxes in an over wrapped carton. The large diameters are supplied either three or four packets in a carton so the inner pack unit relates to sensible quantities that are open at any one time.

This easy-to-use philosophy has been carried through into VacPac products where the electrodes are sealed into an evacuated pack immediately after baking at manufacture. This means the fabricator can use the product direct from his stores without having to go through long and expensive controlled re-baking procedures. This should allow the contents of the pack to be used in a shift.

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Bridge & Communication systems

Comar CSD-300 homes in on target

Comar Systems have announced the launch of their new CSD-300 display. Specifically designed for vessels that require AIS data as primary information, the unit is perfect for managing, sorting and displaying all AIS targets and for locating specific vessels by name or by MMSI number or category.

The unit is supplied in two variants, either as a standalone display for connection to an existing AIS transponder or receiver onboard, or as the CSD-300R which has an integral AIS receiver.

To control the numerous functions available on the CSD-300, the unit has a simple menu structure with clear instructions at every step. The unit can track up to five selected targets, displaying track histories, plus live detailed information on any one vessel. Variable parameters for CPA and TCPA can be set and modified according to user requirements and the unit has a powerful internal audible alarm. Data is displayed on a 6.5" high resolution display overlaid onto worldwide background cartography or as a "radar" style display with range rings. For more detailed cartography, the unit has a slot for a Jeppesen C-MAP C card.

Additional features include listing AIS targets in a tabular format, sorting by range, MMSI, name and even vessel category and there is a "GOTO" feature to take you directly to the vessel on the chart and to immediately access all the data related to this vessel. You can filter targets by transmission type (Class A, B, ATON etc.,) and of course there are full zoom, pan, contrast and dimming functions.

The unit is trunnion mounted and comes complete with mounting bracket. It is suitable for installing on vessels with 12vDC or 24vDC supplies.

Contact Comar Systems Ltd, Medina Court, Arctic Road, Cowes, Isle of Wight, PO31 7XD, UK
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Comar launches CSD 300.

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LNG's comfort blanket

Sloshing remains an issue for the liquefied natural gas (LNG) industry according to ABS, but South Korean shipbuilder Samsung has come up with an idea that it says will dampen the movement of liquid cargo and reduce the sloshing loads on cargo tanks. Samsung unveiled its ABAS Blanket at the March Gastech conference.

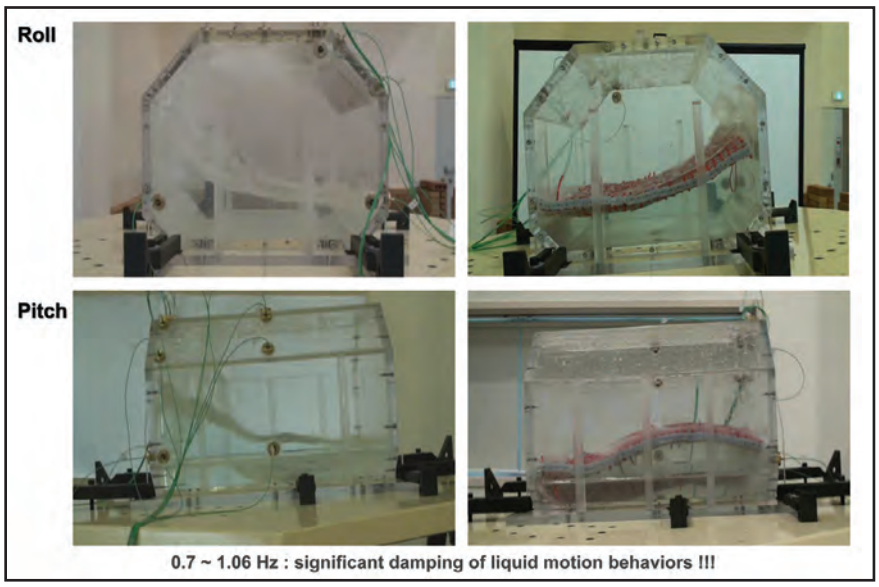
A cheap and effective solution to the sloshing conundrum was unveiled by Samsung Shipyard at the Gastech Conference. The Anti BOG (boil-off gas) Anti-Slosh (ABAS) Blanket dampens the movement of LNG cargo in the tanks significantly reducing the sloshing loads and thereby any tank damage.

Tests of the blanket have been undertaken and Samsung Heavy Industries' principal engineer Sangeon Chun is confident that the system will end the difficulties caused by sloshing in LNG cargo tanks.

Similar concepts have been used to dampen the movement of fuel in a number of vehicles, including space rockets, the Airbus A330 airliner and a number of truck designs and the concept has proved successful, said Mr Chun. The initial concept and project start for the marine version was in 2008 and BASF joined the project team a year later.

Designed by German chemical company BASF the patented Basotect material is an open cell foam made from melamine resin, explained Bernhard Vath, BASF's head of global new business development. The material has a low weight with low temperature flexibility married with constant physical properties over a wide range of temperatures. The Basotect is cut into 1m cubes and, with a hollow aluminium float in the centre of each cube and the cubes that form the blanket are then held together using U-bolts.

The ABAS blanket is extremely lightweight and porous, soaking up the LNG like a sponge the aluminium floats keep the blanket afloat, but the weight of the blanket dampens any sloshing movement. The aluminium buoys have shown signs of cracking due to the low temperature of the LNG cargo and Mr Chun explained that Samsung is looking at an alternative float for the ABAS Blanket.



Tests on the regular motions of cargo with and without the ABAS Blanket.

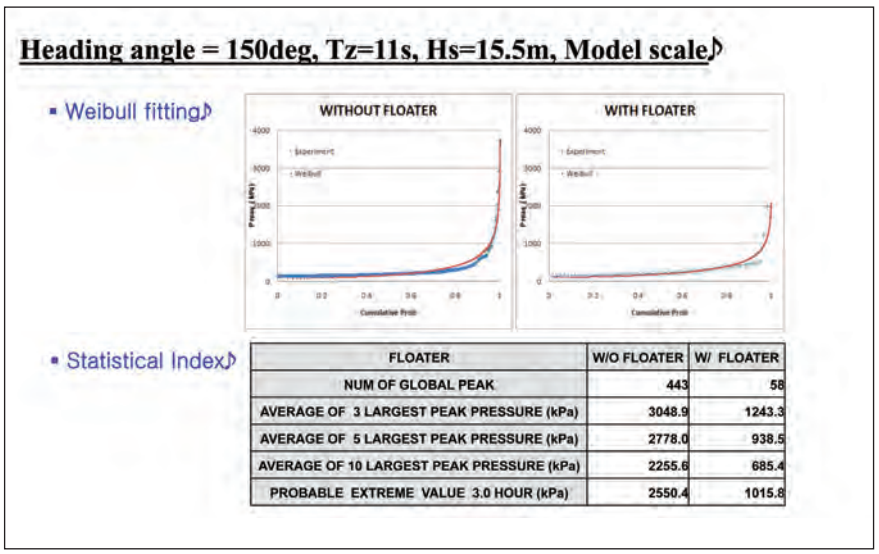
"As sloshing is reduced there is less friction and this means there is less LNG vaporisation, this means a reduction in boil-off gas," explained Mr Chun, though he conceded that "this has not yet been proved".

Samsung have conducted sloshing tests that include regular and irregular sloshing motion with tanks filled to 30%, 70% and 95% of tank height for the regular motion tests and 30% and 95% for the irregular motion tests. In regular motion tests that included surge, sway, pitch and roll the blanket showed significant improvement in the sloshing loads.

Further tests on irregular motions with three heading angles, head seas (180°), quarter (150°) and beam (90°) with test tanks at 30% full were also encouraging, showing a marked improvement with the blanket.

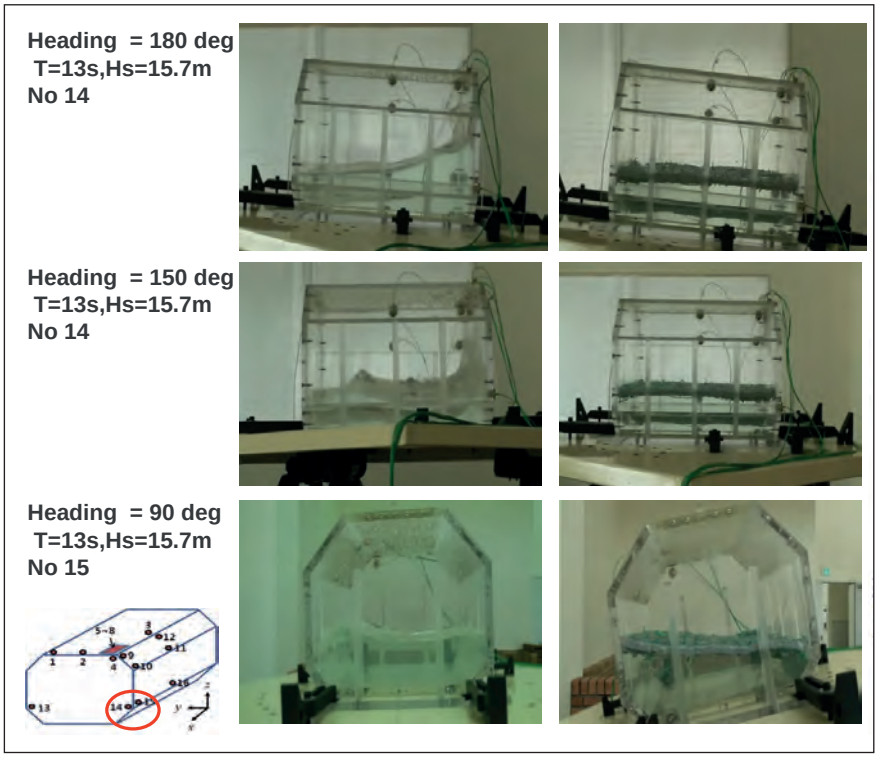
Tests for irregular motions with tanks at 95% full also showed significant improvement in sloshing loads with the ABAS Blanket. Mr Chun believes that the positive effect of the ABAS Blanket on sloshing has been shown and that now more extensive tests on full size tanks must take place.

There are other advantages claimed by Samsung for its ABAS Blanket, including the belief that LNG cargo holds that are fitted with the ABAS Blanket will be able to remove the filling limits that have been imposed as a result of sloshing damage to LNG tankers. However, one criticism aimed at the blanket is that it would use valuable



FLOATER	W/O FLOATER	W/ FLOATER
NUM OF GLOBAL PEAK	443	58
AVERAGE OF 3 LARGEST PEAK PRESSURE (kPa)	3048.9	1243.3
AVERAGE OF 5 LARGEST PEAK PRESSURE (kPa)	2778.0	938.5
AVERAGE OF 10 LARGEST PEAK PRESSURE (kPa)	2255.6	685.4
PROBABLE EXTREME VALUE 3.0 HOUR (kPa)	2550.4	1015.8

Irregular motion tests carried out at 30% filling levels at 180° head seas showing a significant dampening of sloshing movement.



Irregular motion tests carried out at 30% filling levels with three different angles of incidence showing a significant dampening of sloshing movement.

space that could be used for cargo. This is countered by Mr Chun who says that with floating production storage and offloading (FPSO) platforms where loading limits can not be exercised the difficulties were solved through what became known as the 'two-row system' where a central bulkhead split the cargo tanks in half and reduced the sloshing loads as well as offering structural support to the deck.

FPSO platforms are more susceptible to sloshing as they cannot operate with loading limits so the so-called 'two-row' system would effectively reduce sloshing loads.

However, Mr Chun believes that this is an expensive solution for smaller FLNG vessels where an ABAS Blanket would be cheaper. He did concede that larger FPSO's would still require the extra steel bulkhead to support the deck, though he also pointed out that tanks could be designed longer and this would still give the carriers all the advantages of the blanket system.

LNG tankers could also do away with the distinctive chamfered sides at the top of each tank which are designed to reduce sloshing loads. By straightening the tank sides the tank capacity is significantly increased, but the blanket would still dampen the sloshing motion of the cargo.

One industry observer, who wanted to remain anonymous, was dubious about the effectiveness of the ABAS Blanket. He was concerned that when the tank was emptied for inspection the blanket would trap LNG underneath it creating a hazard for those entering the tanks to inspect them. Mr Chun rejected this criticism saying that LNG must be stored at temperatures of -163°C and as temperatures in the tank rise the gas would evaporate. In addition the Basotect material is extremely porous and nearly all its weight would be composed of the LNG any residual gas could not be trapped beneath the blanket.

Another criticism of the system was that the blanket could damage the inner tank structure, but this was dismissed as unlikely by Mr Chun given the softness of the Basotect material. He said that it was far more likely that the blanket would damaged by the movement of the cargo and that this would mean protective material would be needed at the edge of the blanket to prevent fraying.

Furthermore, in response to another criticism, Mr Chun pointed out that the blanket was made from an extremely lightweight material that would mean it was easy to move around the tank when it was empty to inspect the tank floor.

Liquid movement in the cargo tanks of large LNG carriers has caused a headache for containment system designers on and off for the last 35 or more years. Just when the industry believed it had cured the problem,

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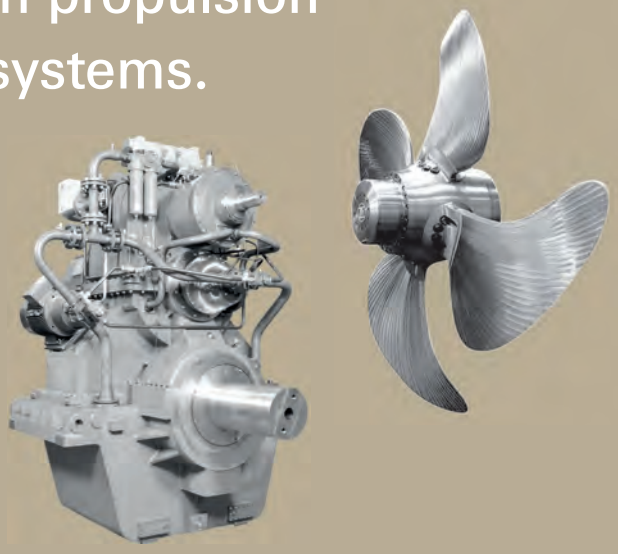

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Driveline and Chassis Technology

in the 1970's and 1980's, along came another ship with sloshing damage. In 2006 *Catalunya Spirit* was found to have indentations in its membrane containment system. *Catalunya Spirit* is fitted with Gaztransport & Technigaz's (GTT) NO96 containment system, but since this period more sloshing damage to GTT's other membrane system, the MKIII, has also been found.

GTT, currently still the world's only supplier of the membrane type containment systems for which sloshing is the major problem, believes that it has made major advances in dealing with the difficulties created by the sloshing movement in tanks.

A recent announcement by GTT outlined new filling limitations for LNG carriers with the company saying that the new low level limitations, of 2.75m for the MKIII and 10% of the tank height for the NO96 membrane systems, means that "the sloshing issue is now solved," according to GTT chairman and CEO Philippe Bertorottiere.

This is not a view shared by some in the industry, with one classification society. Senior staff consultant Yung Shin of ABS has taken the opposite position telling *The Naval Architect* that "the sloshing issue has not been solved". He further qualified this by saying that while high filling sloshing has been solved through the filling limits, namely not below 70% and no higher than 95%, low filling sloshing "is new" and remains a problem.

The classification society believes that the ABAS Blanket is "a great way to reduce sloshing loads" and the society has approved the design in principle, "the concept seems to work, but the detail needs to be worked out", said Mr Shin.

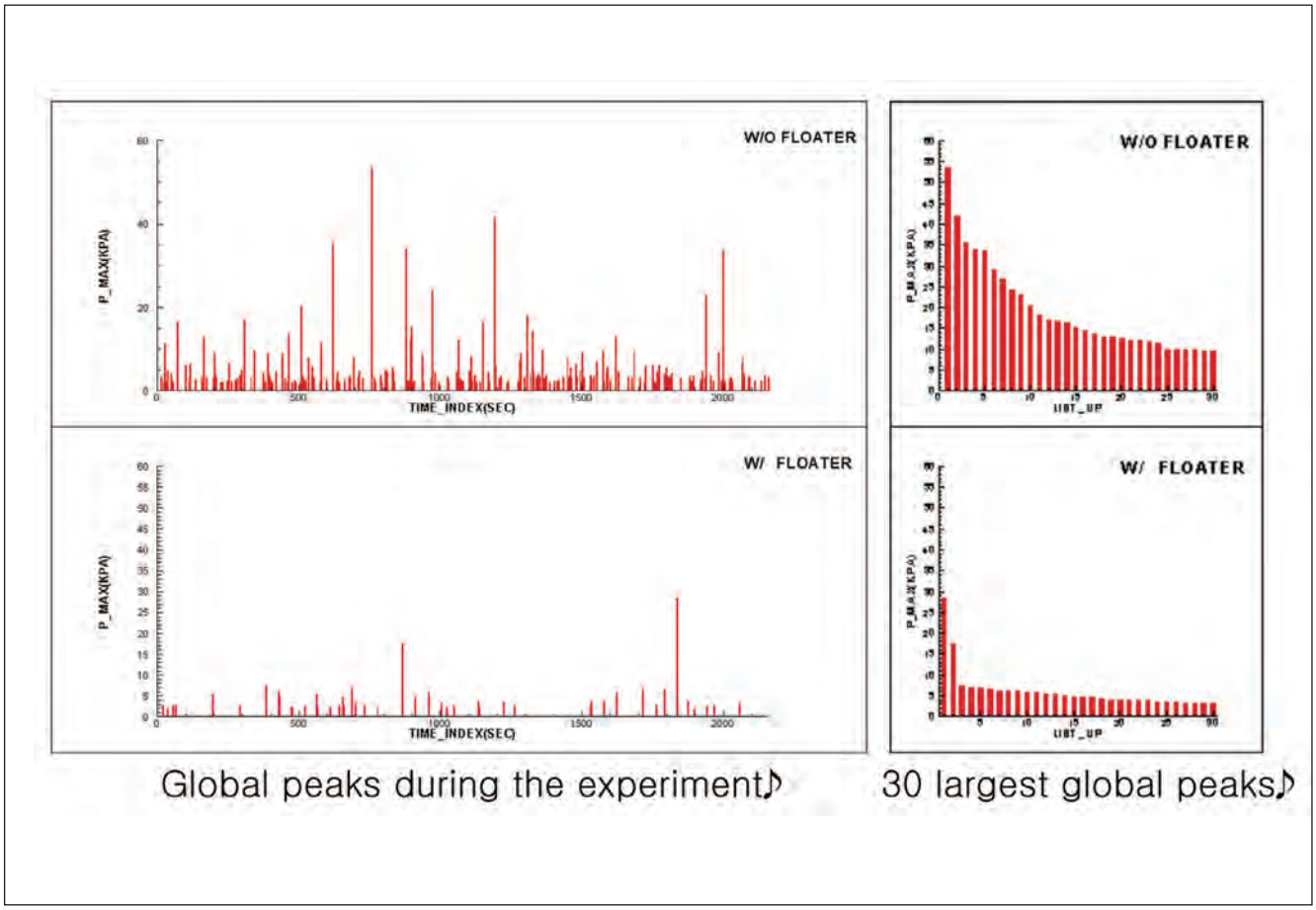
The next step for the ABAS Blanket is to be presented to the industry at Samsung Heavy Industry's (SHI) Open Forum this month. The forum will be held in Seoul, South Korea, and attended by industry specialists and will lead to a joint validation of the ABAS Blanket system.

SHI will present the system to ship owners and classification societies as well as developers before the system gains approval for practical applications and to encourage co-operation in the LNG industry for new businesses such as LNG shuttle and FLNG.

In this first forum the focus will be on two issues: a comprehensive hazard identification study will be undertaken, which is an essential procedure for any new technology, and secondly the group will look at how to jointly validate the ABAS Blanket system before it can be offered for practical applications in the LNG industry.

First stage testing and conceptual design of the ABAS Blanket is now complete and Samsung said it is now looking to take the next step by full-scale testing and verifying that the system works on a LNG tanker. The company hopes that this second stage will begin this year, said Mr Chun. *NA*

Irregular motions - 95% filling.



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Kogas sets out its membrane introduction programme

Gaztransport and Technigaz (GTT) will have to wait for competition in the liquefied natural gas (LNG) containment system market as Kogas explains that its KC-1 project will not be ready to promote to non-Korean customers until 2015 at the earliest.

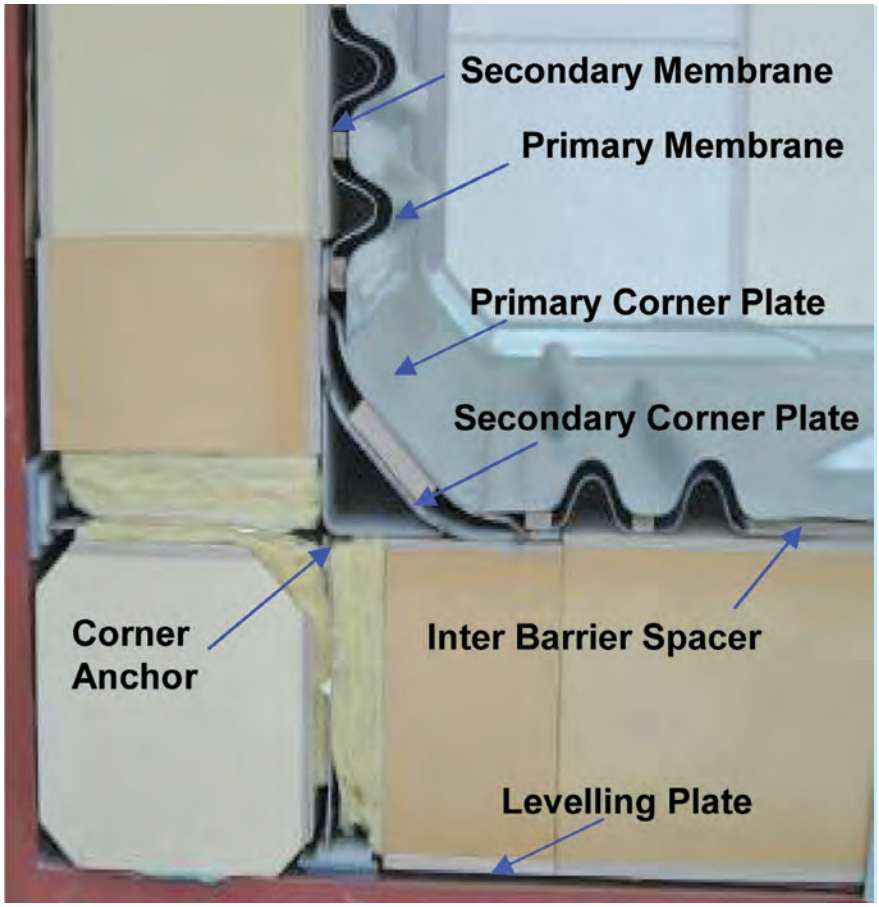
In response to questions regarding competition in the LNG membrane containment system market GTT has maintained that it welcomes the new competition. And, so when GTT chairman and chief executive officer Philippe Bertorotierre was again asked the question at the Gastech Conference in Amsterdam in March there was no hint of exasperation as the GTT president maintained the line.

If, indeed, Mr Bertorotierre is sincere in his protestations, and *The Naval Architect* has no reason to suppose he is not, he will be disappointed to hear that GTT will probably have to wait over four years before his South Korean competitors are ready to go to the market with its membrane system.

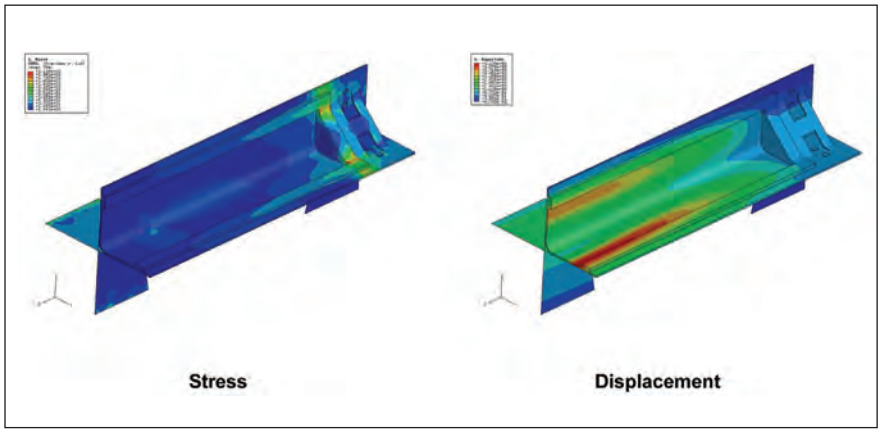
Kogas vice president at its LNG Tech centre, research and development division Yang Young-myung, said that the company, which does not operate ships itself and has no experience in ordering vessels, is currently in negotiations with five South Korean shipping companies SK Shipping, Hanjin Shipping, Hyundai, Korean Shipping and STX Pan Ocean, for the contract to build and operate Kogas' LNG carriers.

Following selection the carrier will build the four vessels with a selected yard and operate them between the Western Australian Gladstone LNG development project and South Korea and the KC-1 containment systems used on these vessels will come at a significantly lower price, "around 10% excluding the licence fee", than similar GTT membrane systems said Mr Young-myung.

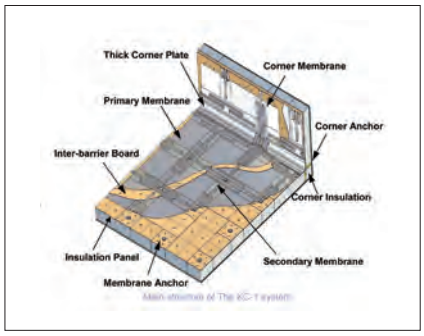
"The first gas from the Gladstone field is not expected until the second



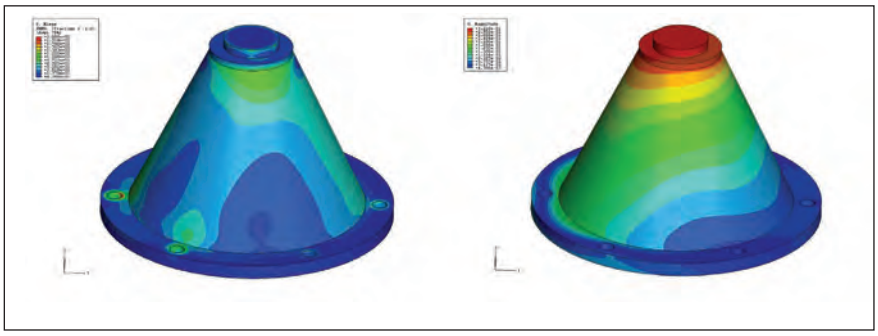
Corner structure of the KCI system.



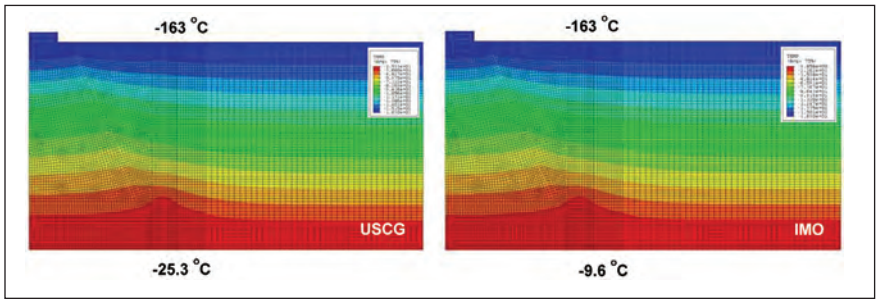
FEM analysis for the 90deg corner.



A cross-section of the KCI containerment system.



Stress displacement.



Thermal analysis results for the membrane anchor in USGG and IMO conditions.

half of 2015 and we need three years to order and build the four ships," explained Mr Young-myung, he added that "orders for the ships would have to be made by 2012" in order to meet the gas delivery schedule.

Kogas has signed a 3.5million tonne per year LNG procurement contract with the Gladstone project and will need four ships of around 155,000m^3 said Mr Young-myung. However, even after delivery Kogas will not be in a position to promote the sale of its KC-1 system. "First we will carry out a few voyages and then decommission the ships and inspect the membrane to make certain that there is no damage and only after these voyages are successful will we be in a position to offer the system to other clients," he said.

The KC-1 system was originally developed by Kogas as a containment system for a 200,000m^3 land-based storage tank. Following collaboration with Korean yards, Samsung Heavy Industries, Daewoo Shipbuilding and Marine Engineering (DSME) and Hyundai Heavy Industries the company developed the marinised version of the system.

Mr Young-myung believes that the KC-1 system has some significant advantages over the current crop of competitor membrane systems. "The gap between the primary and secondary barriers is only 12mm and the insulation material is behind both of these barriers, so the temperature is almost the same," he said. He believes that should the primary barrier of the GTT's MkIII system fail the LNG will suffer from what he called "summer shock" where the LNG will suddenly and significantly increase in temperature from -165˚C to -80˚C which could destabilise the cargo. Insulation for the KC-1 system is high density polyurethane foam (PUF), which Mr Young-myung said has better insulation properties than the reinforced PUF used in the MK III membrane.

In addition the MKIII has continuous corrugations, which are affected by contractions in the metal as the membrane changes temperature. By comparison the KC-1 system utilises a "rotational corrugation system that twists as the metal contracts. Mr Young-myung also says that the triplex material used by the MKIII membrane for its secondary barrier is not gas tight.

Improvements on the design of the MKIII system are under way, however, with GTT seeking to reduce the boil off gas (BOG) rate from 0.15% to 0.1% by improving the insulation using thicker foam, said Philippe Bertorotiere. "These improvements are particularly interesting for dual fuel ships because they will use less of the BOG, so what do you do with it?" he asked rhetorically.

GTT's NO96 membrane containment system is also receiving an upgrade with the "Ultra-Plus Box" which a stronger plywood box, on which the invar primary barrier sits will be reinforced and will, therefore, be able to handle greater filling loads as well as sloshing loads. The NO96 system will also replace its insulation material from perlite to glass wool which will reduce the BOG rate said Mr Bertorotiere.

"The improvements to both systems are waiting for class approvals, but we are expecting that within a matter of weeks," said Mr Bertorotiere. He added that the improvements to the systems would be particularly useful for use in floating LNG storage units which will necessarily utilise the entire range of loading levels.

Restrictions on loading levels were introduced by GTT in order to combat sloshing damage within the membrane tanks. The minimum levels for both MKIII and NO96 type containment systems were recently changed by GTT to 2.75m and 10% of H (tank height) for the MKII and NO 96 respectively. Loading above 10% must be to a minimum of 70% of tank capacity and a maximum of 95%. By maintaining these loading limits sloshing loads and therefore damage can be minimised. *NA*

Cruise operators unprepared for ECA rules

A tough outlook for shipbuilders with emissions and the advent of the North American emission control area (ECA) in 2012, dominated the agenda at the Cruise Shipping Miami conference and trade fair last month. Sandra Speares reports.

Duel fuel systems, using a mix of gas and heavy fuel oil are one consideration as ships could switch from one to the other when either on the high seas or in an ECA. Although all the cruise companies have been looking at LNG as a fuel of the future, it does pose design and storage problems for ships which need to maximise the space for cabins and public areas.

Solar power is also an alternative, and Royal Caribbean's newbuildings have solar panels onboard which, are used to power lifts on the ships, although the power generated is only a fraction of that required for the ship as a whole. Bam Solar installed photovoltaics on the newest 225,000gt Oasis class *Allure of the Seas* that will provide lighting for the vessel's shopping district.

Although there has been plenty of technical discussion about how the North American ECA will work in practice, the advent of the ECA, which means only 0.1% sulphur content by 2015, with the ECA coming into force next year, was a major discussion point at the conference's state of the industry section. Cruise bosses expressed their concerns last month about the effect the ECA, which will extend down to the US Virgin Islands, will have on cruise ship itineraries, with the possible movement of ships to Europe.

The Boardwalk on *Allure of the Seas* during construction at STX's Finnish yard in Turku.

They suggest that the US Environmental Development Agency, which is implementing the changes, may have underestimated the impact they may will have on the cruise industry, with many ships operating seven or 10 day cruises along the USA coastline. There have been suggestions that the advent of the USA ECA may be of even more concern than the increase in fuel prices, which some cruise companies hedge, although some do not.

The sheer scale of the USA ECA far outstrips those already in implementedation in Europe, and there are fears that when the time comes the availability of fuels to meet the new requirements will simply not be there.

As Tom Dow, vice president of public affairs at Carnival North America explained, there are a range of options for operating in the ECA from 2015, including the use of distillate fuels, biofuels, LNG and equivalents.

MARPOL Annex VI provides for "any fitting, material, appliance or apparatus to be fitted in a ship or other procedures, alternative fuel oils or compliance methods used as an alternative" if they are "at least as effective in terms of emissions reductions".

Other alternatives he highlighted included the use of scrubbers, alternative fuels or non conventional forms of propulsion, or emissions trading.

What is certain is that those cruise lines operating extensively on the USA seaboard will have to rethink their itinerary strategy, at a time when they already have to think of innovative ways to save fuel and reduce energy consumption.

Royal Caribbean chief executive Adam Goldstein suggested that biofuels might be a solution in the future, and Royal Caribbean is collaborating with Singapore based Ecospec to use its scrubbing technology on *Independence of the Seas*.

Ecospec's CSNox system was introduced by the company in January 2009, and is the world's first abatement technology reported to remove SOx, NOx and CO_2 from engine emissions in one process.

Royal Caribbean was the first cruise operator to initiate a feasibility study with Ecospec to explore the potential for installation of CSNOx systems on a cruise ship although a number of other operators have been looking at the system.

If the Ecospec system does what it says it will do, and initial tests on a couple of merchant vessels look promising, it may well be a way out for the cruise lines once the results are in.

Holland America has of course been texting a Krystallon seawater scrubber on one of its vessels.

With fuel costs set to continue on an upward curve driven by recent developments in the Middle East, coming up with greater fuel efficiencies and energy saving technology is becoming increasingly important.

In January this year ABB teamed up with Eniram, which provides advanced decision support system, to integrated Eniram's pod optimisation technology into ABB's azipod propulsion system, which will produce savings.

ABB reckons that azipods produce a 10-15% improvement in hydrodynamic efficiency when compared with conventional shaft systems.

ABB announced a US$50 million cruise contract to provide power and propulsion systems for two new cruise ships being built for Norwegian Cruise Liner at Meyer Werft's Papenburg yard. The 143,500gt vessels will be fitted with power generation and distribution systems, thruster motors, and two 17.5MW propulsion systems including transformers, drives and Azipod XO propulsion units.

Norwegian Cruise Line also has a fleet wide deal for a fuel and energy conservation package with Onboard-Napa Ltd, which includes decision support tools for better and more efficient voyage planning, using speed profiles and weather reports to optimise performance.

All operational data collected is reported to a centralised reporting portal called NAPA Office. This offers tools for easy fleet monitoring. Crew members can also learn from the experiences of colleagues which are the most economic voyage plans.

According to Antoine Gurrey, director of Norwegian Cruise Line's fuel budgeting and energy conservation: "A task that used to take several hours can be completed in a couple of minutes with the Data Analysis module in NAPA Office".

Cold ironing is another way that ships can improve their environmental footprint when in port and the state of California's Environmental Protection Agency regulation aims to have 80% of cruise ship calls on shore power by 1 January 2020, or equivalent emissions reductions using other means.

Michael Watts, marine division manager at Cochran Marine, said the company had been working with Holland America Line and Princess Cruises since 2004 to develop cruise ship shore power technology. Cochran has been in partnership with Eaton Corporation to develop a converter which will allow cruise ships which operate on 60Hz power to plug in when in countries that have 50Hz utility loads, thereby giving the system a more international application. Compatibility has been an issue in the development of cold ironing, as has availability of onshore power supplies that are more eco-friendly than conventionally ship-generated power.

Another area where environmental friendliness has been key is in the area of lube oil. For example Castrol Marine has been supplying its Castrol BioStat product to a number of cruise ships through shipmanager International Shipping Partners. Castrol Marine says the product is more environmentally friendly as it biodegrades and offers enhanced renewability in relation to conventional products. ***NA***

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Royal Caribbean is testing Ecospec's SOx scrubbing technology on *Independence of the Seas*.


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Waste not

Management of waste on cruise ships is a major issue, not least because the hotel element of operations means they generate far more waste than most. In consequence the availability of on shore waste reception facilities and the most technologically advanced waste solutions are key elements of the equation, by Sandra Speares.

The European Cruise Council raised the marine waste issue in its annual report last year and will be hoping that a revised European Union (EU) waste directive will ensure that there are adequate waste reception facilities round Europe to meet the cruise ship industry's needs. Energy recovery, by seeking to minimise energy lost and recycle it for use elsewhere in the ship, and waste water treatment are just two parts of the waste management process.

Jochen Deerberg, chief executive of Deerberg Systems says ships must either be able to handle the waste independently for shoreside solutions, or alternatively "the ship must be equipped with onboard pre-treatment facilities to give waste to shore facilities for further processing".

He sees waste management challenges as including the "significant" impact on marine operations of further limitation of onshore incineration facilities, and also the need to ensure that technology advances to meet the demands of future regulation.

On cruise ships, where space is at a premium, one problem may be how to store the waste generated onboard.

Another can be the high cost of delivering it ashore. Mr Deerberg estimated that landing costs of waste per big bag could be approximately €30,000 for a 1000 passenger cruise ship, €155,000 for a 5000 passenger ship and €250,000 for an 8000 passenger ship.

Among other products Mr Deerberg markets a bio-waste dryer that uses

A pipe before cleaning with Hepburn's Bio Zapper.

The pipe after treatment with Hepburn's product.

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As the structures and cargo become bigger and heavier and destinations seemingly more difficult to access the market is looking for more and better equipped vessels. There are also increasing safety and greater environmental concerns for all aspects of marine operations. The new generation of heavy lift vessels designs are responding to the demand for higher lifting capacity and larger outreach. There are also an increasing number of new designs concepts aimed at servicing this increasing demand in the marine heavy transport and lift industry.

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"On cruise ships, where space is at a premium, one problem may be how to store the waste generated onboard"

heat from the incineration process and, therefore, does not need additional heat for the drying process.

Energy efficiency is just one more ingredient in the mix. Installing inverters to power electric motors for ventilation of machinery spaces, is, according to italian class society RINa a means of reducing electrical consumption and improving the ship's efficiency. RINa estimates savings of about 8.7MW in one year's operation with a consequent reduction in CO_2 emissions of about 5700tonnes per year on a 90,000gt cruise vessel of more with more than 3800 passengers and crew.

More efficient heating, ventilation and air conditioning systems can also result in considerable savings. For example Aida's sustainability report in 2010 points to potential savings of three tonnes of fuel per day just by having three way valves on air conditioner ventilation grids, while half a tonne a day can be saved by having hotel – style key cards to turn off lights or turn down air conditioning when passengers are not in the cabin. Heating in public spaces can be adjusted by technological advances that calculate the number of people in the room and adjust the temperature accordingly.

Further savings can be made using different hull designs, hull coatings and reflective film on windows. Further savings and cut down on waste can be made by using the waste heat from the engine for other uses round the ship. Another example of cutting down on waste is provided by Hepburn Bio Care, which aims to radically cut down on the number of cleaning chemicals that cruise, and other ships, have to carry on board. All the company's products are eco-friendly and the company has a large clientele among the cruise industry.

Hepburn's products Hepburn Bio Zapper and Hepburn WC were successful in cleaning blackwater pipes on four Brazilian cruise ships when traditional acid cleaning had failed.

Chief executive Margaret Hepburn says the costs are cheaper too. While typically an acid strip of this kind would cost in the order of €90,000-€120,000 per ship, the Hepburn equivalent does the job for €40,000. *NA*

Under the cosh cruising is bearing up

Pressure on rates, strong competition and few orders has intensified the pressure on cruise operators and European cruise shipbuilders alike, writes Sandra Speares.

Cruise shipbuilding has had its own cross to bear in the last year or so with a lack of new orders and competition emerging from the Far East, not to mention downward pressure on prices.

As Fincantieri revealed in its latest set of results for the full year 2010: "During 2010 Fincantieri secured €1912 million in new orders, which, although slightly higher than the 2009 figure of €1758 million, is well below the 2008 amount of €2528 million and even further below the record €4238 million in 2007. This decrease is a consequence of the continued international crisis, which, since its emergence in 2009, has significantly depressed demand for new ships in all the group's sectors of operation"

Speaking in Miami, Fincantieri chairman, Corrado Antonini said existing production capacity was far outstripping new orders although the orderbook grew last year from 2009 levels.

Experts estimated that "at best 50% of the new building capacity could be utilised in the next 10 years," he told the Miami cruise conference. This was true of the shipbuilding sector as a whole, including China and South Korea who have invested heavily. As a result he said, European yards specialising in high tech products would have to maintain their niche markets, as it was unrealistic to move once more to the production of standard or mass produced ships.

The cruise ship building industry in Europe has obviously been at the forefront of the development of high tech prototypes, and prides itself on the network of suppliers that it has built up and which it feels Far Eastern yards will struggle to emulate.

According to Mr Antonini's statistics, demand and supply for lower berths will start to pull apart from 2014 onwards, with demand exceeding supply by as much as approximately 500,000 lower berths by 2020.

Corrado Antonini, chairman, Fincantieri.

"Newbuilding orders, he predicted would remain below pre-banking crisis levels at an average of six to eight ships per year compared to the 2004-2007 period. "Ships size increases can only marginally mitigate that gap"

While the cruise market is essentially healthy, he said, with prices for cruises, and numbers of passengers strengthening, the cruise lines were delaying or softening their investment programmes because they were seeking margin improvements, or had concerns over financial constraints or rising fuel prices.

Newbuilding orders, he predicted would remain below pre-banking crisis levels at an average of six to eight ships per year compared to the 2004-2007 period. "Ships size increases can only marginally mitigate that gap".

Developing green products and energy saving solutions, as well as innovations in design and quality and widening client portfolios were just some of the ways to tackle the problem he said.

Green design is a challenge to shipbuilders because of the wide range of issues that need to be taken into account, notably emissions issues, including SOx, NOx and CO_2, the advent of the Emission Control Areas and the changes under MARPOL Annex VI and the energy efficiency design index.

Refits and refurbishments should become an important part of the mix as the fleet matures. Crystal Cruises will be spending an estimated US$25 million plus on a major redesign in May, when more than 400 technicians will be flown in for a two week redesign at Hamburg's Blohm +Voss shipyard.

According to Carl-Gustaf Rotkirch, chairman and chief executive of Grand Bahama Shipyard, total potential for routine drydockings, conversions and upgrades and maintenance and voyage repair was US$3.2 billion by 2012 [check].

In 2011, Carnival Corporation expects to refit four to six ships, according to Peter Fetten, senior vice president of corporate refit. The figure is expected "slightly more" from 2012 to 2015, with the "size of the refits larger in line with the size of the ships".

Silversea Cruises' *Silver Shadow* has also had a major makeover this year during a drydocking in Singapore.

With vessels now costing around the

€700 million mark the demands are two fold, Mr Antonini said. Firstly, the supply of innovative products of high quality, with an energy saving and green element, secondly an export credit agency backed funding package.

Jacques Hardelay, chief executive of STX France, while the cruise ship fleet is fairly new there is an important need to retrofit vessels, in an environment when there was pressure on prices, manpower and material and equipment costs were not going down, and tonnage and yard turnover was under pressure.

One of the ways forward he said was to build a new relationship at the initial contract stage with a long term maintenance approach to the vessel. "It is unwise to pay too much, but it is foolish to pay too little," he said in his presentation, and ship owners needed to be open to shipyards' initiatives when designing new ships.

Although there have been threats of challenges from the Far East in the cruise ship arena, these have yet to take centre stage, as Far Eastern yards absorb the downturn in traditional shipbuilding work.

One of the more immediate challenges the European cruise ship building industry faces is to make fuel efficiencies at a time when fuel prices continue to rise as fuel costs make up a substantial proportion of the cruise ship operating equation. With fuel taking up something like 20% of costs, any fuel savings can make a substantial difference to the bottom line.

No shipbuilder can afford to ignore the new regulatory environment and cruise lines, among them Royal Caribbean, have been at the forefront of developments with the introduction of the new probabilistic approach to shipbuilding and safety measures like safe return to port and enhancements to lifesaving appliances and equipment.

The company has recently signed a contract with Meyer Werft for two new 158,000gt vessels, code named Project Sunshine which are due for delivery in 2014 and 2015. "Royal Caribbean has worked hard to earn a reputation of offering the most innovative ships in the cruise industry and this next generation will not disappoint," Richard Fain, chairman and CEO of Royal Caribbean Cruises said on announcing the project. "While we continue our policy of keeping our newest ideas and features under wraps during the early stages of construction, I can say that I am very excited about the passion and imagination that our teams have devoted to the project."

Innovations like the glass blowing facility on the new Solstice class Celebrity ships bring with them their own headaches in ensuring that they comply with fire safety measures.

However, new regulations are not only affecting ship design and construction but health and safety, not to mention security onboard ships. Passenger rights legislation has been an issue, as has discrimination in approaching such issues as access for disable passengers on cruises ships – and all this implies in design terms when dealing with other vessels. *NA*

Visentini yard builds on successful ro-pax formula

Economic, versatile ro-pax ferries have been the trademark product of family-owned Italian shipbuilder Cantiere Navale Visentini for the past decade and a half, and two new entrants to the Mediterranean traffic in 2010 are testament to the yard's prowess in an increasingly competitive market segment, writes David Tinsley.

Visemar One and *Cartour Delta* each provide an attractive blend of freight and passenger capacity, speed and fuel efficiency, using a well-proven design concept and 'best practice' operating layout that has continually evolved and been moulded to individual client requirements over the years.

The Visentini ro-pax ferry *diaspora* is currently to be found on Irish Sea, English Channel, Baltic, Mediterranean, Mexican and Vietnamese services. Compared with previous ships, the two 2010 deliveries provide a step-up in ro-ro intake, through the adoption of an additional freight deck, while bearing the distinctive Visentini 'look' in their hull lines and large, raked funnel casing.

Located at Donada, near the delta of the River Po in northeast Italy, the yard turns out two ro-pax vessels per annum. The latest ships are of around 2800 lane-metre capacity, while earlier years' production focused on the 2000-2500 lane-metre category.

Giving an industrial dimension to a local economy keyed largely to agriculture, Visentini maintains a core workforce of skilled tradesmen and technical staff, complemented by regular contractors in various disciplines. The Visentini formula has been a success in terms of product quality, delivery performance and shipbuilding competitiveness, and in engendering a class of vessel that has drawn wide market favour.

The Visentini ro-pax family reflects the input of Trieste-based NAOS Ship & Boat Design, which began activities in 1993 as the principal design centre for the yard, thereafter quickly expanding its client list at home and abroad.

Visemar One inaugurated Visemar Line's dedicated ro-pax service last year between Venice, Tartous (Syria) and Alexandria (Egypt), providing the requisite combination of capacity for passengers, perishable goods, industrial products and other freight. Southern Italian operator Caronte & Tourist subsequently commissioned Cartour Delta, boosting payload potential on the company's route between Salerno and Messina.

Visemar Line was set up as a joint venture by Visentini and the Tositti Group, a specialist in maritime agency and freight forwarding, to create a 'motorway of the sea' service linking Venice and its hinterland with Middle East markets. Expeditious transits and short staytimes in port were considered of the essence to attract time-sensitive goods, not least fruit and vegetables. The 26,650gt *Visemar One* can accommodate about 200 trucks or trailers for a total of over 7500tonnes of

Visemar One operates Visemar Line's ro-pax service between Venice, Tartous (Syria) and Alexandria (Egypt), providing capacity for passengers, perishable goods, and other freight.

TECHNICAL PARTICULARS
Visemar One
Visentini yard no 223
NAOS design project P271
Length overall 186.5m
Length b.p. 177.4m
Breadth, moulded 25.6m
Depth to upper deck 15.0m
Depth to main deck 9.15m
Draught, design 6.85m
Ro-ro provision ..... 4 freight decks + 1 car deck
Ro-ro capacity ..... 2859 lane-m(freight) + 74 cars
Lower hold capacity ..... 234 lane-m (+ car deck/74 cars)
Lower hold max free height 4.335m
Main deck capacity ..... 897 lane-m
Main deck free height 4.887m
Upper deck capacity ..... 1040 lane-m
Upper deck free height 4.812m
Weatherdeck capacity ..... 688 lane-m
Weatherdeck loading free height . 4.875m
Ro-ro external access ..... Stern ramp, 13m+3m length x 16.5m width
Ro-ro internal access ..... 3 fixed ramps
Passenger cabin berths 276
Pullman-type seats 51
Main engines ..... 2 x 10,800kW
Propellers ..... 2 x 4.8m diameter
Bow thrusters ..... 2 x 1300kW
Diesel generators ..... 3 x 1800kW
Shaft generators ..... 2 x 2200kW
Service speed ..... 24 knots
Class ..... RINA C Ro-Ro Passenger Ship; Unrestricted navigation; AUT-UMS

freight, and is equipped with 100 electrical sockets to serve the so-called 'cold chain', or temperature-controlled produce logistics.

In addition to 2860 lane-metres of freight, the vessel can take 74 cars on a dedicated car deck in the lower hold, and has a good standard of facilities and berths for 325 passengers, with 67 cabins plus about 50 Pullman-type seats.

Visentini has eschewed a bow door, such that all cargo handling is by way of a stern ramp/door. This gives direct access to the main deck and, by way of a fixed ramp on the port side, to the upper trailer deck. From there, another fixed ramp allows on-movement of trucks to the weather deck. The lower hold and car deck is reached by ramp from the main deck.

Two medium-speed main engines of the wide-bore MAN 48/60B type give a total output of 21,600kW, driving twin propellers through reduction gearing. This type and make of machinery has been well received over the life of the Visentini ro-pax series. In conjunction with the hydrodynamic properties of the vessel design, the plant confers a competitive fuel consumption as well as an attractive service speed of 23knots or more.

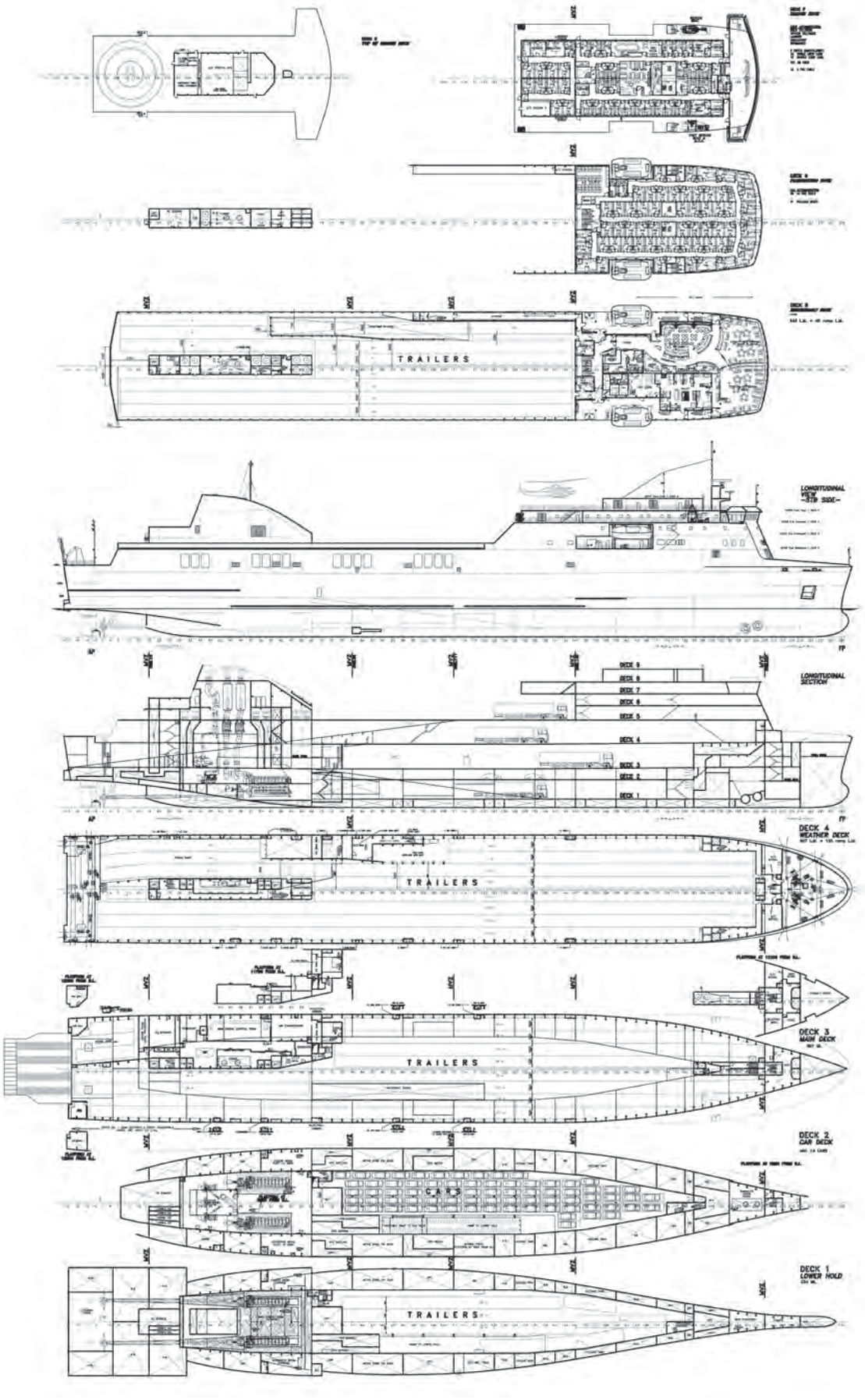
Cartour Delta, the follow-on delivery from the Visentini ro-pax 'production line' perpetuates the *Visemar One* in a technical context, and provides a further reference for the Italian shipbuilder in the fleet deployed by Caronte & Tourist.

The company's first Visentini ship, named *Cartour*, inaugurated the Salerno/Messina service in 2001, and subsequent fleet development based on Donada-built tonnage included the ro-pax ferries *Cartour Beta* and *Cartour Gamma* in 2006. The Salerno connection with the Sicilian port represented a pioneering 'Autostrada del Mare'(Motorway of the Sea) project, aimed at providing a waterborne alternative for north/south road freight faced with new regulations limiting commercial drivers' time at the wheel and increasing congestion on the motorway between Salerno and Reggio di Calabria.

Design progression within common main dimensions of 186.5m length overall and 25.6m breadth is clearly expressed in the *Cartour Delta* relative to *Cartour Beta*. The major change is the addition of a fourth freight deck, hoisting linear capacity from 2245 to 2860 lane-metres. Although this has penalised capacity for passenger cabins, the coastwise operation into which Cartour Delta has been deployed, as with many other routes, is primarily aimed at the road haulage market. Compared with the provision for 1000 passengers in *Cartour Beta*, the latest vessel is certificated for a maximum of 580 persons.

It is understood that a further vessel of the type encapsulated by *Visemar One* and Cartour Delta, and now approaching completion by Visentini, has been earmarked for service in Italian waters with Caronte & Tourist. The investment is in keeping with the growth in demand for freight space. *NA*

GA Plan for Visemar one.



Messina changes tack for new generation

Remarkable not only for its pioneering role in ro-ro shipping, but also for a policy applied over many decades of renewing and expanding its fleet through secondhand vessel purchases and conversions, Ignazio Messina has altered direction with a bold investment programme based on new construction, reports David Tinsley.

The anticipated delivery in October 2011 of the first of four 45,200dwt ro-ro container vessels ordered from Daewoo Shipbuilding & Marine Engineering will be a landmark in the company's history, denoting a policy shift in favour of newbuild tonnage, purpose-designed to the owner's requirements.

The new generation of versatile freight carriers will provide the shrewd Genoese company with the means of raising capacity, capability and efficiency on the longest routes in its network from the Mediterranean, and with the scope for responding over time to evolving opportunities in the African trades. It is clear that the project encapsulates a practical blend of operational and technical know-how. It applies Messina's extensive experience in ro-ro and lo-lo cargo handling in conjunction with the use of innovative technology, including advances in environmental engineering. In fact, the design emanates from Messina's own technical department.

The 'future-proofing' strategy is implicit not only in the very high degree of cargo loading and trading flexibility reflected in the design, but also in the specification of systems to minimise environmental impact. Such is the standard of the design and equipment chosen that the vessels will be the first of their kind, built to Registro Italiano Navale (RINa)'s Green Plus class notation.

At the time of writing, Messina had still to reveal precisely which route or trade would receive the new vessels, while confirming that the tonnage would surely be employed within the compass of the existing route network linking Mediterranean European ports with East Africa, West Africa, the Red Sea and Persian Gulf. Genoa, Naples, Marseilles, Barcelona and Castellon form the European range served by the company's existing ro-ro container vessels.

Cargo handling by ro-ro or sto-ro means will be effected over a huge stern ramp on the starboard quarter, dimensioned for awkward size cargo and project consignments, up to 7m in height, and with a 350tonne load capacity. Internal ramps will provide for vehicular and wheelborne freight throughout all decks, including the weatherdeck, which will also or otherwise accommodate containers to a maximum of six tiers, worked to and from the ship by shoreside crane.

The design can take up to 6030 lane-metres of multifarious ro-ro freight, or a maximum 2920TEU containers. In practice, payloads will be permutations of ro-ro, sto-ro and weatherdeck lo-lo cargo. Messina's expertise in operating and handling vessels with mixed stows of containers, wheeled freight and other units, and in the often space-restricted conditions in Mediterranean and African ports and terminals, has been brought to bear in the newbuild project, so as to secure the best efficiencies in working disparate cargo types. A total of 200 sockets for refrigerated boxes will confer extra flexibility, serving flows of temperature-controlled goods.

The transport flexibility ensured by the new series, in conjunction with a maximum draught of 11.5m, has particular relevance to regions and countries on the African continent where large containerships cannot be received due to lack of infrastructure, draught restrictions, and the composition of overseas trade. In keeping with the draught criterion, hull width has been taken to 37.5m, beyond the current Panamax size.

A state-of-the-art system that can monitor hull stresses in a seaway, and serve also as a tool to assist in operating the ship with limited roll motions, is to be fitted to the new vessels. Developed by the Norwegian firm Light Structures, the SENSFIB fibre optic hull stress monitoring system is of an advanced configuration for ro-ro container vessel applications. Each installation will comprise 12 strain sensors and three acceleromoters.

Messina has opted for a direct-drive, single low-speed diesel propulsion plant in the interests of operating efficiency. The choice has fallen on a seven-cylinder model of MAN's L70ME-C design in its Mark 8 version, giving a maximum power output of 22,890kW, for a service speed of 21.5knots.

Considerable industry attention has been captured by the announcement that the auxiliary machinery will be fitted with seawater-based exhaust scrubbers, so that the ships can continue to run on residual fuel while meeting rules limiting sulphur emissions to the equivalent of burning 0.1% sulphur-content fuel. As a consequence of an European Union (EU) edict introduced in January 2010, vessels are subject to a 0.1% sulphur cap while in port, achievable through

TECHNICAL PARTICULARS

Messina ro-ro/lo-lo newbuilds

Length overall	239.00m
Breadth	37.50m
Draught, maximum	11.50m
Deadweight	45,200dwt
Cargo load area	18,630m^2
Cargo decks	4
Ro-ro capacity	6030 lane-m
Container capacity	2920TEU
Reefer sockets	200
Main engine	MAN 7L70ME-C8
Main engine power	22,890kW
Speed	21.5 knots
Flag	Italian
Class	RINa
Builder	Daewoo
Deliveries(4)	Oct 2011-Feb 2013

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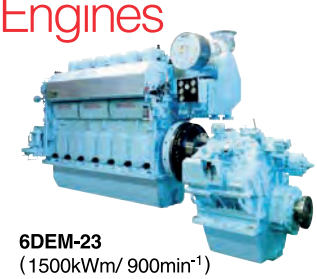

6DEM-23
(1500kWm/900min^{-1})
(1200kWm/750min^{-1})

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the use of low sulphur fuel (marine gas oil), currently considerably more expensive than fuel oil, or alternatively by adopting suitable abatement technology.

Messina's strategy has been to fit Hamworthy Krystallon seawater scrubbers to the engines in each shipset of four 1840kW gensets. An additional unit will be applied to the auxiliary boiler, and all five scrubbers for each vessel will be encapsulated within the funnel casing. The deal represents a commercial breakthrough for the Hamworthy equipment, which had hitherto only been at sea in two trial installations.

By such means, the Messina series will be able to use fuel with a sulphur content up to 4.5%, safe in the knowledge that compliance with the 0.1% limit will be achieved, and securing potentially substantial fuel cost savings in the process.

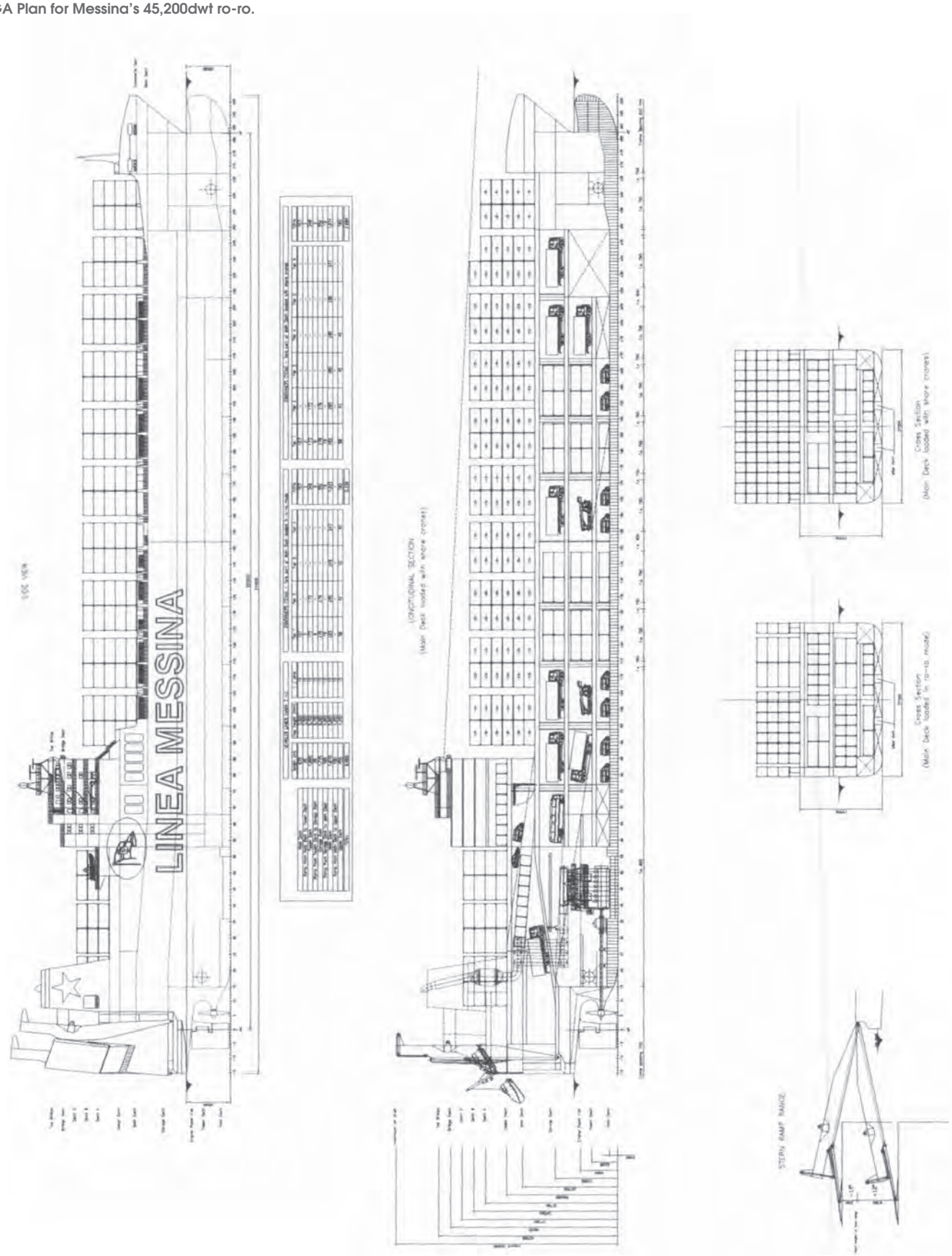
Messina has also taken a proactive approach to the prospect in 2015 of an IMO-mandated 0.1% sulphur limit, or use of the requisite exhaust gas treatment technology, for ships trading within designated Sulphur Emission Control Areas (SECAs). Provision has been made in the newbuild vessels for the future installation of a scrubbing plant serving the main engine.

Each of the ships has been specified with Martek Marine's MariNOx emissions monitoring system, an element of the outfit which has contributed to meeting RINa Green Plus criteria. Emissions of NOx (oxides of nitrogen), SOx (oxides of sulphur) and CO_2 (carbon dioxide) in the exhaust gases from the main and auxiliary engines and the auxiliary boiler will be measured by the system to the accuracy defined in the IMO's NOx Technical Code.

Monitoring by the system is continuous, and the Martek installations will also be capable of measuring carbon monoxide, oxygen, hydrocarbons, and particulate matter. All sensor readings will be logged in a centralised data management system, and user-configurable emission level alarms will also be provided. One of the additional benefits of MariNOx is its facility for continuous optimisation of engine performance to deliver fuel savings, potentially up to 4%.

Daewoo's success in landing the US$300 million-plus series is a measure of the Okpo yard's capabilities in the higher value-added segments of the newbuild market, and of a track record in both shortsea and deepsea ro-ro-equipped vessel construction. With Messina's lead ship due in October this year, subsequent completions are scheduled for February 2012, October 2012, and February 2013. The company intends to put all the vessels under the Italian flag, manned by Italian crew. *NA*

GA Plan for Messina's 45,200dwt ro-ro.



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Going where the growth is

Genoa-based classification society RINa celebrates its 150th anniversary this year. Its history tracks that of Italy's maritime industries, with a marked emphasis on passenger shipping and going global quickly in the last few years.

Despite the choppy shipping markets, CEO Ugo Salerno says RINa had a satisfactory year in 2010, maintaining growth. That was due to its ability to expand in new markets.

"We were able to grow by focusing resources where growth was happening, especially in China and India," he explained. "Our growth in China was exceptional, and we are now seen as a local company there. We intend to replicate that around the world in the coming years."

Maritime classification continued to be the backbone of RINa's global activities and revenues during 2010. The classed fleet grew strongly by 20% to 4175 ships totalling 30.5 million gt. "The growth came from newbuildings joining the fleet and from Chinese, Indian and Greek owners choosing to transfer modern ships into RINa class," said Mr Salerno. "The current fleet is now well diversified with a strong presence in each sector - bulk, dry cargo, tanker, passenger, warships and service craft - and an increasingly global distribution of owners."

RINa's classed fleet of bulk carriers grew very strongly last year, from 6.3 million to 9.5 million gt and there were a significant number of conversions from oil tankers to ore/bulk carriers, in particular for Chinese owners. As an example, RINa supervised the conversion of two 270,000dwt tankers into ore carriers for Fujian Ocean Shipping. The number of Chinese owners choosing RINa class doubled in 2010 and Asian owners now make up 15% of the classed fleet.

Ugo Salerno, CEO, RINa.

Owners continued to entrust newbuilding orders to RINa class and at the year-end the orderbook stood at 450 vessels totalling 6 million gt. Most of these were for building in Asian shipyards.

The lower average age of the classed fleet, strengthened support services for owners and a relentless focus on quality paid off as the Paris MOU rated RINa the best performing Recognised Organisation and leading classification society based on port state control results in 2010.

During 2010 RINa strengthened its position as the world leader in classing passenger ferries, with a 16% growth in classed tonnage. A key new contract was for the classification of two 1700-passenger and 450-car ro-pax vessels ordered by Hellenic Seaways Maritime, Greece, at Estaleiros Navais De Viana Do Castelo, Portugal.

Six major cruise ships are under construction for the Carnival group to RINa class and three recent major passenger deliveries were the 450-passenger luxury *Seabourn Sojourn* built by T. Mariotti for Seabourn, the 2826-passenger *Costa Deliziosa*, built by Fincantieri for Costa Crociere and the 485-cabin, 250-car Cruise *Olympia*, built by Fincantieri for the Grimaldi Group.

Seabourn Sojourn, a RINa-class luxury cruise vessel delivered in 2010.

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Meet us at Nor-Shipping 2011

In the global luxury yacht sector RINa's market share is over 20%, and 200 new mega yachts are currently building to RINa class.

"One thing we are doing at RINa is trying to break down old divisions between sectors," said Mr Salerno. "Multi disciplinary work increased 70% in 2010 and we will take that further with a matrix structure in 2011. We have multi-disciplinary teams working for Saipem on the supervision of the conversion and classification of the world's first offshore FSRU, the OLT Livorno, and RINa is also providing authority and owner engineering, ship handling simulation and regulatory compliance assistance."

RINa recently began work on the supervision of the conversion of a tanker into the FPSO *w* and Edison employed RINa to provide technical support for the planned replacement of the FSO *Alba Marina* in the Adriatic Sea. Work included mooring system assessment, meteo-marine studies, hydrodynamic and structural analysis, fatigue assessment and tender support.

RINa is working hard to increase its offshore portfolio and recently published new Rules for Offshore Units and a Guide to Risk Analysis and Guidance on the Technology Qualification process, all aimed at speeding the use of risk-based assessment to help develop new offshore energy projects quickly and safely.

Feasibility studies were recently carried out on three LNG regasification terminals in Indonesia on behalf of Humpuss, and work has begun on a study for an FSRU off West Africa. RINa is using its offshore gas expertise to develop rules and guidelines for Compressed Natural Gas transport. It is approving pressure vessels with different metal and polymeric linings and composite construction for use in the marine environment and the conceptual design of various CNG carriers.

Practising what it delivers to clients, RINa has put in place a three-year integrated QHSEA (Quality, Health, Safety, Environment and Administrative responsibility) scheme which will set and implement global safety and quality standards. Moving to ISO 18001 and 14001 standards, RINa has a series of programmes in place to embed the right cultural values across its multinational staff. "The whole group has to be thinking green, thinking safety, thinking quality and thinking customer care," emphasises Salerno.

Exuma, Platinum Green Plus yacht.

According to Mr Salerno, respect for the environment was at the heart of everything that RINa did during 2010. It was both a key factor in how the group acted itself, and the vector for a widening range of services around the globe. "RINa plans to be a global environmental leader, showing the way by example and helping every industry it works with to think and act more sustainably," he says.

Headlining RINa's wide range of environmental activities is a rapid expansion of Clean Development Mechanism validation and verification, especially in India, China, Brazil and South-East Asia. RINa is now active in more than 150 CDM projects on behalf of global companies.

Projects included three gas recovery from landfill schemes in Vietnam, Malaysia and Indonesia, a bio gas scheme in the Philippines and a river hydro-electric plant in Brazil. A dedicated CDM office has been established in Chennai, India. Business also grew in emissions trading certification.

There is strong growth in demand for environmental certification, often combined with health and safety systems. Italian shipping Group Ignazio Messina recently attained Environmental (ISO 14001) and Health and Safety (OHSAS 18001) certification for all its activities, including its logistics chain.

In the marine sector RINa is overseeing the building of four highly sophisticated environmentally friendly ro-ro container vessels for Linea Messina in Korea. The 45,200 dwt vessels will be the first cargo ships to have RINa's highest voluntary environmental certification, Green Plus. It will be awarded based on an environmental performance index which covers all aspects of the vessels' impact on the environment, including carbon emissions. The Messina Group has voluntarily implemented a number of high-level design solutions on the new vessels, including high-performance Bilge Water Treatment, magnetic coupling on oil pumps, advanced sewage treatment plant, ballast water treatment according with the requirements of the Ballast Water Convention not yet in force, cold ironing, optimisation of hull transom design, exhaust scrubbers and NOx, SOx and CO_2 emissions monitoring and recording.

Italy is a world leader in luxury yacht building and RINa works closely with all the major yards. "Owners of these vessels do not want to damage the maritime environment they enjoy," says Salerno. That is why we are assisting yards, designers and owners to build yachts with the lowest environmental impact. During 2010 the first Green Plus Platinum certificate was awarded to the Perini Navi Group's Picchiotti 50m *Exuma*, recognising her hull form optimisation and weight-saving choices."

New services for ship owners launched recently include teaming up with certification services provider SPM Instrument SRL and the Italian Ship Research Centre CETENA to help cope with an increase in demand for Condition-Based Maintenance (CBM) programmes.

These cover not only installations critical to ship safety and operation, such as propulsion, electrical plant and fire detection systems, but also other items such as cargo equipment and air-conditioning systems, which are essential to the safe and efficient operation of ships. *NA*

Race for the BMWC

The ballast water management convention (BWMC) is close to being adopted, but questions surrounding how the convention will be enforced and whether there will be enough time for ship owners to react remain to be answered?

The ballast water management convention will come into force one year after thirty states representing 35% of the world's merchant shipping tonnage have signed it without reservation or have ratified it. So far 27 states representing 25.32% of the world's merchant shipping tonnage have ratified the convention, giving rise to predictions that the convention will come into force around 2012.

Ballast water treatment companies have been keeping up with their end of the bargain by making sure that ballast water treatment equipment is available on the market for ship owners for when the convention becomes enforcable, which was initially expected last year.

Nick Whitear, communications director from Thomas Miller P&I Ltd believes time is running out for ship owners to react to the convention.

Even as the enforcement date moves there is still pressure on ship owners to bring vessels up to standard as soon as possible, so as to meet the new expected deadline. Nick Whitear, communications director from Thomas Miller P&I Ltd believes that there are issues surrounding the implementation of the convention for ship owners.

"The implementation procedure will cause some problems for ship owners. With choices such as what systems that they will want to use, some systems are more available than others. Operators wanting

mega systems, of 5000m^3 do not have a great choice. Plus they will need to make sure that is the appropriate equipment for their vessel type."

Martin Ayris, managing director, RWO GmbH Marine Water Technology has also highlighted that the longer the convention remains unsigned the more challenging it will become for ship owners to install the equipment that is needed, because the time frame they will have to fit the equipment will decrease. "There is still a lot of uncertainty in the market. We are doing a lot of quotes, which shows that there is now more serious interest out there, but not many orders are coming through. Everyone is waiting for the convention to come into force", he said.

"People have done there homework about what ballast system they are looking at, but so far this has not translated into contracts. The concern for the ship owner is that if they have a difficult vessel to fit, they need to do it now. As it may be difficult for them once the convention has come into force and contracts/work are plenty", Mr Ayris added.

Martin Ayris, managing director, RWO GmbH Marine Water Technology reckons there will be a rush for systems once the convention comes into force.

The ballast water management convention is not the only legislation that is impacting the ballast water market, as Mr Whitear highlights: "The US has its own state based legislation for pollution in water, with each state having different levels in their standards." Standards in some regions of the USA could be more stringent than the IMO ballast water management convention, up to 100 times in some places. Mr Whitear commented: "It will be interesting how they [USA] pursue the legislation. The US is famous doing what it thinks best. It would be dangerous to sit back and think that it will just follow IMO." However, whether the equipment to meet these strigent standards is available is open to question, he added.

Mr Ayris commented: "Owners want clarity on what will happen in the US and whether it will tie in with the IMO regulations. Orders have been placed for

systems, but it is minute compared to what has still got to be done."

The choices that ship owners have for treating ballast water is either treatment (Regulation D-2) using a ballast water treatment system, or exchange (Regulation D1), where by at least 95% of the ballast water in the ships tank must be exchanged. The ballast water exchange should be conducted 200 nautical miles from the nearest land, or if not possible 50 miles away from land in water of 200m depth.

With the exchange process there is also the issue with stability with larger vessels. For this owners would have to look at how to treat the motion of the vessel and talk to class and incorporate it into the ballast water plan, commented Mr Whitear.

There is also the issue of training the crew, which also presented a problem when electronic chart navigation display information systems (ECDIS) came into force. "We have seen this before with ECDIS implementation. The owner may have to train crew to use several different systems on safety of using the system, to make sure that it is easy to use and also the maintenance of the system. There will probably be a diversity of systems being installed on a fleet of vessel and the crew will need to understand each system", explained Mr Whitear.

Mr Whitear has stressed that it is important for ship owners to start adapting their vessels to meet the regulations in time before the deadline catches up with them. However, Tor Atle Eiken, sales director, OceanSaver has said that he does not reckon that there will be a rush once the convention comes into force. "There are so many birds on the fence, but they won't jump over the fence until the convention comes into play. This is the tradition in the industry, they know that it will come into play, they will to see what the convention is like when it is signed", he said.

Mr Eiken believes that ship owners should select at least two ballast water treatment systems if they have a range of vessels in their fleet, he has highlighted that if a ship owner only selects one then it is doing the industry an injustice and that it will probably need two companies to cater for different sized vessels.

John Strevens, solutions development manager, Wilhelmsen Technical Solutions has further added: "There won't be a rush,

Mr Warg predicts the retrofit market will "explode" once the convention comes into force.

The ballast water treatment is ready in time for the convention, but is the industry?

but it will still have an effect. You can have a convention, but until they know how they are expected to comply, they won't react", he commented.

Mr Strevens likens the implementation of the ballast water management convention to the chicken and the egg scenario, with the biggest obstacle in its way is the uncertainty of how the convention will be enforced. He has highlighted that the biggest pressure for the ship owner is the fulfillment of the convention. The ship owner will not want to be left with a system that no one else wants, if they react too late. Mr Strevens has said that in the long term their will not be a huge number of competitors on the ballast water treatment market, the choice of the ship owner will be of the supplier not the system. "Owners are evaluating systems. Uncertainties will turn owners back to brands they know", commented Mr Strevens.

A Japanese paper that was presented to the MEPC based on the current industry production rate, predicts that 16,500 systems will be fitted by 2017, Mr Strevens believes that the peak will not reach that high due to the impact of the recession slowing down the building of vessels.

The installation of ballast water systems once the convention comes into force is expected to see an increase in the newbuild market at first with the retrofit market taking over around 2014. Alfa Laval's product manager Per Warg has said that the company has had a good start to this year with a significant increase in both projects and sales for its system.

However, Mr Ayris believes that we will see a rush once the convention comes into force. "I think there will be rush once it is known that it is coming into force, as it will be happening and it will force people to react" he said.

Mr Warg also believes that the equipment manufacturers will see a rush once the convention has been ratified. "There will be a massive impact. Most ship owners that have a keel lay date for 2012 are already planning and ordering systems that they will install. The retrofit market will also explode, as if the convention was to be ratified now that would mean all vessels constructed in 2009/10 and than 2011 will have to have ballast water systems fitted, which is equal to 1000s of vessels", he commented.

He further added that it will be likely that the industry will see a bottleneck once the convention comes in to force not because of the system suppliers, but with the installation companies trying to fit as many ships as possible.

The price to pay

The question of how the convention will be upheld remains a consideration for many. The member states that sign up to the regulation will have the convention as part of that country's law, but what sanctions that each country will implement is a growing concern for the industry.

Mr Whitear has noted that each country will possibly have a slight variation of how to impose sanctions relating to the convention, but added that it would be a positive move for the European Union (EU) to step

Mr Strevens says ship owners need to react now to be in time for the ballast water convention.

onboard as it would create a level playing field. "If the EU decides to take a view on the matter then it can make it level. Say for instance you take two countries one may be more stringent than the other. It will be positive if the EU got onboard as this would tip the scale and would make it easier for vessels if they knew that they were going into an EU convention port", he said.

Sampling – The last resort

As a last resort the port authorities may be able to sample ballast systems of vessels that they believe are in breach of the regulations. Mr Strevens has highlighted that this form of testing is a concern in the industry as it is believed that such testing will not be able to produce reliable, recurrent data. Sampling is still in active discussion, as at current there is no "bullet-proof" way of testing the systems.

Mr Ayris on the other hand believed that sampling as a form of testing will be used to enforce the convention. "There has been lots of testing with lots of different sampling regimes. What is needed is a practical solution and so far this is it. So far there has not been a test method that has demonstrated a reliable way of testing and yes there is potential for error as the testing method [of sampling] is not the same as approval testing. But, it comes down to what is reasonable and practical at the end of the day", he concluded.

Mr Warg believed that sampling is a "good idea and necessary". However, he highlights that when it comes into practice that issues will start to arise as it has not been tested in reality. He also highlighted that some vessels may also find issues in some ports with certain systems. "Electrolysis systems do not perform well in fresh water and UV systems also have problems. I don't think that the vessels will get exemptions, but it will cause discussions to happen that we have not yet had", he said.

Mr Whitear raised the fact that there has been evidence that species have been moving between different waters, some with devastating effect on local species. Shipping needs to manage this and show that ships are meeting the standards to prevent this from occurring and the convention will be a way of meeting these necessary demands. *NA*

Electrolytic disinfection treatment systems are not equal

Bill Boroughs, BalPure product manager, Severn Trent De Nora explains how the slip stream treatment approach offers process advantages.

Electrolytic disinfection has been effectively used for more than thirty-five years to control micro-organisms in industrial and municipal waters. The technology has a strong history in marine and offshore markets and is now proven to be highly effective for the treatment of ballast water.

While electrolytic ballast water disinfection systems share the same basic chemistry for electrolyzing seawater, commercially available electrolytic disinfection technologies differ significantly. Understanding the technical and commercial performance criteria of the various electrolytic ballast water treatment technologies is critical to the equipment selection process and in ensuring that a proven, effective and reliable technology is selected to meet regulatory requirements.

Electrolytic ballast water treatment systems typically pass the entire ballast stream through the electrolytic cells. The BalPure ballast water treatment system from Severn Trent De Nora is different in that it diverts a small side stream from the main ballast line. Rather than treat the whole volume of ballast water, a slip stream approach feeds a percentage of total volume into the electrolytic system to generate a disinfectant within the electrolysers. The BalPure system feeds approximately 1% of the total ballast water volume and generates a disinfection solution on site with electricity and available seawater. The disinfectants are then reintroduced to the main ballast flow downstream of the pumps. These active compounds are neutralised back to their original state on discharge.

Temperature and salinity

All in-situ sodium hypochlorite-based ballast water treatment systems share common treatment principles yet due to significant variations in designs employed; not all are capable of performing in extreme water conditions – cold and/or low salinity uptake areas.

Bill Boroughs believes that electronic disinfection systems are the way forward for ballast water treatment.

BalPure has received type approval and passed corrosion testing.

Electrolytic technology functions optimally with significant chloride ion concentrations and above 15°C seawater feed. Significant chloride concentration is normally encountered in ocean ports (full marine salinity) but will likely not be available in low salinity brackish waters, up river or estuaries with fresh water inlets. However, during instances where occasional brackish or fresh water supply is encountered, the aft peak can be filled with seawater to feed the BalPure slip stream ballast water treatment approach before the vessel comes into port.

Performance of hypochlorite generation is also reduced at water temperatures between 10 – 15°C and the technology does not function at all below 5°C. Below 10°C, the formation of chlorine hydrate (precipitating clathrate chlorine gas hydrate) significantly reduces the efficiency of the generator. Below 5°C, the electrolytic product is mostly oxygen with no chlorine generation.

In cold water applications, when the incoming ballast seawater is less than 15°C, the advantage of the BalPure treatment approach is that the side stream can be easily warmed to significantly improve the hypochlorite production rate and extend the life of the electrodes.

It is normal practice for the BalPure system to be operated at low water temperatures below 15°C and to take the slipstream supply from the discharge from the main sea water cooling system on a motor vessel or alternatively from the main or dump condenser system on a steam turbine ship. By making this design provision, slipstream water temperatures would always be in the range 20 to 35°C.

Reduction in energy consumption

Electrolytic disinfection systems generate 100% of the sodium hypochlorite to conduct the disinfection/ ballast water treatment during uptake. Following treatment, there is residual free available chlorine (FAC) present in the ballast tanks. During de-ballasting,

it is only necessary to neutralise the remaining FAC with sodium bisulfate. The bisulfate pumps are very small (approximately 2kW on large systems) – thus no additional electric generation capacity is required to complete the de-ballasting operations. The bisulfate tanks will be located in the main or auxiliary machinery spaces and supplied with a deck filling arrangements located at main deck level where the vessel would take bunkers and fresh water.

A slip stream treatment approach, coupled with only having to treat during the uptake of the ballasting cycle (function of electrolytic disinfection) allows a ballast water treatment system to offer significantly reduced power requirements compared to competitive technologies– ensuring low operational costs. A typical BalPure installation capable of treating 5000m^3 per hour of ballast water will draw 157kW at 6ppm, 199kW at 8ppm and 313kW at 12ppm. The slip stream treatment approach has no added differential pressure that forces upsize in ballast pump or additional booster pumps.

Flexible installation

Installation flexibility of an electrolytic ballast water treatment design is determined by its placement in-line with the main ballast system or its ability to treat a portion of the ballast water volume to achieve discharge standards. With a slip stream treatment approach the existing ship configuration does not have to undergo redesign to relocate equipment just to accommodate the addition of the BalPure ballast water treatment system. This approach allows for flexibility in how the unit is located on board the vessel.

The BalPure system is composed of six sub-assembly components which can be remotely mounted from each other, including on multiple decks – allowing small available spaces to be used in the engine room or other locations. This sub-assembly component design makes for much simpler loading of the ballast water treatment system components into the vessel in the yard, at the dockside or even at sea in preparation for installation and commissioning.

Another major advantage of the slip stream approach is on vessels with pump rooms, for example, the ballast water treatment unit can be installed in the engine room or in other available spaces. This capability avoids taking up precious space in the pump room, negating expensive modifications and removing the need for the unit to meet the complex and expensive ATEX rules governing hazardous cargo areas. The self-cleaning filter (ATEX rated if required).and the ORP probes (intrinsically safe devices) are the only components of the BalPure system placed in pump room.

All systems are not equal

A slip stream electrolytic disinfection system is among the safest, most cost-effective ballast water treatment technologies available to prevent the transfer of non-indigenous species.

Severn Trent De Nora has recently announced that its ballast water treatment system BalPure has also received type approval and has completed a corrosion testing programme.

The company's BalPure system that uses electronic disinfection for ballast water treatment underwent shipboard testing at the end of last year, with type approval of the system expected in the first half of 2011.

The testing of the system was undertaken on the Californian Maritime Academy training ship, Golden Bear from May to December of 2010. Installation engineering of the BalPure system was performed by The Glosten Associates. Testing of the system was performed during the training voyages on Golden Bear in the Pacific. The ship sailed from San Francisco to Busan, Korea, Kobe, Japan, Guam, Saipan and Honalulu, Hawaii. Biology tests were also carried out at the ports of Busan, Kobe and the Apra, Guam.

Data samples were compiled and tested over the course of the shipboard trial verified the efficacy of the BalPure system to meet the most stringent ballast water treatment discharge standards. In several cases, the BalPure system greatly exceeded the regulatory standards for living organism standards outlined by IMO D-2. The BalPure system also operated without failure during the seven-month observation period under routine shipboard operating conditions.

Severn Trent De Nora launched its system in 2005 for newbuilds and retrofits. The system can accommodate ballast water treatment for vessels from 500 to 20,000m^3/hr. The system treats the water during uptake into the vessel. Bill Burroughs, BalPure product manager, Severn Trent De Nora, said: "The BalPure slip stream treatment approach, coupled with only having to treat during the uptake of the ballasting cycle (function of electrolytic disinfection) allows the system to offer significantly reduced power requirements compared to competitive technologies– ensuring low operational costs."

"A major advantage of the BalPure slip stream approach is on vessels with pump rooms. For example, the ballast water treatment unit can be installed in the engine room or in other available spaces. This capability avoids taking up precious space in the pump room, negating expensive modifications and removing the need for the unit to meet the complex and expensive ATEX rules governing hazardous cargo areas", he added.

Testing progamme

Adding to the recent testing BalPure has also undergone a corrosion testing programme to access whether it meets with the recommendations from IMO MEPC 59/2/16. The testing of the system was carried out by a GL Nobel Denton. The result showed that BalPure had no effect on coated steel, naval bronze and Cu-Ni alloys, but did show an effect on bare steel which the company has said was due to the presence of free chlorine and has a minimal practical implications in ballast tanks.

The tests that were carried out included accelerated studies for the BalPure ballast water treatment system in untreated and full-salinity, treated, seawater up to 8mg/litre (PPM) total residual chlorine. Comparative studies were also carried out using uncoated steel test pieces and coated test pieces. *NA*

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Keeping clean

Chief engineers and masters of vessels are being increasingly persecuted for the discharge of bilge water overboard that has a high level of oil content. However, Alfa Laval has launched it latest product that will aid chief engineers to keep tighter security of the bilge system.

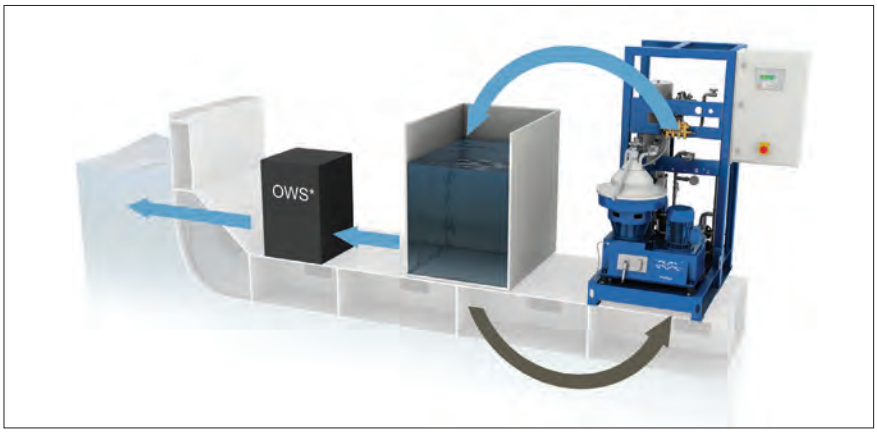
By 2008 corporate criminal fines imposed involving oily water separators and environmental infractions had already reached US$145 million with the individuals involved sentenced to a total of 18 years imprisonment.

The situation with bilge water discharge has become so serious in the shipping industry that in light of this it published guidance notes on the use of oily water separators, published jointly by the Baltic and International Maritime Council, Intercargo, the International Chamber of Shipping, ISF, Intertanko and OCIMF.

Both government agencies and other authorities now employ aerial and satellite surveillance of the oceans to detect vessels that may be breaching the International Convention. Even minor and accidental infringements are being detected and as a result costing ship owners vast sums of money in fines. Whilst deliberate violations of the MARPOL requirements and falsification of records can render the perpetrator's liable for criminal prosecution and imprisonment.

Alfa Laval has launched its latest product the "BlueBox" in a bid to give ship owners added security for the ships bilge system. The BlueBox will record and store data from the vessels bilge system, giving the chief engineer more control over monitoring and operation of the system. The data recorder records oil ppm level and also the global positioning system (GPS) position, seperator operation, full alarm log, overboard valve position and overboard flow data.

The BlueBox has been developed by Alfa Laval to offer better security for bilge systems.



PreBilge has been developed to aid vessels that have bilge systems that do not meet the standards require by the IMO.

The systems electromagnetic overboard flowmeter records both current and total flow. To protect against operator error or tampering, a proximity switch registers the actual position of the overboard valve. If the flowmeter registers a flow when the overboard valve is in the recirculation position, the software will give an alarm and the system will shut down. The flow meter contains no moving parts.

The flow data recorder includes the time the overboard discharge starts, the oil content meter level over a discharge cycle, total quantity of water pumped overboard in a discharge cycle and the time the overboard pumping stops. The information is stored in an encrypted format for a minimum of 18 months and can be downloaded to a USB stick.

As added security the BlueBox has been designed to prevent tampering,w with the water line fully encapsulated and the unit can only be open by authorised personnel that have a special pin code to access the

system. The system has been fitted with a coded magnetic limit switch. So if a screwdriver or other implement is inserted between the cover and the main unit in an attempt to force it open, it will generate an alarm that will make the overboard valve go into recirculation.

The development of this product has been customer based, said Alfa Laval. "We are making the best from the available technology", commented Pauli Kujala, product manager, Alfa Laval. "This system will help prove and protect the innocence of crew onboard these vessels," he added.

The BlueBox has received type approval as part of the whole system (fitted on to Alfa Laval's PureBilge unit). The idea is that the BlueBox will come as part of the PureBilge system and can only be fitted to Alfa Laval's PureBilge systems if ordered separately, which will cost the owner €4000.

Helping hand

Alfa Laval has also launched its PreBilge system that has been developed to work along side the bilge systems that are not so efficient by adding a pre filtration stage.

The International regulations demand the reduction of oil content in bilge water to 15ppm before it can be discharged into the ocean. Yet while bilge water treatment systems are carefully regulated by International Maritime Organization (IMO) resolution MEPC.60(33) or MEPC 107(49), many ship owners and operators still possess type-approved equipment that does not meet the standards, highlighted Mr Kujula.

"Between 1994 and 2005 the rules have changed, but the equipment hasn't. Now the gap between tests and expectations of the equipment has grown", commented Mr Kujula.

PreBilge the latest in bilge filtration systems from Alfa

A reason why standards are not being met by treatment systems on the market reflects on the process of the type approval system. Alfa Laval has pointed out that the MEPC. 107(49) only requires a system to be tested with one surfactant chemical, where as in a real life scenario there are many that that the system would have to process. Further, the test is carried out for a short period on land, which does not give a true testing of the different motion behaviours that system would undergo on a vessel at sea.

Alfa Laval's PreBilge gives the ship owner another option, instead of having to install another bilge system. PreBilge makes use of centrifugal separation, which is an effective means available for dealing with complex bilge water mixtures. This is why, in spite of its small size, it can solve the problems of larger systems, Alfa Laval highlights.

The system employs a force that is 6000 times stronger than that of gravity and removes heavy oils, particles and emulsions. To achieve the same result with a gravitational coalescer it would have to have a settling area of 3000m^2. The liquid in the separator bowl creates a gyroscopic effect, keeping the liquid level when the vessel is pitching and rolling.

Alfa Laval PreBilge is a compact unit with a footprint of 1.5m^2, with a progressive-cavity feed pump on a separate skid. The system is easy to install also in small engine rooms and can be flexibly placed with pipe connection drawn as needed. Several different operating voltages are available for PreBilge, as are a number of different heating options. Depending on the vessel's requirements, plate heat exchanger (PHE) to use hot water as heating mathod, e.g. engine cooling water. If heating coils or immersion heaters are already available onboard, no additional heating is required.

PreBilge has a capacity of 500l/h, which is 10 times the rate that vessels usually accumulate bilge water. PreBilge is designed to be run day and night and in all possible operating conditions, stopping for routine maintenance only once every 2000 hours.

Alfa Laval believes that there are in the region of 40,000 vessels without an effective bilge system onboard. By introducing this product on to the market it believes that it is lending a "helping hand" for those who do not want the expense of updating bilge systems. *NA*

OceanSaver set to launch Mark II

OceanSaver has announced that it has developed the Mark II version of its ballast water treatment system to cater for all types of vessels.

After receiving type approval of its first generation ballast water treatment system in 2009 OceanSaver has now redeveloped the system to be beneficial to a range of vessel types, by incorporating the latest filtration technology into the system, which also has an energy reduction of 50%.

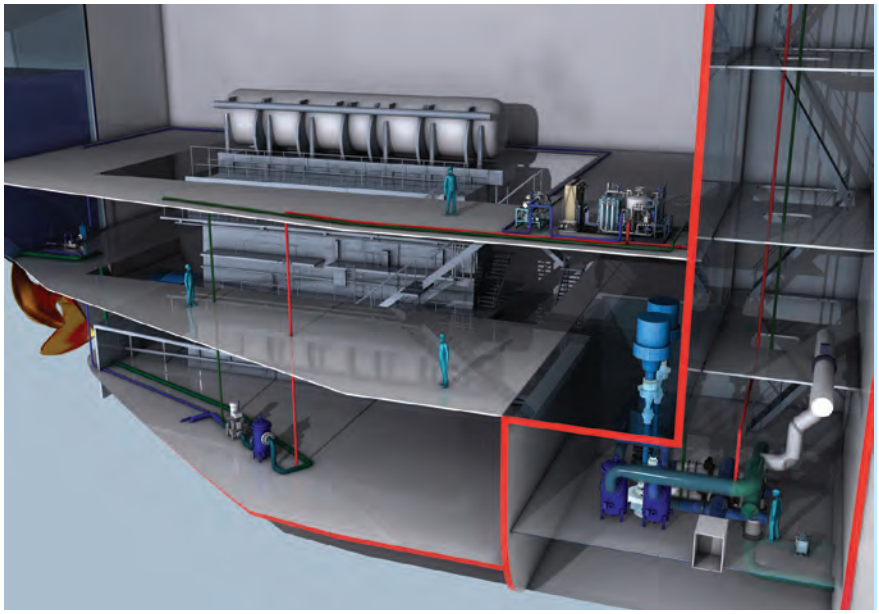
"We are broadening our market reach. In the past we have focused on 40,000dwt to VLCC type vessels. Today we are also looking at the larger/high end market," Commented Tor Atle Eiken, sales director, OceanSaver.

The OceanSaver Mark II ballast water treatment system is a specially tailored version of the Mark I model, but the most 'energy demanding' features of the Mark I have been removed. "We have sharpened the technology that we use and have left in the components from the old system and added better filtration. It is a non-chemical system, but we have also removed the cavitation system to give better efficiency. We have added nitrogen as an option for the system as well", added Mr Eiken.

The Mark II system also sees an energy reduction of 50%, along with no treatment during deballasting operations. OceanSaver said that it has managed to make this system more efficient by the removal or the cavitation system and through the back pressure of the system.

The Mark II has been approved for installations in gas hazardous areas, a prequesite for tanker applications. During the development of the technology, comprehensive and independent corrosion and coating impact studies had been carried out, both in laboratories and under real-life onboard conditions. These confirmed reduced corrosion and coating weathering rates. The OceanSaver ballast water treatment system has demonstrated compliance with the intentions of the International Maritime Organization (IMO) performance standard for protective coatings (PSPC).

OceanSaver has said that it will be able to increase focus on the retrofit market with this latest solution in addition to the newbuild market. Without the need for extra piping that would be found in the Mark I due to the addition of the cavitation units, the ship owner will be able to save time and money in the dry-docking stage, said OceanSaver.



Installation onboard a tanker.

Installation onboard a bulk carrier.

Mr Eiken commented that it would be good to see the ballast water management convention ratified in Q1 of 2011, with this, he believes, that between now and 2014 there will be an increase in systems on newbuildings, with the demand then changing to retrofits between 2014 – 2018/19.

OceanSaver's Mark II system has received interest from tanker fleet owners, with interest also coming from bulk carrier owners. "Owners would like to see how it works first", said Mr Eiken about potential orders for the system. The system is due to receive type approval in September this year. *NA*

Wilhelmsen's solution for tankers

Wilhelmsen has highlighted the fact that chemical tankers and other vessels that have submerged ballast pumps face particular difficulties when it comes to ballast water treatment solutions, due to the location of the pumps. However, Wilhelmsen has come up with a solution to tackle this problem.

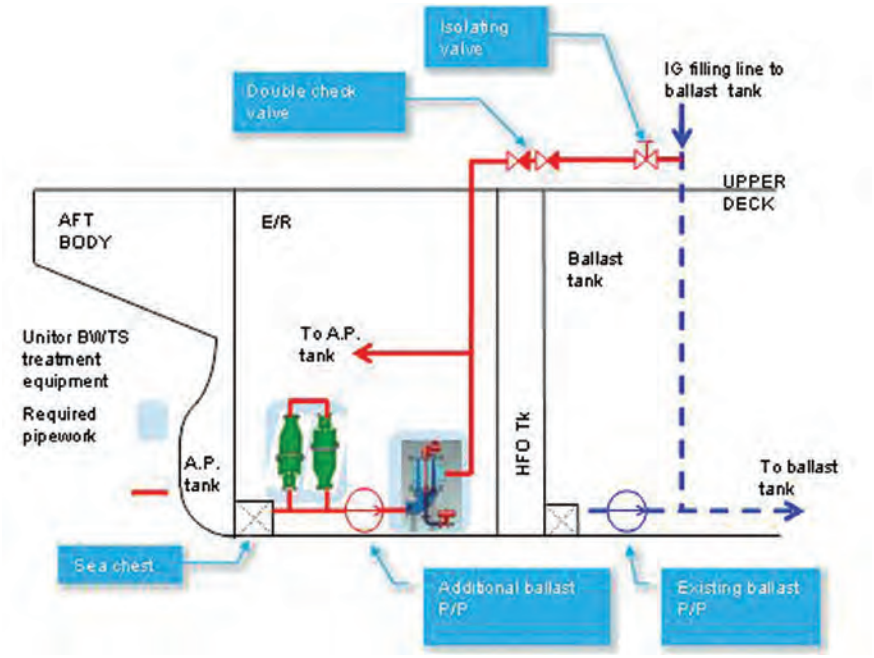
The solution uses Wilhelmsen's Unitor ballast water treatment system, which needs to treat on ballasting only. The vessel takes on ballast water with a ballast pump located in the engine room which has a standard ballast water treatment systems (BWTS) fitted around it and then for de-ballasting the vessel uses its submersible pumps.

Roger Strevens, Solutions Development Manager, Wilhelmsen Technical Solutions said: "Typically the ballast water treatment system is fitted around the ballast pump, however with submerged pumps this presents problems with accessibility and maintenance. The problem could be addressed by creating a dry space around the pump or by placing a containerised treatment system on deck, however both are expensive in terms of installation and may not be feasible depending on the ship design."

"With this solution the Unitor BWTS is installed around a new ballast pump located in the engine room. The new pump is used for ballasting and the submerged pump is used for de-ballasting, which suits the Unitor BWTS because it only needs to treat ballast water on intake." He added that "since the engine room is a non-hazardous area the treatment system is not required to be Ex-rated"

The benefits of using this approach is that it is easier to maintain and vessel often ballast at a lower rate than they de-ballast, a smaller, less expensive ballast water treatment system can be installed

Wilhemsen has come up with an idea of how to handle submerged pumps on tanker for ballast water treatment.



Breakthrough in China

Wilhelmsen Technical Solutions has reported that it has received orders for five Unitor Ballast Water Treatment Systems (Unitor BWTS) from Chinese yards. Three systems are to be installed onboard general purpose cargo vessels being built at Baibuting Shipbuilding Co. Shandong. The remaining two systems are to be installed on asphalt carriers built at Nanjing East Start Shipbuilding Co.

The cargo vessels being built at Baibuting Shipbuilding Co. Shandong are for Shipowner Bluarrow Shipping SA with technical consultant La Prora Ship Management. The vessels require ballast water systems with a capacity of 350m^3/h each. The vessel deliveries are due in Q2 and Q4 in 2011. The asphalt carriers built at Nanjing East Start Shipbuilding Co are for the Singapore based ship owner Stolt Bitumen Services, a new division of the Stolt Nielsen Group. Each system has a capacity of 200m^3/h and the vessels will be delivered in Q4 2011 and Q1 2012.

With an increasing number of Type Approved ballast water treatment systems in the market, the competition for securing new contracts is tough highlights Wilhelmsen Technical Solutions. "We have developed a system that benefits both the installers and operators", says Petter Traaholt, President of Wilhelmsen Technical Solutions. "A small footprint and flexible installation options are valued by the yards. Feedback from owners suggest that treatment on ballasting only, low power consumption and easy operation are seen as key factors when selecting a ballast water treatment system", he continues.

"This is the first ballast water treatment system we have ordered. With little service experience with any system, we wanted to choose a supplier that has excellent worldwide support and the backup of a large organisation", says a representative at Stolt Bitumen Services.

Human Factors in Ship Design and Operation

25-26th February 2009, RINA HQ, London, UK

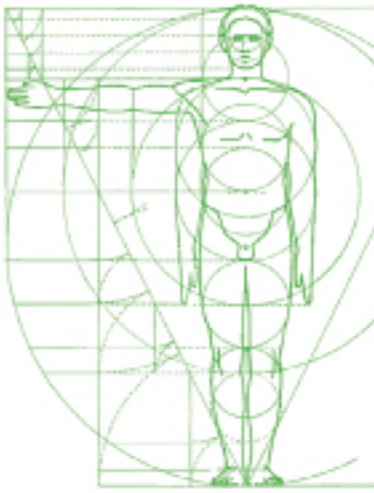
Call for papers and First Notice

The work of naval architects and marine engineers directly influences the operability and safety of the vessel and the wellbeing of the seafarer. Design decisions can influence human behaviour. An improved understanding of ergonomics by engineers can 'design out' hazards and prevent pollution incidents. The shortage of seafarers can be mitigated by design for improved habitability and better operation with lean manning

With ever more complex systems and technology greater improvements in safety can be achieved through a better understanding of human/system dynamics. A greater awareness of the role played by management structures, culture, procedures and regulation in safe and effective operation.

This conference aims to bring together international specialists and professionals including designers, ship operators, seafarers, equipment manufacturers and regulators to highlight how an improved understanding of human factors can reduced costs and improve safety. The conference will cover the following topics:

- Integration of human factors into the design process
- Examples of practical applications of human factors engineering
- Feedback from the users into the design loop
- Survivability, escape and evacuation systems
- Design of navigation & control systems
- Maritime operating organisations and teamwork
- Safety performance and management
- Design for occupational heath and safety
- Habitability



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Wilhemsen has already sold one unit to that was installed onboard a tanker for Kristian Gerhard Jebsen Skipsrederi AS (KGJS). Mr Strevens also notes that no other products have been "shoe-horned" into the solution and that they have used technology that is readily available to the market. The solution also lends itself to certain type of technologies like ultra violet (UV) technology.

Wilhelmsen Maritime Services has said that it has had a good reaction from the market and expects to see further interest in the solution soon. *NA*

TechCross enters the market

Korean-based TechCross has recently announced that it has upgraded its Electro-Clean (ECS) ballast water management system to better suit confined spaces as well as reducing power consumption.

The company was launched in 2000 and received type approval for its system in 2010, the latest development of the technology will see the introduction of the EPU 600, a combined model of the electronic chamber unit (ECU) and power rectifier unit (PRE) for European customers.

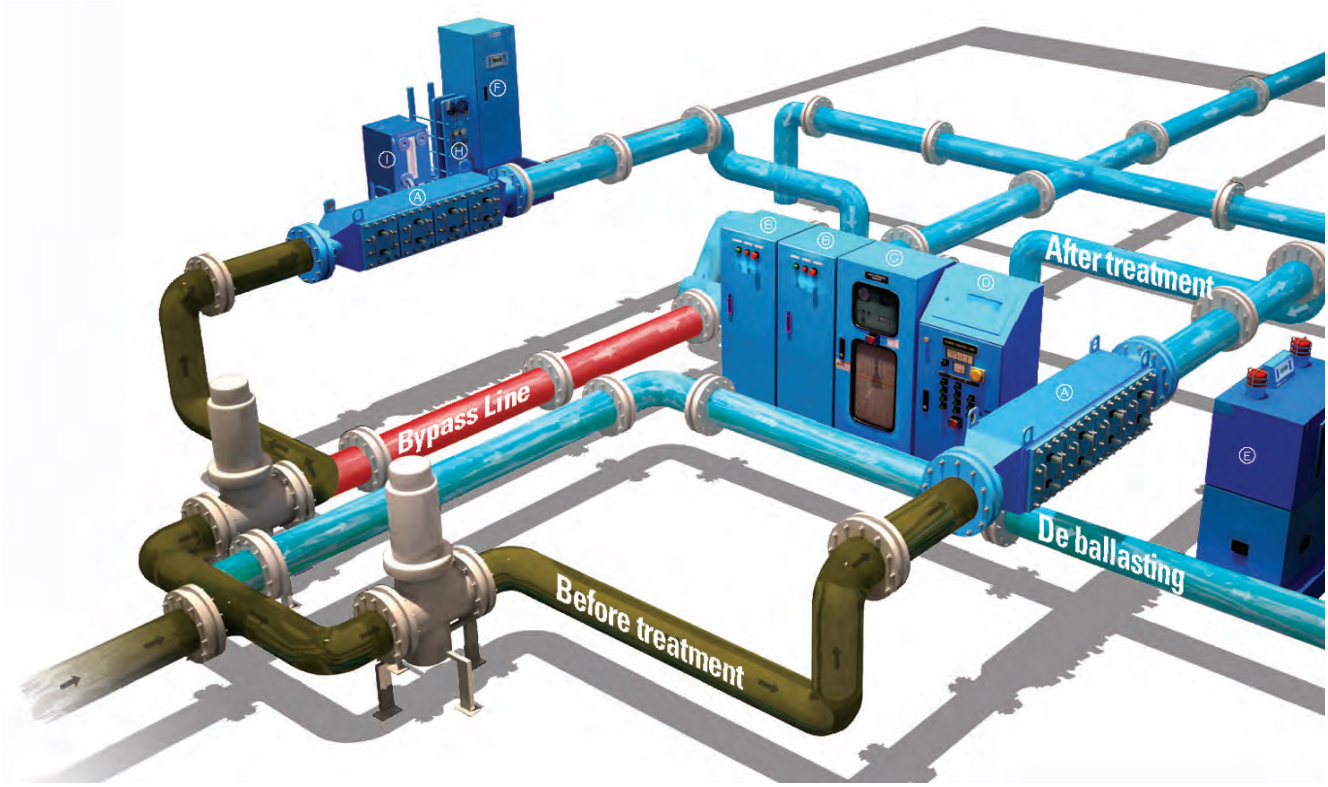
The development of the EPU 600 has allowed the company to save space with the removal of the cables between the ECU and PRE, which also gives the unit a better power efficiency.

In August last year TechCross supplied its system to be installed onboard a 317,000dwt VLCC that was under construction a Hyundai Heavy Industries (HHI). The vessel was delivered to its Middle Eastern owner at the end of January this year. TechCross has also completed and installed an explosion-proof version of the system on a previous vessel.

The sales director at TechCross said: "It is encouraging that the ECS was the first in the industry to be applied to the VLCC and it will be helpful to win contract for various types of ships in the future."

TechCross has highlighted that large ship types such as a VLCC need mass capacity ballast water and thus the ballast water treatment system must also be able to treat at mass capacity. TechCross has designed it mass capacity ballast water treatment systems for VLCC installation through a combination of ECS models. In addition for the VLCC that the system has been installed on, room was made on the vessel for the ECS on the deck and designed all the equipment as one unit enabling easier and faster installation and maintenance. *NA*

TechCross launches latest product on to the market.



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INTERNATIONAL CONFERENCE ON SHIP & OFFSHORE TECHNOLOGY - INDIA 2011

Technological Innovations in Shipbuilding

8 -9 December 2011, Kharagpur

Organised by

The Royal Institution of Naval Architects
and
Department of Ocean Engineering
& Naval Architecture, IIT Kharagpur

First Announcement & Call for Papers

Today, the international maritime industry faces new challenges as it responds to the global financial crisis. It is therefore understandable that the industry's priority and attention is on consolidation and survival. However, at such a time it is all the more important for the industry to look ahead in order to respond to the continuing challenges it will face from the increasing demands of operators, regulators and society for greater efficiency, safety and the protection of the environment, as it emerges from the current crisis. This response will require innovative thinking from all sectors of the maritime industry, and particularly those involved in ship design and construction.

The first International Conference on Ship & Offshore Technology – India, will take "Developments in Ship Design & Construction" as its theme and will bring together members of the international maritime industry to present and discuss the latest developments in the ship design and construction process which will provide the improvements in productivity and cost-competitiveness necessary to respond to the demand for lower cost of ownership.

Papers are invited on the following topics:

- Design of all ship types
- Fabrication & welding technology
- Material developments; steels, alloys, composites, etc.
- Corrosion and coating technology
- Project management
- System integration
- Quality assurance

http://www.rina.org.uk/icsotindia2011.html

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Globalisation key to Dutch success

Finding a role and focusing on performing it to a high standard and then offering those services to the broader maritime community while maintaining its roots believe has kept the Dutch maritime industry afloat say Wijsmuller.

There is a positive feeling in the Dutch shipping community at present. "I think our maritime community weathered the global crisis remarkably well," said Michiel Wijsmuller, managing director of Ijmuiden-based Offshore Ship Designers. "And now certainly in our specialist sectors of offshore support vessels and tugs we see a positive trend in the market. The keys to success for all Dutch maritime businesses have been the same – be very good at what you do in a niche business, be global, but retain a good competence base in the Netherlands."

Mr Wijsmuller says that two things are happening currently which are good for naval architects. "We see queries up strongly and projects going ahead as life comes back into the global economy, and crucially, we see that these projects need a design element. In Europe that is because the new vessels we are being ordered for new applications, especially wind farms. The support vessels for these farms cannot simply use off the shelf tug designs. There are a number of features which are specific to wind farms". We have recently signed a deal to design an offshore tug for a Dutch owner, and its principal function will be wind farm support and installation. And we have a major new conceptual design now in the bidding phase for an offshore mother ship concept for deep-water wind farm maintenance."

However, Mr Wijsmuller said it is no longer sensible or possible to be a purely Dutch company. "We have offices in the UK which gives us a bigger European footprint, especially for North Sea work, and we have offices in Singapore and Shanghai, which gives us two things. One is a good source of trained naval architects at a reasonable cost for detailed work and construction drawings and the other is access to local markets. Our Shanghai office, for example, is recruiting to increase in size from fifteen to thirty naval architects at present. Half the work comes from Europe, where we do the conceptual design and liaise with the owners and then they can do a very good job on the detailed design and construction drawings. But, also half of the work is direct from local yards, so it adds to our strength"

It is not all bright, simply because Wijsmuller sees an impending shortage of trained naval architects in The Netherlands. "We are hiring here in Ijmuiden, and it is not easy to find good people because the existing workforce is ageing and three out of the four mid-level naval architect institutes have closed. So not enough trained youngsters are coming into the profession, which is a pity," he says.

What are the important planks for the future in the Netherlands? "First, retain and train good people," said Mr Wijsmuller. "Then retain our independence. That is very important for us. A lot of people in ship design are now tied to either equipment suppliers or ship yards. That restricts what they can do for clients when new areas of work like wind farms, or offshore Brazil deep-water throw up the need for new designs. Independence of thought is a very Dutch character trait and independence is very important to us as a business asset. The third thing I would say is that to grow here in The Netherlands we also have to grow abroad. We are growing in China, very strongly, the UK is good, and we are looking now at an office in Brazil. There is a big market for our sector there and we have been actively developing projects, I hope to sign the first contract soon and then we will put people and an office into Brazil. But, I expect and hope that that will not be our last international move. I see room for growth in Africa and other parts of Asia, and when the market is right then we will be there. But we will always have our heart and central competence here in The Netherlands."

Mr Wijsmuller is positive about The Netherlands for two reasons. "Well," he says, I am Dutch and I am a naval architect. But here in The Netherlands we have a very strong and complete maritime cluster, with the MARIN Institute, good owners and strong niche shipyards and equipment suppliers. That means we are in a mutually supportive pool of expertise and innovation in the end it is expertise and innovation that sells ship design." *NA*

Scrubbers ride to the rescue

Can scrubbers stand up to the demand of ever more stringent regulations.

At Cruise Shipping Miami an operational theme that reccurred throughout the conference is the implementation of the North American Emissions Control Area or ECA regulations in 2012. Shipping companies are actively looking at viable alternatives to reduce the sulphur oxides and particulate matter of emissions. Doom and gloom merchants insist these regulations could have profound negative consequences on shipping, but the US Environment Protection Agency (EPA) and organisations like it say the new rules will help to protect human health and the environment.

The ports of Los Angeles and Long Beach are due to start a US$3.4 million collaboration exploring ways of tackling air pollution in the region. One of the systems that will be monitored is the Hamworthy- Krystallon sea water scrubber, which will be installed onboard *APL England*, a 5500TEU container ship trading between Asia and the USA.

A previous trial of the Krystallon scrubber was conducted onboard the Holland America vessel, *Zaandam*. In the final report submitted to the US EPA in March 2010 the scrubber removed 75% of sulphur oxide (SOx) and 57% of the particulate matter. Since it is not designed to remove oxides of nitrogen (NOx) or Carbon Monoxide (CO) there was negligible impact on these emissions. Hamworthy claimed that due to project time constraints for component installation, higher results were not achieved.

The Krystallon system is an open loop system which requires seawater to be pumped on board through the sea chest intake. Exhaust gas passes through the scrubber where it is mixed with this seawater. The scrubbing cools the gas and uses the alkalinity in the water to absorb sulphur compounds from the exhaust stream.

When fuels containing sulphur are burned, mainly sulphur dioxide (SO_2) is produced. This gas is the indicator for the larger group of gaseous sulphur oxides (SOx). The SO_2 in the exhaust reacts with oxygen to produce sulphur trioxide. When cooled, it reacts with any available water to form sulphuric acid which can lead to corrosion problems. The sulphuric acid in the water in turn reacts with carbonates and other salts in the seawater to form sulfates.

In the Krystallon system, this highly acidic wash water flows out of the base unit to a multicyclone unit located in the engine room where the particulate matter (PM) is separated from the wash water. PM trapped in the seawater can be harmful to the environment. The more SOx and PM is removed from the exhaust by the scrubber, the more pollutants have to be removed from the effluent. According to Hamworthy, the Krystallon Scrubbers remove 70% or more of the PM present in exhaust gas which is collected in a chamber in the base of the unit and sent to a storage tank.

To raise the pH of the wash water prior to its discharge overboard an equal amount of 'reaction water' is added from a separate supply line. The quantity is almost the same as the amount of water pumped through the scrubber. Therefore, if 400tonnes of water is pumped up through the scrubber then approximately 500tonnes of reaction water is added after the multicyclone.

The key to the neutralisation of sulphuric acid, and in turn SO_2 reduction is water alkalinity. Alkalinity does not refer simply to pH, but to the ability of water to resist changes in pH. It contains buffering materials which are primarily bicarbonate, carbonate, but also hydroxide, borates, silicates, phosphates, ammonium, sulphides, and organic compounds.

Sea water has a pH of approximately 8.2 and an average carbonate content of approximately 140ppm. Fresh water however lowers seawater pH and contains less carbonates. The Baltic Sea's alkalinity, for example, is lower than found normally in sea areas because of the minimal exchange of water through the Danish straits. This means that in some specific geographic areas, the sea water scrubber is operating outside of its design envelope in terms of the concentration of alkalinity of the scrubber wash water.

Being a journalist and not a marine biologist, the issues that come to the forefront of my mind are, is the removal of 70% of PM sufficient? Also, in areas where seawater has reduced carbonates, do the acidic sulphates affect marine life?

Liquefied natural gas is gaining strong popularity as an alternative fuel. As it contains no sulphur, there are no SOx emissions and it almost eliminates the emissions of particulate matter. Additionally, the NOx emissions are reduced by up to 90% due to reduced peak temperatures in the combustion process. Since the control of NOx emissions are on the agenda of the ECA, this may very well be the next step. In the meantime all eyes remain on seawater scrubber technology. *NA*

Sir

I have noted with interest the programme for the conference on "The Damaged Ship" (which regrettably I was unable to attend) and the report by Patrick Couser in the April issue of *The Naval Architect*.

The scope of the conference was intended to cover all aspects of sea-keeping, stability and strength after damage, but I have yet to see any serious attempt to analyse the post-damage strength of a hull, the assumption apparently being that conventional analytical methods of wave bending and response are adequate.

In fact the very existence of hull damage renders those assumptions invalid because of the loss of symmetry and resulting coupling of bending, torsion and shear, and particularly the likely loss of shear flow paths in the region of damage leading to a far greater susceptibility to shear failure.

Indeed even with the latest finite element tools it is difficult to predict the response to such loading on account of significant non-linearity. Much effort seems to have been applied to creating typical models of damage to allow for the effects flooding on the hydrodynamic response and similar models could reasonably be applied to structural response. The analysis is tedious rather than difficult but would require much experience and ingenuity to predict failure modes to underpin the modelling.

Dr David Chalmers (Fellow)

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First Notice & Call for Papers

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Duties and Responsibilities: As a result of a grant by The Lloyd's Register Educational Trust (The LRET), the Department of Mechanical Engineering is able to offer the exciting opportunity of appointment to a Research Associate in Naval Architecture. The main duties and responsibilities will involve carrying out research and assisting with teaching and administration within the Department of Mechanical Engineering, principally in the areas of marine hydrodynamics, naval architecture, and mechanical engineering. "This post is funded for 5 years in the first instance".

The job will require close liaison with Professor G.X. Wu, who is The LRET Chair and who is responsible for the joint centre on deep water engineering and hydrodynamics, involving University College London, Shanghai Jiao Tong University (China) and Harbin Engineering University (China).

Key Requirements: The postholder will have expertise in one of the following areas: naval architecture or offshore engineering or deep water engineering or coastal engineering, which must be supported by a track record of publications. The successful candidate will have a PhD degree in one of the following areas of naval architecture, offshore engineering, deep water engineering, costal engineering, or in hydrodynamics.

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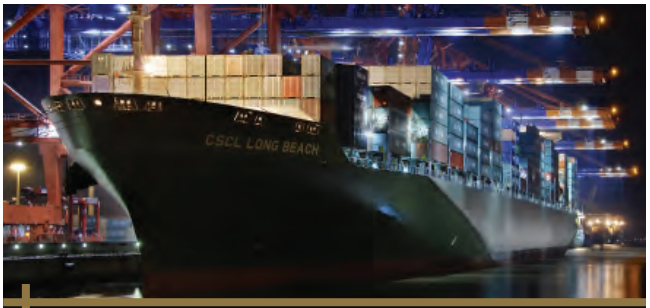

Naval Architect

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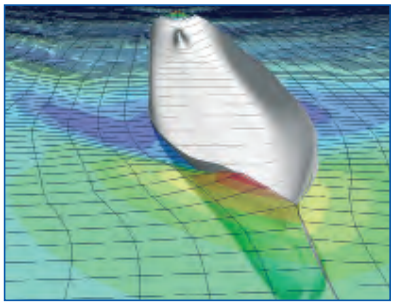

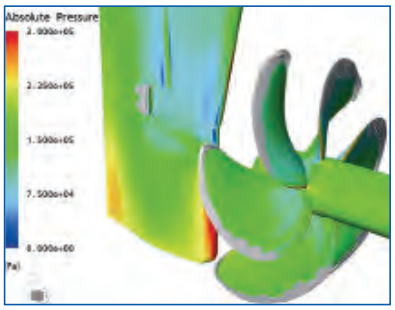

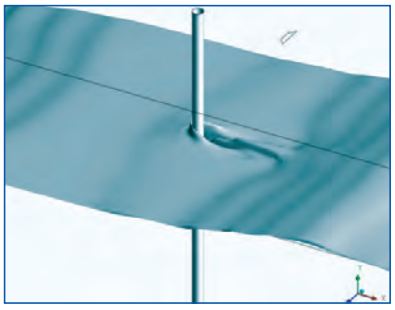

18 -19 November, Chennai, India

First Announcement and Call For Papers

Computational Fluid Dynamics (CFD) is now used to solve a wide range of maritime applications from resistance prediction to slamming loads calculation. While it may still lack the accuracy to match results obtained in real-life experiments, it can provide important insights into physical flow characteristics and offers an economic way to investigate a range of design options.

Generic CFD codes often lack some features and capabilities needed to address specific maritime applications. The presence of the free surface provides a major departure from conventional CFD applications. The need to represent this fluid interface accurately presents a considerable challenge, not least because its behaviour can vary considerably within the computational domain, and as a function of hull form and speed.

While it might not yet be possible to develop a single CFD tool suitable for all maritime applications significant progress has been made in the past two decades towards the development of the 'numerical towing tank' and 'virtual basin or cavitation tunnel'. Research and development work is still ongoing to enhance their stability, accuracy, computational speed and to integrate CFD into the overall design process.

This International conference will offer delegates an opportunity to meet and discuss the latest developments and practical marine application of CFD.

Papers will relate to the following topics:

- Practical applications of CFD techniques to marine design
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- Improvements in automatic mesh generation
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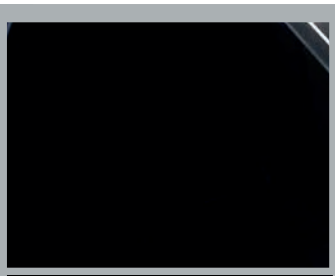
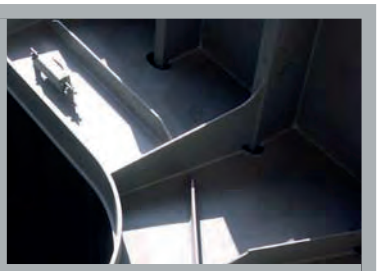
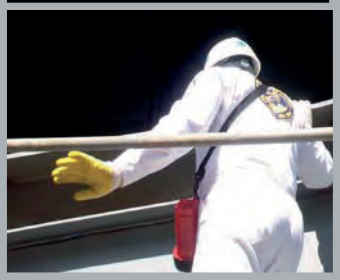
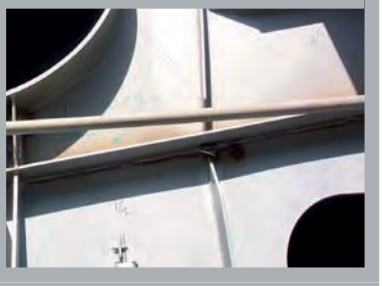





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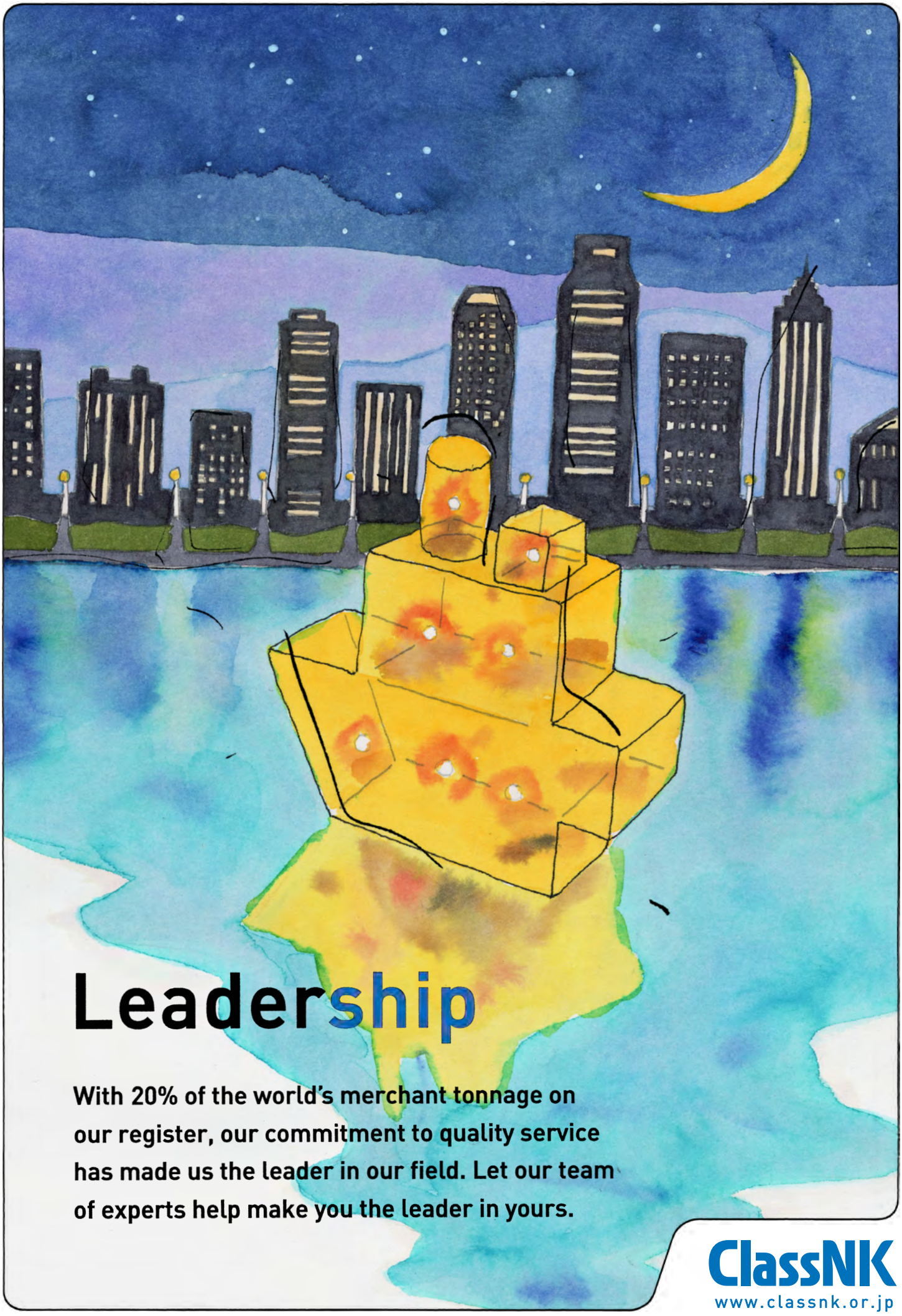
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